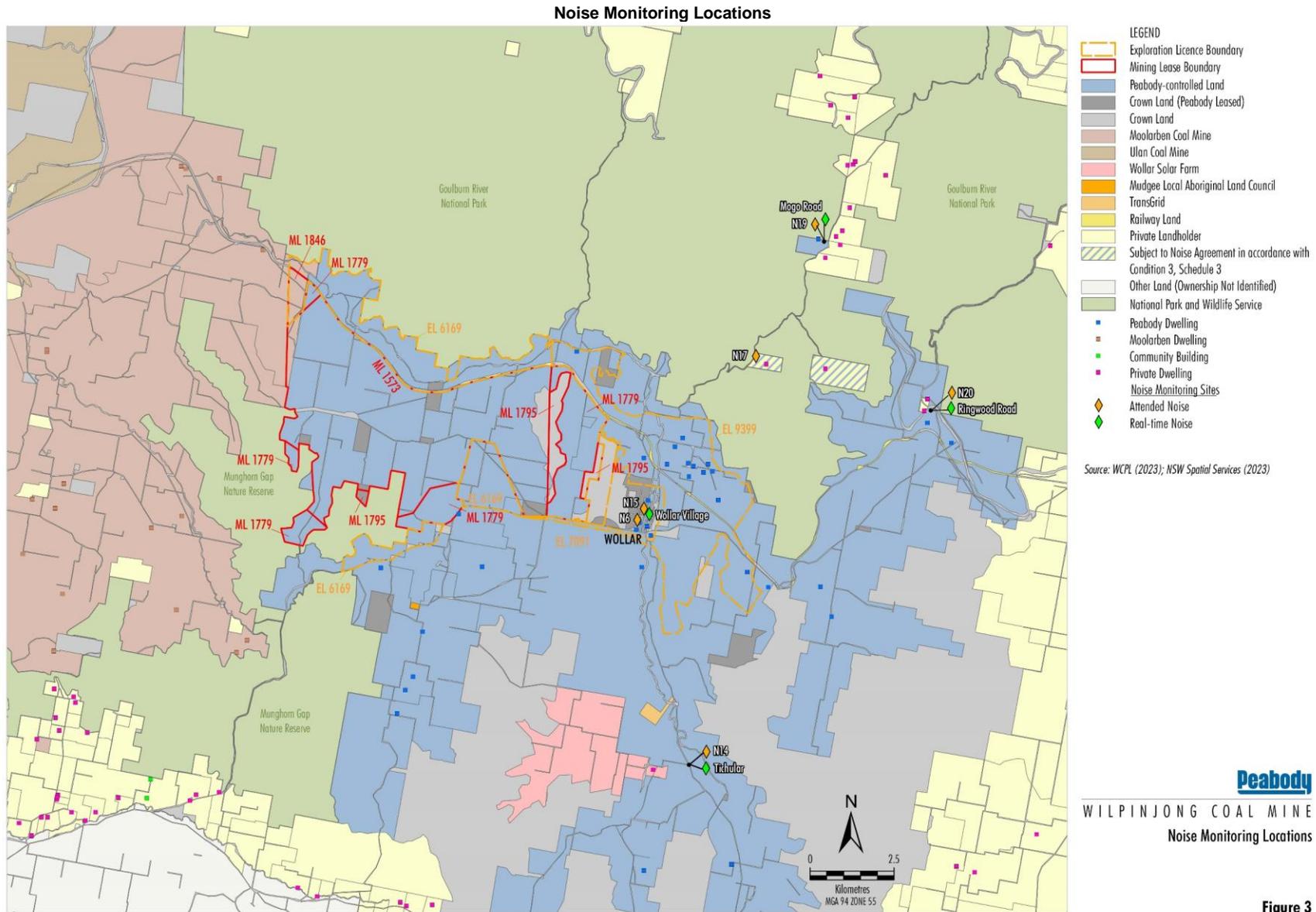


APPENDIX 3F
NOISE MONITORING DATA



Peabody
 WILPINJONG COAL MINE
 Noise Monitoring Locations

Figure 3

Noise Monitoring Locations (Wollar)



WIL12-11_EMS_2023_2014

Source: WCPL (2023); NSW Spatial Services (2023)

- | | | | |
|---------------|---|-------------------------------|------------------------------|
| LEGEND | | Noise Monitoring Sites | |
| | Peabody-controlled Land | | Attended Noise |
| | Crown Land (Peabody Leased) * | | Real-time Noise |
| | Crown Land | | Blasting Monitoring Sites |
| | Railway Land | | Fixed Blast |
| | Subject to Noise Agreement in accordance with Condition 3, Schedule 3 | | Air Quality Monitoring Sites |
| | Landholder Reference Number | | Static Dust Gauge |
| | Peabody Dwelling | | High Volume Air Sampler |
| | Community Building | | Real-time PM _{2.5} |
| | Private Dwelling | | Real-time PM ₁₀ |

* Special Lease/Licence Holder

Peabody
 WILPINJONG COAL MINE
 Wollar Environmental Monitoring Sites

Noise Monitoring Reports

Wilpinjong Coal

Annual environmental monitoring report 2023

Prepared for Wilpinjong Coal Pty Ltd

February 2024

Wilpinjong Coal

Annual environmental monitoring report 2023

Wilpinjong Coal Pty Ltd

E221231 RP1

February 2024

Version	Date	Prepared by	Reviewed by	Comments
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V2	18/03/2024	Will Moore	Robert Kirwan	Final

Approved by



Robert Kirwan

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18 March 2024

Level 3 175 Scott Street

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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 2023, 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 2023. 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.

A.1 January to December 2023 compliance

During 2023 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations.

A.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.

A.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 one exception.

During the September 2023 measurement at N15, the measured site only L_{Aeq} and $L_{A1,1minute}$ were both 4 dB higher than predicted under strong inversion conditions.

TABLE OF CONTENTS

Executive summary	ES.1
1 Background	1
1.1 Monitoring locations	1
1.2 Terminology and abbreviations	3
2 Statutory requirements and criteria	4
2.1 Project approval	4
2.2 Development consents	4
2.3 Environment protection licence	4
2.4 Noise monitoring program	4
2.5 Noise limits	4
2.6 Additional requirements	5
3 Methodology	6
3.1 Overview	6
3.2 Attended noise monitoring	6
3.3 Modifying factors	6
3.4 Attended real time noise monitoring comparison	7
3.5 Comparison with WEP EIS model predictions	7
4 Results	9
4.1 January 2023	9
4.2 February 2023	12
4.3 March 2023	15
4.4 April 2023	18
4.5 May 2023	21
4.6 June 2023	24
4.7 July 2023	27
4.8 August 2023	30
4.9 September 2023	33
4.10 October 2023	36
4.11 November 2023	39
4.12 December 2023	42
5 Long term trends	45
5.1 Noise trend graphs	45

5.2	Discussion	49
6	Comparison with EIS modelled predictions	50
6.1	Results	51
6.2	Discussion	57
7	Summary	58
7.1	January to December 2023 compliance	58
7.2	Long term noise trends	58
7.3	EIS Comparison	58

Tables

Table 2.1	Attended monitoring locations	1
Table 2.2	Terminology and abbreviations	3
Table 2.1	Noise impact limits, dB	4
Table 3.1	Attended and real time monitoring locations for comparison	7
Table 3.2	Meteorological condition definitions	8
Table 4.1	Total measured noise levels, dB – January 2023 ¹	9
Table 4.2	Site noise levels and limits – January 2023	10
Table 4.3	Real time and attended noise levels ¹ – January 2023	11
Table 4.4	Total measured noise levels, dB – February 2023 ¹	12
Table 4.5	Site noise levels and limits – February 2023	13
Table 4.6	Real time and attended noise levels ¹ – February 2023	14
Table 4.7	Total measured noise levels, dB – March 2023 ¹	15
Table 4.8	Site noise levels and limits – March 2023	16
Table 4.9	Real time and attended noise levels ¹ – March 2023	17
Table 4.10	Total measured noise levels, dB – April 2023 ¹	18
Table 4.11	Site noise levels and limits – April 2023	19
Table 4.12	Real time and attended noise levels ¹ – April 2023	20
Table 4.13	Total measured noise levels, dB – May 2023 ¹	21
Table 4.14	Site noise levels and limits – May 2023	22
Table 4.15	Real time and attended noise levels ¹ – May 2023	23
Table 4.16	Total measured noise levels, dB – June 2023 ¹	24
Table 4.17	Site noise levels and limits – June 2023	25
Table 4.18	Real time and attended noise levels ¹ – June 2023	26
Table 4.19	Total measured noise levels, dB – July 2023 ¹	27
Table 4.20	Site noise levels and limits – July 2023	28
Table 4.21	Real time and attended noise levels ¹ – July 2023	29
Table 4.22	Total measured noise levels, dB – August 2023 ¹	30

Table 4.23	Site noise levels and limits – August 2023	31
Table 4.24	Real time and attended noise levels ¹ – August 2023	32
Table 4.25	Total measured noise levels, dB – September 2023 ¹	33
Table 4.26	Site noise levels and limits – September 2023	34
Table 4.27	Real time and attended noise levels ¹ – September 2023	35
Table 4.28	Total measured noise levels, dB – October 2023 ¹	36
Table 4.29	Site noise levels and limits – October 2023	37
Table 4.30	Real time and attended noise levels ¹ – October 2023	38
Table 4.31	Total measured noise levels, dB – November 2023 ¹	39
Table 4.32	Site noise levels and limits – November 2023	40
Table 4.33	Real time and attended noise levels ¹ – November 2023	41
Table 4.34	Total measured noise levels, dB – December 2023 ¹	42
Table 4.35	Site noise levels and limits – December 2023	43
Table 4.36	Real time and attended noise levels ¹ – December 2023	44
Table 6.1	WCP operational predictions, Year 2024 - dB	50
Table 6.2	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N6, dB(A)	51
Table 6.3	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N14, dB(A)	52
Table 6.4	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N15, dB(A)	53
Table 6.5	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N17, dB(A)	54
Table 6.6	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N19, dB(A)	55
Table 6.7	Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N20, dB(A)	56

Figures

Figure 2.1	Wilpinjong noise monitoring locations	2
Figure 5.1	Attended noise monitoring data, N6	46
Figure 5.2	Attended noise monitoring data, N14	46
Figure 5.3	Attended noise monitoring data, N15	47
Figure 5.4	Attended noise monitoring data, N17	47
Figure 5.5	Attended noise monitoring data, N19	48
Figure 5.6	Attended noise monitoring data, N20	48

1 Background

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report (AEMR) for 2023, 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 2023. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits.

1.1 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

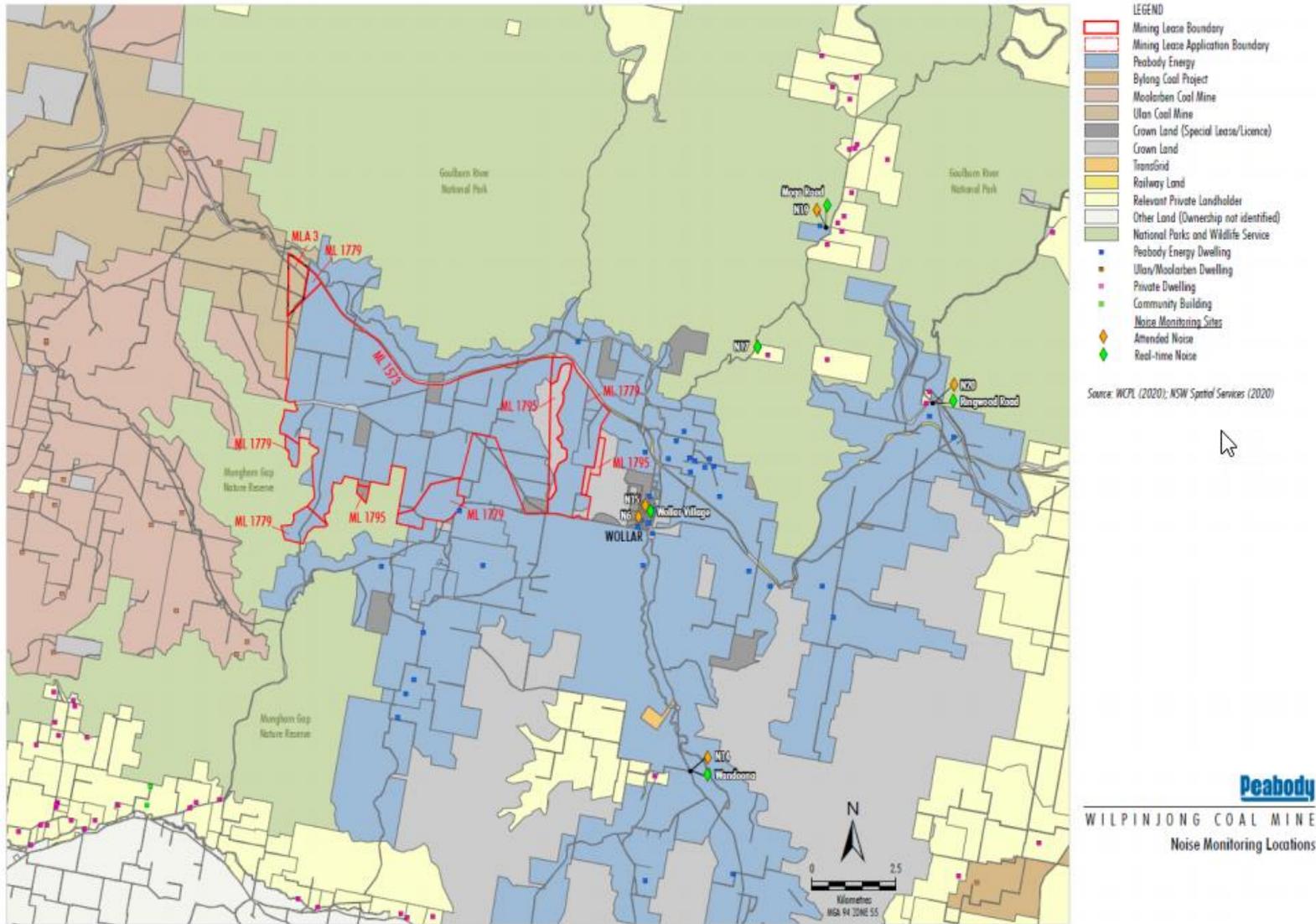


Figure 1.1 Wilpinjong noise monitoring locations

1.2 Terminology and abbreviations

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

Table 1.2 Terminology 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% of the time.
$L_{A1,1minute}$	The noise level which is exceeded for 1% of the specified time period of 1 minute.
L_{A10}	The noise level which is exceeded for 10% 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% of the time and the median noise level during a measurement period.
L_{A90}	The level exceeded for 90% 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 7:00 am to 6:00 pm.
Evening	This is the period 6:00 pm to 10:00 pm.
Night	This is the period 10:00 pm to 7:00 am.

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), which covers all current operations and has replaced the previous consent (05-0021).

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 2023.

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 June 2021.

2.5 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

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 measurements with the most overlap with attended monitoring times are selected for comparison.

Attended monitoring locations and the real-time monitoring locations they represent are listed in Table 3.1.

Table 3.1 Attended and real time monitoring locations for comparison

NMP descriptor	Real time monitor ID	Monitoring location
N15	SX33-N1	Wollar Village
N19	SX32-N1	North Mogo Road
N20	SX30-N1	Ringwood Road, off Wollar Road
N14	SX31-N1	'Tichular', intersection of Tichular and Barigan Roads, Tichular

3.5 Comparison with WEP EIS model predictions

A noise and blasting assessment was prepared in November 2015 as part of the EIS to support project approval for the WEP. The report assessed noise and blasting impacts associated with ongoing operations. As part of the modelling assessment, noise levels from WCP were predicted for representative operating scenarios, time periods and weather conditions. Predicted noise levels for “Year 2024” most closely aligned with the 2023 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions.

Table 11 of the noise and blasting assessment lists modelled meteorological conditions and is reproduced below.

Table 11 INP Assessable Meteorological Noise Modelling Parameters

Period	Meteorological Parameter	Air Temperature	Relative Humidity	Wind Speed and Direction	Temperature Gradient
Daytime	Calm	20°C	50%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	19°C	55%	E 3 m/s	0°C/100 m
Evening	Calm	19°C	56%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	18°C	63%	ESE 3 m/s	0°C/100 m
	Winter Wind 30% (occurrence)	10°C	71%	WNW, NW 3 m/s	0°C/100 m
Night-time	Calm	14°C	76%	0 m/s	0°C/100 m
	Summer Wind > 30% (occurrence)	19°C	68%	ESE, SE, E 3 m/s	0°C/100 m
	Strong Inversion (10% exceedance) ¹	6°C	86%	0 m/s	5.2°C/100 m

Note 1: Winter evening/night-time 10% exceedance temperature gradient in accordance with INP Appendix E Table 4.

Note 2: m/s = metres per second.

The following rules were used to allocate meteorological parameter bounds for each condition:

- 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 NPfl.

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

Table 3.2 Meteorological condition definitions

Parameter	Night		
	Calm	Summer wind	Strong inversion
Wind speed (m/s)	0.0 – 0.5	0.5 – 3.0	0.0 – 0.5
Wind direction (°)	All	67.5° – 157.5°	All
Stability category	D and E	D and E	F and G

4 Results

4.1 January 2023

4.1.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.1.

Table 4.1 Total measured noise levels, dB – January 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	17/01/2023 22:30	53	47	41	37	32	30	27
N14	17/01/2023 23:30	43	36	35	34	33	32	30
N15	17/01/2023 23:00	55	39	30	31	29	28	26
N17 ²	-	-	-	-	-	-	-	-
N19 ²	-	-	-	-	-	-	-	-
N20	17/01/2023 22:00	49	43	39	38	37	35	32

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

2. Locations not accessible due to road closure.

4.1.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.1.3 Monitoring results

Table 4.2 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.2 Site noise levels and limits – January 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	17/01/2023 22:30	2.9	53	E	Yes	37	45	IA	IA	Nil	Nil
N14	17/01/2023 23:30	2.4	60	E	Yes	35	45	IA	IA	Nil	Nil
N15	17/01/2023 23:00	2.7	46	E	Yes	37	45	IA	IA	Nil	Nil
N17 ⁵	-	-	-	-	-	-	-	-	-	-	-
N19 ⁵	-	-	-	-	-	-	-	-	-	-	-
N20	17/01/2023 22:00	3.0	56	E	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.
 5. Locations not accessible due to road closure.

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 4.3. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.3 Real time and attended noise levels ¹ – January 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	17/01/2023 23:30	17/01/2023 23:30	40	36	22	17	32	IA
N15/SX29 ³	17/01/2023 23:00	17/01/2023 23:00	31	28	19	15	28	IA
N19/SX32 ⁴	-	-	-	-	-	-	-	-
N20/SX30	17/01/2023 22:00	17/01/2023 22:00	46	42	37	20	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. Data taken from SX29 as SX33 was not operational during this period.
 4. Location not accessible due to road closure.

4.2 February 2023

4.2.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.4.

Table 4.4 Total measured noise levels, dB – February 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	21/02/2023 00:00	47	41	39	38	38	37	35
N14	21/02/2023 00:30	48	46	38	37	36	34	33
N15	20/02/2023 23:00	52	47	44	42	42	41	38
N17	20/02/2023 22:28	43	41	36	34	34	32	29
N19	20/02/2023 22:00	44	37	33	31	31	28	26
N20	20/02/2023 23:30	49	47	37	37	34	33	31

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

4.2.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.2.3 Monitoring results

Table 4.5 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.5 Site noise levels and limits – February 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	21/02/2023 00:00	0.0	-	G	No	37	45	IA	IA	N/A	N/A
N14	21/02/2023 00:30	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	20/02/2023 23:00	0.6	312	F	Yes	37	45	IA	IA	Nil	Nil
N17	20/02/2023 22:28	0.0	-	F	Yes	38	45	IA	IA	Nil	Nil
N19	20/02/2023 22:00	0.9	299	F	Yes	35	45	IA	IA	Nil	Nil
N20	20/02/2023 23:30	0.6	294	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.6. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.6 Real time and attended noise levels ¹ – February 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				Attended measurement	
			Total L_{Aeq} dB	Total L_{A90} dB	Low pass (<630Hz) L_{Aeq} dB	Low pass (<630Hz) L_{A90} dB	Total L_{A90} dB	WCP L_{Aeq} dB
N14/SX31	21/02/2023 00:30	21/02/2023 00:30	58	55	21	19	34	IA
N15/SX29 ³	20/02/2023 23:00	20/02/2023 23:00	53	51	37	22	41	IA
N19/SX32	20/02/2023 22:00	20/02/2023 22:00	32	29	15	12	28	IA
N20/SX30	20/02/2023 23:30	20/02/2023 23:30	43	40	19	17	33	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. Data taken from SX29 as SX33 was not operational during this period.

4.3 March 2023

4.3.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.7.

Table 4.7 Total measured noise levels, dB – March 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	17/03/2023 00:28	51	40	37	36	35	34	31
N14	16/03/2023 23:30	50	42	42	41	41	40	38
N15	16/03/2023 23:00	47	43	42	40	40	38	35
N17	16/03/2023 22:24	45	38	36	34	33	31	28
N19	16/03/2023 22:00	41	34	32	30	30	29	26
N20	17/03/2023 00:00	53	49	41	38	35	29	26

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

4.3.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.3.3 Monitoring results

Table 4.8 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.8 Site noise levels and limits – March 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	17/03/2023 00:28	0.0	-	G	No	37	45	IA	IA	N/A	N/A
N14	16/03/2023 23:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	16/03/2023 23:00	0.0	-	G	No	37	45	<20	<20	N/A	N/A
N17	16/03/2023 22:24	0.0	-	G	No	38	45	27	30	N/A	N/A
N19	16/03/2023 22:00	0.9	330	G	No	35	45	IA	IA	N/A	N/A
N20	17/03/2023 00:00	0.4	308	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.9. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.9 Real time and attended noise levels¹ – March 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	16/03/2023 23:30	16/03/2023 23:30	52	49	21	19	40	IA
N15/SX29 ³	16/03/2023 23:00	16/03/2023 23:00	47	45	28	23	38	<20
N19/SX32	16/03/2023 22:00	16/03/2023 22:00	35	33	16	14	29	IA
N20/SX30	17/03/2023 00:00	17/03/2023 00:00	38	34	26	22	29	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. Data taken from SX29 as SX33 was not operational during this period.

4.4 April 2023

4.4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.10.

Table 4.10 Total measured noise levels, dB – April 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	20/04/2023 23:41	48	44	38	34	29	21	19
N14	21/04/2023 01:00	47	35	28	27	25	23	22
N15	20/04/2023 23:00	45	38	32	29	27	21	19
N17	20/04/2023 22:26	46	42	36	32	24	21	19
N19	20/04/2023 22:02	46	31	26	24	21	19	16
N20	21/04/2023 00:15	48	45	29	31	23	21	19

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

4.4.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.4.3 Monitoring results

Table 4.11 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.11 Site noise levels and limits – April 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	20/04/2023 23:41	1.6	71	E	Yes	37	45	IA	IA	Nil	Nil
N14	21/04/2023 01:00	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	20/04/2023 23:00	1.4	71	E	Yes	37	45	IA	IA	Nil	Nil
N17	20/04/2023 22:26	1.6	81	D	Yes	38	45	IA	IA	Nil	Nil
N19	20/04/2023 22:02	1.8	65	D	Yes	35	45	IA	IA	Nil	Nil
N20	21/04/2023 00:15	0.9	54	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.12. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.12 Real time and attended noise levels ¹ – April 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				Attended measurement	
			Total L_{Aeq} dB	Total L_{A90} dB	Low pass (<630Hz) L_{Aeq} dB	Low pass (<630Hz) L_{A90} dB	Total L_{A90} dB	WCP L_{Aeq} dB
N14/SX31	21/04/2023 01:00	21/04/2023 01:00	42	40	21	19	23	IA
N15/SX33	20/04/2023 23:00	20/04/2023 23:00	35	22	38	15	21	IA
N19/SX32	20/04/2023 22:02	20/04/2023 22:00	26	21	24	14	19	IA
N20/SX30	21/04/2023 00:15	21/04/2023 00:15	30	26	26	19	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.

4.5 May 2023

4.5.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.13.

Table 4.13 Total measured noise levels, dB – May 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	31/05/2023 00:45	43	35	32	28	27	22	19
N14	30/05/2023 23:45	36	28	25	23	23	21	18
N15	30/05/2023 23:15	38	36	33	28	25	22	21
N17	30/05/2023 22:23	42	39	38	33	30	26	23
N19	30/05/2023 22:00	38	32	30	28	28	26	23
N20	31/05/2023 00:15	51	47	37	36	33	27	23

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

4.5.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.5.3 Monitoring results

Table 4.14 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.14 Site noise levels and limits – May 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	31/05/2023 00:45	1.0	290	F	Yes	37	45	28	38	Nil	Nil
N14	30/05/2023 23:45	1.1	296	E	Yes	35	45	IA	IA	Nil	Nil
N15	30/05/2023 23:15	1.4	260	F	Yes	37	45	<25	32	Nil	Nil
N17	30/05/2023 22:23	0.0	-	F	Yes	38	45	<30	<30	Nil	Nil
N19	30/05/2023 22:00	1.6	232	E	Yes	35	45	26	28	Nil	Nil
N20	31/05/2023 00:15	1.1	287	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.15. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.15 Real time and attended noise levels¹ – May 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	30/05/2023 23:45	30/05/2023 23:45	24	21	24	22	21	IA
N15/SX33	30/05/2023 23:15	30/05/2023 23:15	50	24	48	24	22	<25
N19/SX32	30/05/2023 22:00	30/05/2023 22:00	31	28	30	27	26	26
N20/SX30	31/05/2023 00:15	31/05/2023 00:15	43	29	40	26	27	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.

4.6 June 2023

4.6.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.16.

Table 4.16 Total measured noise levels, dB – June 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	27/06/2023 22:48	44	39	32	29	24	22	21
N14	27/06/2023 23:45	39	31	27	25	25	22	20
N15	27/06/2023 23:15	41	34	30	27	26	23	21
N17	27/06/2023 22:22	46	32	30	27	27	23	19
N19	27/06/2023 22:00	49	39	27	26	20	17	16
N20	28/06/2023 00:15	44	36	24	25	22	20	19

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

4.6.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.6.3 Monitoring results

Table 4.17 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.17 Site noise levels and limits – June 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	27/06/2023 22:48	1.0	315	F	Yes	37	45	<25	<25	Nil	Nil
N14	27/06/2023 23:45	0.6	296	F	Yes	35	45	<25	26	Nil	Nil
N15	27/06/2023 23:15	0.6	312	F	Yes	37	45	27	36	Nil	Nil
N17	27/06/2023 22:22	1.2	281	F	Yes	38	45	27	32	Nil	Nil
N19	27/06/2023 22:00	0.8	314	F	Yes	35	45	IA	IA	Nil	Nil
N20	28/06/2023 00:15	0.0	-	F	Yes	35	45	<20	<20	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.18. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.18 Real time and attended noise levels¹ – June 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	27/06/2023 23:45	27/06/2023 23:45	24	20	23	21	22	<25
N15/SX33	27/06/2023 23:15	27/06/2023 23:15	28	21	28	22	23	27
N19/SX32	27/06/2023 22:00	27/06/2023 22:00	24	21	24	NR	17	IA
N20/SX30	28/06/2023 00:15	28/06/2023 00:15	28	24	22	19	20	<20

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.
2. NR – no Sentinex data recorded for this period.

4.7 July 2023

4.7.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.19.

Table 4.19 Total measured noise levels, dB – July 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	13/07/2023 00:46	51	49	44	40	36	24	22
N14	13/07/2023 00:18	53	36	30	29	28	26	24
N15	12/07/2023 23:15	42	37	30	28	26	24	21
N17	12/07/2023 22:38	36	24	18	17	15	15	14
N19	12/07/2023 22:15	34	27	23	20	18	16	15
N20	12/07/2023 23:45	83	71	67	60	42	25	21

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

4.7.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.7.3 Monitoring results

Table 4.20 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.20 Site noise levels and limits – July 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	13/07/2023 00:46	0.0	-	F	Yes	37	45	<30	35	Nil	Nil
N14	13/07/2023 00:18	0.0	-	G	No	35	45	<25	27	N/A	N/A
N15	12/07/2023 23:15	0.0	-	F	Yes	37	45	26	35	Nil	Nil
N17	12/07/2023 22:38	0.0	-	F	Yes	38	45	<20	<20	Nil	Nil
N19	12/07/2023 22:15	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N20	12/07/2023 23:45	0.0	-	D	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.21. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.21 Real time and attended noise levels¹ – July 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				Attended measurement	
			Total L_{Aeq} dB	Total L_{A90} dB	Low pass (<630Hz) L_{Aeq} dB	Low pass (<630Hz) L_{A90} dB	Total L_{A90} dB	WCP L_{Aeq} dB
N14/SX31	13/07/2023 00:18	13/07/2023 00:15	28	24	26	24	26	<25
N15/SX33	12/07/2023 23:15	12/07/2023 23:15	44	26	40	26	24	26
N19/SX32	12/07/2023 22:15	12/07/2023 22:15	23	20	20	15	16	IA
N20/SX30	12/07/2023 23:45	12/07/2023 23:45	48	26	45	20	25	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.

4.8 August 2023

4.8.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.22.

Table 4.22 Total measured noise levels, dB – August 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	28/08/2023 23:18	44	42	39	35	33	28	25
N14	29/08/2023 00:30	45	34	31	29	28	26	24
N15	28/08/2023 23:00	60	56	48	45	35	29	27
N17	28/08/2023 22:24	41	29	23	20	17	16	15
N19	28/08/2023 22:00	37	28	23	19	17	16	14
N20	28/08/2023 23:46	66	60	58	53	42	31	28

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

4.8.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.8.3 Monitoring results

Table 4.23 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.23 Site noise levels and limits – August 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	28/08/2023 23:18	1.5	68	F	Yes	37	45	IA	IA	Nil	Nil
N14	29/08/2023 00:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	28/08/2023 23:00	1.4	68	F	Yes	37	45	IA	IA	Nil	Nil
N17	28/08/2023 22:24	1.5	75	F	Yes	38	45	IA	IA	Nil	Nil
N19	28/08/2023 22:00	1.8	51	E	Yes	35	45	IA	IA	Nil	Nil
N20	28/08/2023 23:46	0.9	92	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.24. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.24 Real time and attended noise levels¹ – August 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	29/08/2023 00:30	29/08/2023 00:30	27	26	18	NR	26	IA
N15/SX33	28/08/2023 23:00	28/08/2023 23:00	26	24	20	18	29	IA
N19/SX32	28/08/2023 22:00	28/08/2023 22:00	20	18	14	NR	16	IA
N20/SX30	28/08/2023 23:46	28/08/2023 23:45	44	29	41	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.

4.9 September 2023

4.9.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.25.

Table 4.25 Total measured noise levels, dB – September 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	18/09/2023 23:37	56	46	40	38	35	34	32
N14	19/09/2023 00:00	38	34	32	30	30	27	25
N15	18/09/2023 22:45	48	44	41	39	38	37	34
N15 remeasure	18/09/2023 23:15	42	41	37	35	34	32	29
N17	18/09/2023 22:22	39	35	28	26	24	22	20
N19	18/09/2023 22:00	35	25	24	22	22	20	19
N20	19/09/2023 00:30	73	69	66	59	40	24	22

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

4.9.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.9.3 Monitoring results

Table 4.26 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.26 Site noise levels and limits – September 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	18/09/2023 23:37	0.0	-	G	No	37	45	31	38	N/A	N/A
N14	19/09/2023 00:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	18/09/2023 22:45	0.0	-	G	No	37	45	39	45	N/A	N/A
N15 remeasure	18/09/2023 23:15	0.0	-	G	No	37	45	34	41	N/A	N/A
N17	18/09/2023 22:22	0.0	-	G	No	38	45	<20	<20	N/A	N/A
N19	18/09/2023 22:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N20	19/09/2023 00:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute} includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.27. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.27 Real time and attended noise levels ¹ – September 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	19/09/2023 00:00	19/09/2023 00:00	31	25	26	23	27	IA
N15/SX33	18/09/2023 22:45	18/09/2023 22:45	46	39	46	38	37	39
N15/SX33	18/09/2023 23:15	18/09/2023 23:15	38	35	36	32	32	34
N19/SX32	18/09/2023 22:00	18/09/2023 22:00	25	22	20	16	20	IA
N20/SX30	19/09/2023 00:30	19/09/2023 00:30	49	28	47	21	24	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.

4.10 October 2023

4.10.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.28.

Table 4.28 Total measured noise levels, dB – October 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	24/10/2023 22:50	45	38	33	30	28	26	24
N14	24/10/2023 23:45	35	29	25	23	22	20	17
N15	24/10/2023 23:15	37	36	33	30	28	25	22
N17	24/10/2023 22:23	38	36	34	31	31	27	24
N19	24/10/2023 22:00	41	39	34	30	29	19	16
N20	25/10/2023 00:15	43	34	31	26	20	18	16

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

4.10.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.10.3 Monitoring results

Table 4.29 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.29 Site noise levels and limits – October 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	24/10/2023 22:50	0.0	-	F	Yes	37	45	28	30	Nil	Nil
N14	24/10/2023 23:45	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	24/10/2023 23:15	0.0	-	F	Yes	37	45	30	36	Nil	Nil
N17	24/10/2023 22:23	0.4	359	F	Yes	38	45	31	38	Nil	Nil
N19	24/10/2023 22:00	0.3	279	F	Yes	35	45	<20	<20	Nil	Nil
N20	25/10/2023 00:15	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.30. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.30 Real time and attended noise levels ¹ – October 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	24/10/2023 23:45	24/10/2023 23:45	27	18	25	19	20	IA
N15/SX33	24/10/2023 23:15	24/10/2023 23:15	44	33	43	32	25	30
N19/SX32	24/10/2023 22:00	24/10/2023 22:00	30	24	19	14	19	<20
N20/SX30	25/10/2023 00:15	25/10/2023 00:15	47	22	42	15	18	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.

4.11 November 2023

4.11.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.31.

Table 4.31 Total measured noise levels, dB – November 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	27/11/2023 22:48	52	40	36	35	34	33	28
N14	27/11/2023 23:45	53	50	48	46	46	43	38
N15	27/11/2023 23:15	43	40	37	33	31	29	27
N17	27/11/2023 22:22	44	43	41	40	40	39	36
N19	27/11/2023 22:00	46	43	38	35	34	32	29
N20	28/11/2023 00:15	48	37	32	30	28	27	25

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

4.11.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.11.3 Monitoring results

Table 4.32 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.32 Site noise levels and limits – November 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	27/11/2023 22:48	3.0	48	D	Yes	37	45	IA	IA	Nil	Nil
N14	27/11/2023 23:45	2.7	64	D	Yes	35	45	IA	IA	Nil	Nil
N15	27/11/2023 23:15	2.4	52	D	Yes	37	45	IA	IA	Nil	Nil
N17	27/11/2023 22:22	1.1	38	E	Yes	38	45	IA	IA	Nil	Nil
N19	27/11/2023 22:00	0.7	306	E	Yes	35	45	IA	IA	Nil	Nil
N20	28/11/2023 00:15	3.7	67	D	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.33. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.33 Real time and attended noise levels ¹ – November 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	27/11/2023 23:45	27/11/2023 23:45	36	33	25	23	43	IA
N15/SX33	27/11/2023 23:15	27/11/2023 23:15	37	32	33	24	29	IA
N19/SX32	27/11/2023 22:00	27/11/2023 22:00	46	38	20	15	32	IA
N20/SX30	28/11/2023 00:15	28/11/2023 00:15	44	30	39	17	27	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 2023

4.12.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement are provided in Table 4.34.

Table 4.34 Total measured noise levels, dB – December 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	5/12/2023 23:19	43	35	34	32	31	28	25
N14	6/12/2023 00:23	52	49	47	44	44	40	31
N15	5/12/2023 23:00	53	42	40	37	36	31	26
N17	5/12/2023 22:24	48	47	46	43	41	39	38
N19	5/12/2023 22:00	48	44	43	42	42	39	32
N20	5/12/2023 23:46	43	31	29	27	27	25	23

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

4.12.2 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.12.3 Monitoring results

Table 4.35 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.35 Site noise levels and limits – December 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	5/12/2023 23:19	0.0	-	G	No	37	45	<30	<30	N/A	N/A
N14	6/12/2023 00:23	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	5/12/2023 23:00	0.6	282	G	No	37	45	<30	<30	N/A	N/A
N17	5/12/2023 22:24	0.0	-	G	No	38	45	<20	23	N/A	N/A
N19	5/12/2023 22:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N20	5/12/2023 23:46	0.0	-	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 4.36. Low pass (<630 Hz) L_{Aeq} and L_{A90} are typically good indicators of mining noise levels.

Table 4.36 Real time and attended noise levels ¹ – December 2023

Location/Sentinex	Attended start date and time	Sentinex start date and time	Sentinex data ²				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	6/12/2023 00:23	6/12/2023 00:30	34	32	24	22	40	IA
N15/SX33	5/12/2023 23:00	5/12/2023 23:00	39	35	30	28	31	<30
N19/SX32	5/12/2023 22:00	5/12/2023 22:00	36	35	17	14	39	IA
N20/SX30	5/12/2023 23:46	5/12/2023 23:45	32	28	14	13	25	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 2019 to December 2023 have been collated and graphed to summarise WCP long-term noise performance.

Due to the qualitative nature of some attended noise monitoring descriptors, calculation of site noise statistics such as mean, median, and standard deviation is not always possible. Subsequently, site only L_{Aeq} noise levels for each monitoring event have been grouped into one of three categories:

- 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 L_{Aeq} was between 30 dB and the relevant impact assessment criterion (inclusive), represented by blue bars, or
- WCP only L_{Aeq} was greater than the impact assessment criterion for that location, represented by red bars.

For each calendar year, the percentage of occurrence for each of these categories is shown, as well as annual trend lines over the entire five-year period. Figures show site only L_{Aeq} noise levels, including adjustments due to modifying factors, as defined by the Environment Protection Authority (EPA) 'Noise Policy for Industry' (NPfI, current as of October 2017). Meteorological conditions and applicability of noise criteria have not been considered.

5.1 Noise trend graphs

Site only L_{Aeq} noise levels measured during attended environmental noise monitoring over a 5-year period have been collated and graphed to summarise long-term noise trends. Figure 5.1 to Figure 5.6 provide percentage occurrence information for WCP noise levels at six monitoring locations.

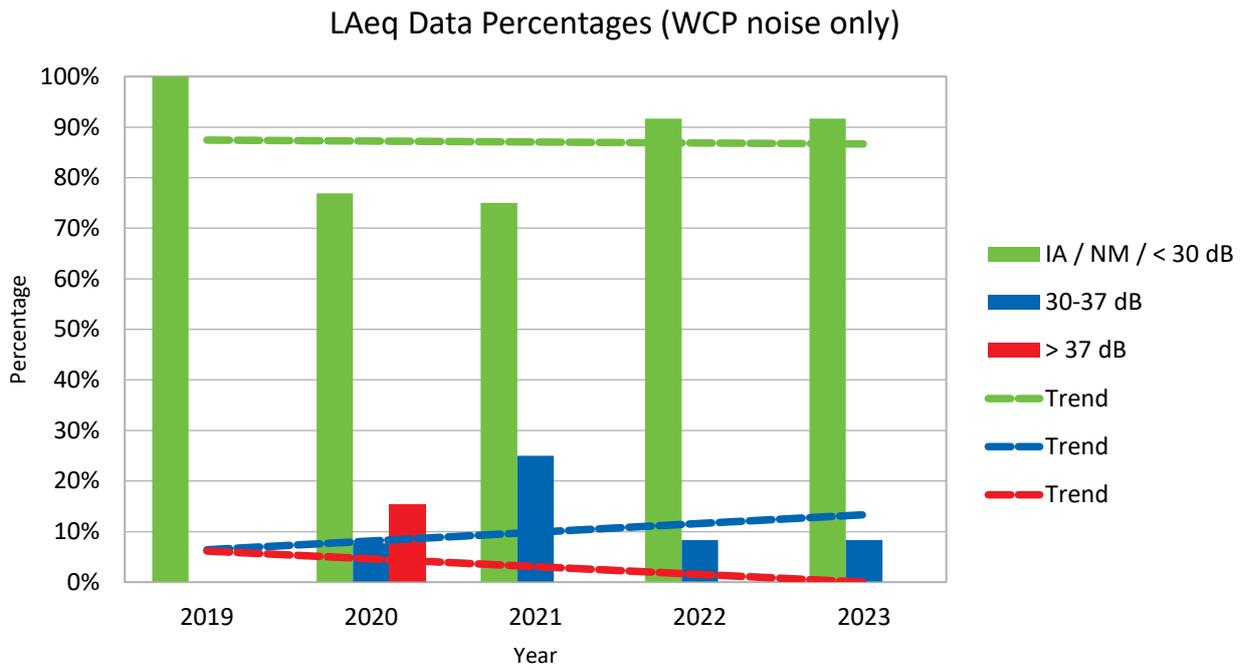


Figure 5.1 Attended noise monitoring data, N6

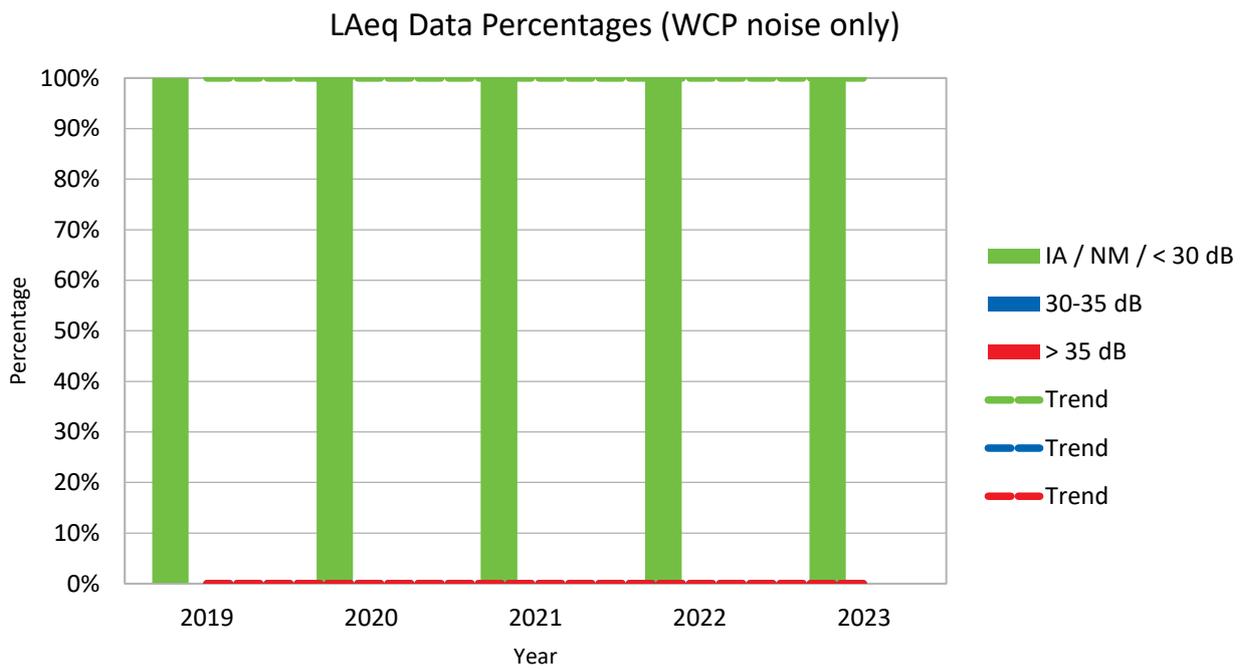


Figure 5.2 Attended noise monitoring data, N14

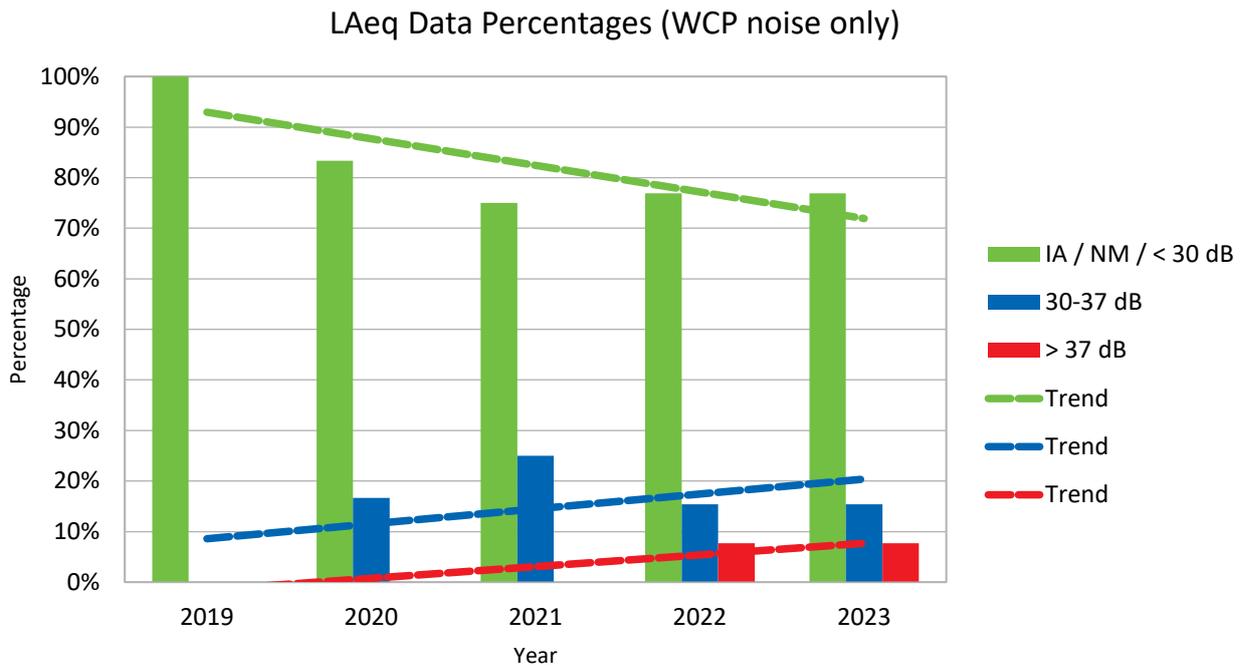


Figure 5.3 Attended noise monitoring data, N15

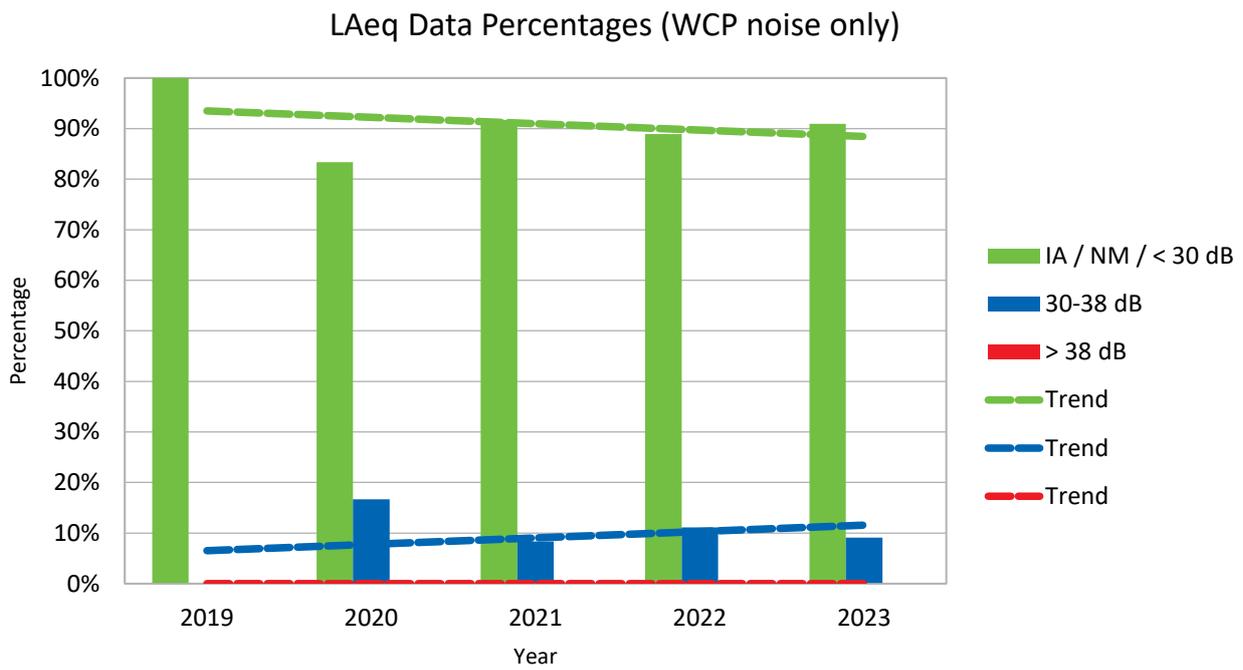


Figure 5.4 Attended noise monitoring data, N17

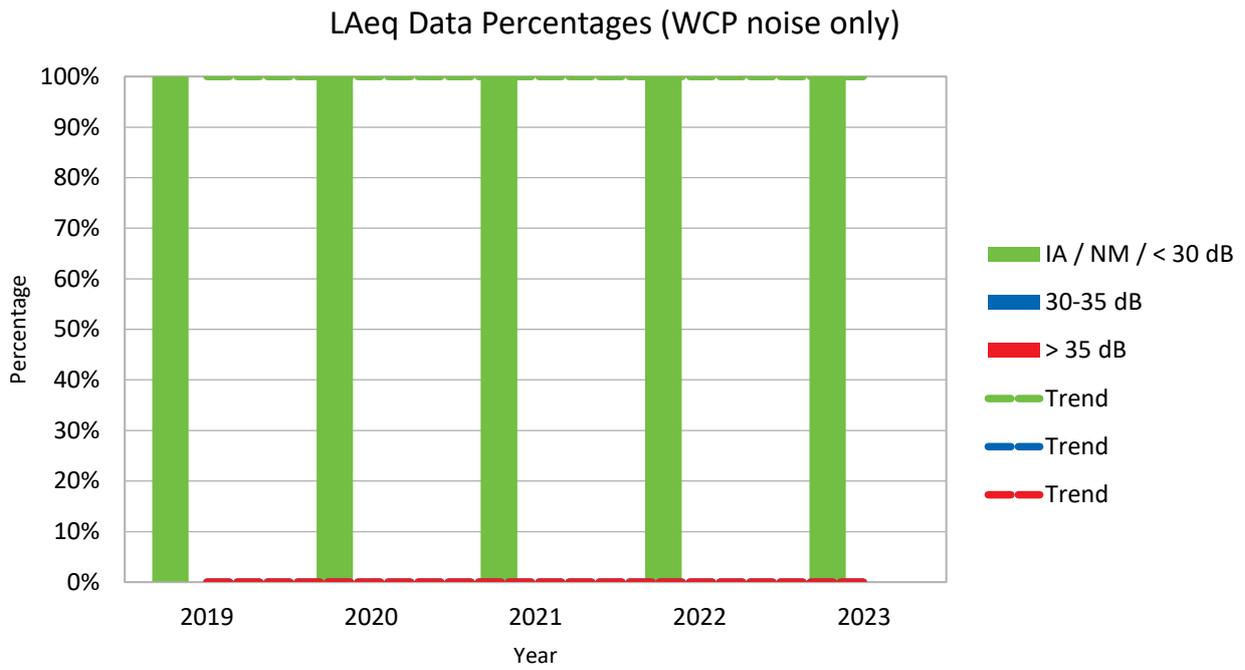


Figure 5.5 Attended noise monitoring data, N19

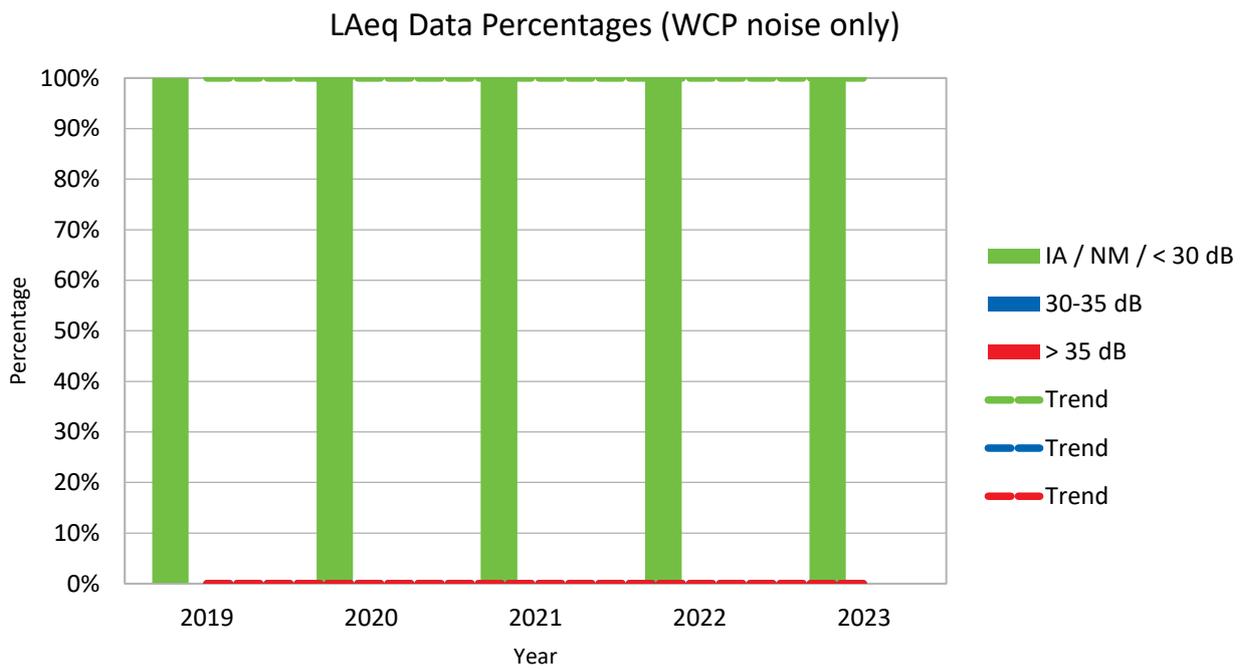


Figure 5.6 Attended noise monitoring data, N20

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 2024” most closely aligned with the 2023 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions. Table 6.1 summarises predicted noise levels for specific monitoring locations detailed in Table 26 and 27 of the noise and blasting assessment, under certain meteorological condition defined in Section 3.5 of this report.

Table 6.1 WCP operational predictions, Year 2024 - dB

NMP descriptor	Monitoring locations	Nearest property ID	Night LAeq,15minute Calm	Night LAeq,15minute Wind or Inversion	Night LA1,1minute Wind or Inversion
N6	St Laurence O’Toole Catholic Church	(903) ¹	18	33	40
N14	Tichular	(153) ¹	10	30	36
N15	Wollar Village	(933) ¹	17	35	41
N17	Mogo Road	102	21	34	41
N19	North Mogo Road	104	18	30	36
N20	Ringwood Road	160	8	26	32

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 2024. 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 Church

Table 6.2 Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N6, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference ^{2,3}	Measured WCP $LA_{1,1minute}$	Predicted WCP $LA_{1,1minute}$	Difference ^{2,3}
January	N/A	IA	-	N/A	IA	-	N/A
February	Strong Inversion	IA	33	NC	IA	40	NC
March	Strong Inversion	IA	33	NC	IA	40	NC
April	Summer Wind	IA	33	NC	IA	40	NC
May	N/A	28	-	N/A	38	-	N/A
June	N/A	<25	-	N/A	<25	-	N/A
July	Strong Inversion	<30	33	NC	35	40	-5
August	N/A	IA	-	N/A	IA	-	N/A
September	Strong Inversion	31	33	-2	38	40	-2
October	Strong Inversion	28	33	-5	30	40	-10
November	N/A	IA	-	N/A	IA	-	N/A
December	Strong Inversion	<30	33	NC	<30	40	NC

Notes: 1. Refer to Table 3.2 for applicable meteorological conditions.

2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.

3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a “less than” (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

6.1.2 N14, Tichular

Table 6.3 Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N14, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference ^{2,3}	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference ^{2,3}
January	N/A	IA	-	N/A	IA	-	N/A
February	Strong Inversion	IA	30	NC	IA	36	NC
March	Strong Inversion	IA	30	NC	IA	36	NC
April	Strong Inversion	IA	30	NC	IA	36	NC
May	N/A	IA	-	N/A	IA	-	N/A
June	N/A	<25	-	N/A	26	-	N/A
July	Strong Inversion	<25	30	NC	27	36	-9
August	Strong Inversion	IA	30	NC	IA	36	NC
September	Strong Inversion	IA	30	NC	IA	36	NC
October	Strong Inversion	IA	30	NC	IA	36	NC
November	N/A	IA	-	N/A	IA	-	N/A
December	Strong Inversion	IA	30	NC	IA	36	NC

Notes: 1. Refer to Table 3.2 for applicable meteorological conditions.

2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.

3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

6.1.3 N15, Wollar Village

Table 6.4 Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N15, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference ^{2,3}	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference ^{2,3}
January	N/A	IA	-	N/A	IA	-	N/A
February	N/A	IA	-	N/A	IA	-	N/A
March	Strong Inversion	<20	35	NC	<20	41	NC
April	Summer Wind	IA	35	NC	IA	41	NC
May	N/A	<25	-	N/A	32	-	N/A
June	N/A	27	-	N/A	36	-	N/A
July	Strong Inversion	26	35	-9	35	41	-6
August	N/A	IA	-	N/A	IA	-	N/A
September	Strong Inversion	39	35	+4	45	41	+4
September remeasure	Strong Inversion	34	35	-1	41	41	0
October	Strong Inversion	30	35	-5	36	41	-5
November	N/A	IA	-	N/A	IA	-	N/A
December	N/A	<30	-	N/A	<30	-	N/A

Notes: 1. Refer to Table 3.2 for applicable meteorological conditions.

2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.

3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

6.1.4 N17, Mogo Road

Table 6.5 Measured WCP $L_{Aeq,15\text{minute}}$ compared to year 2024 predicted $L_{Aeq,15\text{minute}}$ at N17, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15\text{minute}}$	Predicted WCP $L_{Aeq,15\text{minute}}$	Difference ^{2,3}	Measured WCP $L_{A1,1\text{minute}}$	Predicted WCP $L_{A1,1\text{minute}}$	Difference ^{2,3}
January ⁴	-	-	-	-	-	-	-
February	Strong Inversion	IA	34	NC	IA	41	NC
March	Strong Inversion	27	34	-7	30	41	-11
April	Summer Wind	IA	34	NC	IA	41	NC
May	Strong Inversion	<30	34	NC	<30	41	NC
June	N/A	27	-	N/A	32	-	N/A
July	Strong Inversion	<20	34	NC	<20	41	NC
August	N/A	IA	-	N/A	IA	-	N/A
September	Strong Inversion	<20	34	NC	<20	41	NC
October	Strong Inversion	31	34	-3	38	41	-3
November	N/A	IA	-	N/A	IA	-	N/A
December	Strong Inversion	<20	34	NC	23	41	-18

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions.
 2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.
 3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.
 4. Access to Mogo Road closed, measurements could not be taken.

6.1.5 N19, North Mogo Road

Table 6.6 Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N19, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference ^{2,3}	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference ^{2,3}
January ⁴	-	-	-	-	-	-	-
February	N/A	IA	-	N/A	IA	-	N/A
March	N/A	IA	-	N/A	IA	-	N/A
April	N/A	IA	-	N/A	IA	-	N/A
May	N/A	26	-	N/A	28	-	N/A
June	N/A	IA	-	N/A	IA	-	N/A
July	Strong Inversion	IA	30	NC	IA	36	NC
August	N/A	IA	-	N/A	IA	-	N/A
September	Strong Inversion	IA	30	NC	IA	36	NC
October	Strong Inversion	<20	30	NC	<20	36	NC
November	N/A	IA	-	N/A	IA	-	N/A
December	Strong Inversion	IA	30	NC	IA	36	NC

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions.
 2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.
 3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.
 4. Access to Mogo Road closed, measurements could not be taken.

6.1.6 N20, Ringwood Road

Table 6.7 Measured WCP $L_{Aeq,15minute}$ compared to year 2024 predicted $L_{Aeq,15minute}$ at N20, dB(A)

Month	Applicable Meteorological Condition ^{1,2}	Measured WCP $L_{Aeq,15minute}$	Predicted WCP $L_{Aeq,15minute}$	Difference ^{2,3}	Measured WCP $L_{A1,1minute}$	Predicted WCP $L_{A1,1minute}$	Difference ^{2,3}
January	N/A	IA	-	N/A	IA	-	N/A
February	N/A	IA	-	N/A	IA	-	N/A
March	Strong Inversion	IA	26	NC	IA	32	NC
April	N/A	IA	-	N/A	IA	-	N/A
May	N/A	IA	-	N/A	IA	-	N/A
June	Strong Inversion	<20	26	NC	<20	32	NC
July	Calm	IA	8	NC	IA	-	NC
August	N/A	IA	-	N/A	IA	-	N/A
September	Strong Inversion	IA	26	NC	IA	32	NC
October	Strong Inversion	IA	26	NC	IA	32	NC
November	N/A	IA	-	N/A	IA	-	N/A
December	Strong Inversion	IA	26	NC	IA	32	NC

Notes: 1. Refer to Table 3.2 for applicable meteorological conditions.

2. N/A indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions and were not applicable for comparison.

3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (e.g. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

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 one exception.

During the September 2023 measurement at N15, the measured site only L_{Aeq} and $L_{A1,1minute}$ were both 4 dB higher than predicted under strong inversion conditions.

7 Summary

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report for 2023, 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 2023. 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 2023 compliance

During 2023 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations.

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 one exception.

During the September 2023 measurement at N15, the measured site only L_{Aeq} and $L_{A1,1minute}$ were both 4 dB higher than predicted under strong inversion conditions.

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Wilpinjong

Environmental Noise Monitoring - January 2023

Prepared for Wilpinjong Coal Pty Ltd

January 2023

Wilpinjong

Environmental Noise Monitoring - January 2023

Wilpinjong Coal Pty Ltd

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January 2023

Version	Date	Prepared by	Reviewed by	Comments
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TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.2	Attended monitoring locations	1
1.3	Terminology and abbreviations	1
2	Noise limits	2
2.1	Development consent	2
2.2	Environment protection licence	2
2.3	Noise management plan	2
2.4	Noise limits	2
2.5	Additional requirements	3
3	Methodology	4
3.1	Overview	4
3.2	Attended noise monitoring	4
3.3	Modifying factors	5
3.4	Instrumentation	5
4	Results	6
4.1	Total measured noise levels and atmospheric conditions	6
4.2	Site only noise levels	6
5	Discussion	8
5.1	Noted noise sources	8
5.2	N6	9
5.3	N14	10
5.4	N15	11
5.5	N17	12
5.6	N19	12
5.7	N20	13
6	Summary	14

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	1
Table 1.2	Terminology and abbreviations	1
Table 2.1	Noise impact limits, dB	2
Table 3.1	Attended noise monitoring equipment	5
Table 4.1	Measured noise levels – January 2022 ¹	6
Table 4.2	Measured atmospheric conditions – January 2022	6
Table 4.3	Site noise levels and limits – January 2022	7
Table 5.1	Historical WCP only noise levels at N6	9
Table 5.2	Historical WCP only noise levels at N14	10
Table 5.3	Historical WCP only noise levels at N15	11
Table 5.4	Historical WCP only noise levels at N17	12
Table 5.5	Historical WCP only noise levels at N19	12
Table 5.6	Historical WCP only noise levels at N20	13
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	1
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	8
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	9
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	10
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	11
Figure 5.5	Environmental noise levels N20, Ringwood Road	13
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The survey purpose was to quantify the acoustic environment and compare site noise contributions against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 17 January at four monitoring 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 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location descriptor/ID	Description/address	Coordinates (MGA94, Zone 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

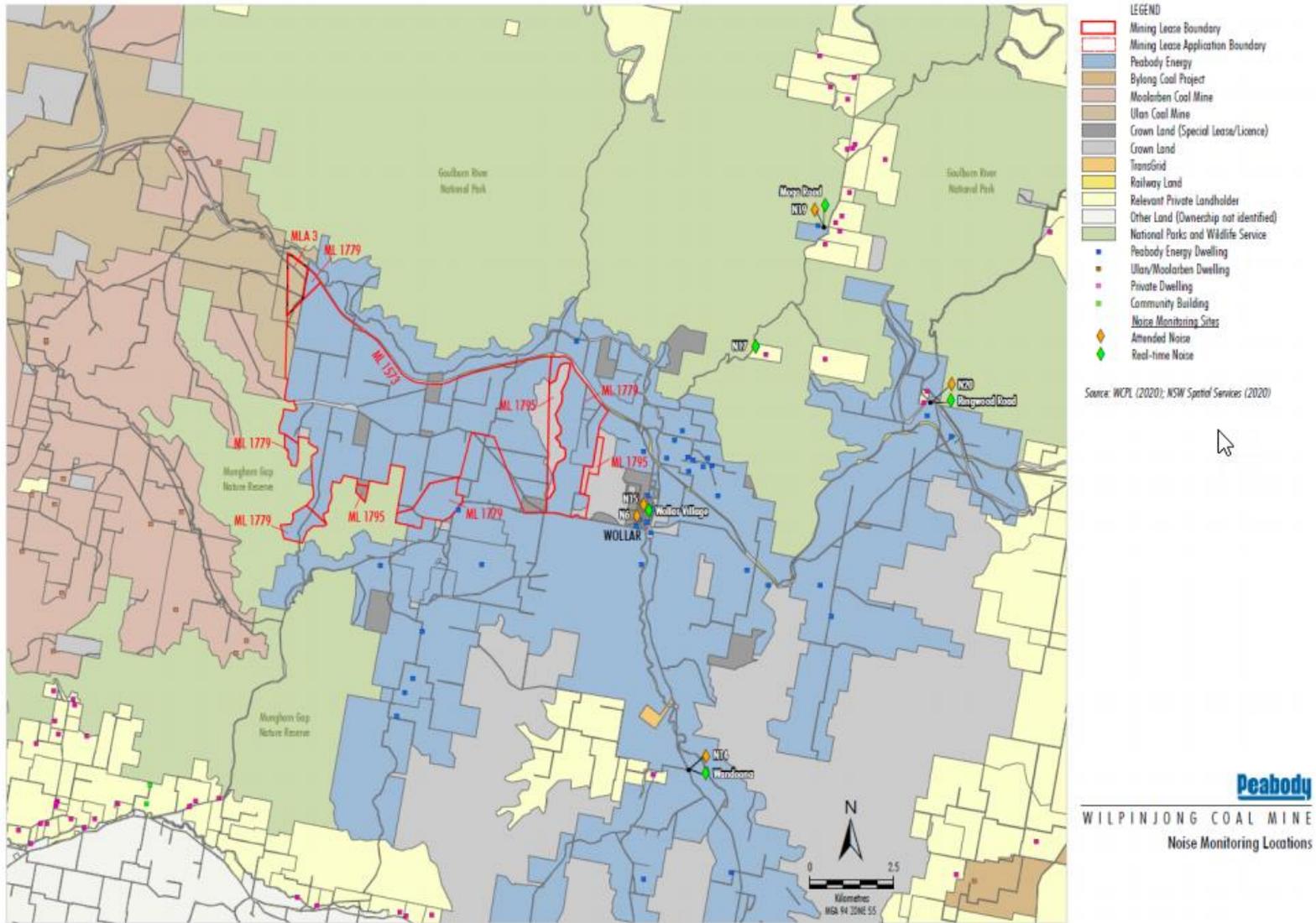


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10 percent of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90 percent of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the project approval are reproduced in Appendix B.1.

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 December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the project approval and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. 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, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If the exact contribution from site could not be established due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be more than 5 dB lower than relevant limits, then a maximum estimate of the potential contribution of the site may be provided based on methods detailed in Section 7.1 of the NPfI. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may 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 site noise was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- Site noise levels were extremely low and unlikely, in many cases, to be noticed.
- Site noise levels were masked by other more dominant noise sources that are characteristic of the environment, such as breeze in foliage or continuous road traffic noise, that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include 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 $L_{A1,1\text{minute}}$. The EPA accepts sleep disturbance analysis based on either the $L_{A1,1\text{minute}}$ or L_{Amax} metrics, with the L_{Amax} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

3.4 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00701424	02/06/2023	IEC 61672-1:2002
Pulsar 106 acoustic calibrator	79631	26/05/2023	IEC 60942

4 Results

4.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements 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.

Table 4.1 Measured noise levels – January 2022¹

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	17/01/2023 22:30	53	47	41	37	32	30	27
N14	17/01/2023 23:30	43	36	35	34	33	32	30
N15	17/01/2023 23:00	55	39	30	31	29	28	26
N20	17/01/2023 22:00	49	43	39	38	37	35	32

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction and temperature were measured at approximately 1.5 metres. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – January 2022

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction ° Magnetic North ¹	Cloud Cover 1/8s
N6	17/01/2023 22:30	23	0.9	10	0
N14	17/01/2023 23:30	19	0.6	120	0
N15	17/01/2023 23:00	26	0.0	-	0
N20	17/01/2023 22:00	24	2.4	130	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

Table 4.3 provides site noise level contributions in the absence of other sources, where possible. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – January 2022

Location	Start Date and Time	Wind		Stability Class	Limits apply? ¹	Limits, dB		Site levels, dB ²		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
N6	17/01/2023 22:30	2.9	53	E	Yes	37	45	IA	IA	Nil	Nil
N14	17/01/2023 23:30	2.4	60	E	Yes	35	45	IA	IA	Nil	Nil
N15	17/01/2023 23:00	2.7	46	E	Yes	37	45	IA	IA	Nil	Nil
N20	17/01/2023 22:00	3.0	56	E	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute} includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in project approval.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1000 Hz, while industrial noise is observed at frequencies less than 1000 Hz.

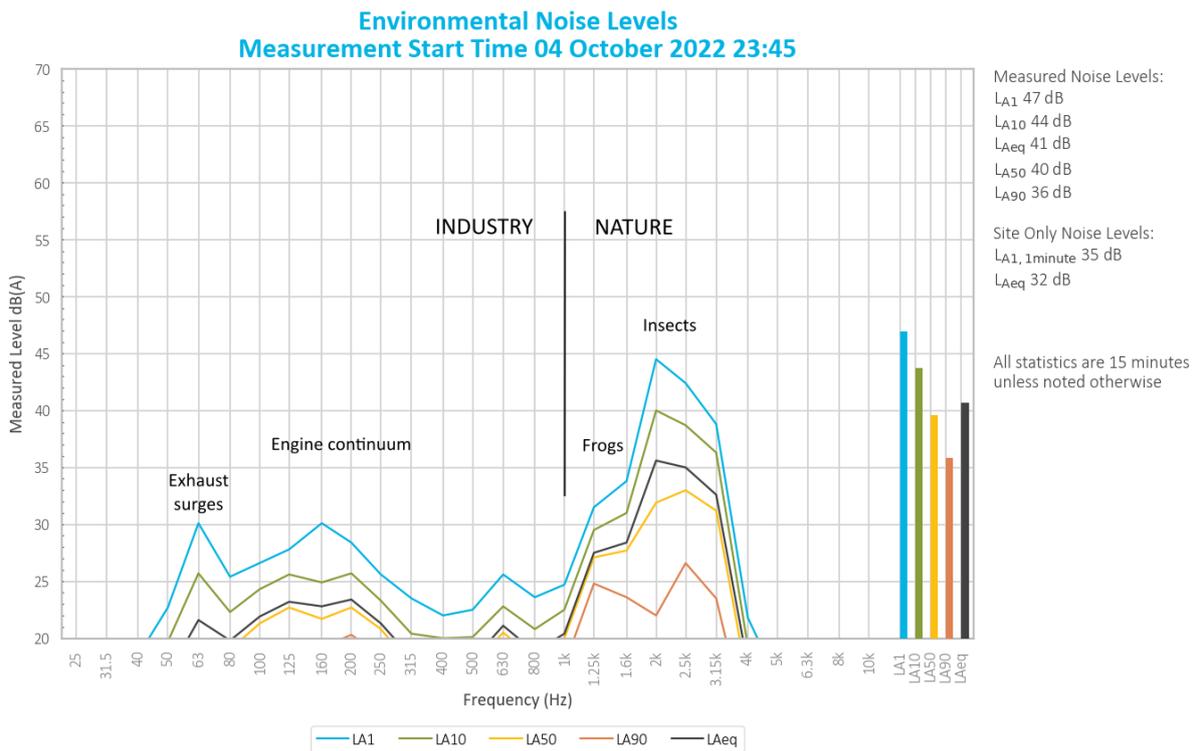


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

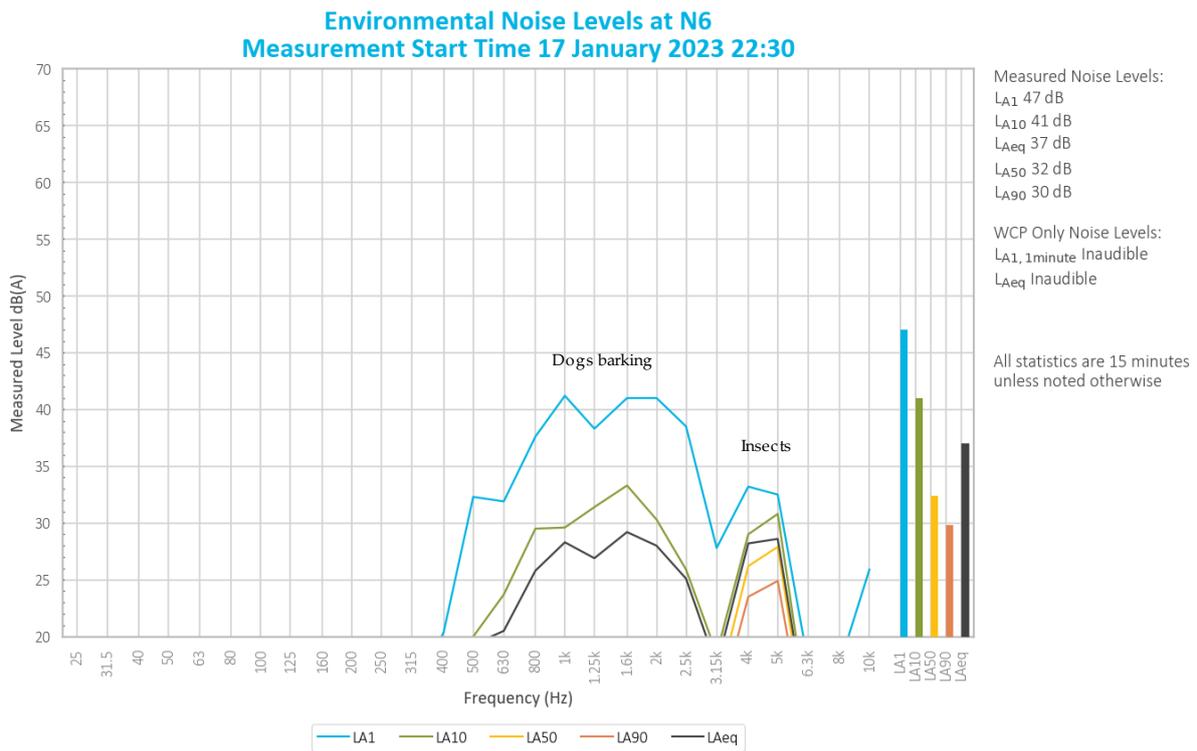


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

Dogs were primarily responsible for generating the measured LA1. Both dogs and insects generated the measured LA10 and LAeq. Insects were responsible for generating the measured LA50 and LA90.

Noise from a bat in a nearby tree and a traffic pass by (which was paused out) were also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022
LAeq	IA	IA	IA	<20	<25	30	IA	IA	IA	IA	<25	<20
LA1,1min	IA	IA	IA	23	<25	37	IA	IA	IA	IA	27	<20

5.3 N14

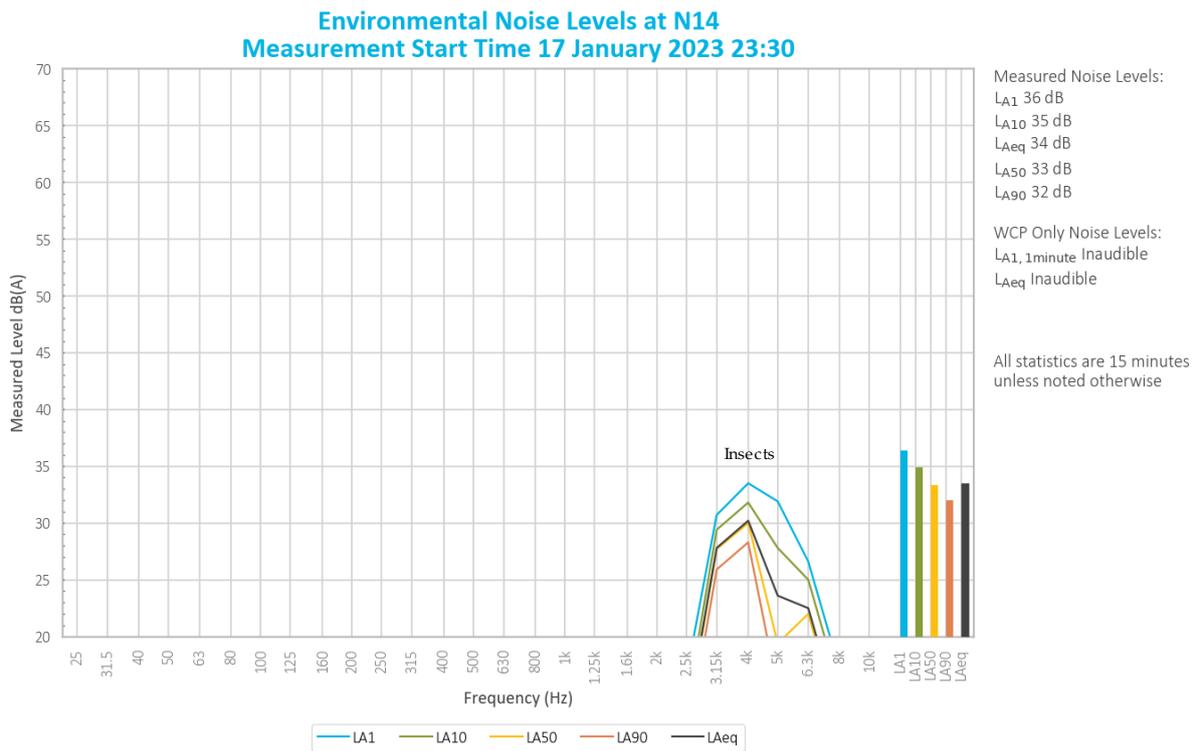


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Insects were responsible for generating all measured noise levels.

Noise from frogs, wind in the trees, splashing in a nearby pond, and a distant train were also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Nov 2022
LAeq	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	<25	IA
LA1,1min	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	30	IA

5.4 N15

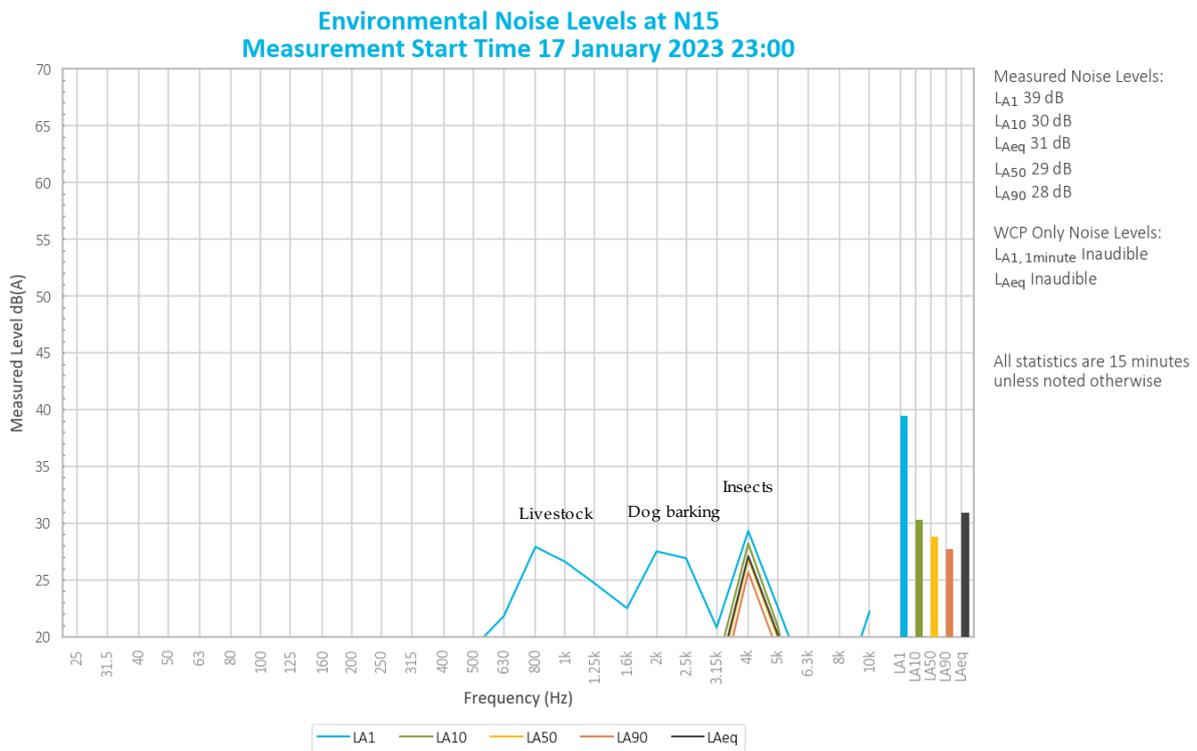


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

Insects, dogs, and livestock were responsible for generating the measured LA1. Insects generated the measured LAeq, LA10, LA50 and LA90.

Noise from a bird, a bat, and a residential machine were also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022
LAeq	IA	IA	IA	23	34	38/34	29	IA	<25	IA	<25	<20
LA1,1min	IA	IA	IA	32	38	42/35	40	IA	<25	IA	<25	<20

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

5.5 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	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹
LAeq	IA	IA	IA	<20	32	23	27	IA	27	-	-	-
LA1,1min	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.

5.6 N19

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

Table 5.5 Historical WCP only noise levels at N19

Month	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹
LAeq	IA	IA	IA	IA	<20	IA	IA	IA	<25	-	-	-
LA1,1min	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.

5.7 N20

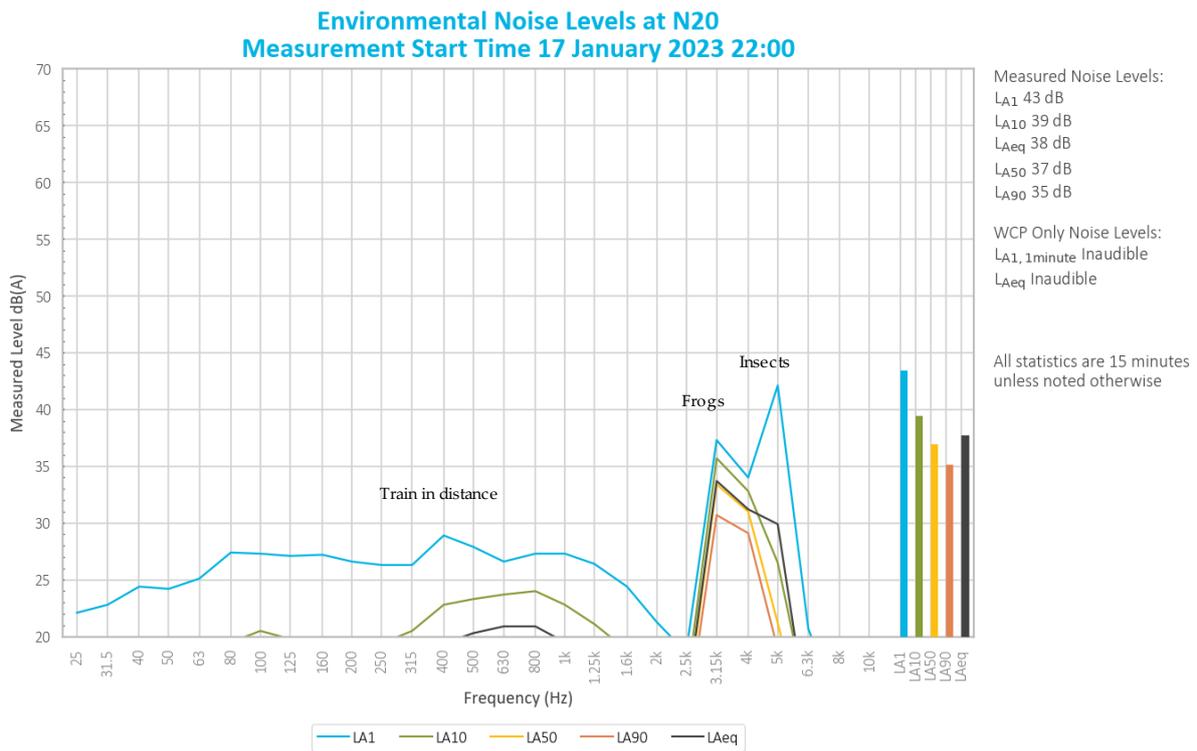


Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible throughout the measurement.

Insects and frogs generated the measured LA1 and LA10 with a small contribution from a distant train. Insects and frogs generated the measured LAeq, LA50 and LA90.

Occasional noise from wind in trees was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022
LAeq	IA	IA	IA	<25	22	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	<25	28	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and Development Consent.

Attended environmental noise monitoring described in this report was done during the night period of 17 January at four monitoring 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.

Noise levels from site complied with relevant limits at all monitoring locations during the January 2022 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

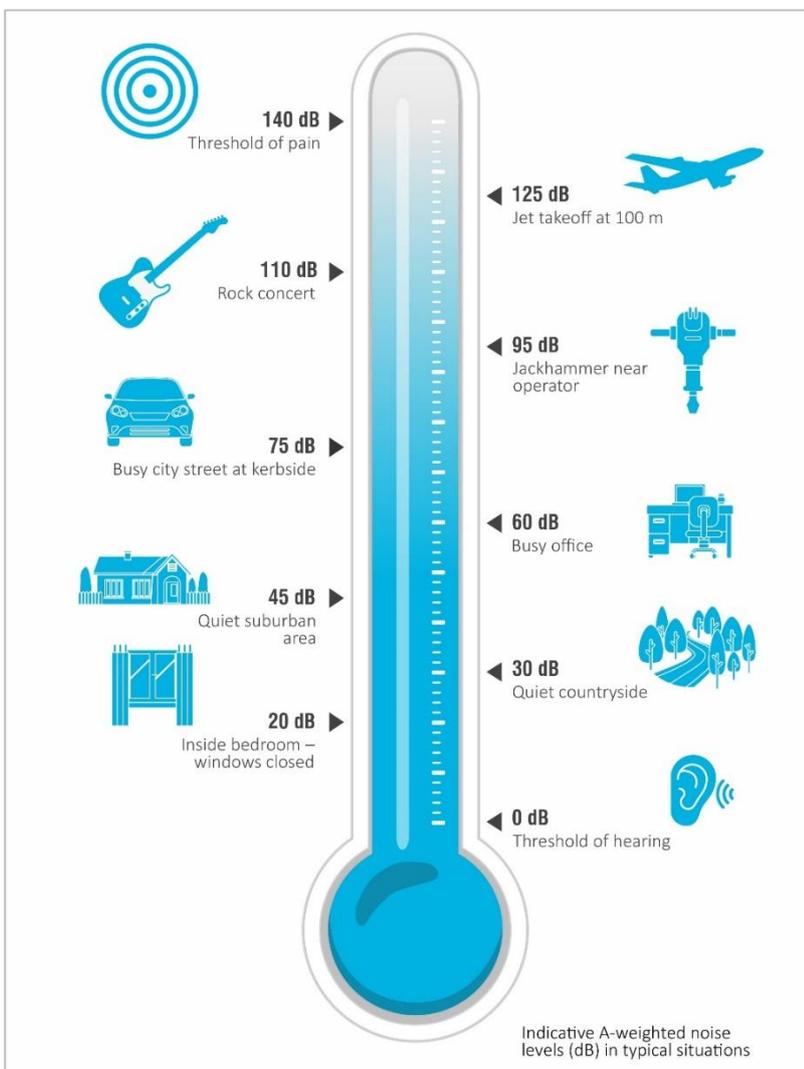


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Project approval

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C21344

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 20.6°C	Ambient Temperature : 22.4°C
Relative Humidity : 47%	Relative Humidity : 44%
Barometric Pressure : 101.05kPa	Barometric Pressure : 100.91kPa
Calibration Technician : Jeff Yu	Secondary Check: Harrison Kim
Calibration Date : 2 Jun 2021	Report Issue Date : 2 Jun 2021
Approved Signatory :	Ken Williams

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

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

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-3:2013.

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

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



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

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

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

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



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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
Calibration Date : 26 May 2021
Secondary Check: Harrison Kim
Report Issue Date : 26 May 2021

Approved Signatory :

Ken Williams

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

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

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

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

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

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

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



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

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

February 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP02

February 2023

Version	Date	Prepared by	Reviewed by	Comments
V1	03/03/2023	Harry Flick	Tony Welbourne	Final
V2	03/04/2023	Will Moore	Jesse Tribby	Added NPfI reference

Approved by



Jesse Tribby

Senior Acoustical Consultant

3 April 2023

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TABLE OF CONTENTS

1	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – February 2023 ¹	10
Table 4.2	Measured atmospheric conditions – February 2023	10
Table 4.3	Site noise levels and limits – February 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	A.4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Limited (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 20/21 February 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

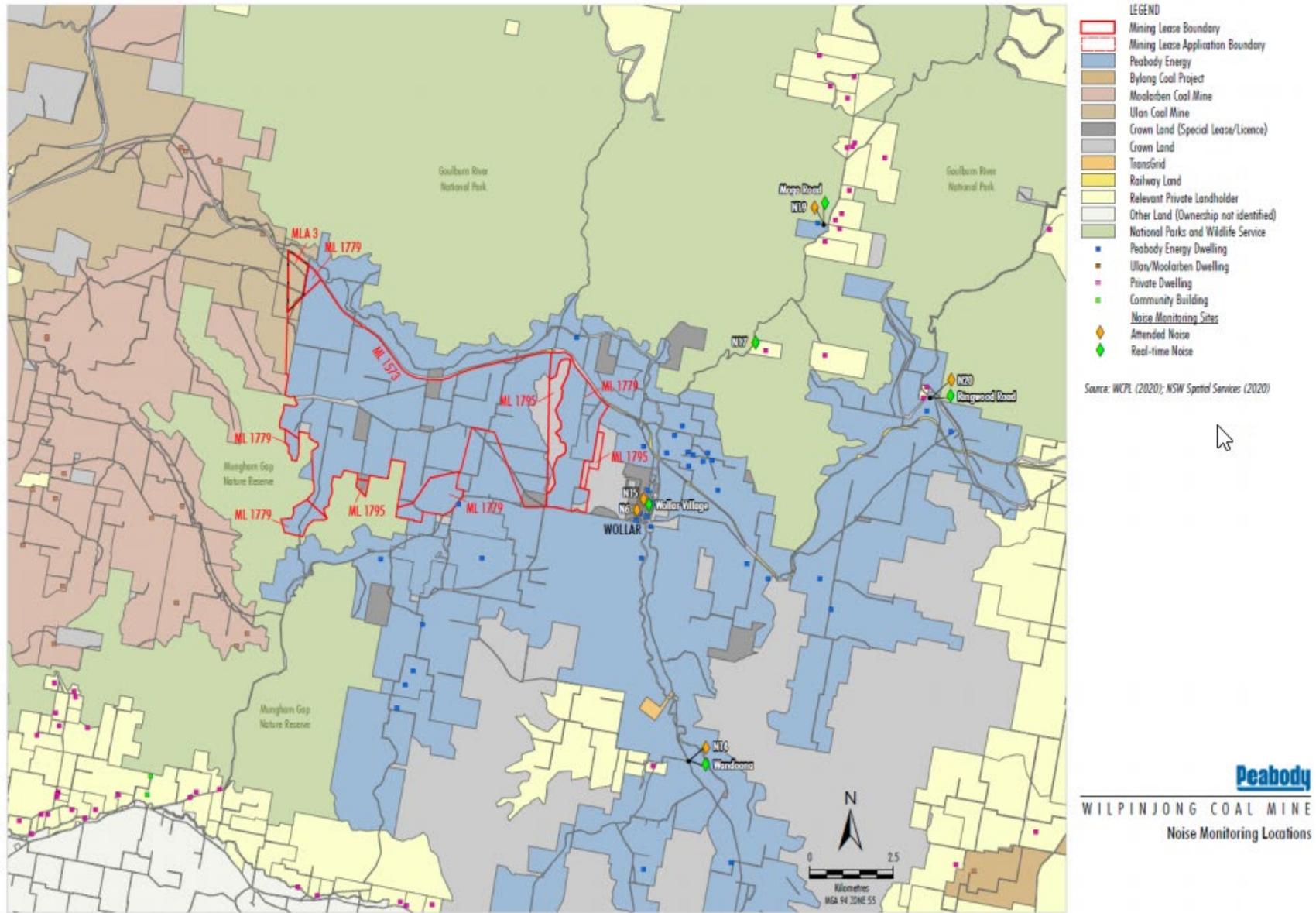


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

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 December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If the exact contribution from site could not be established due to masking by other sources in a similar frequency range, but site noise levels are observed to be more than 5 dB lower than relevant limits, then a maximum estimate may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. IA indicates that site noise was inaudible at the monitoring location. NM means site noise was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- Site noise levels were extremely low and unlikely, in many cases, to be noticed.
- Site noise levels were masked by other, more dominant, noise sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) so that it can be visually compared to the measured site spectra.

3.4 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	01070590	09/06/2024	IEC 61672-1:2002
Pulsar 106 acoustic calibrator	74813	09/06/2024	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – February 2023¹

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	21/02/2023 00:00	47	41	39	38	38	37	35
N14	21/02/2023 00:30	48	46	38	37	36	34	33
N15	20/02/2023 23:00	52	47	44	42	42	41	38
N17	20/02/2023 22:28	43	41	36	34	34	32	29
N19	20/02/2023 22:00	44	37	33	31	31	28	26
N20	20/02/2023 23:30	49	47	37	37	34	33	31

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – February 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
N6	21/02/2023 00:00	24	0.8	250	0
N14	21/02/2023 00:30	22	0.6	180	0
N15	20/02/2023 23:00	25	0.0	-	2
N17	20/02/2023 22:28	24	0.0	-	0
N19	20/02/2023 22:00	25	0.0	-	0
N20	20/02/2023 23:30	26	0.0	-	1

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – February 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	21/02/2023 00:00	0.0	-	G	No	37	45	IA	IA	NA	NA
N14	21/02/2023 00:30	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	20/02/2023 23:00	0.6	312	F	Yes	37	45	IA	IA	Nil	Nil
N17	20/02/2023 22:28	0.0	-	F	Yes	38	45	IA	IA	Nil	Nil
N19	20/02/2023 22:00	0.9	299	F	Yes	35	45	IA	IA	Nil	Nil
N20	20/02/2023 23:30	0.6	294	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was conducted, and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

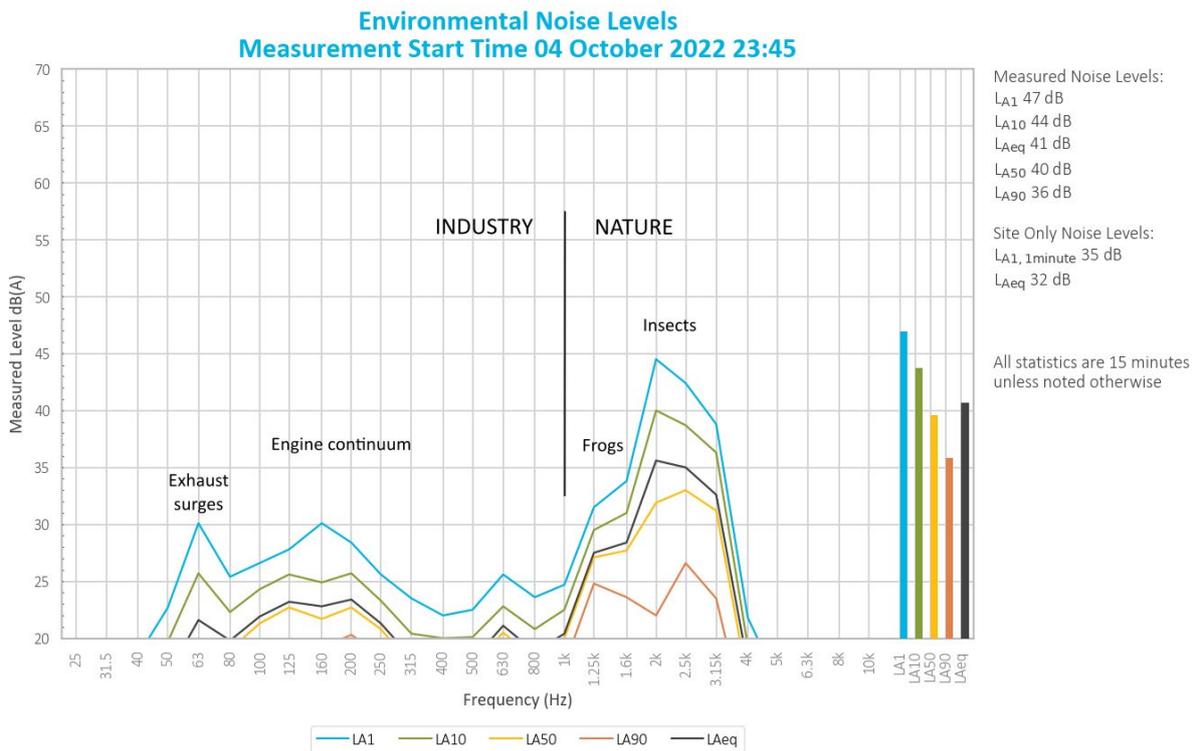


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

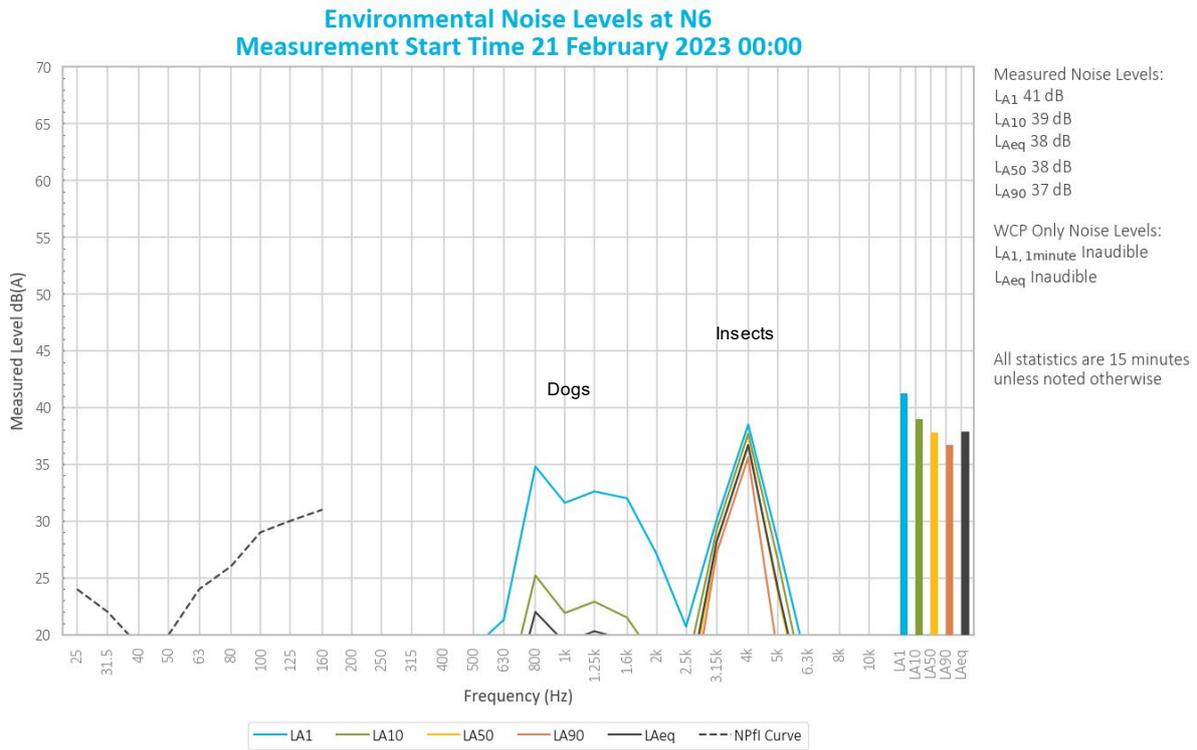


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

Dogs and insects were responsible for generating the measured LA1. Insects were responsible for generating the measured LA10, LAeq, LA50, and LA90.

Noise from nearby livestock was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023
LAeq	IA	IA	<20	<25	30	IA	IA	IA	IA	<25	<20	IA
LA1,1min	IA	IA	23	<25	37	IA	IA	IA	IA	27	<20	IA

5.3 N14

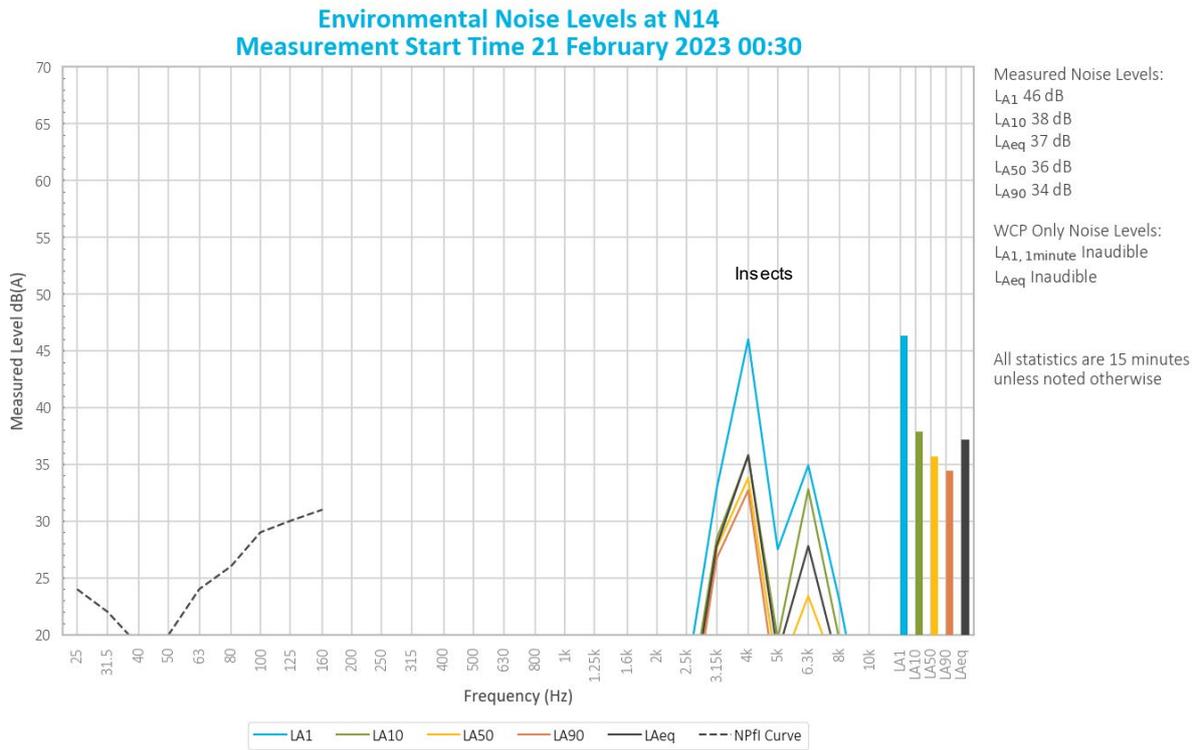


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Insects were responsible for measured noise levels.

Noise from nearby livestock, an owl, and a residential pump were also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023
LAeq	IA	IA	<25	IA	IA	IA	IA	<25	<25	<25	IA	IA
LA1,1min	IA	IA	<25	IA	IA	IA	IA	<25	<25	30	IA	IA

5.4 N15

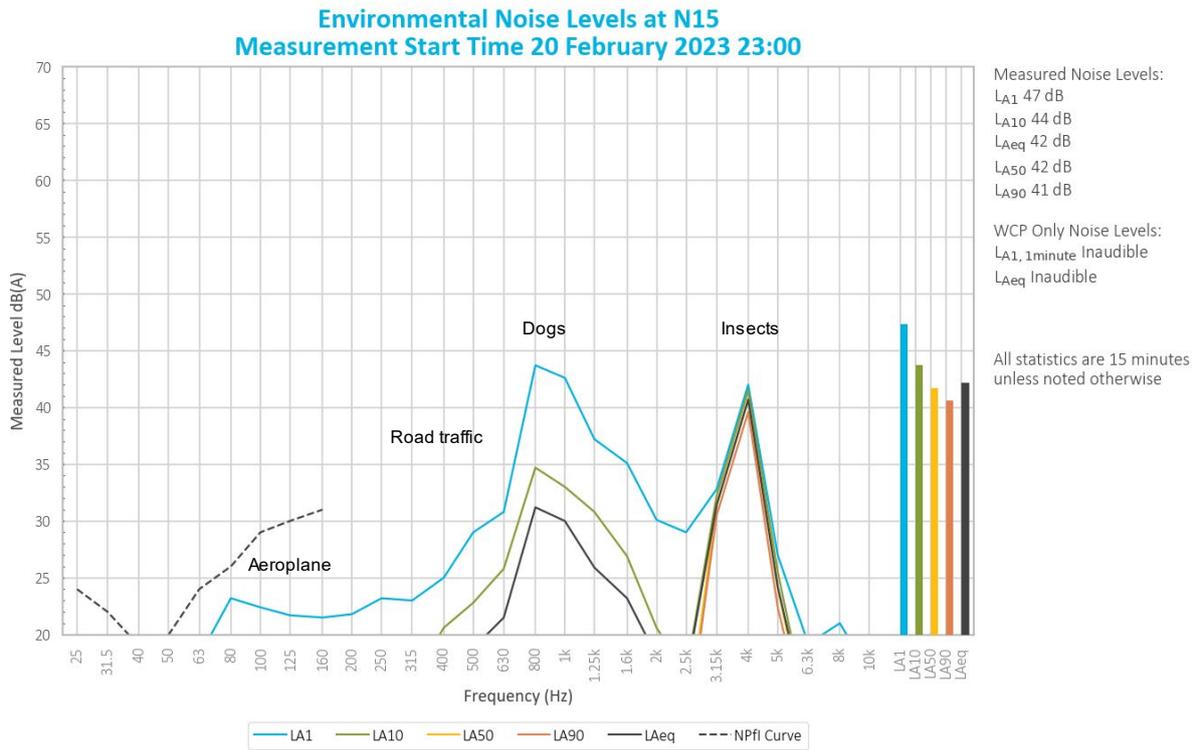


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

Insects and dogs were responsible for generating the measured LA1. Insects, dogs, and road traffic generated the measured LAeq and LA10. Insects generated the measured LA50 and LA90.

Noise from an aeroplane was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023
LAeq	IA	IA	23	34	38/34	29	IA	<25	IA	<25	<20	IA
LA1,1min	IA	IA	32	38	42/35	40	IA	<25	IA	<25	<20	IA

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

5.5 N17

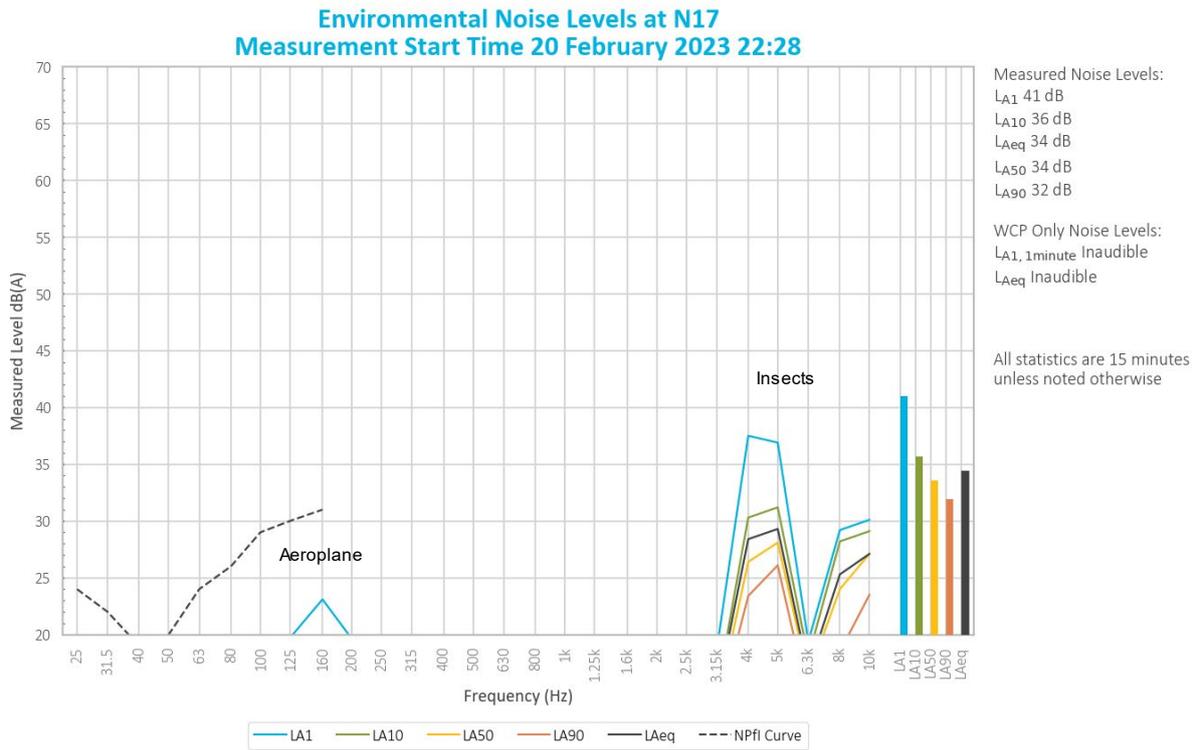


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

WCP was inaudible during the measurement.

Insects were responsible for measured noise levels.

Noise from frogs, a possum, an aeroplane, and a bird were also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹
LAeq	IA	IA	<20	32	23	27	IA	27	-	-	-	-
LA1,1min	IA	IA	23	37	28	30	IA	34	-	-	-	-

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

5.6 N19

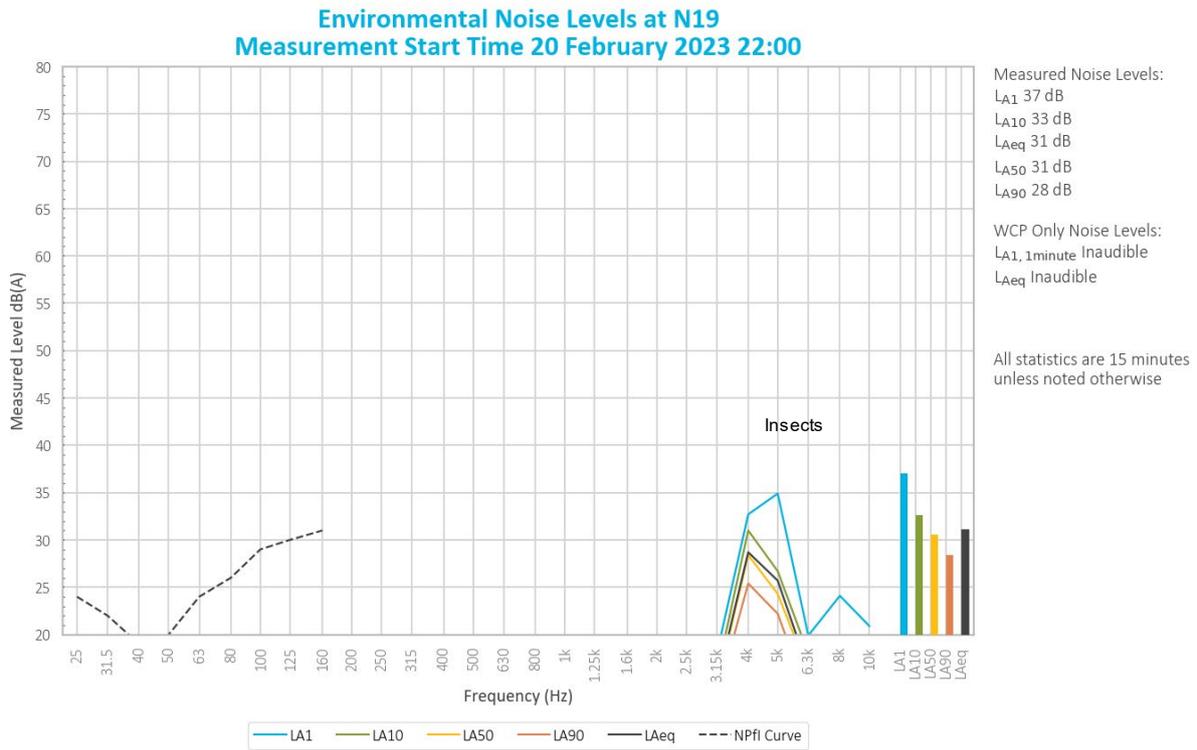


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Insects were responsible for measured noise levels.

Noise from frogs and a bird were also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹
LAeq	IA	IA	IA	<20	IA	IA	IA	<25	-	-	-	-
LA1,1min	IA	IA	IA	<20	IA	IA	IA	26	-	-	-	-

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

5.7 N20

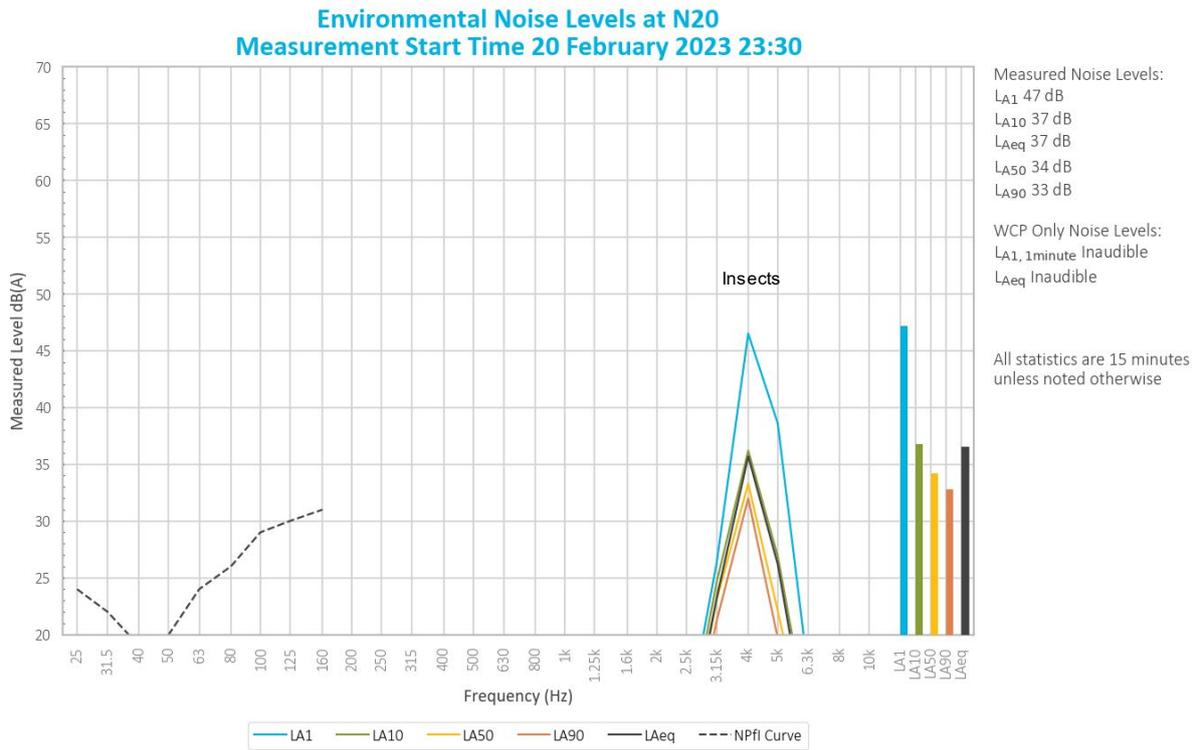


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Insects were responsible for measured noise levels.

Noise from a nearby creek and a distant aircraft were also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023
LAeq	IA	IA	<25	22	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	<25	28	IA	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 20/21 February 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the February 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

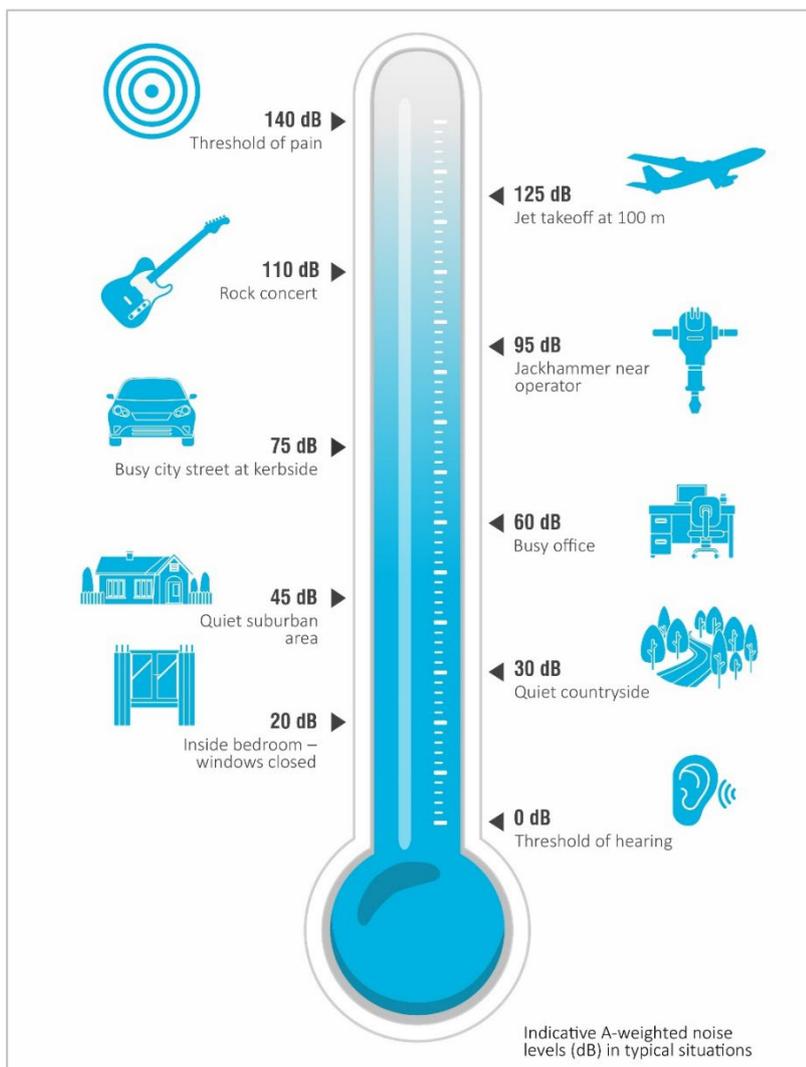


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.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
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Unit 36/14 Loyalty Rd
 North Rocks NSW AUSTRALIA 2151
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 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 :	Ken Williams

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

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

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%
8kHz	±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.

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



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**Sound Calibrator
IEC 60942:2017**

Calibration Certificate

Calibration Number C22374

Client Details EMM Consulting
Suite 6, Level 1, 146 Hunter Street
Newcastle NSW 2300

Equipment Tested/ Model Number : Pulsar Model 106
Instrument Serial Number : 74813

Atmospheric Conditions

Ambient Temperature : 25.8°C
Relative Humidity : 33.6%
Barometric Pressure : 100.19kPa

Calibration Technician : Lucky Jaiswal **Secondary Check:** Max Moore
Calibration Date : 09 Jun 2022 **Report Issue Date :** 20 Jun 2022

Approved Signatory :  **Ken Williams**

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.09	1000.30

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

Uncertainties of Measurement -			
Specific Tests	Environmental Conditions		
Generated SPL	±0.10dB	Temperature	±0.1°C
Frequency	±0.13%	Relative Humidity	±1.9%
Distortion	±0.20%	Barometric Pressure	±0.014kPa

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.

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

March 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP03

March 2023

Version	Date	Prepared by	Reviewed by	Comments
V1	03/04/2023	Will Moore	Tony Welbourne	

Approved by



Tony Welbourne

Associate Director

4 April 2023

Level 3 175 Scott Street

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TABLE OF CONTENTS

1	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – March 2023 ¹	10
Table 4.2	Measured atmospheric conditions – March 2023	10
Table 4.3	Site noise levels and limits – March 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 16/17 March 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

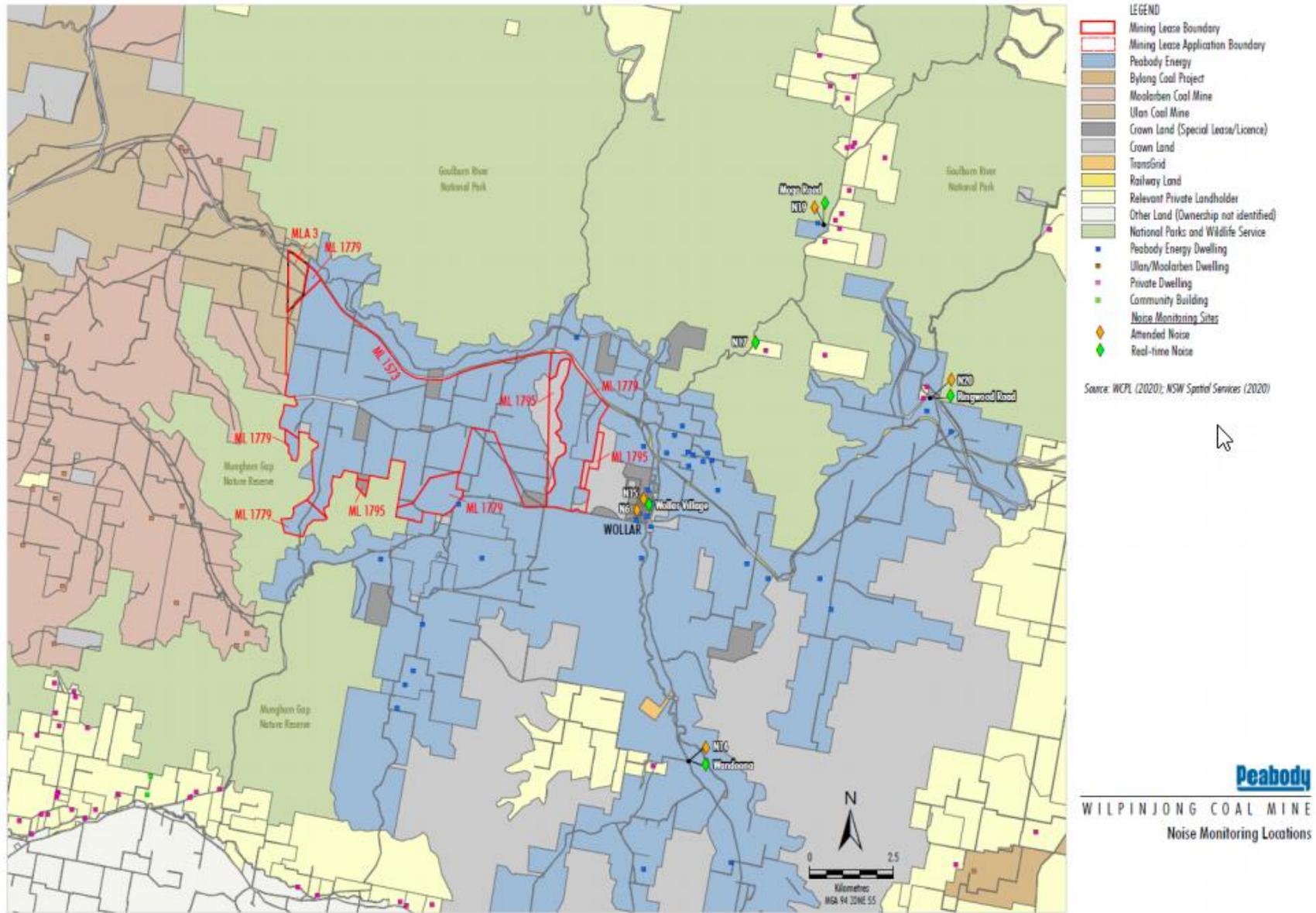


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If the exact contribution from site could not be established due to masking by other sources in a similar frequency range, but site noise levels are observed to be more than 5 dB lower than relevant limits, then a maximum estimate may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. IA indicates that site noise was inaudible at the monitoring location. NM means site noise was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- site noise levels were extremely low and unlikely, in many cases, to be noticed
- site noise levels were masked by other, more dominant, noise sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location
- it was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) so that it can be visually compared to the measured site spectra.

3.4 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00701424	02/06/2023	IEC 61672-1:2002
Pulsar 106 acoustic calibrator	79631	26/05/2023	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – March 2023¹

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	17/03/2023 00:28	51	40	37	36	35	34	31
N14	16/03/2023 23:30	50	42	42	41	41	40	38
N15	16/03/2023 23:00	47	43	42	40	40	38	35
N17	16/03/2023 22:24	45	38	36	34	33	31	28
N19	16/03/2023 22:00	41	34	32	30	30	29	26
N20	17/03/2023 00:00	53	49	41	38	35	29	26

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – March 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	17/03/2023 00:28	16	0.0	-	0
N14	16/03/2023 23:30	20	0.0	-	0
N15	16/03/2023 23:00	23	0.0	-	0
N17	16/03/2023 22:24	21	0.0	-	0
N19	16/03/2023 22:00	26	0.0	-	0
N20	17/03/2023 00:00	20	0.0	-	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfI and methodology described in Section 3.3. There were no modifying factors, 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.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – March 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	17/03/2023 00:28	0.0	-	G	No	37	45	IA	IA	N/A	N/A
N14	16/03/2023 23:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	16/03/2023 23:00	0.0	-	G	No	37	45	<20	<20	N/A	N/A
N17	16/03/2023 22:24	0.0	-	G	No	38	45	27	30	N/A	N/A
N19	16/03/2023 22:00	0.9	330	G	No	35	45	IA	IA	N/A	N/A
N20	17/03/2023 00:00	0.4	308	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

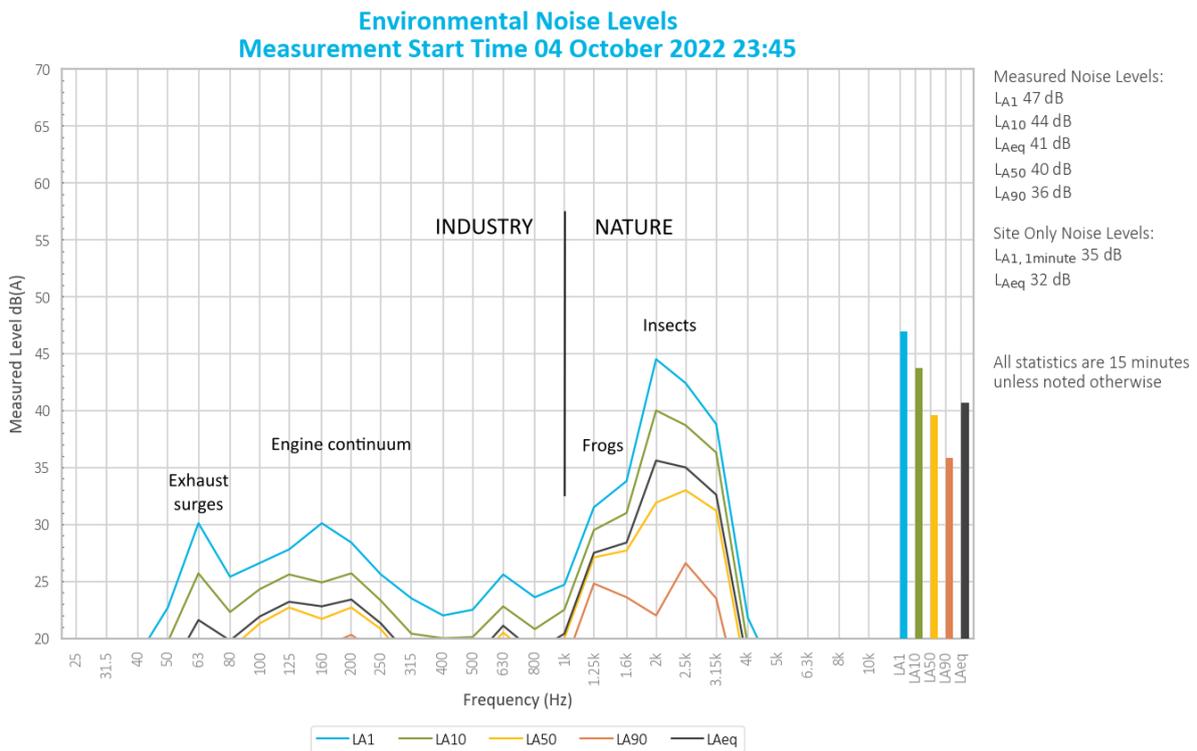


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

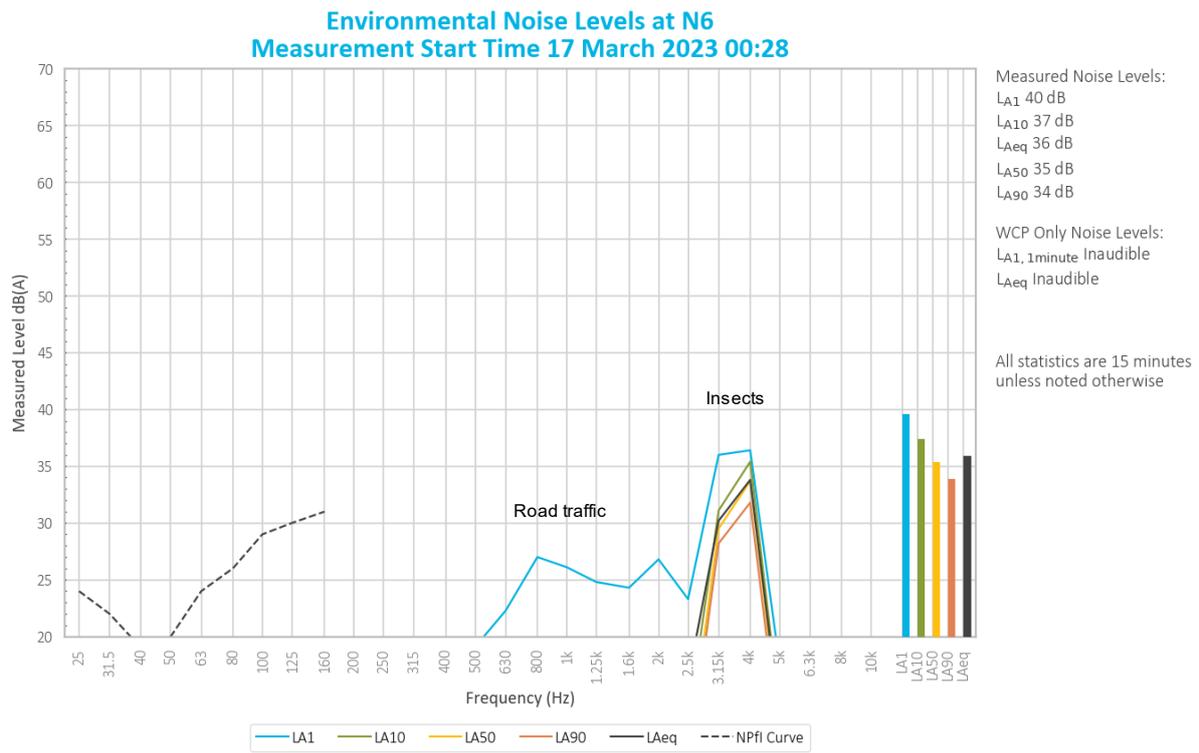


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

Insects generated measured noise levels.

Noise from bats, birds, local continuum and road traffic was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023
LAeq	IA	<20	<25	30	IA	IA	IA	IA	<25	<20	IA	IA
LA1,1min	IA	23	<25	37	IA	IA	IA	IA	27	<20	IA	IA

5.3 N14

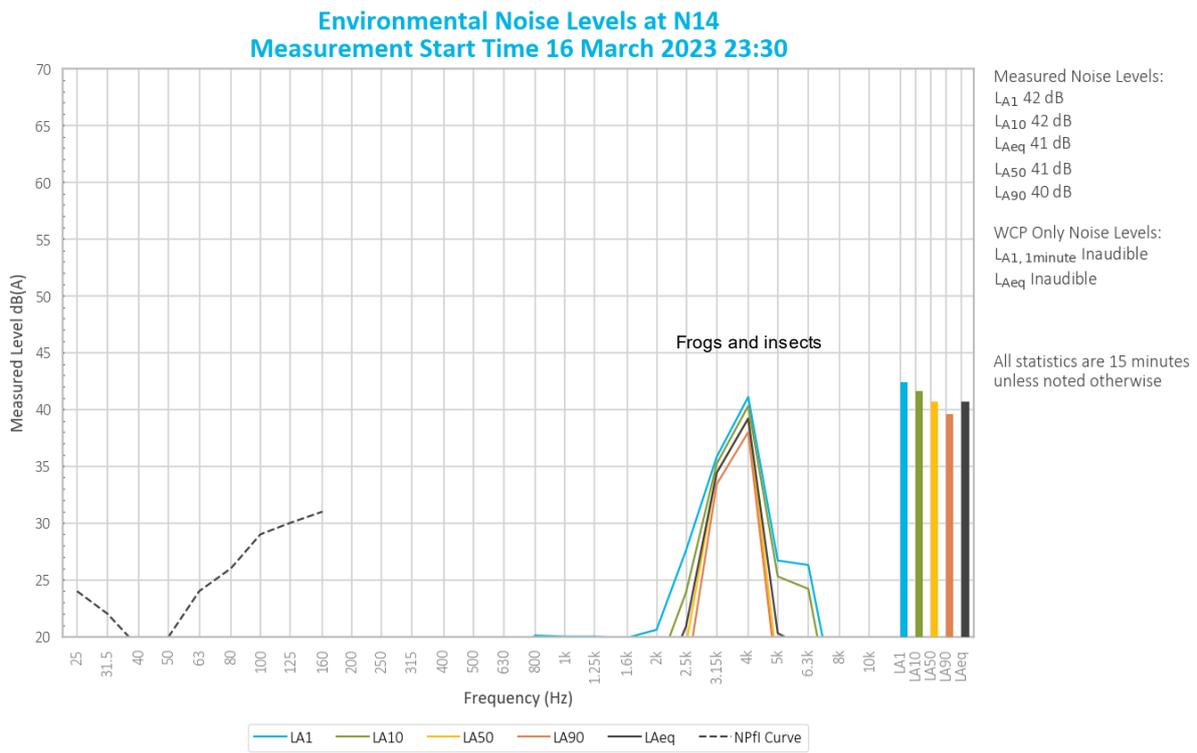


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

Noise from bats, and continuum from a nearby substation was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023
LAeq	IA	<25	IA	IA	IA	IA	<25	<25	<25	IA	IA	IA
LA1,1min	IA	<25	IA	IA	IA	IA	<25	<25	30	IA	IA	IA

5.4 N15

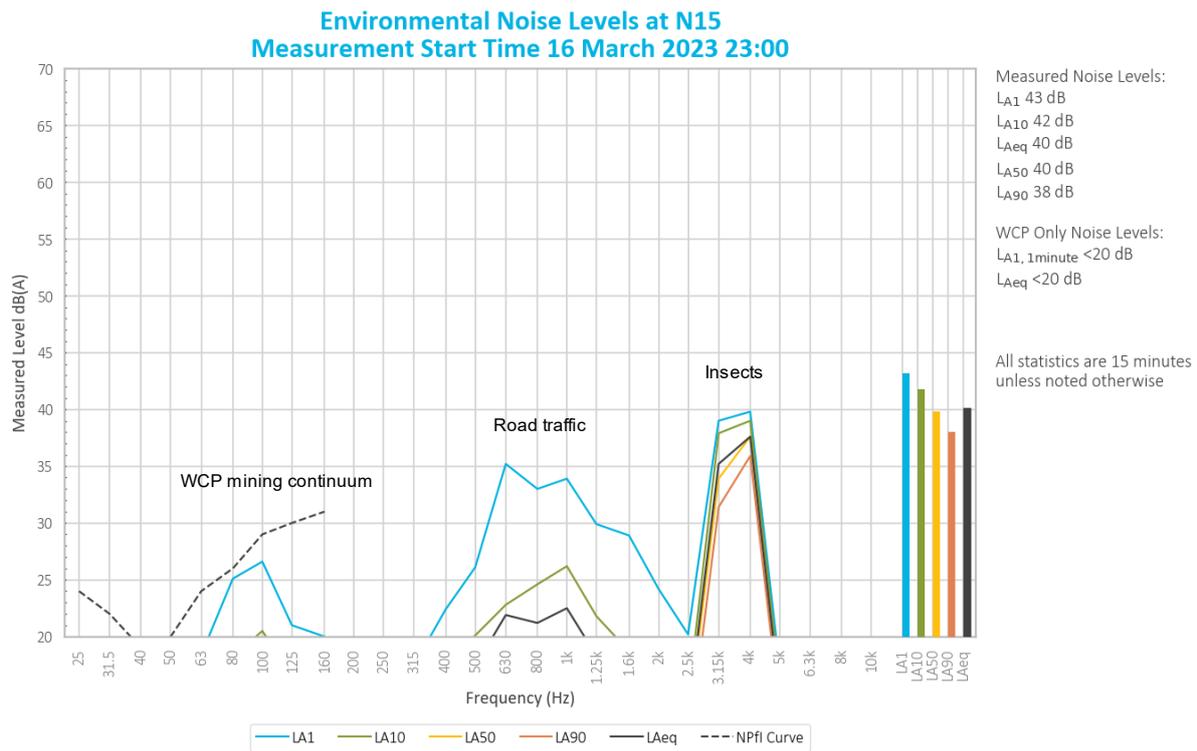


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

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

Insects generated measured noise levels.

Noise from bats, dogs and road traffic was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	March 2022	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023
LAeq	IA	23	34	38/34	29	IA	<25	IA	<25	<20	IA	IA
LA1,1min	IA	32	38	42/35	40	IA	<25	IA	<25	<20	IA	IA

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

5.5 N17

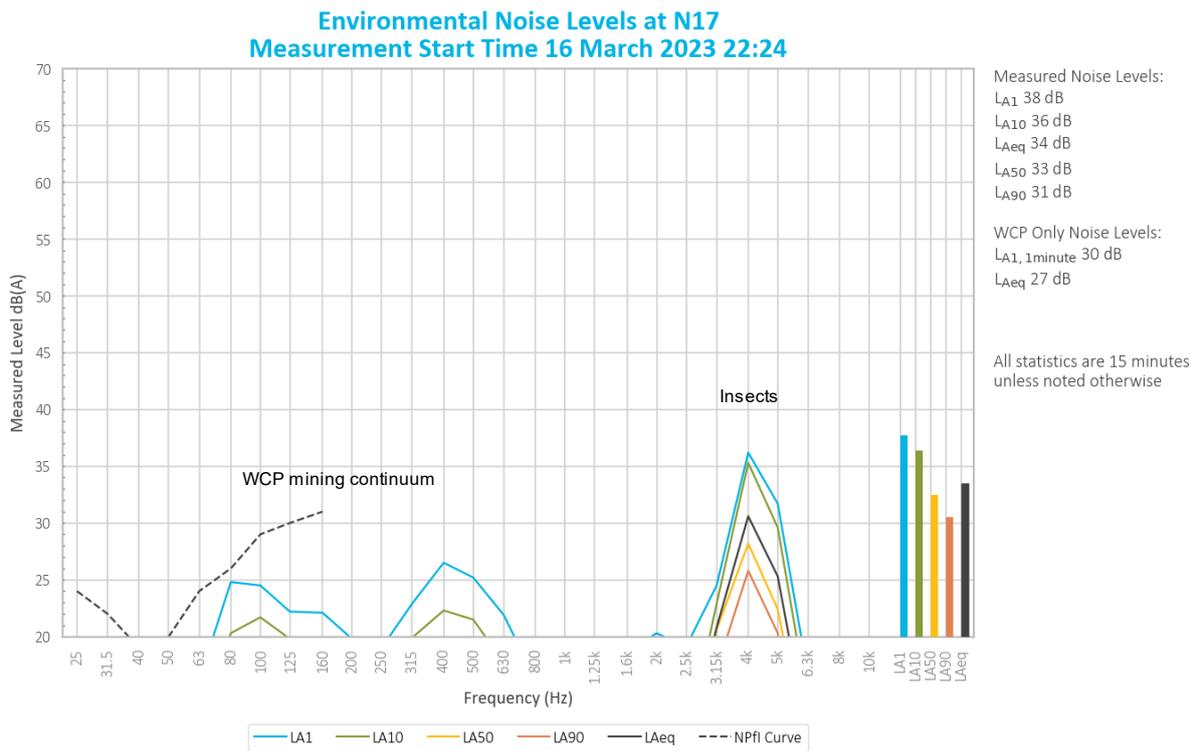


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

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

Insects generated measured noise levels.

Noise from bats was also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023
L_{Aeq}	IA	<20	32	23	27	IA	27	-	-	-	-	IA
$L_{A1,1min}$	IA	23	37	28	30	IA	34	-	-	-	-	IA

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

5.6 N19

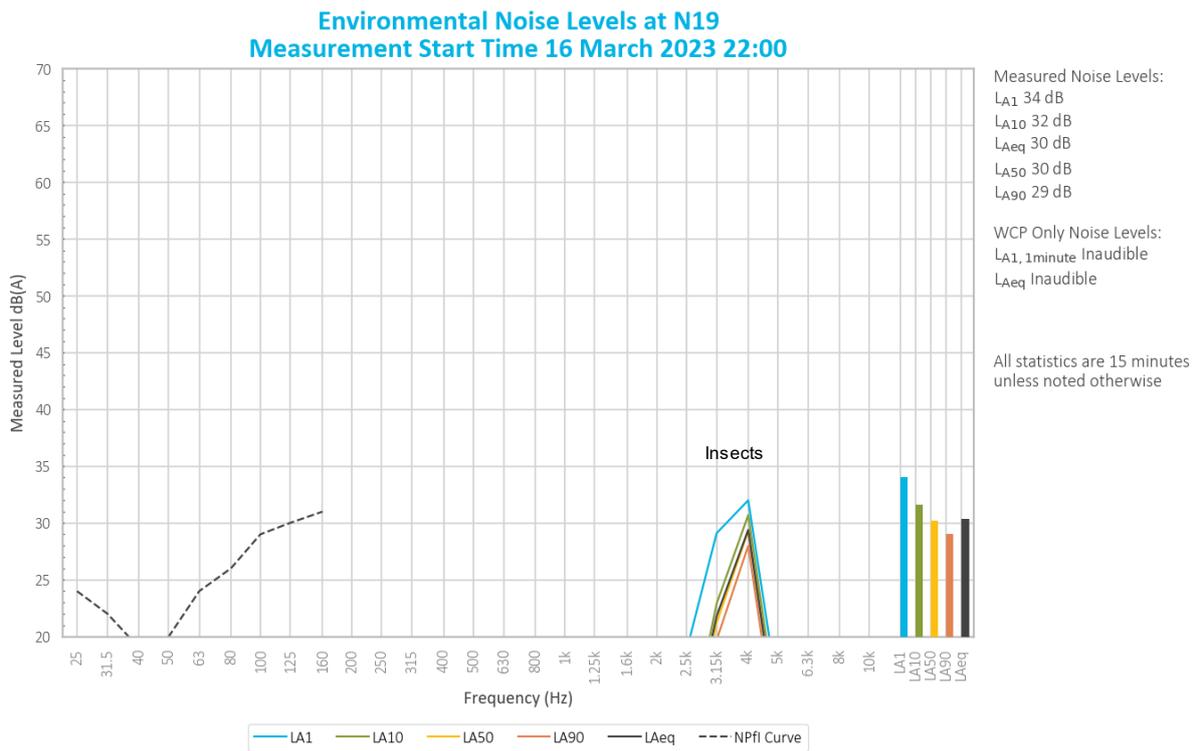


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Insects generated measured noise levels.

Noise from an aeroplane and bats was also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023
LAeq	IA	IA	<20	IA	IA	IA	<25	-	-	-	-	IA
LA1,1min	IA	IA	<20	IA	IA	IA	26	-	-	-	-	IA

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

5.7 N20

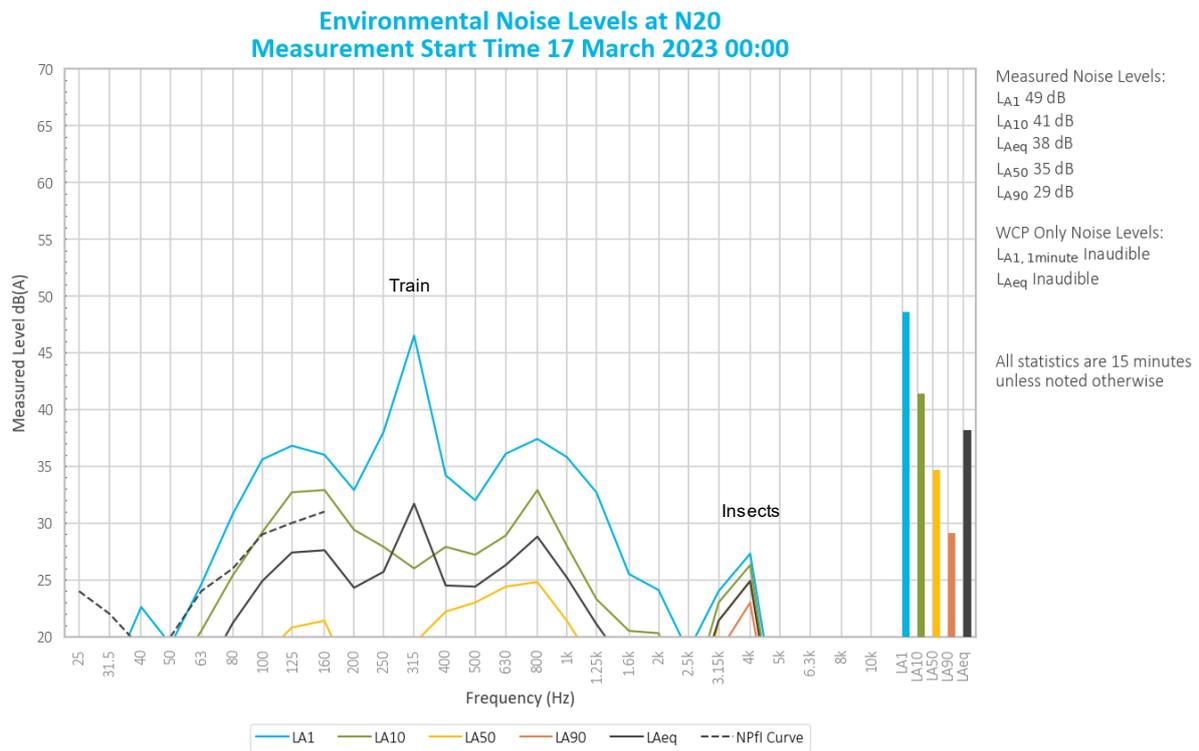


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

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

Noise from bats and road traffic was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023
LAeq	IA	<25	22	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	<25	28	IA	IA	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 16/17 March 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the March 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

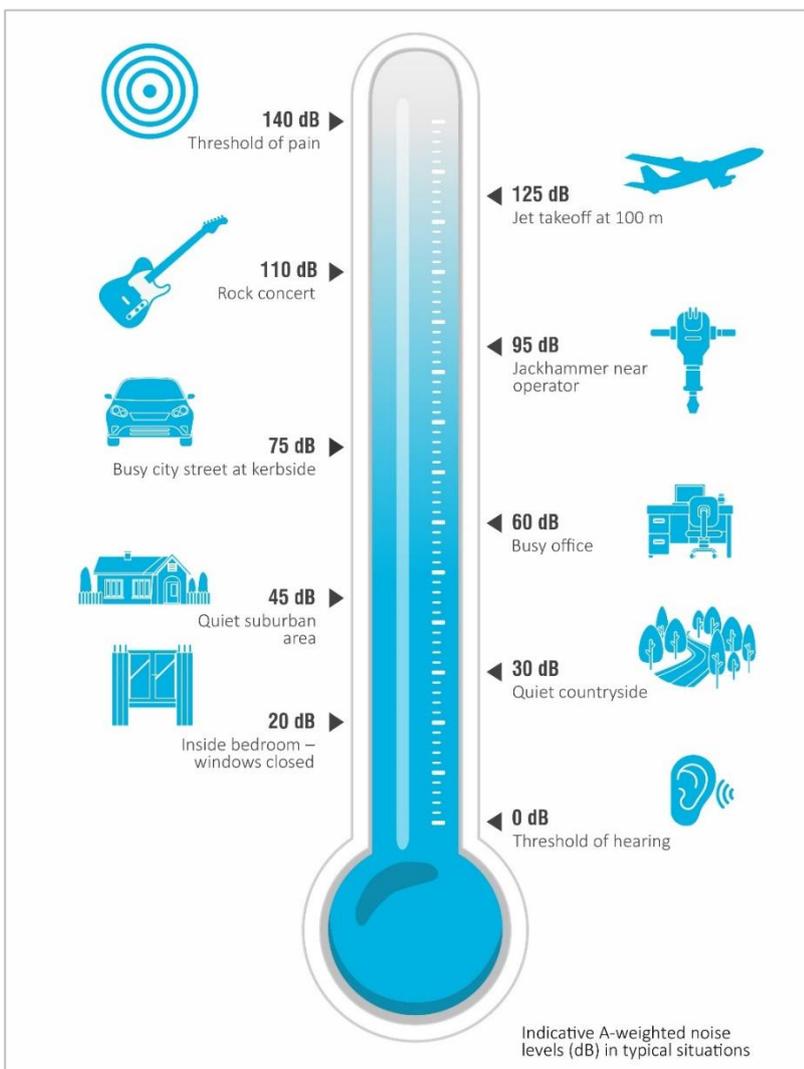


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C21344

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 20.6°C	Ambient Temperature : 22.4°C
Relative Humidity : 47%	Relative Humidity : 44%
Barometric Pressure : 101.05kPa	Barometric Pressure : 100.91kPa
Calibration Technician : Jeff Yu	Secondary Check: Harrison Kim
Calibration Date : 2 Jun 2021	Report Issue Date : 2 Jun 2021
Approved Signatory :	Ken Williams

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

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

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

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

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



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

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

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

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



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Sound Calibrator

IEC 60942-2017

Calibration Certificate

Calibration Number C21341

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

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

Atmospheric Conditions

Ambient Temperature : 22.7°C
Relative Humidity : 47.5%
Barometric Pressure : 100.64kPa

Calibration Technician : Jeff Yu
Calibration Date : 26 May 2021
Secondary Check: Harrison Kim
Report Issue Date : 26 May 2021

Approved Signatory : 

Ken Williams

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

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

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

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

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

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

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

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

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

April 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP04

April 2023

Version	Date	Prepared by	Reviewed by	Comments
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26 April 2023

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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	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – April 2023 ¹	10
Table 4.2	Measured atmospheric conditions – April 2023	10
Table 4.3	Site noise levels and limits – April 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 20/21 April 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

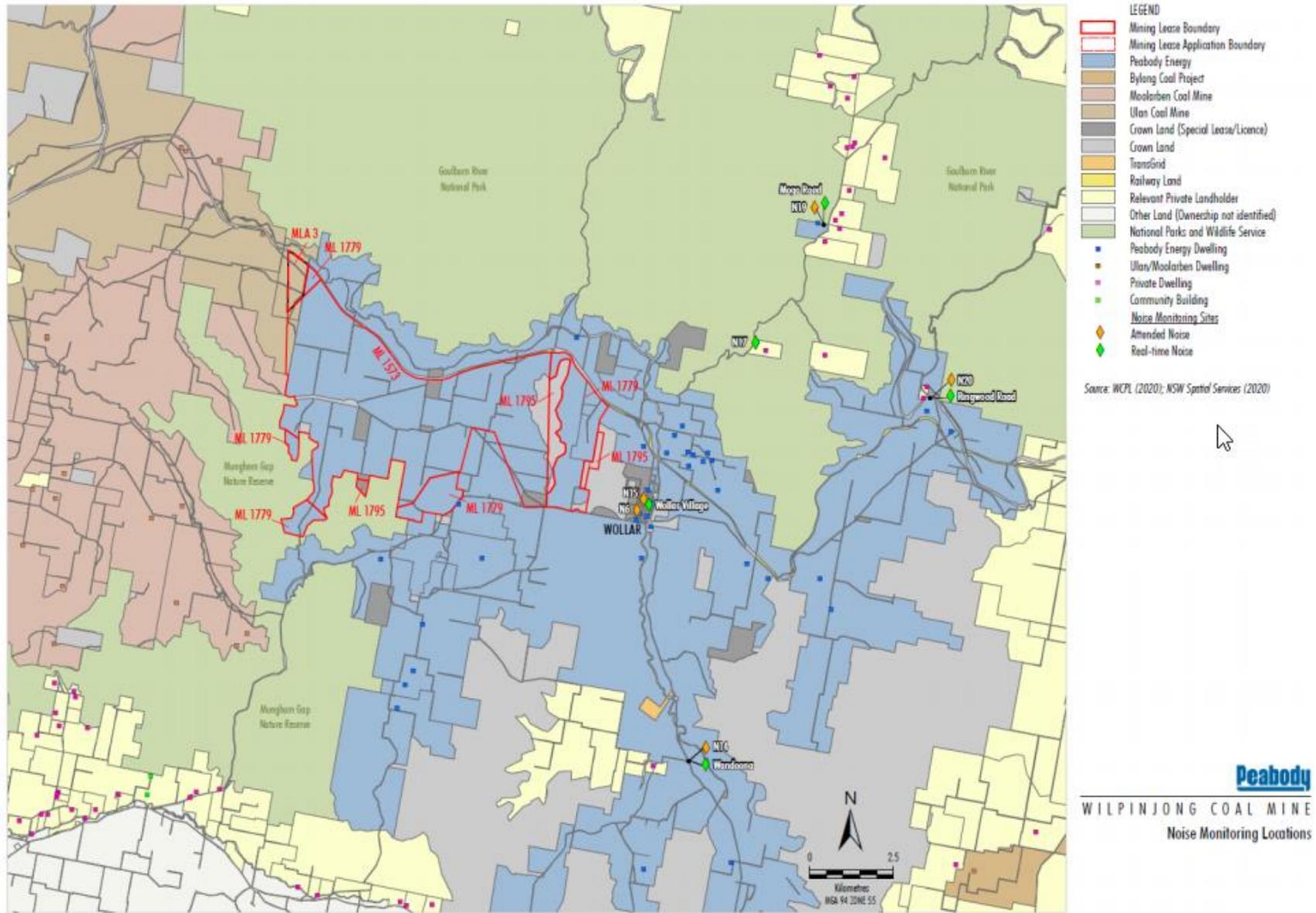


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1% of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10% of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If the exact contribution from site could not be established due to masking by other sources in a similar frequency range, but site noise levels are observed to be more than 5 dB lower than relevant limits, then a maximum estimate may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. IA indicates that site noise was inaudible at the monitoring location. NM means site noise was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- site noise levels were extremely low and unlikely, in many cases, to be noticed
- site noise levels were masked by other, more dominant, noise sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location
- it was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	23/01/2025	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	78226	24/01/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – April 2023 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	20/04/2023 23:41	48	44	38	34	29	21	19
N14	21/04/2023 01:00	47	35	28	27	25	23	22
N15	20/04/2023 23:00	45	38	32	29	27	21	19
N17	20/04/2023 22:26	46	42	36	32	24	21	19
N19	20/04/2023 22:02	46	31	26	24	21	19	16
N20	21/04/2023 00:15	48	45	29	31	23	21	19

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – April 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	20/04/2023 23:41	14	0.0	-	1
N14	21/04/2023 01:00	12	0.0	-	1
N15	20/04/2023 23:00	12	0.0	-	0
N17	20/04/2023 22:26	14	0.0	-	0
N19	20/04/2023 22:02	15	0.5	40	0
N20	21/04/2023 00:15	14	0.0	-	1

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – April 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	20/04/2023 23:41	1.6	71	E	Yes	37	45	IA	IA	Nil	Nil
N14	21/04/2023 01:00	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	20/04/2023 23:00	1.4	71	E	Yes	37	45	IA	IA	Nil	Nil
N17	20/04/2023 22:26	1.6	81	D	Yes	38	45	IA	IA	Nil	Nil
N19	20/04/2023 22:02	1.8	65	D	Yes	35	45	IA	IA	Nil	Nil
N20	21/04/2023 00:15	0.9	54	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

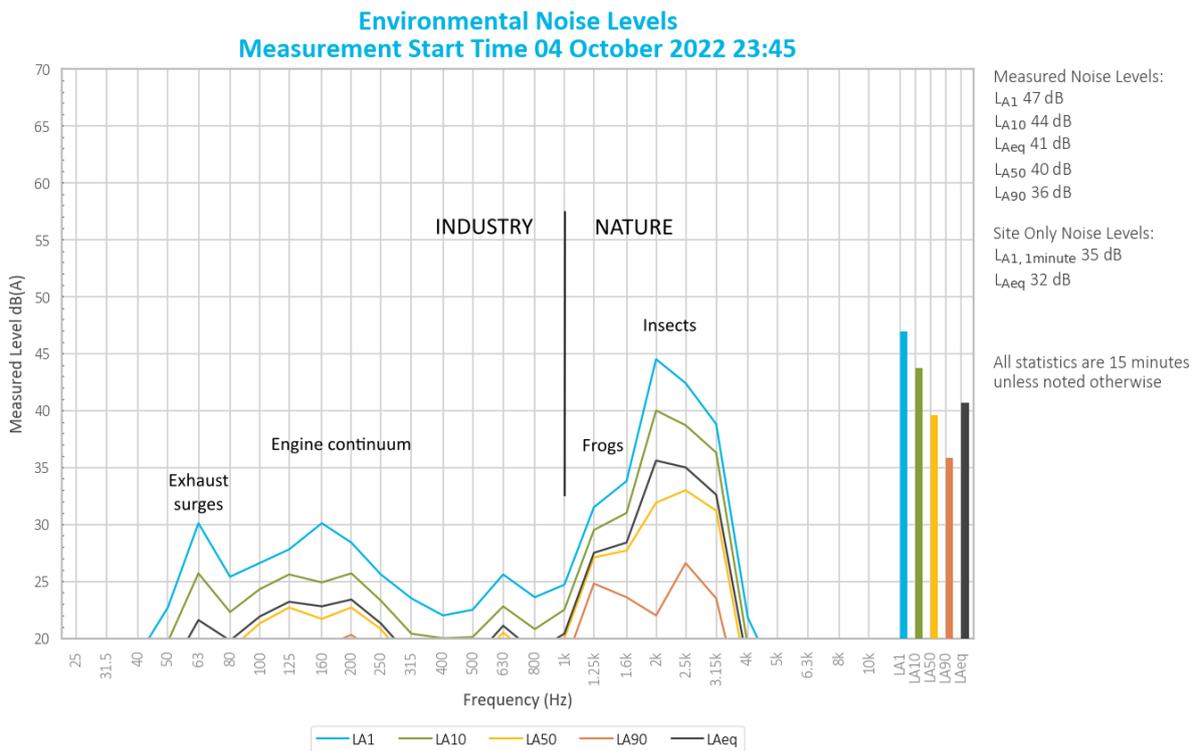


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

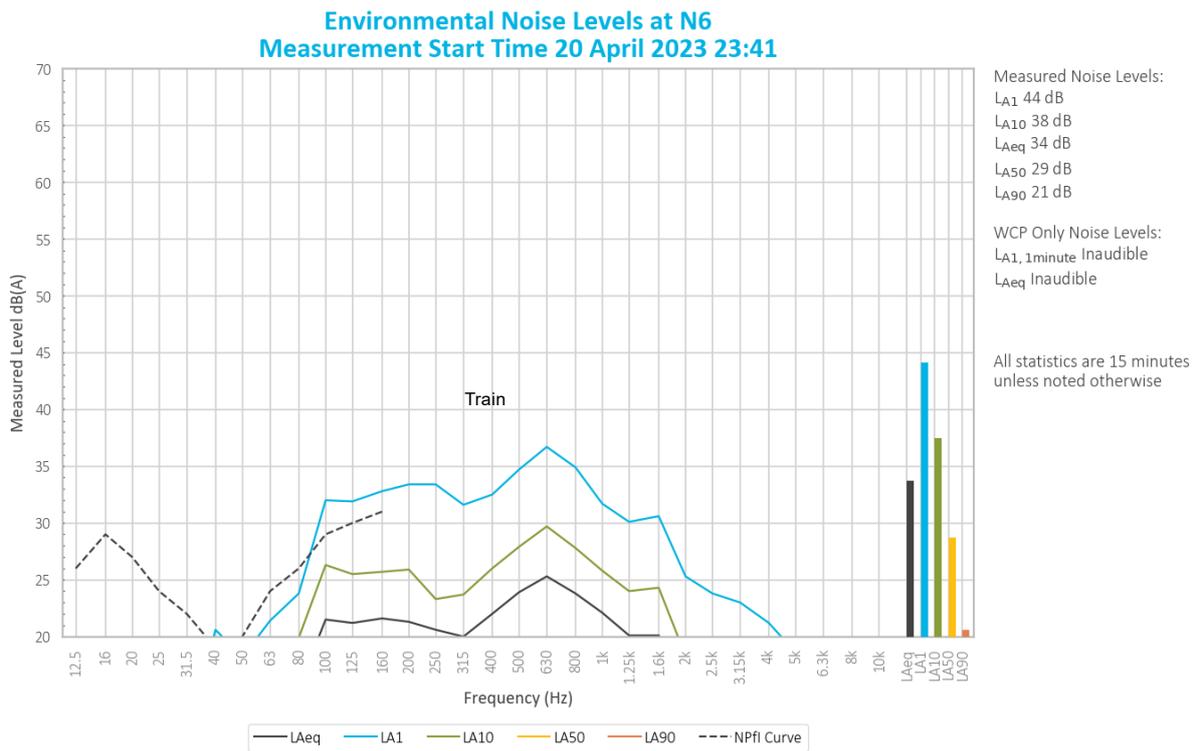


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

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

Noise from dogs and road traffic was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023
L_{Aeq}	<20	<25	30	IA	IA	IA	IA	<25	<20	IA	IA	IA
$L_{A1,1min}$	23	<25	37	IA	IA	IA	IA	27	<20	IA	IA	IA

5.3 N14

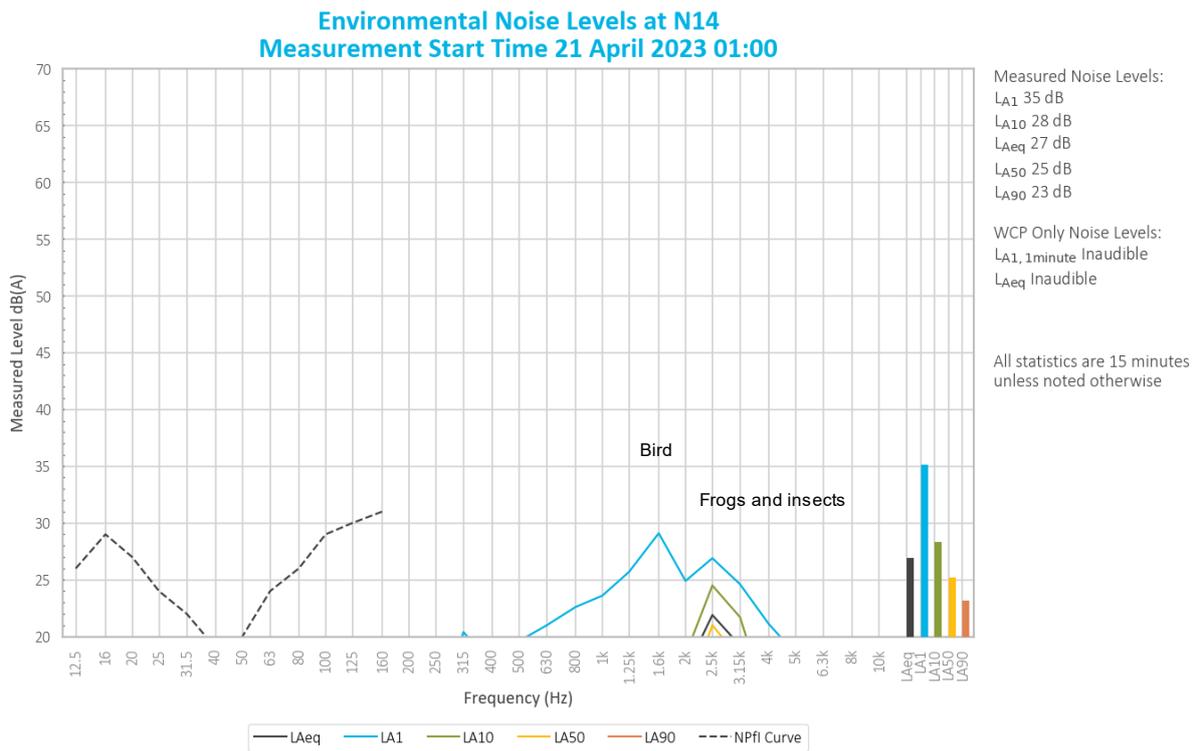


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. A bird generated the measured LA1.

Continuum from a nearby substation was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023
LAeq	<25	IA	IA	IA	IA	<25	<25	<25	IA	IA	IA	IA
LA1,1min	<25	IA	IA	IA	IA	<25	<25	30	IA	IA	IA	IA

5.4 N15

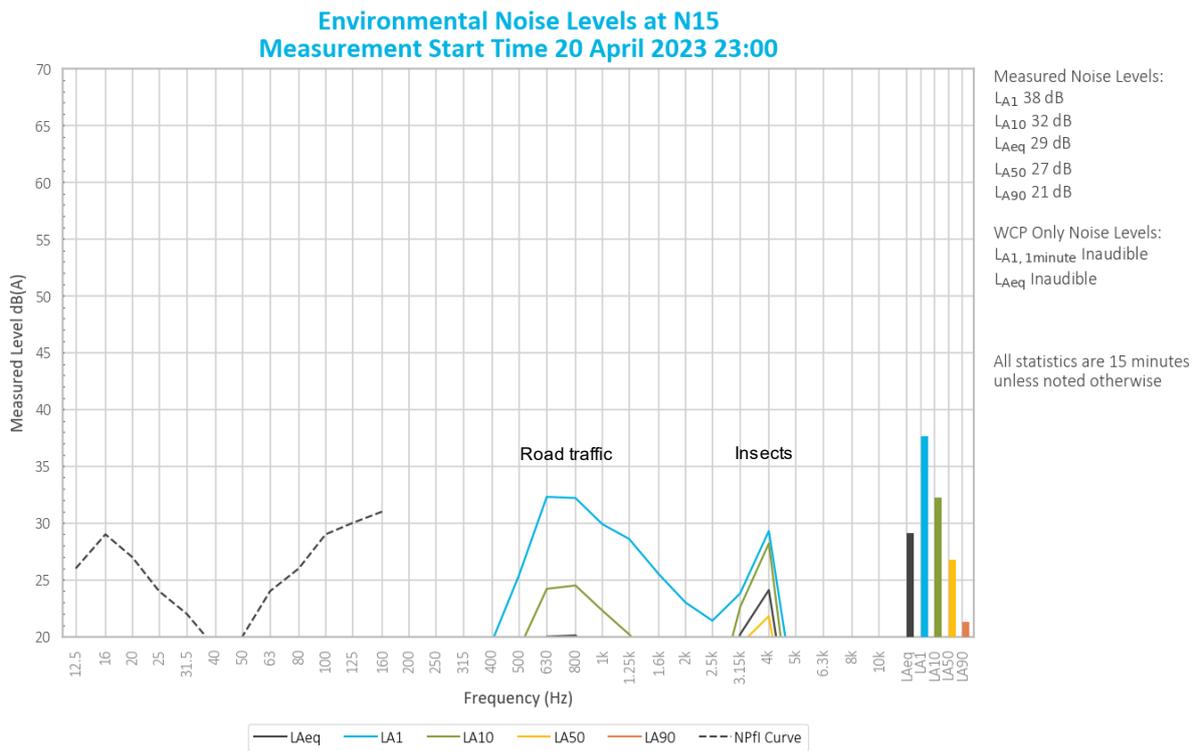


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

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

Noise from birds, dogs and local residents was also noted at very low levels.

Table 5.3 Historical WCP only noise levels at N15

Month	April 2022	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023
LAeq	23	34	38/34	29	IA	<25	IA	<25	<20	IA	IA	<20
LA1,1min	32	38	42/35	40	IA	<25	IA	<25	<20	IA	IA	<20

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

5.5 N17

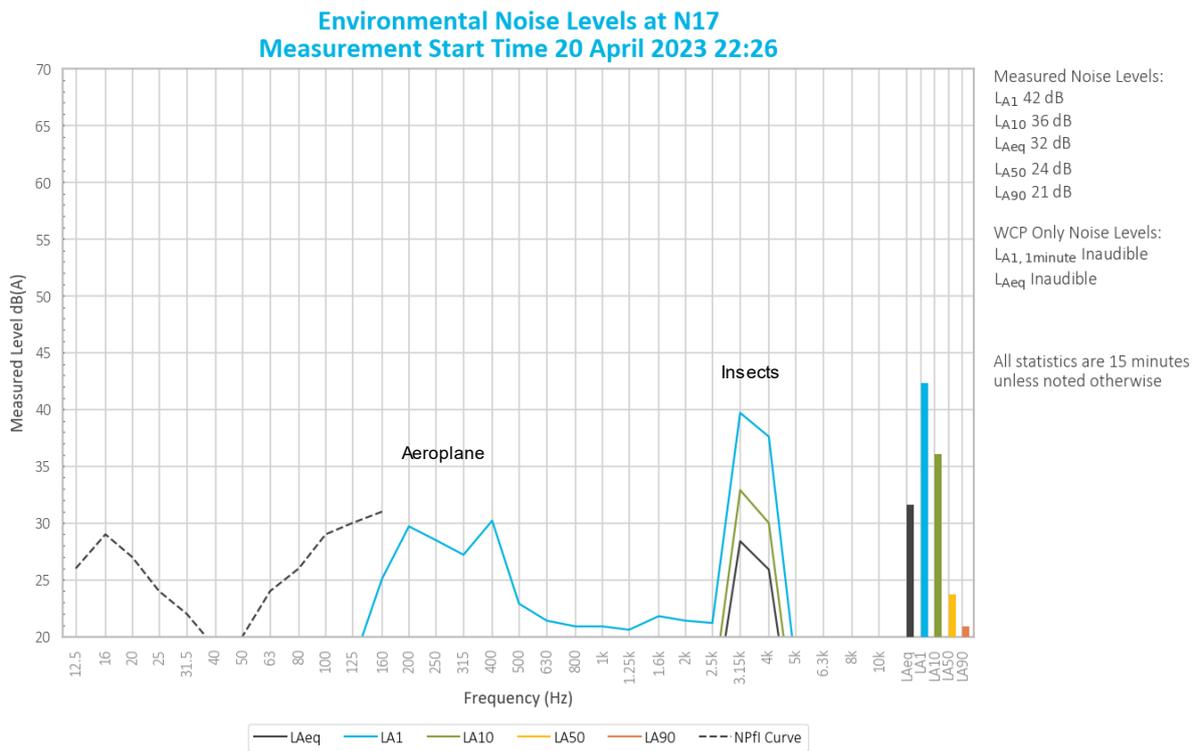


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

WCP was inaudible during the measurement.

Insects were primarily responsible for generating measured noise levels. An aeroplane contributed to the measured LA10.

Noise from birds and local continuum was also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023
LAeq	<20	32	23	27	IA	27	-	-	-	-	IA	27
LA1,1min	23	37	28	30	IA	34	-	-	-	-	IA	30

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

5.6 N19

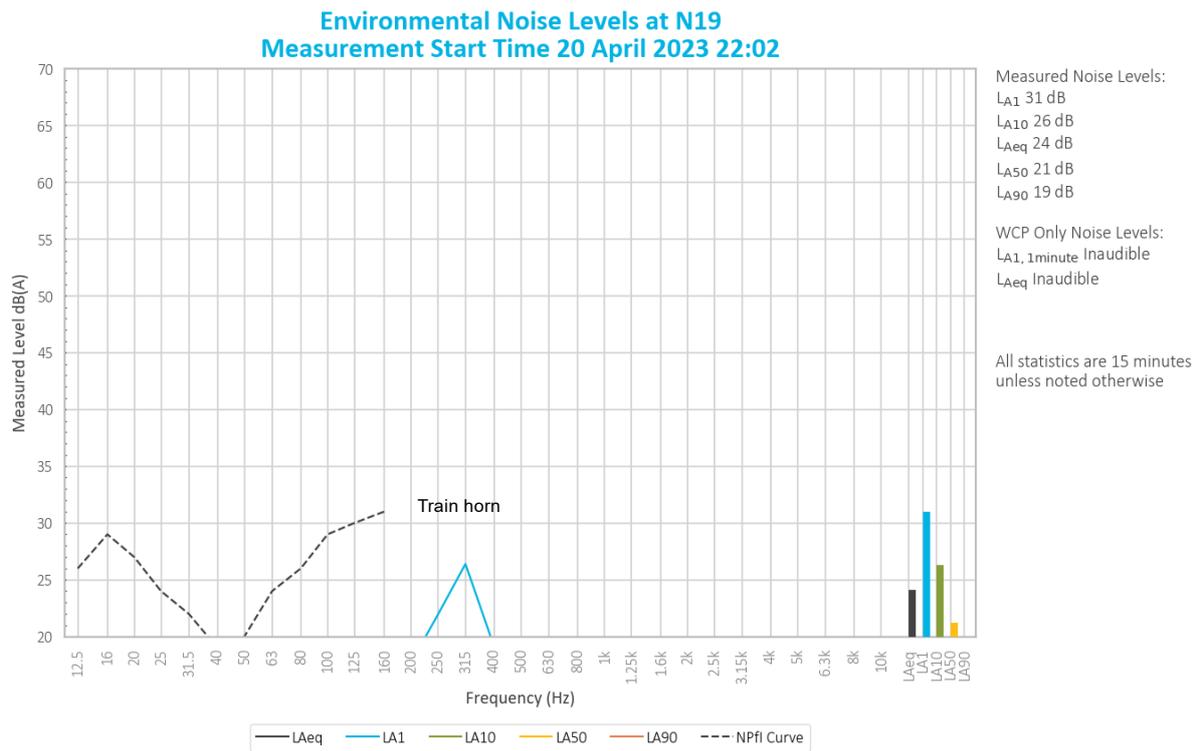


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

A train horn generated the measured LA1. An aeroplane contributed to the LA10 and LAeq. Insects contributed to the LA10 and LAeq and generated the measured LA50 and LA90.

Noise from birds and a breeze in nearby foliage was also noted at very low levels.

Table 5.5 Historical WCP only noise levels at N19

Month	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023
LAeq	IA	<20	IA	IA	IA	<25	-	-	-	-	IA	IA
LA1,1min	IA	<20	IA	IA	IA	26	-	-	-	-	IA	IA

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

5.7 N20

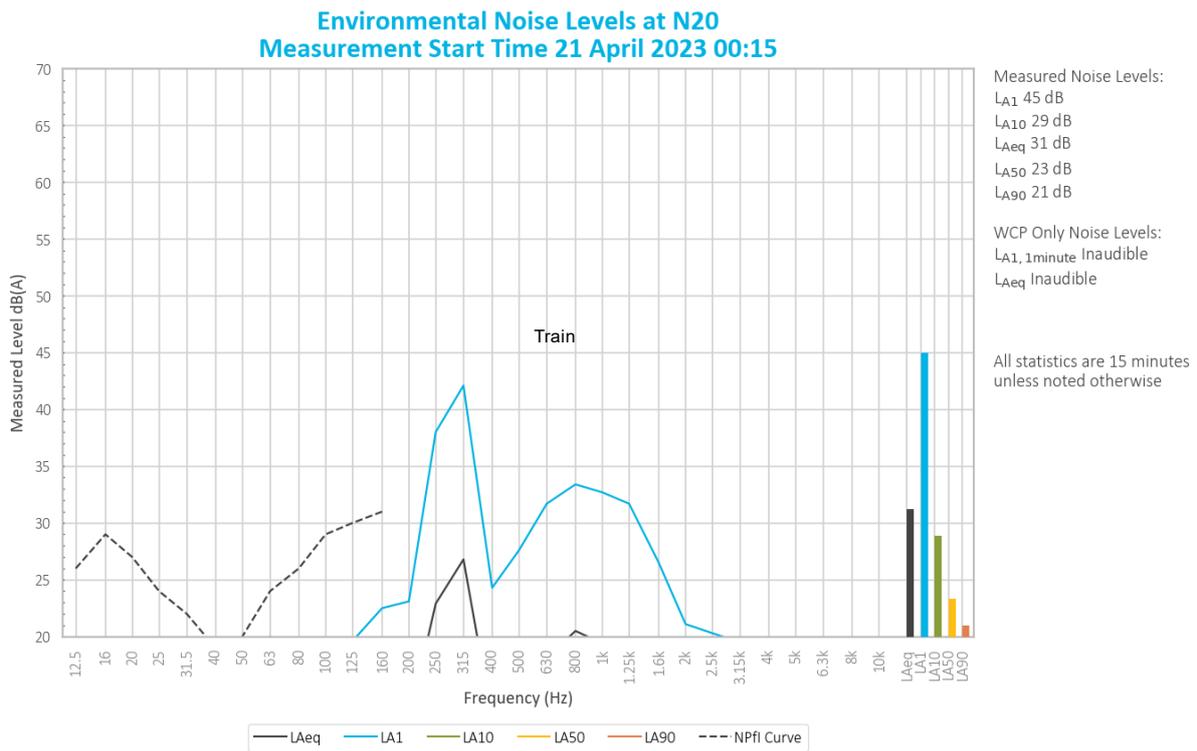


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

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

Noise from running water was also noted at a very low level.

Table 5.6 Historical WCP only noise levels at N20

Month	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023
LAeq	<25	22	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	<25	28	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 20/21 April 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the April 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

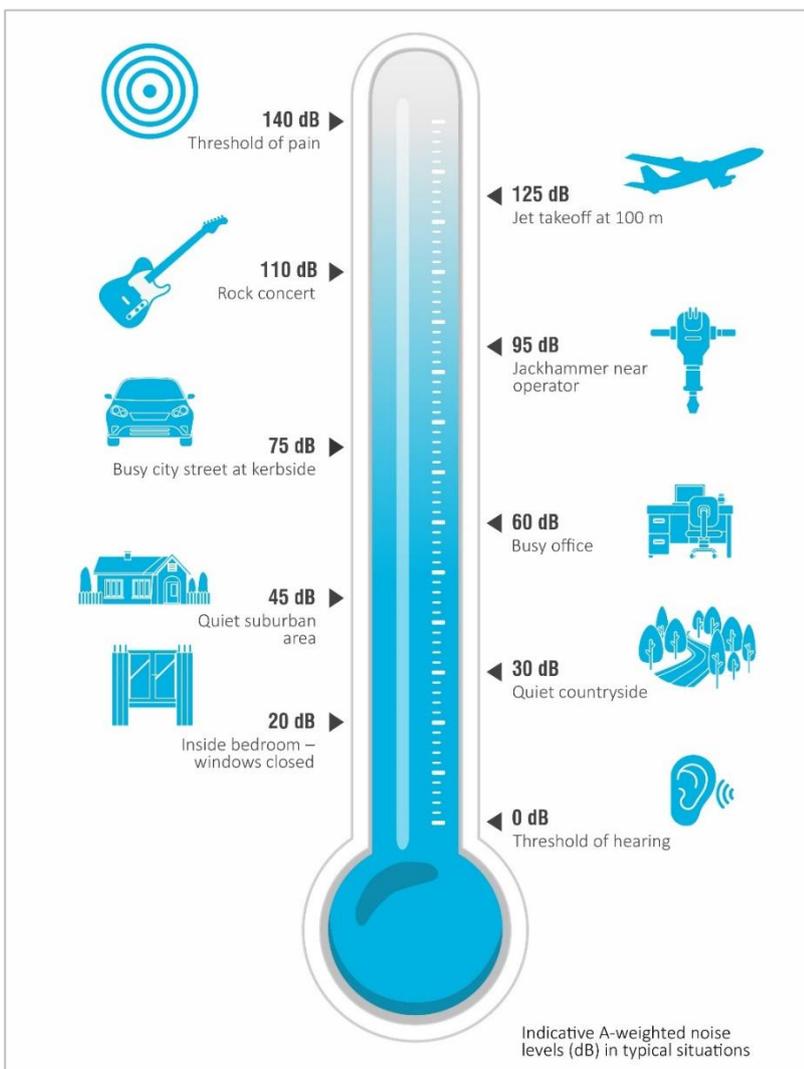


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.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
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C23032

Client Details	EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	30131882
Microphone Serial Number :	04739
Pre-amplifier Serial Number :	11942
Firmware Version :	2.0
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 23.5°C
Relative Humidity : 47.3%	Relative Humidity : 46.1%
Barometric Pressure : 100.14kPa	Barometric Pressure : 100.16kPa
Calibration Technician : Shaheen Boaz	Secondary Check: Dylan Selge
Calibration Date : 23 Jan 2023	Report Issue Date : 25 Jan 2023
Approved Signatory :	Ken Williams

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

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

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%
8kHz	±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.

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



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Sound Calibrator
IEC 60942:2017

Calibration Certificate

Calibration Number C23033

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

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

Atmospheric Conditions
Ambient Temperature : 24.4°C
Relative Humidity : 50.2%
Barometric Pressure : 100.2kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 24 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.17	1000.40

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Uncertainties of Measurement -			
Specific Tests		Environmental Conditions	
Generated SPL	±0.10dB	Temperature	±0.1°C
Frequency	±0.13%	Relative Humidity	±1.9%
Distortion	±0.20%	Barometric Pressure	±0.014kPa

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



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

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

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

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

May 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP05

May 2023

Version	Date	Prepared by	Reviewed by	Comments
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TABLE OF CONTENTS

1	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – May 2023 ¹	10
Table 4.2	Measured atmospheric conditions – May 2023	10
Table 4.3	Site noise levels and limits – May 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 30/31 May 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

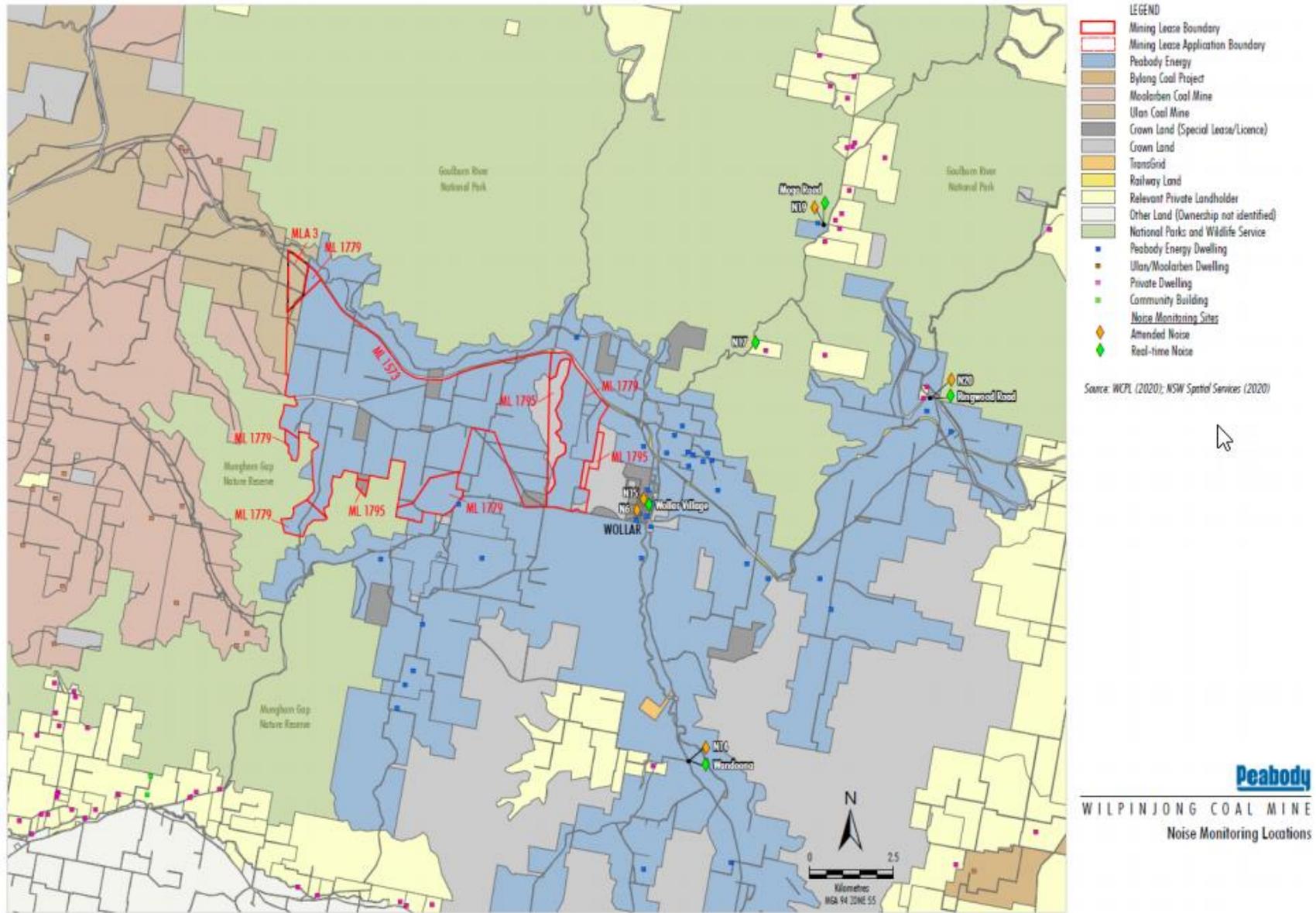


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of them may be provided. These are expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- site noise levels were extremely low and unlikely, in many cases, to be noticed
- site noise levels were masked by other, more dominant, noise sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location
- it was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00370304	31/10/2024	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	81334	29/11/2023	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – May 2023 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	31/05/2023 00:45	43	35	32	28	27	22	19
N14	30/05/2023 23:45	36	28	25	23	23	21	18
N15	30/05/2023 23:15	38	36	33	28	25	22	21
N17	30/05/2023 22:23	42	39	38	33	30	26	23
N19	30/05/2023 22:00	38	32	30	28	28	26	23
N20	31/05/2023 00:15	51	47	37	36	33	27	23

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – May 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	31/05/2023 00:45	5	0.0	-	0
N14	30/05/2023 23:45	4	0.0	-	0
N15	30/05/2023 23:15	6	0.0	-	0
N17	30/05/2023 22:23	7	0.0	-	0
N19	30/05/2023 22:00	10	0.7	310	0
N20	31/05/2023 00:15	5	0.9	280	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – May 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	31/05/2023 00:45	1.0	290	F	Yes	37	45	28	38	Nil	Nil
N14	30/05/2023 23:45	1.1	296	E	Yes	35	45	IA	IA	Nil	Nil
N15	30/05/2023 23:15	1.4	260	F	Yes	37	45	<25	32	Nil	Nil
N17	30/05/2023 22:23	0.0	-	F	Yes	38	45	<30	<30	Nil	Nil
N19	30/05/2023 22:00	1.6	232	E	Yes	35	45	26	28	Nil	Nil
N20	31/05/2023 00:15	1.1	287	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

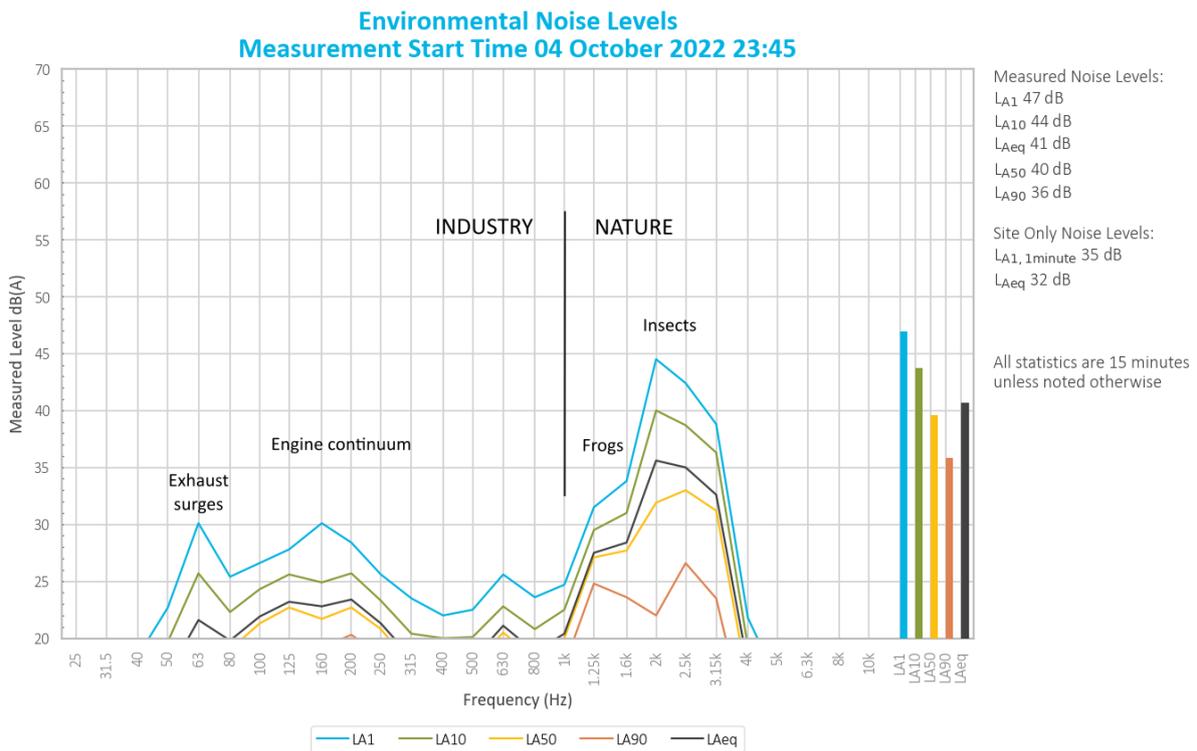


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

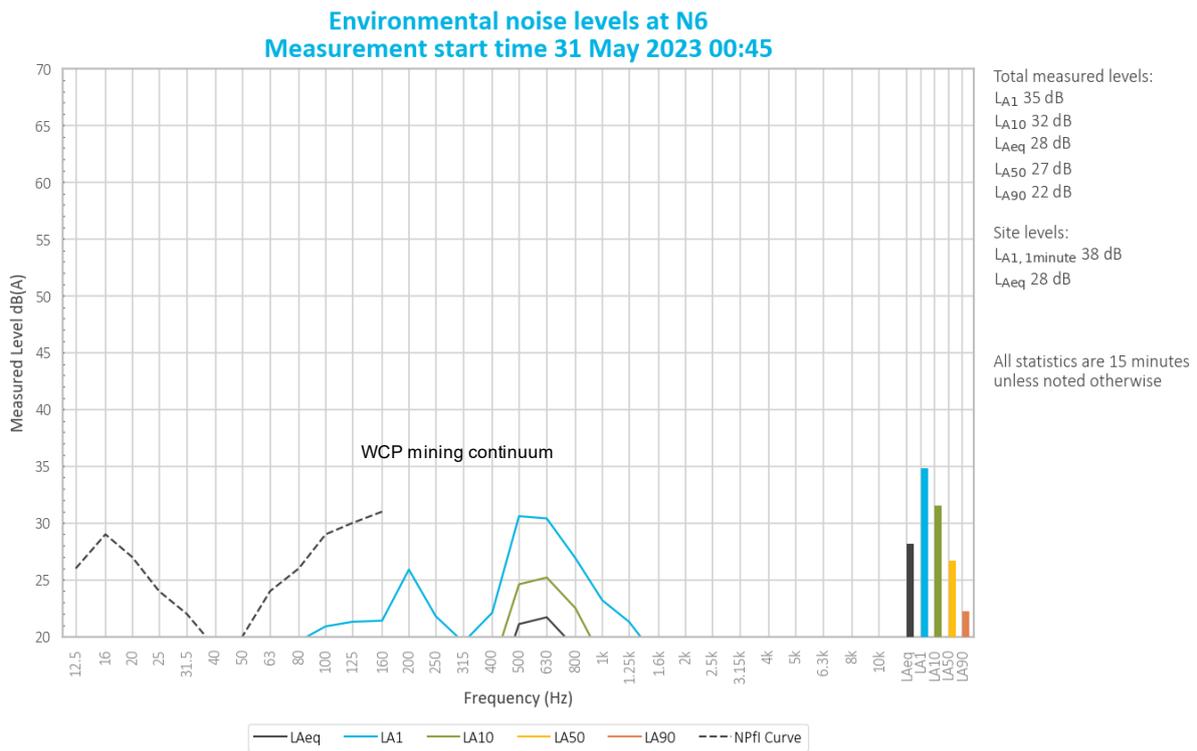


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of 28 dB. Track noise generated the site-only $L_{A1,1minute}$ of 38 dB.

Continuum from WCP generated measured noise levels.

Noise from road traffic and cattle was noted at low levels.

Table 5.1 Historical WCP only noise levels at N6

Month	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023
LAeq	<25	30	IA	IA	IA	IA	<25	<20	IA	IA	IA	IA
LA1,1min	<25	37	IA	IA	IA	IA	27	<20	IA	IA	IA	IA

5.3 N14

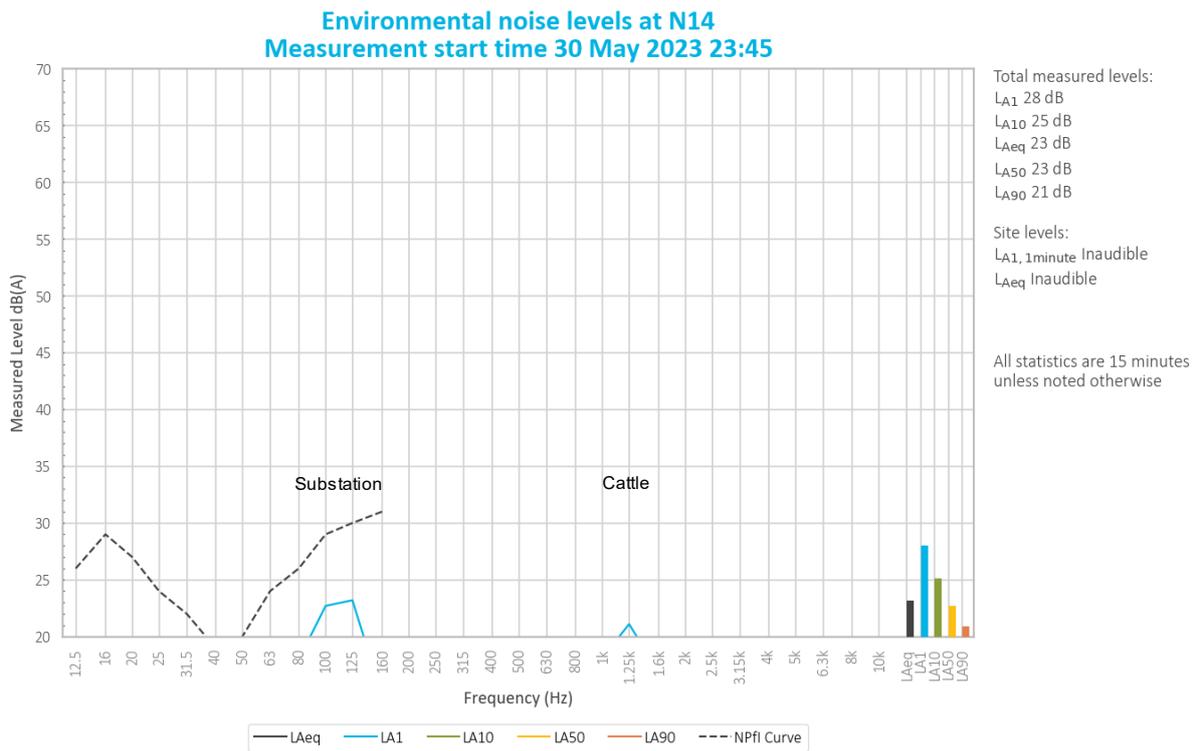


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Continuum from a nearby substation primarily generated measured noise levels. Cattle contributed to the measured LA1 and LA10.

Noise from birds was noted at low levels.

Table 5.2 Historical WCP only noise levels at N14

Month	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023
LAeq	IA	IA	IA	IA	<25	<25	<25	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	<25	<25	30	IA	IA	IA	IA	IA

5.4 N15

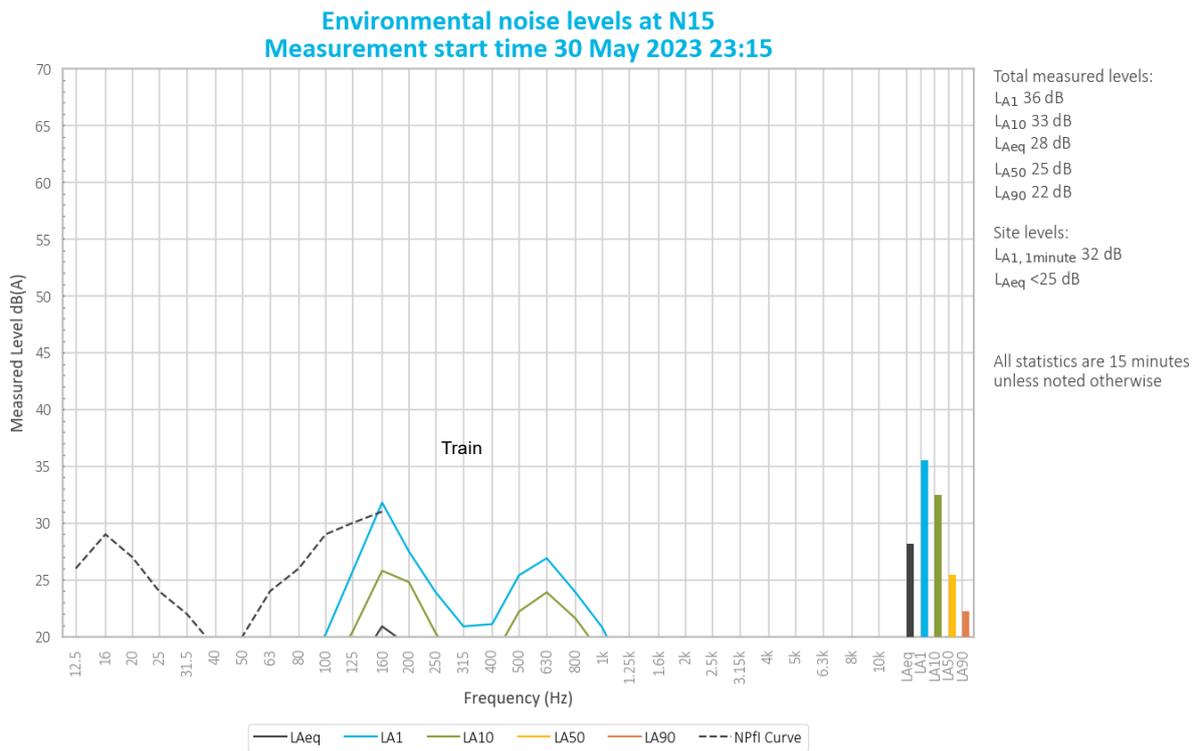


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of less than 25 dB. Impact noise generated the site-only $L_{A1,1minute}$ of 32 dB.

A train primarily generated measured noise levels. Continuum from WCP contributed to the L_{A50} and generated the measured L_{A90} .

Noise from frogs was also noted at low levels.

Table 5.3 Historical WCP only noise levels at N15

Month	May 2022	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023
L_{Aeq}	34	38/34	29	IA	<25	IA	<25	<20	IA	IA	<20	IA
$L_{A1,1min}$	38	42/35	40	IA	<25	IA	<25	<20	IA	IA	<20	IA

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

5.5 N17

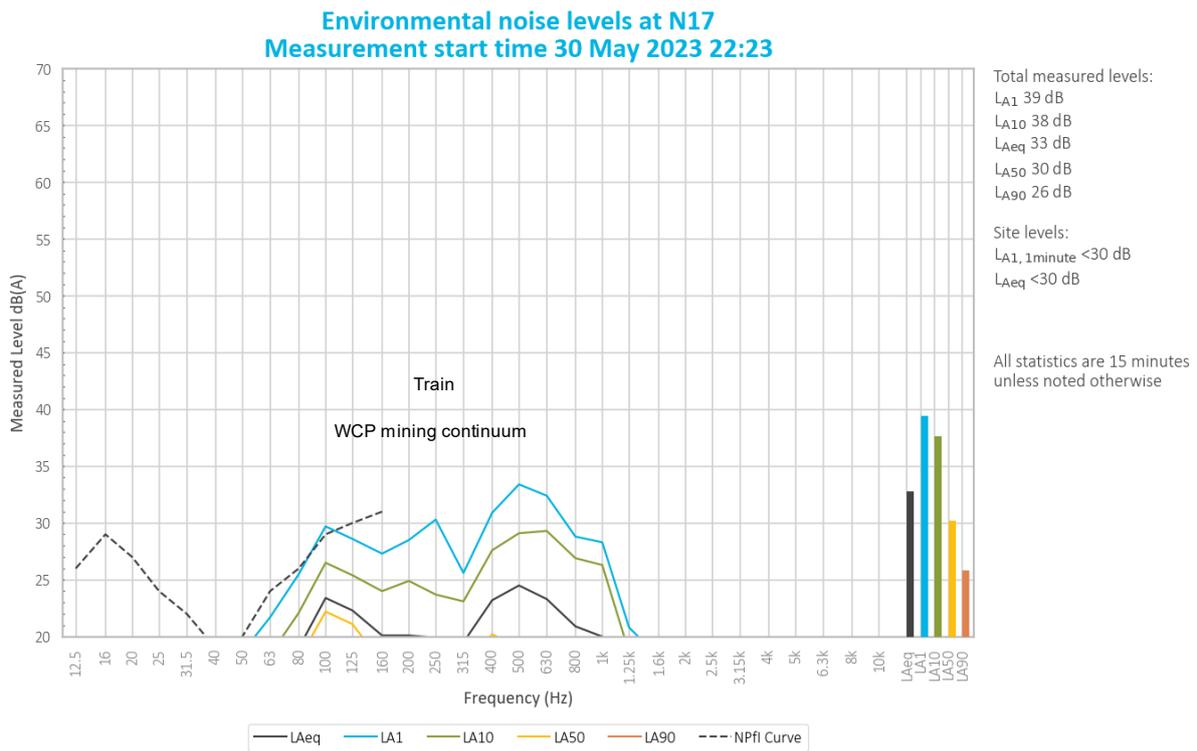


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

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

A train primarily generated measured noise levels. Continuum from WCP contributed to the L_{A50} and generated the measured L_{A90} .

Table 5.4 Historical WCP only noise levels at N17

Month	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023
L_{Aeq}	32	23	27	IA	27	-	-	-	-	IA	27	IA
$L_{A1,1min}$	37	28	30	IA	34	-	-	-	-	IA	30	IA

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

5.6 N19

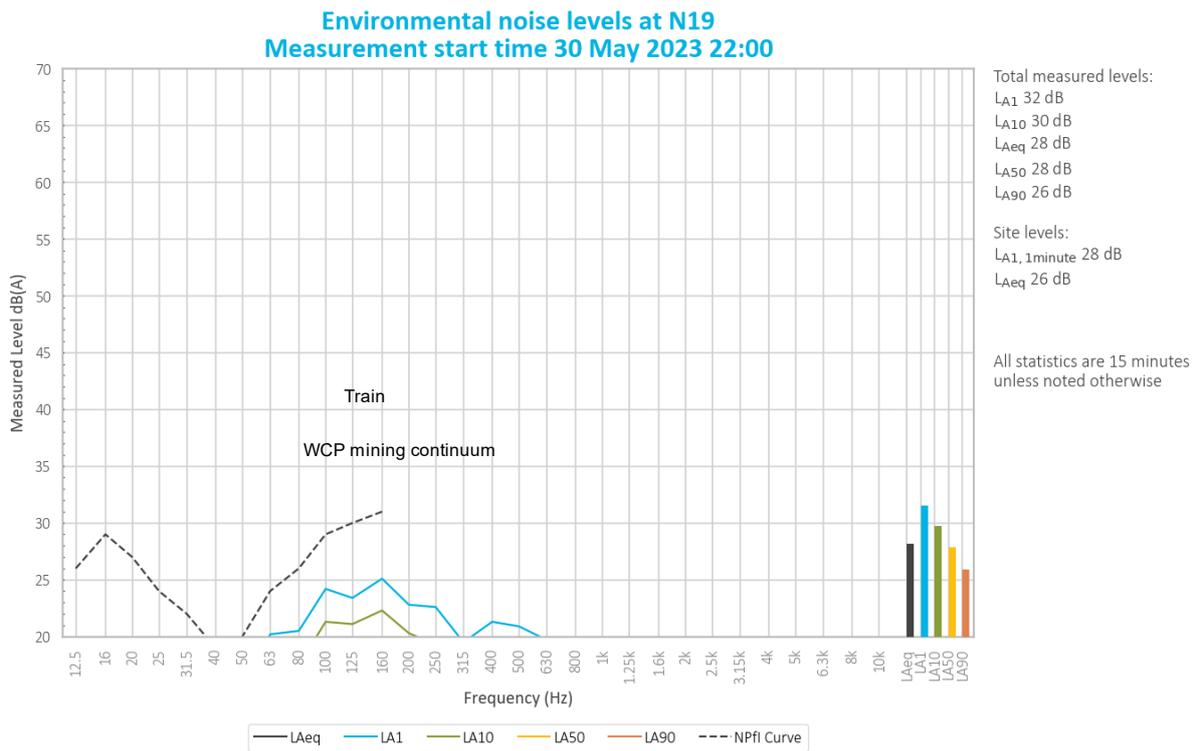


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

A mining continuum from WCP was audible throughout the measurement and generated a site-only LAeq of 26 dB. An engine surge generated the site-only LA1,1minute of 38 dB. Track noise was also noted.

Continuum from WCP primarily generated measured noise levels. A train contributed to the measured LA1 and LA10. A breeze in nearby foliage contributed to the measured LAeq and LA50.

Table 5.5 Historical WCP only noise levels at N19

Month	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023
LAeq	<20	IA	IA	IA	<25	-	-	-	-	IA	IA	IA
LA1,1min	<20	IA	IA	IA	26	-	-	-	-	IA	IA	IA

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

5.7 N20

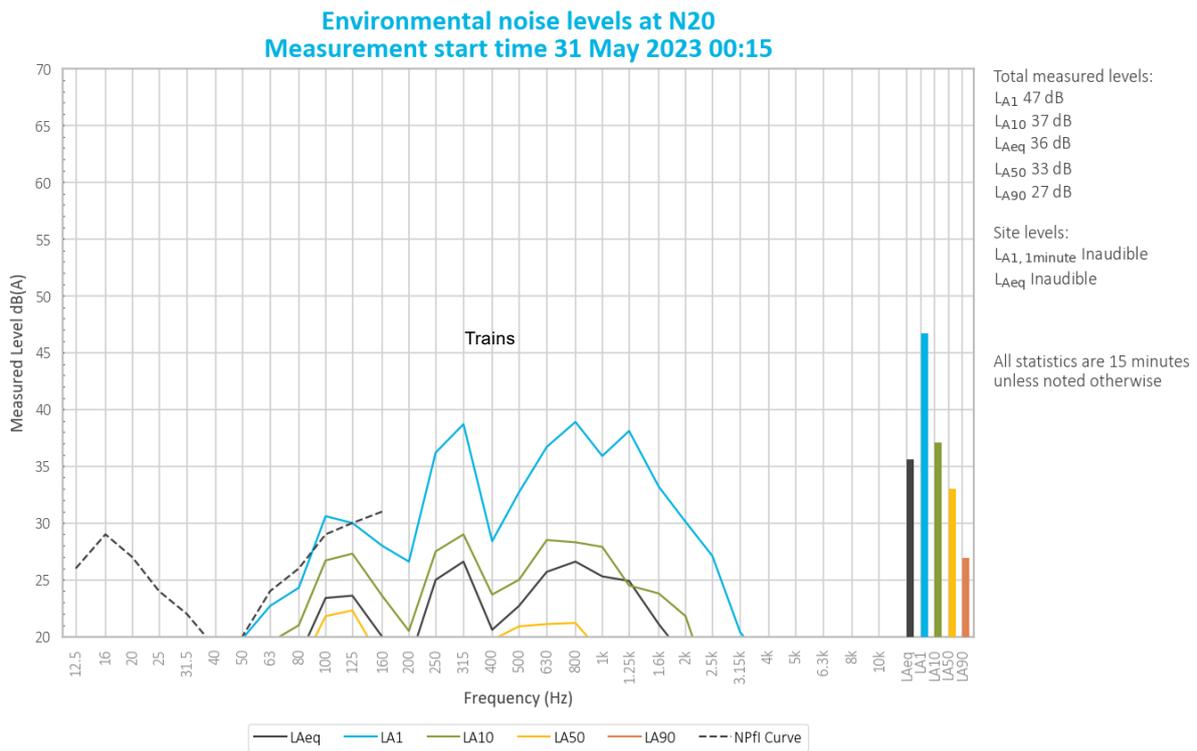


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Trains generated measured noise levels.

Noise from a dog and road traffic was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023
LAeq	22	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	28	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 30/31 May 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the May 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

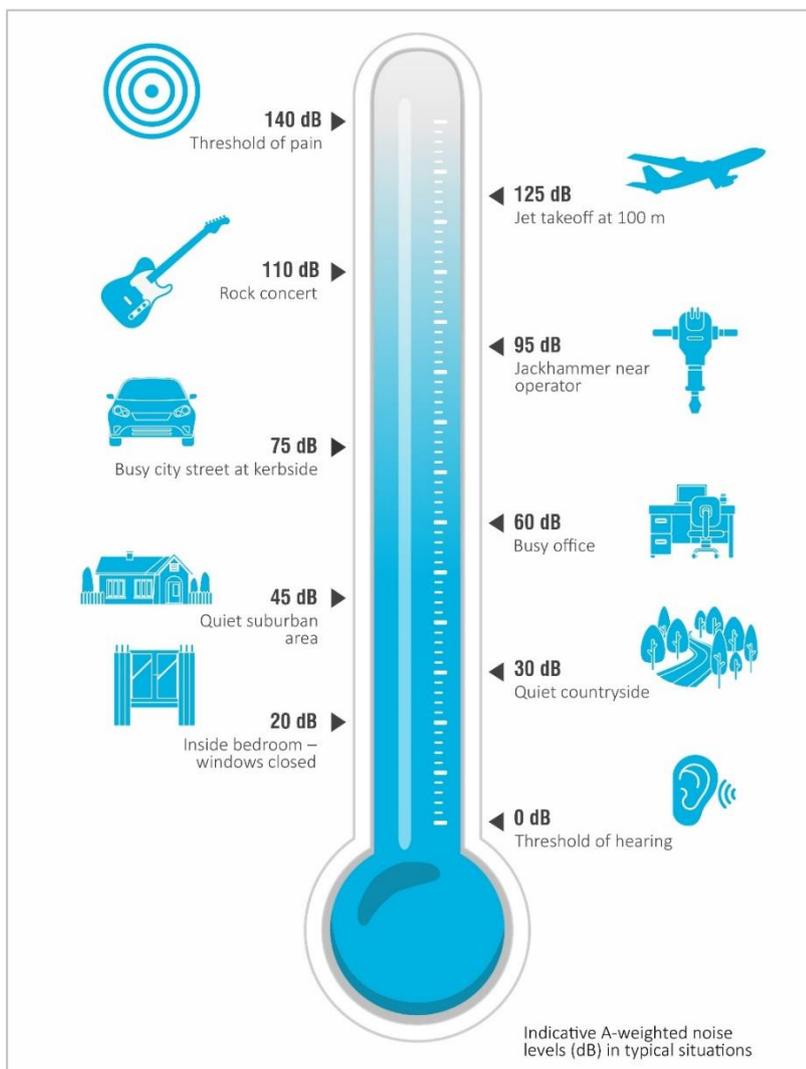


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



**Octave Band Filter
IEC 61260-3:2016
Calibration Certificate**

Calibration Number C22699A

Client Details	EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300		
Filter Model Number :	Rion NA-28		
Filter Serial Number :	N/A		
Instrument Serial Number :	00370304		
Microphone Serial Number :	10421		
Pre-amplifier Serial Number :	60313		
Firmware Version :	2.0		
Atmospheric Conditions			
Ambient Temperature :	23.8°C		
Relative Humidity :	47.8%		
Barometric Pressure :	98.77kPa		
Calibration Technician :	Lucky Jaiswal	Secondary Check:	Dhanush Bonu
Calibration Date :	31 Oct 2022	Report Issue Date :	31 Oct 2022
Approved Signatory :			Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
Midband Relative Attenuation (Clause 10)	Pass	Operating Range Lower Limit (Clause 12)	Pass
Linearity, Range and Overload (Clause 11)	Pass	Relative Attenuation (Clause 13)	Pass

The filter submitted for testing successfully completed the periodic tests of IEC 61260-3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the filter to the full specifications of IEC 61260-1:2014 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of filter fully conformed to the class 1 specifications in IEC 61260-1:2014 and (b) because the periodic tests of IEC 61260-3 cover only a limited subset of the specifications in IEC 61260-1:2014.

Uncertainties of Measurement -			
Electrical Tests		Environmental Conditions	
$-5dB < \Delta A(\Omega) \leq 40dB$	$\pm 0.12dB$	Temperature	$\pm 0.1^\circ C$
$40dB < \Delta A(\Omega) \leq 120dB$	$\pm 0.2dB$	Relative Humidity	$\pm 1.9\%$
		Barometric Pressure	$\pm 0.014kPa$

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



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

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

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

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



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C21832

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

Equipment Tested/ Model Number : Pulsar Model 105
Instrument Serial Number : 81334

Atmospheric Conditions

Ambient Temperature : 25°C
Relative Humidity : 49.6%
Barometric Pressure : 100.8kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 29 Nov 2021
Secondary Check: Harrison Kim
Report Issue Date : 2 Dec 2021

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.19	1000.30

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

Specific Tests	Uncertainties of Measurement -		
		Environmental Conditions	
Generated SPL	±0.11dB	Temperature	±0.1°C
Frequency	±0.07%	Relative Humidity	±1.9%
Distortion	±0.50%	Barometric Pressure	±0.014kPa

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.

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PAGE 1 OF 1

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

June 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP06

June 2023

Version	Date	Prepared by	Reviewed by	Comments
1	29/06/2023	Will Moore	Robert Kirwan	Final

Approved by



Robert Kirwan

Associate Consultant

30 June 2023

Level 3 175 Scott Street

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TABLE OF CONTENTS

1	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – June 2023 ¹	10
Table 4.2	Measured atmospheric conditions – June 2023	10
Table 4.3	Site noise levels and limits – June 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 27/28 June 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

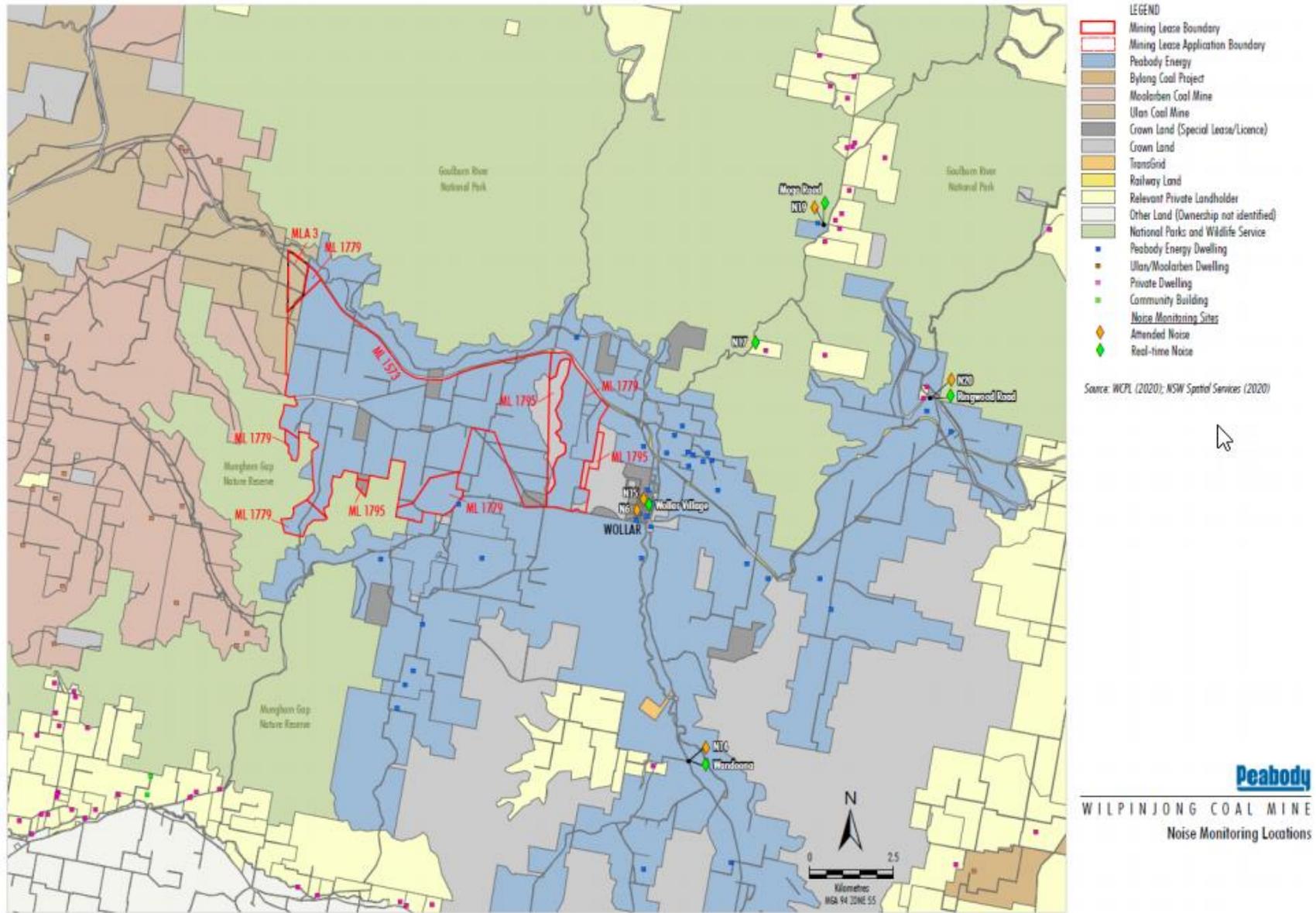


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1% of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10% of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of them may be provided. These are expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- site noise levels were extremely low and unlikely, in many cases, to be noticed
- site noise levels were masked by other, more dominant, noise sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location
- it was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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 $L_{A1,1\text{minute}}$. The EPA accepts sleep disturbance analysis based on either the $L_{A1,1\text{minute}}$ or L_{Amax} metrics, with the L_{Amax} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	23/01/2025	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	78226	24/01/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – June 2023 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	27/06/2023 22:48	44	39	32	29	24	22	21
N14	27/06/2023 23:45	39	31	27	25	25	22	20
N15	27/06/2023 23:15	41	34	30	27	26	23	21
N17	27/06/2023 22:22	46	32	30	27	27	23	19
N19	27/06/2023 22:00	49	39	27	26	20	17	16
N20	28/06/2023 00:15	44	36	24	25	22	20	19

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – June 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	27/06/2023 22:48	10	0.6	330	8
N14	27/06/2023 23:45	12	0.5	120	6
N15	27/06/2023 23:15	11	0.0	-	8
N17	27/06/2023 22:22	13	0.0	-	8
N19	27/06/2023 22:00	14	0.0	-	8
N20	28/06/2023 00:15	11	0.0	-	6

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – June 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	27/06/2023 22:48	1.0	315	F	Yes	37	45	<25	<25	Nil	Nil
N14	27/06/2023 23:45	0.6	296	F	Yes	35	45	<25	26	Nil	Nil
N15	27/06/2023 23:15	0.6	312	F	Yes	37	45	27	36	Nil	Nil
N17	27/06/2023 22:22	1.2	281	F	Yes	38	45	27	32	Nil	Nil
N19	27/06/2023 22:00	0.8	314	F	Yes	35	45	IA	IA	Nil	Nil
N20	28/06/2023 00:15	0.0	-	F	Yes	35	45	<20	<20	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

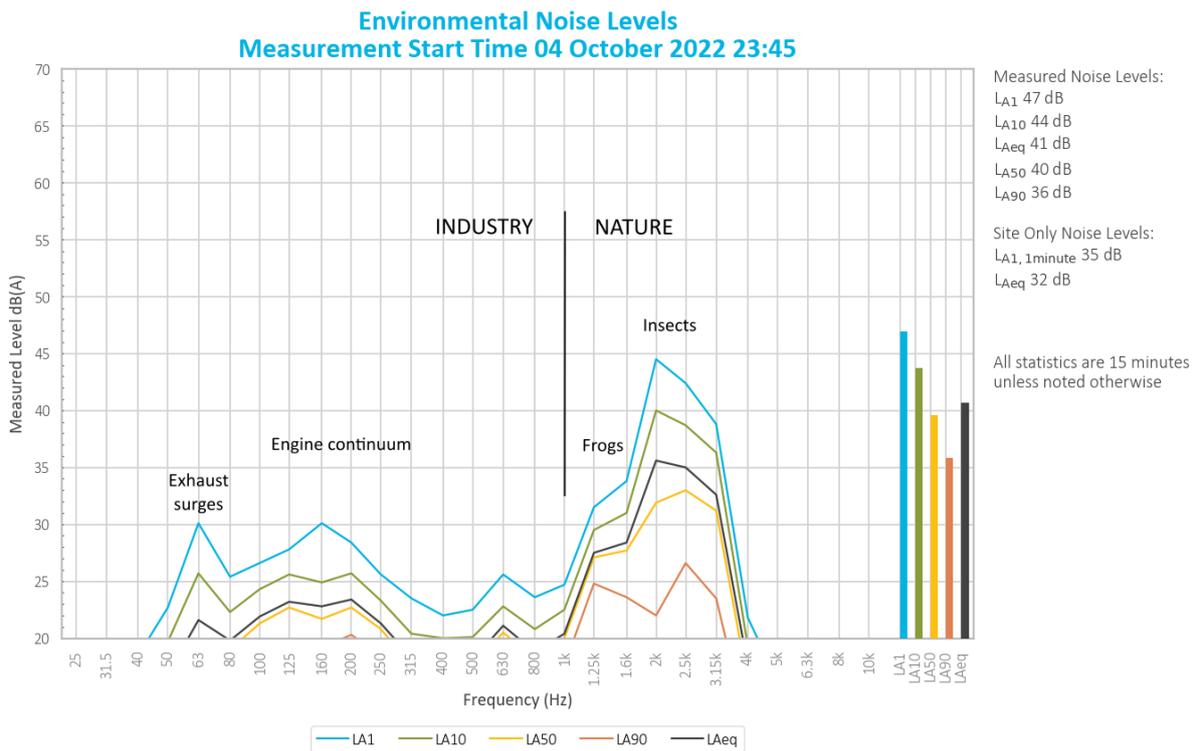


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

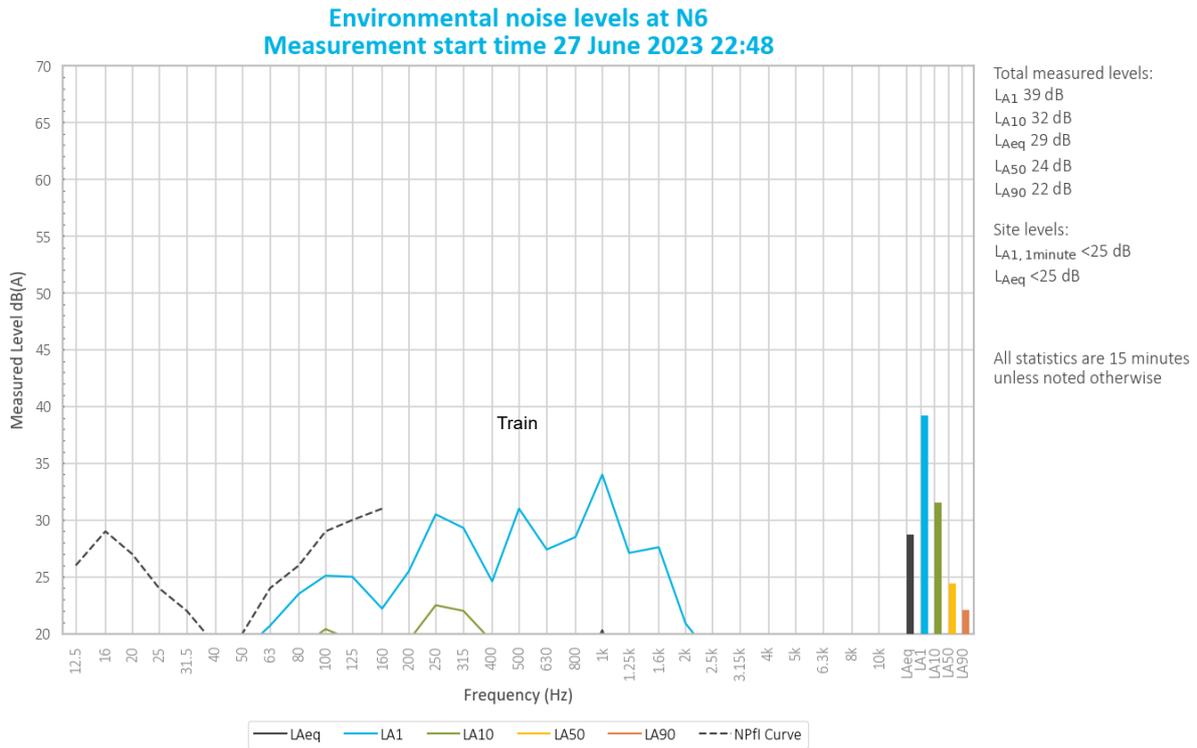


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

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

A train generated the measured LA1 and LA10. An aeroplane generated the LAeq and continuum from WCP generated the LA50 and LA90.

Table 5.1 Historical WCP only noise levels at N6

Month	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023
LAeq	30	IA	IA	IA	IA	<25	<20	IA	IA	IA	IA	28
LA1,1min	37	IA	IA	IA	IA	27	<20	IA	IA	IA	IA	38

5.3 N14

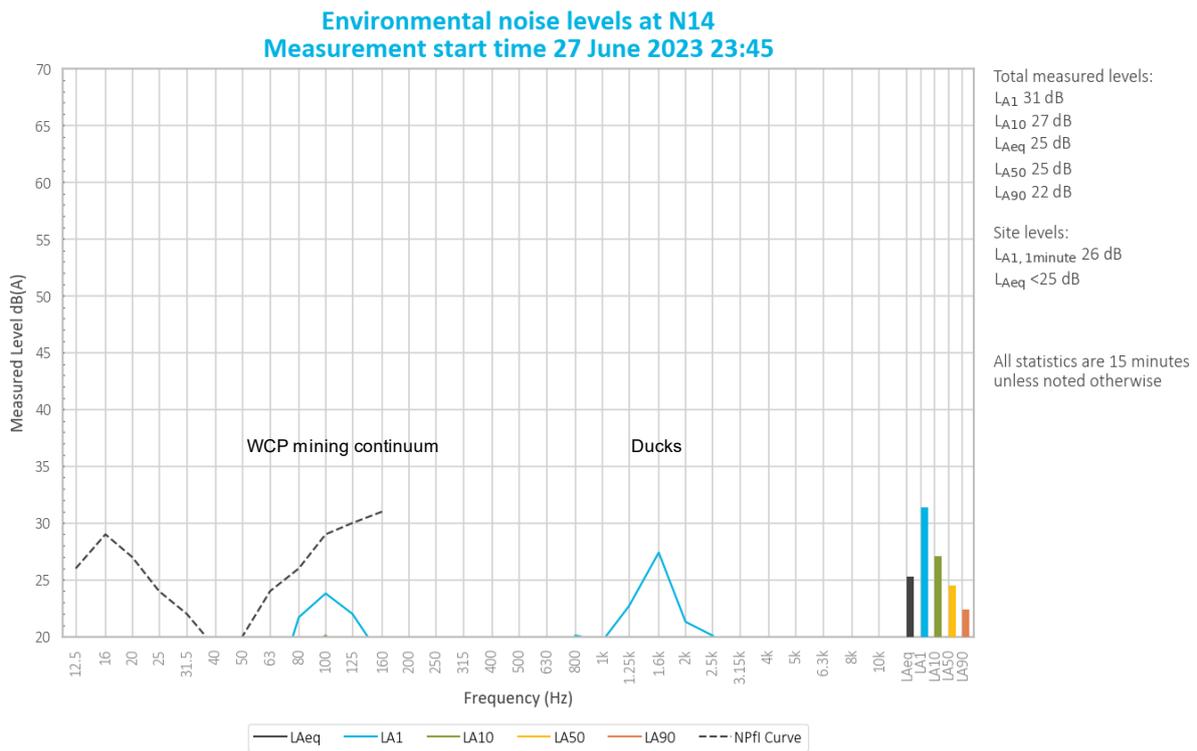


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

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

Ducks generated the measured L_{A1} and L_{A10} and contributed to the L_{Aeq} and L_{A50} . Continuum from WCP contributed to the L_{Aeq} and L_{A50} and generated the measured L_{A90} .

Table 5.2 Historical WCP only noise levels at N14

Month	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023
L_{Aeq}	IA	IA	IA	<25	<25	<25	IA	IA	IA	IA	IA	IA
$L_{A1,1min}$	IA	IA	IA	<25	<25	30	IA	IA	IA	IA	IA	IA

5.4 N15

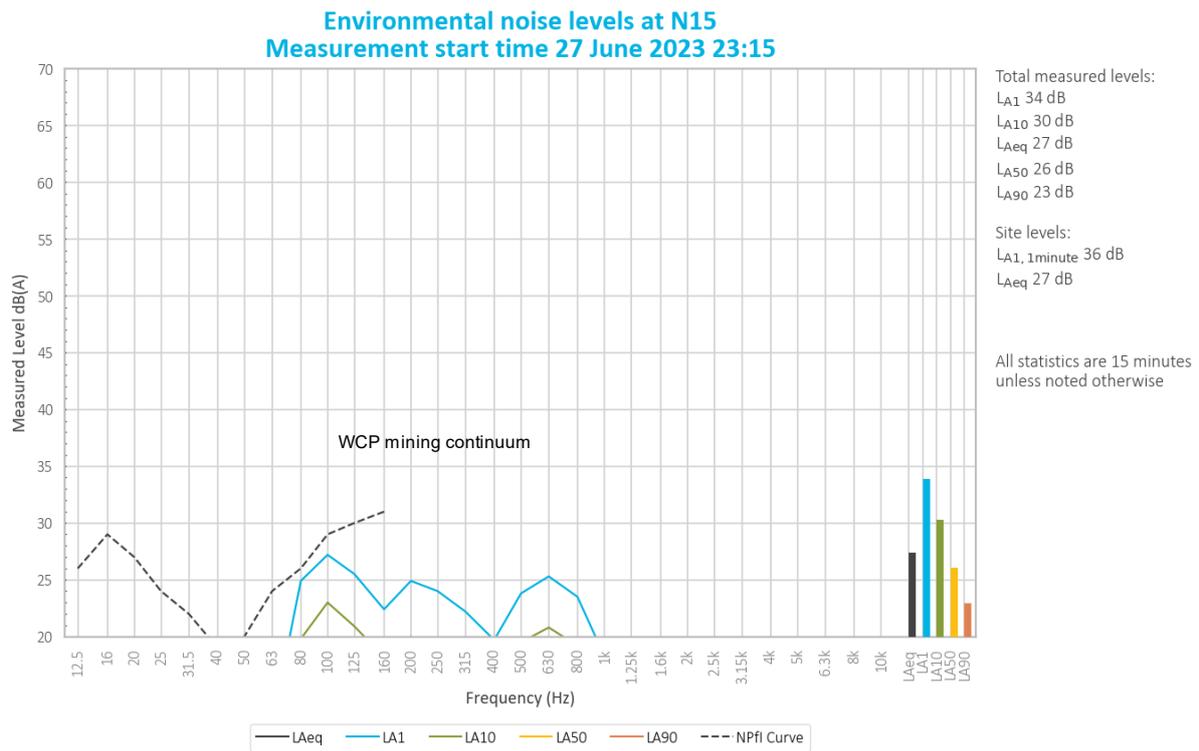


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of 27 dB. Impact noise generated the site-only $L_{A1,1minute}$ of 36 dB. Engine surges, horns and track noise was also noted.

Continuum from WCP generated measured noise levels.

Noise from a pump was also noted at low levels.

Table 5.3 Historical WCP only noise levels at N15

Month	June 2022 ¹	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023
L_{Aeq}	38/34	29	IA	<25	IA	<25	<20	IA	IA	<20	IA	<25
$L_{A1,1min}$	42/35	40	IA	<25	IA	<25	<20	IA	IA	<20	IA	32

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

5.5 N17

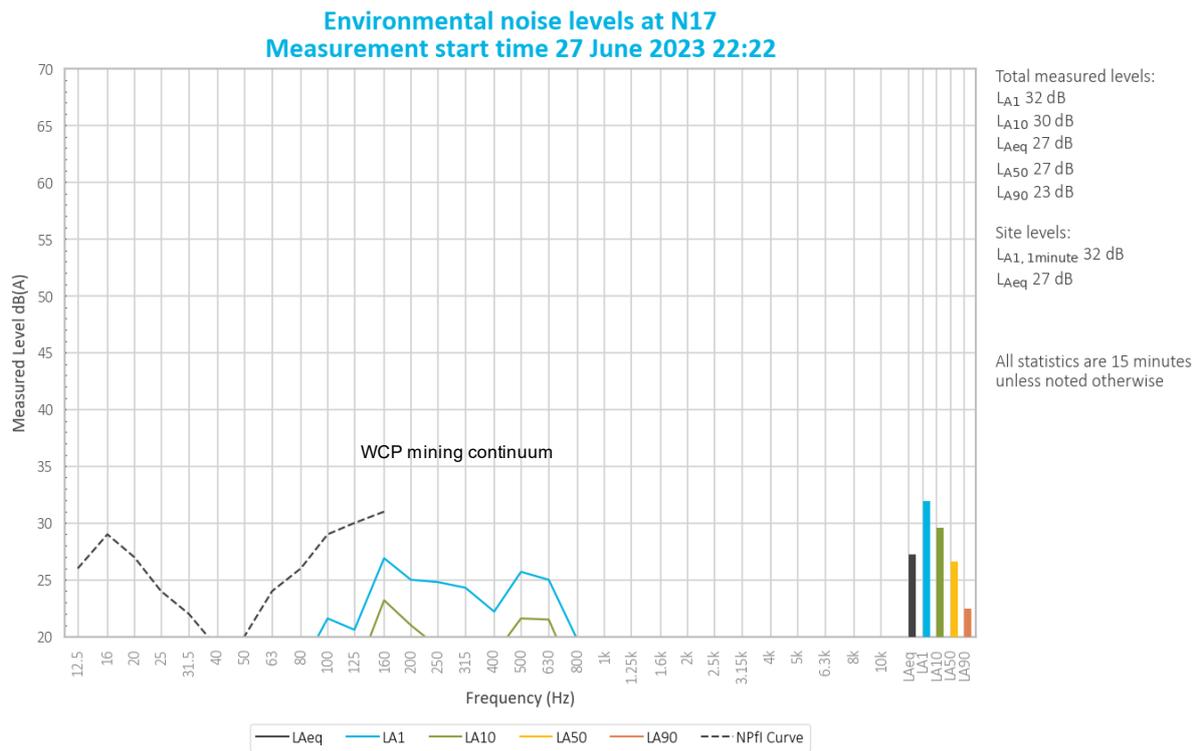


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of 27 dB. Engine surges generated the site-only $L_{A1,1minute}$ of 32 dB. Track noise was also noted.

Continuum from WCP generated measured noise levels.

Noise from and aeroplane was also noted at low levels.

Table 5.4 Historical WCP only noise levels at N17

Month	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 1	Nov 2022 1	Dec 2022 1	Jan 2023 1	Feb 2023	March 2023	April 2023	May 2023
L_{Aeq}	23	27	IA	27	-	-	-	-	IA	27	IA	<30
$L_{A1,1min}$	28	30	IA	34	-	-	-	-	IA	30	IA	<30

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

5.6 N19

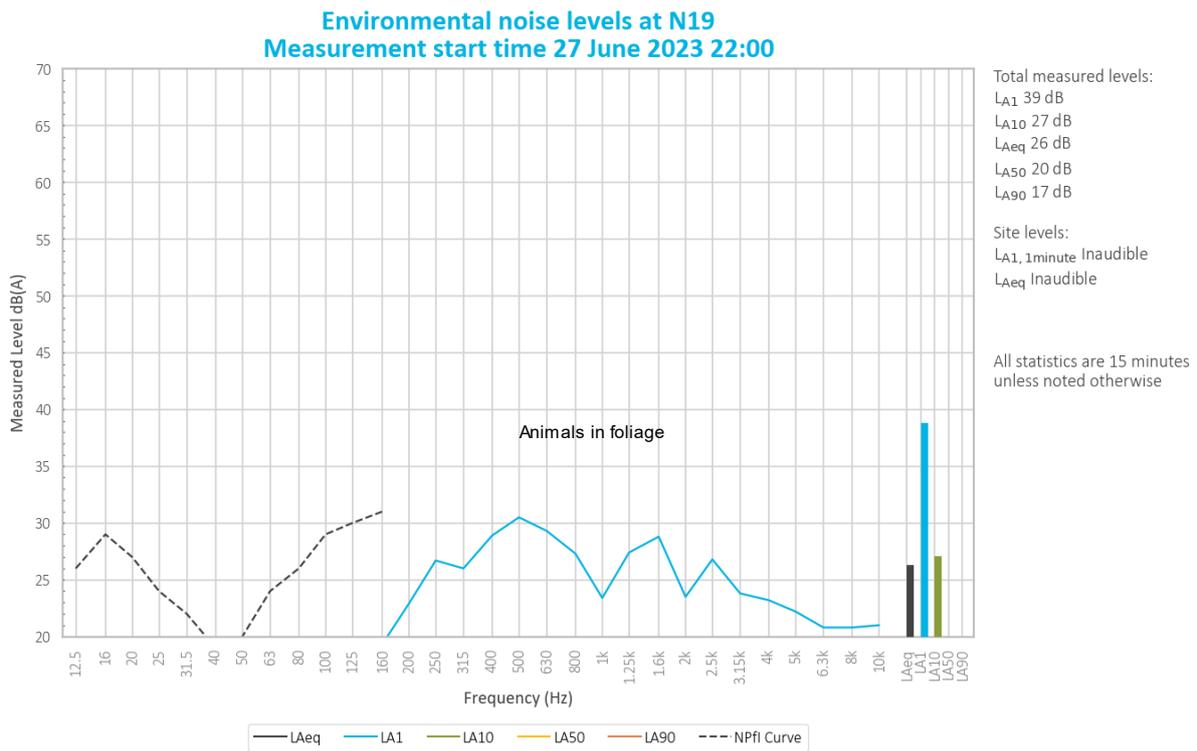


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Animals in the nearby foliage generated measured noise levels.

Noise from an aeroplane was also noted at low levels.

Table 5.5 Historical WCP only noise levels at N19

Month	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023
LAeq	IA	IA	IA	<25	-	-	-	-	IA	IA	IA	26
LA1,1min	IA	IA	IA	26	-	-	-	-	IA	IA	IA	28

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

5.7 N20

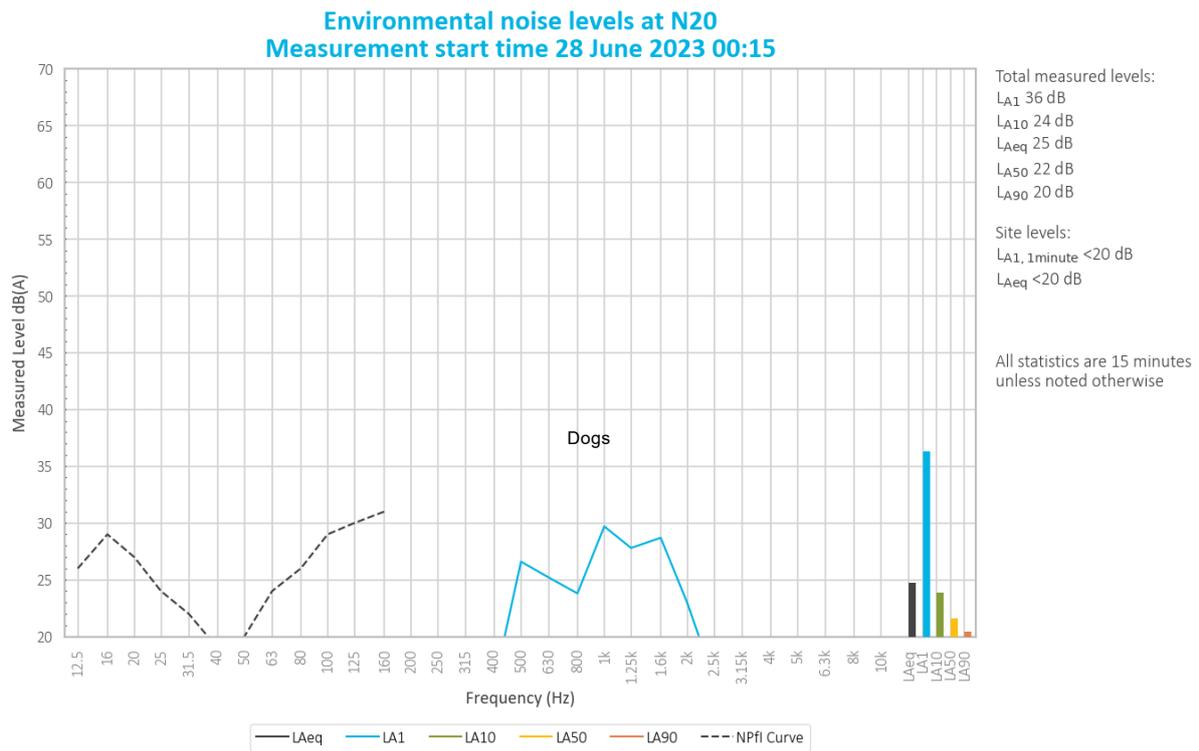


Figure 5.7 Environmental noise levels N20, Ringwood Road

A mining continuum from WCP was audible throughout the measurement and generated a site-only LAeq and LA1,1minute of less than 20 dB.

Dogs generated the measured LA1, LA10 and LAeq. Running water and continuum from WCP both contributed to the LA50 and LA90.

Table 5.6 Historical WCP only noise levels at N20

Month	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 27/28 June 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the June 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

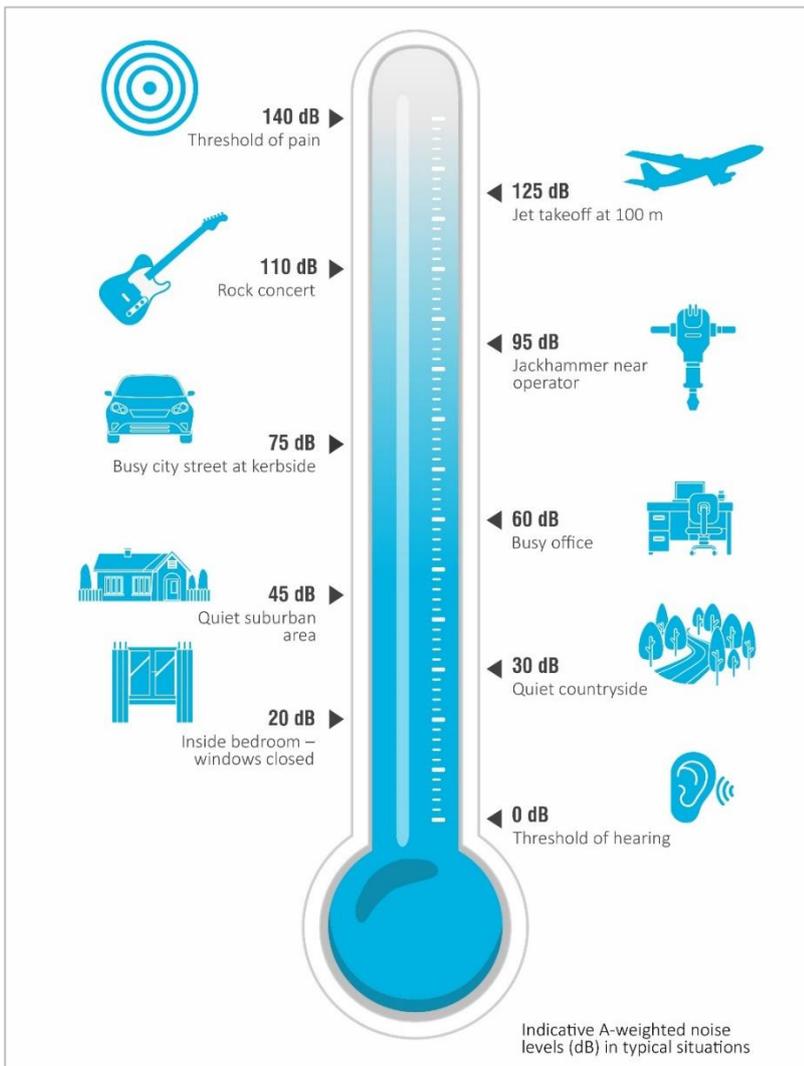


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none"> As per Table 7, Figure 3 and Figure 4
Period	<ul style="list-style-type: none"> Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none"> 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter IEC 61672-3:2013 Calibration Certificate

Calibration Number C23032

Client Details	EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
-----------------------	--

Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	30131882
Microphone Serial Number :	04739
Pre-amplifier Serial Number :	11942
Firmware Version :	2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 23.5°C
Relative Humidity : 47.3%	Relative Humidity : 46.1%
Barometric Pressure : 100.14kPa	Barometric Pressure : 100.16kPa

Calibration Technician : Shaheen Boaz	Secondary Check: Dylan Selge
Calibration Date : 23 Jan 2023	Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

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

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%
8kHz:	±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.

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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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23033

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

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

Atmospheric Conditions

Ambient Temperature : 24.4°C
Relative Humidity : 50.2%
Barometric Pressure : 100.2kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 24 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.17	1000.40

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.13%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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Accredited for compliance with ISO/IEC 17025 - Calibration.

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

July 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP07

July 2023

Version	Date	Prepared by	Reviewed by	Comments
1	17/07/2023	Will Moore	Tony Welbourne	Final

Approved by



Tony Welbourne

Associate Director

19 July 2023

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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	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels – July 2023 ¹	10
Table 4.2	Measured atmospheric conditions – July 2023	10
Table 4.3	Site noise levels and limits – July 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 12/13 July 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

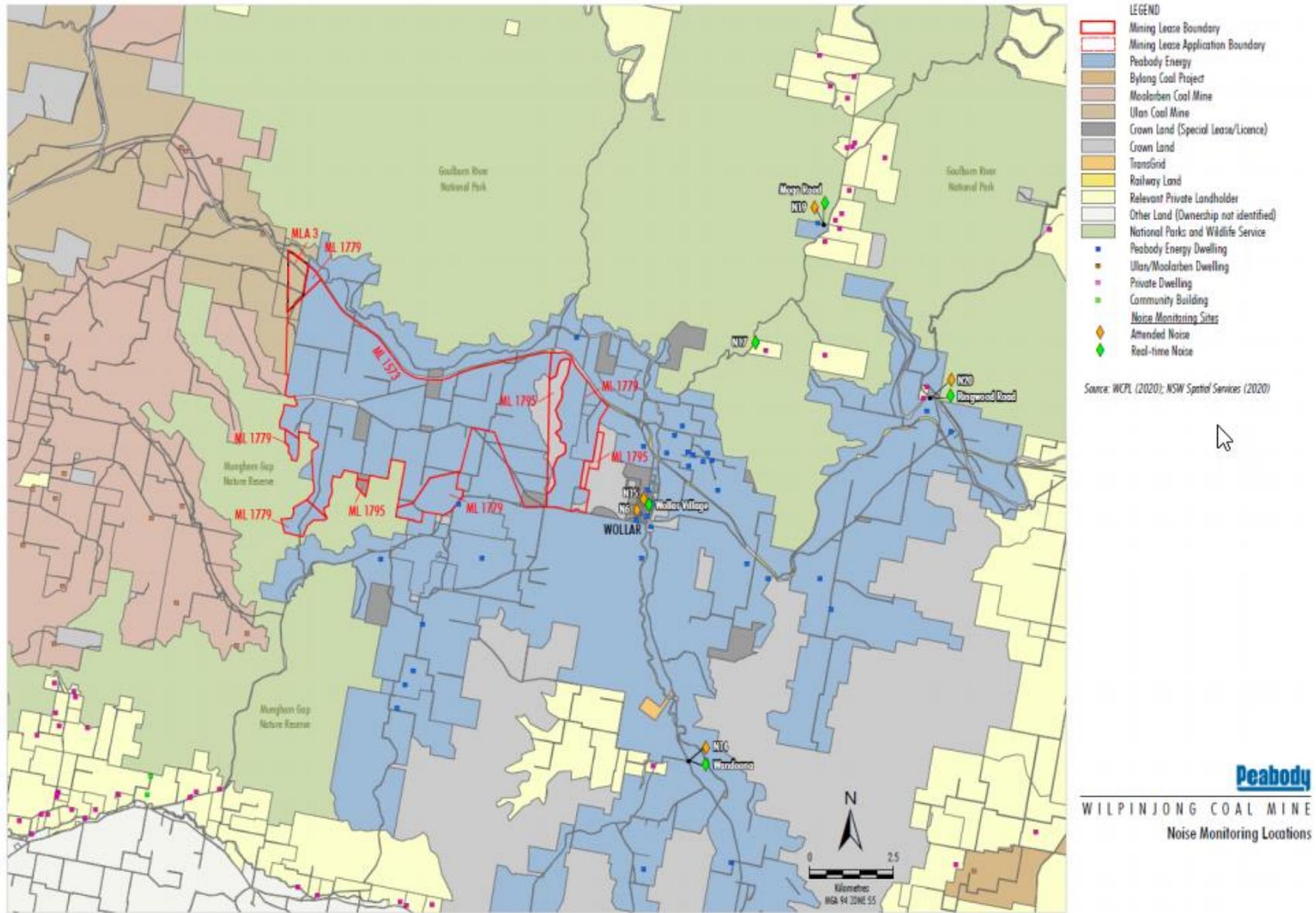


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods, such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00701424	01/06/2025	IEC 61672-1:2002
Rion NC-73 acoustic calibrator	11248306	02/06/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels – July 2023¹

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	13/07/2023 00:46	51	49	44	40	36	24	22
N14	13/07/2023 00:18	53	36	30	29	28	26	24
N15	12/07/2023 23:15	42	37	30	28	26	24	21
N17	12/07/2023 22:38	36	24	18	17	15	15	14
N19	12/07/2023 22:15	34	27	23	20	18	16	15
N20	12/07/2023 23:45	83	71	67	60	42	25	21

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – July 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	13/07/2023 00:46	0	0.6	250	0
N14	13/07/2023 00:18	4	1.1	160	0
N15	12/07/2023 23:15	3	0.0	-	0
N17	12/07/2023 22:38	7	0.0	-	0
N19	12/07/2023 22:15	8	0.0	-	0
N20	12/07/2023 23:45	-1	0.9	240	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfI and methodology described in Section 3.3. There were no modifying factors, 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.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – July 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	13/07/2023 00:46	0.0	-	F	Yes	37	45	<30	35	Nil	Nil
N14	13/07/2023 00:18	0.0	-	G	No	35	45	<25	27	Nil	Nil
N15	12/07/2023 23:15	0.0	-	F	Yes	37	45	26	35	Nil	Nil
N17	12/07/2023 22:38	0.0	-	F	Yes	38	45	<20	<20	Nil	Nil
N19	12/07/2023 22:15	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N20	12/07/2023 23:45	0.0	-	D	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

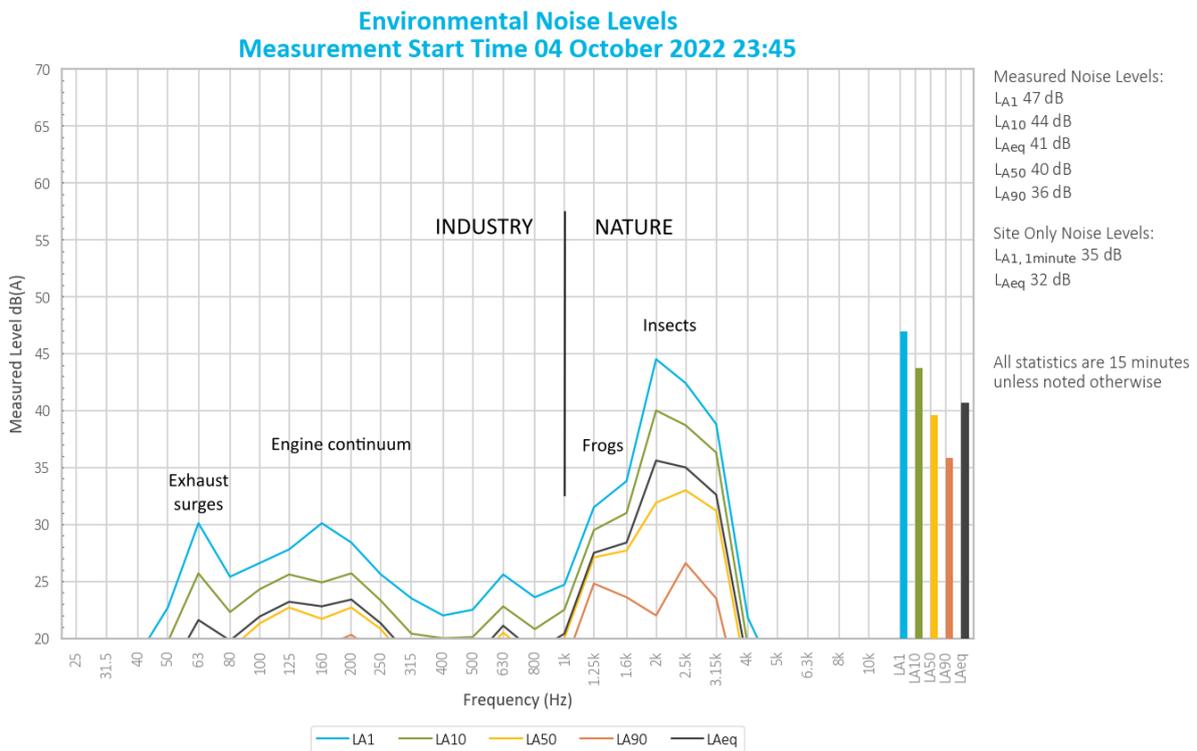


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

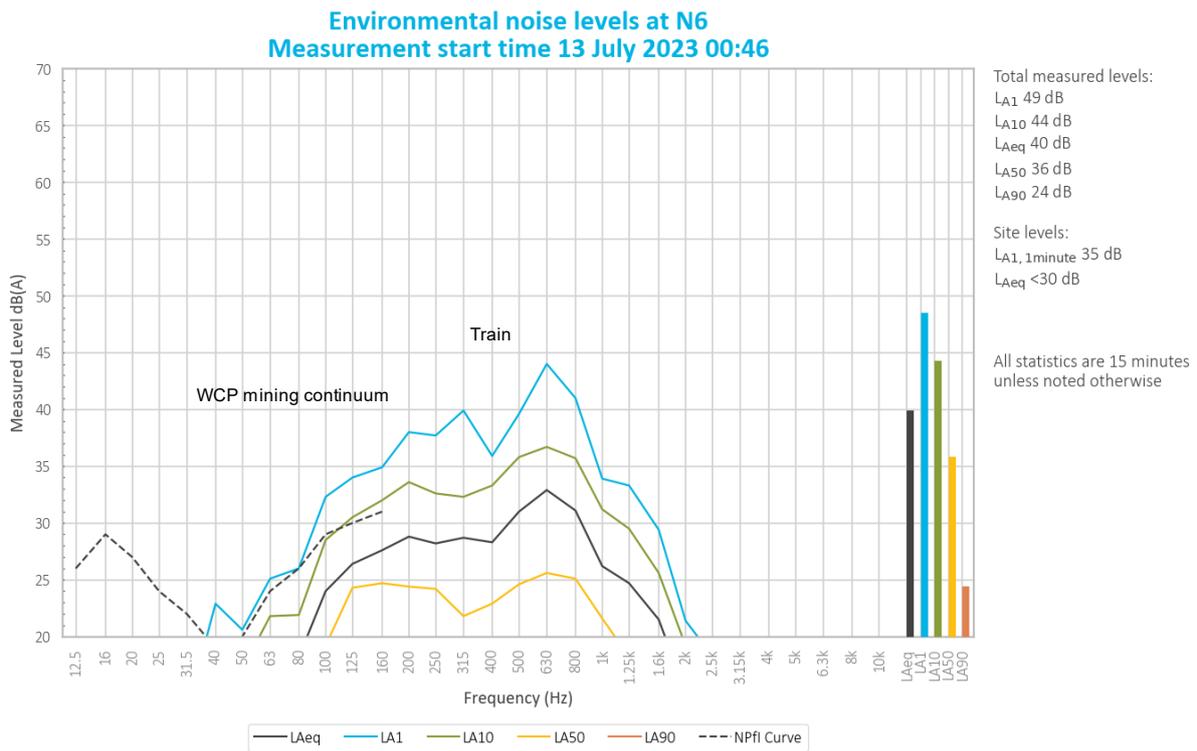


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of less than 30 dB. Engine surges generated the site-only $L_{A1,1minute}$ of 35 dB.

A train generated measured noise levels. Continuum from WCP contributed to the L_{A50} and L_{A90} .

Table 5.1 Historical WCP only noise levels at N6

Month	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023
L_{Aeq}	IA	IA	IA	IA	<25	<20	IA	IA	IA	IA	28	<25
$L_{A1,1min}$	IA	IA	IA	IA	27	<20	IA	IA	IA	IA	38	<25

5.3 N14

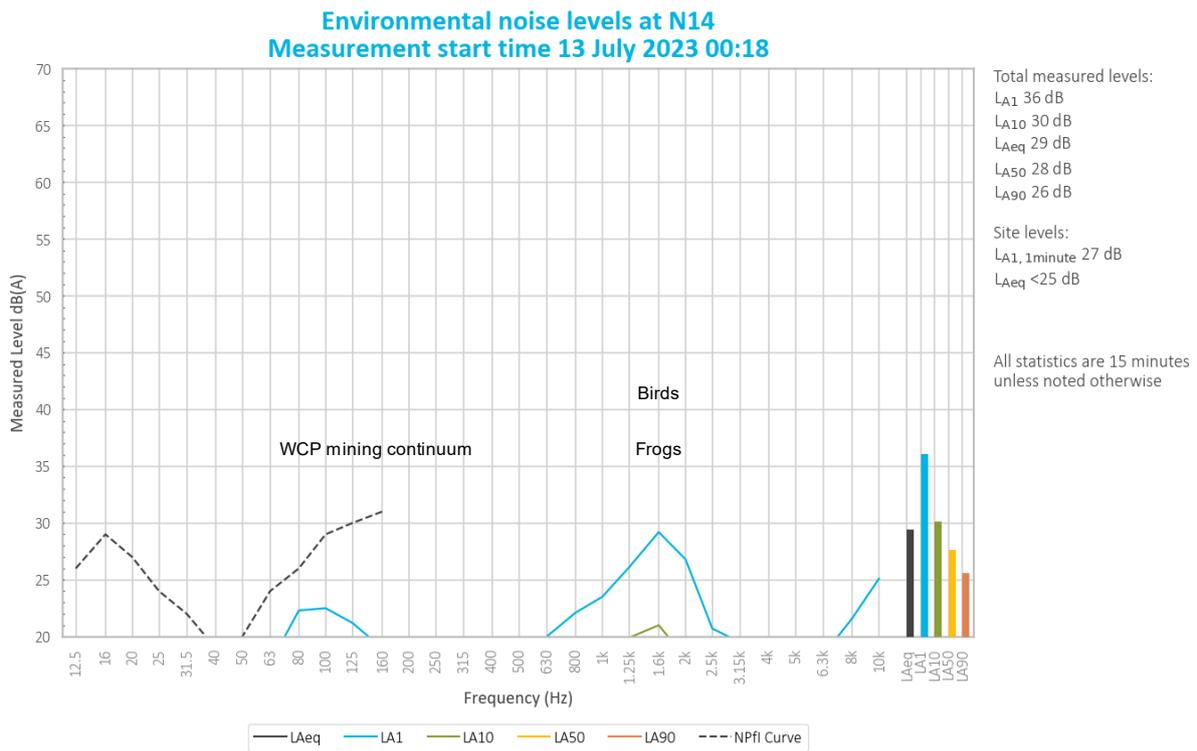


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

A mining continuum from WCP was audible throughout the measurement and generated a site-only LAeq of less than 25 dB and LA1,1minute of 27 dB.

Birds generated the measured LA1 and LA10. Breeze in the nearby foliage generated the measured LAeq and contributed to the LA50. Continuum from WCP and frogs both contributed to the LA50 and LA90.

Noise from cattle and a nearby substation was also noted at low levels.

Table 5.2 Historical WCP only noise levels at N14

Month	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023
LAeq	IA	IA	<25	<25	<25	IA	IA	IA	IA	IA	IA	<25
LA1,1min	IA	IA	<25	<25	30	IA	IA	IA	IA	IA	IA	26

5.4 N15

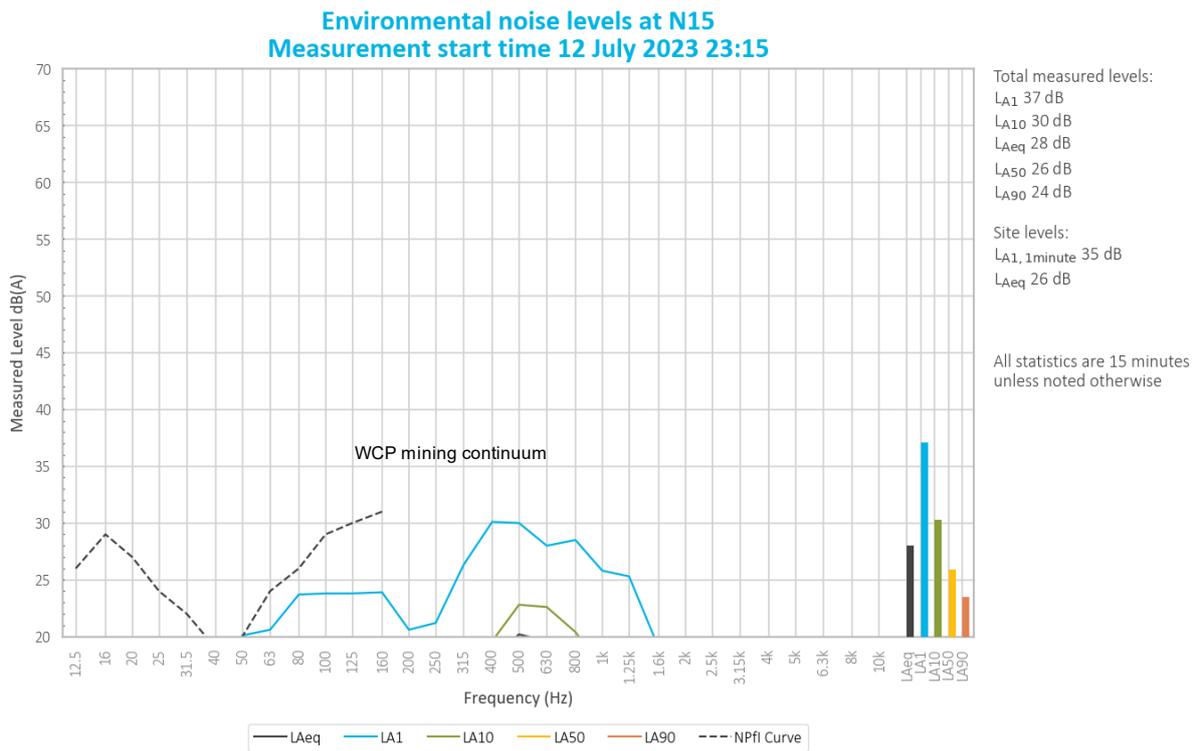


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement and generated a site-only L_{Aeq} of 26 dB. Engine surges generated the site-only $L_{A1,1minute}$ of 36 dB. Track noise was also noted.

Continuum from WCP primarily generated measured noise levels. Road traffic contributed to the measured L_{A1} and L_{A10} .

Noise from an air-conditioning unit, dogs and frogs was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023
L_{Aeq}	29	IA	<25	IA	<25	<20	IA	IA	<20	IA	<25	27
$L_{A1,1min}$	40	IA	<25	IA	<25	<20	IA	IA	<20	IA	32	36

5.5 N17

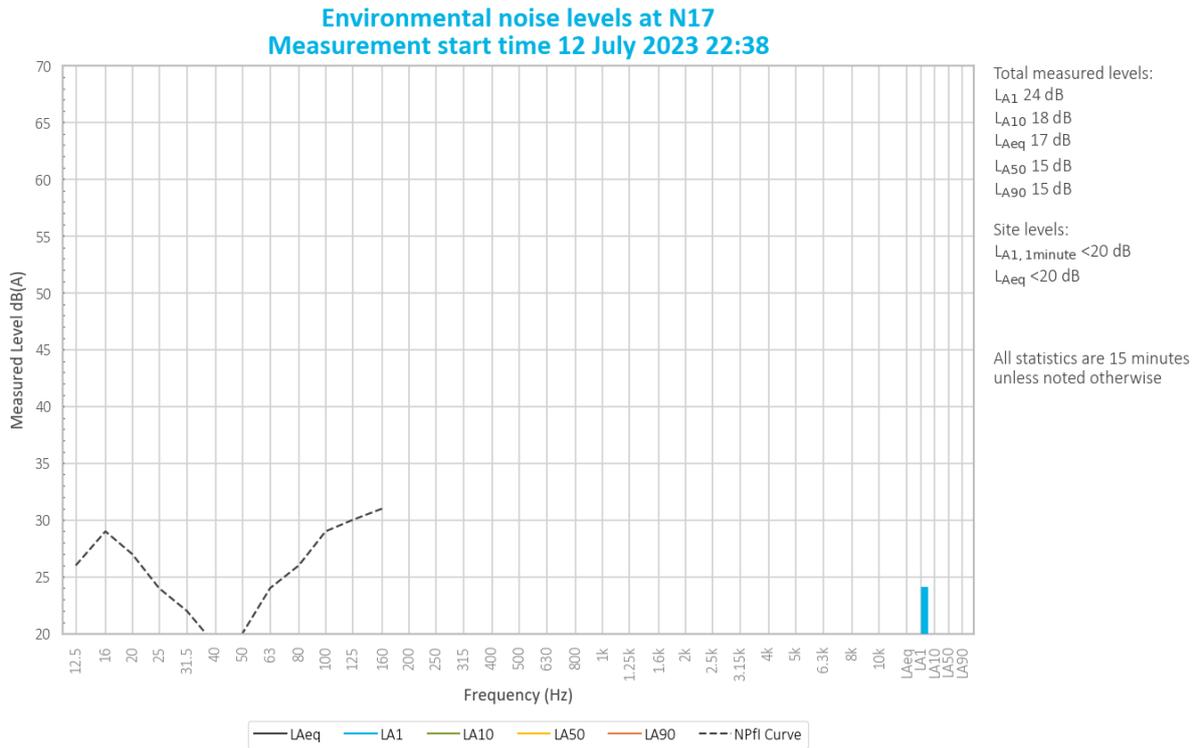


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

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

Continuum from WCP generated measured noise levels. A train generated the measured L_{A1} .

Table 5.4 Historical WCP only noise levels at N17

Month	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023
L_{Aeq}	27	IA	27	-	-	-	-	IA	27	IA	<30	27
$L_{A1,1min}$	30	IA	34	-	-	-	-	IA	30	IA	<30	32

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

5.6 N19

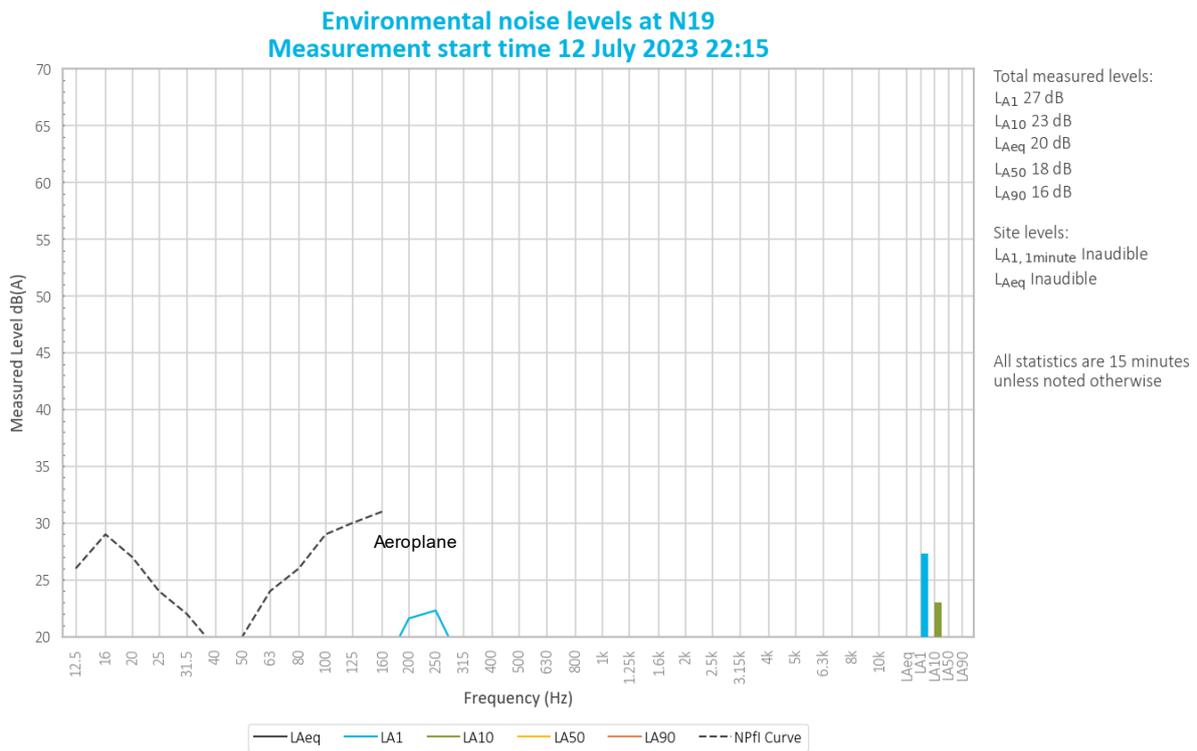


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

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

Noise from road traffic was also noted at low levels.

Table 5.5 Historical WCP only noise levels at N19

Month	July 2022	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023
LAeq	IA	IA	<25	-	-	-	-	IA	IA	IA	26	IA
LA1,1min	IA	IA	26	-	-	-	-	IA	IA	IA	28	IA

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

5.7 N20

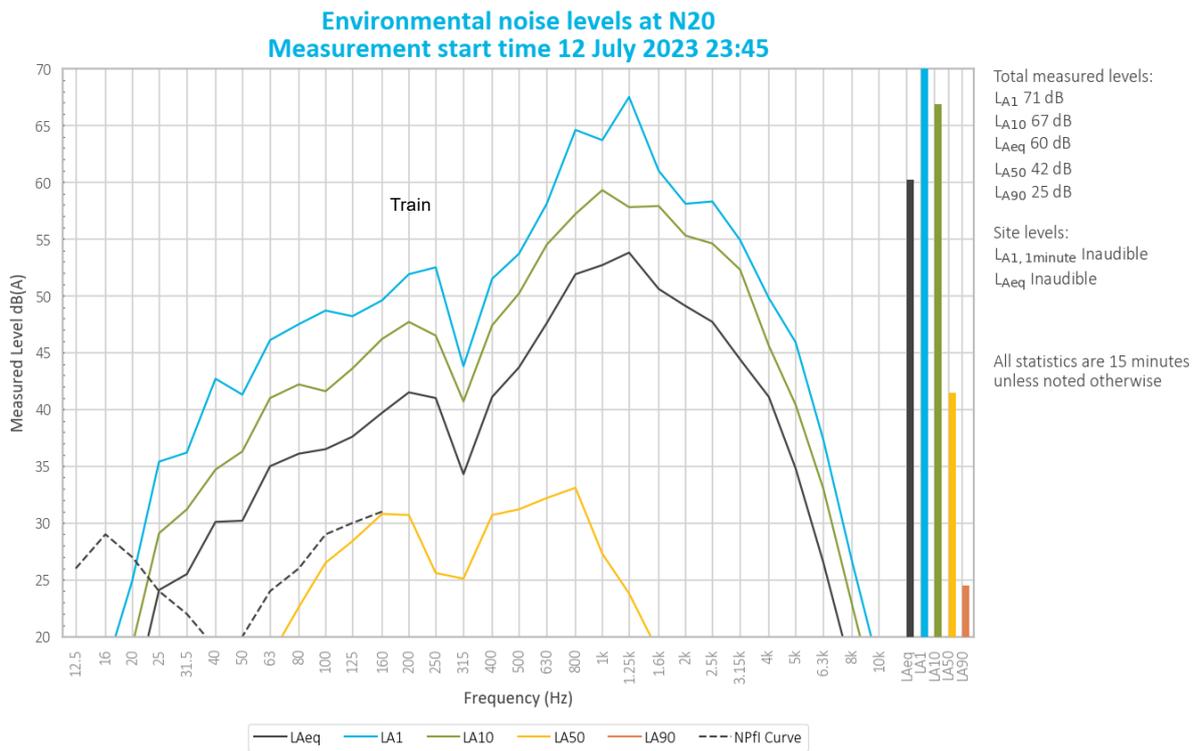


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train generated measured noise levels.

Noise from road traffic and running water was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 12/13 July 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the July 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

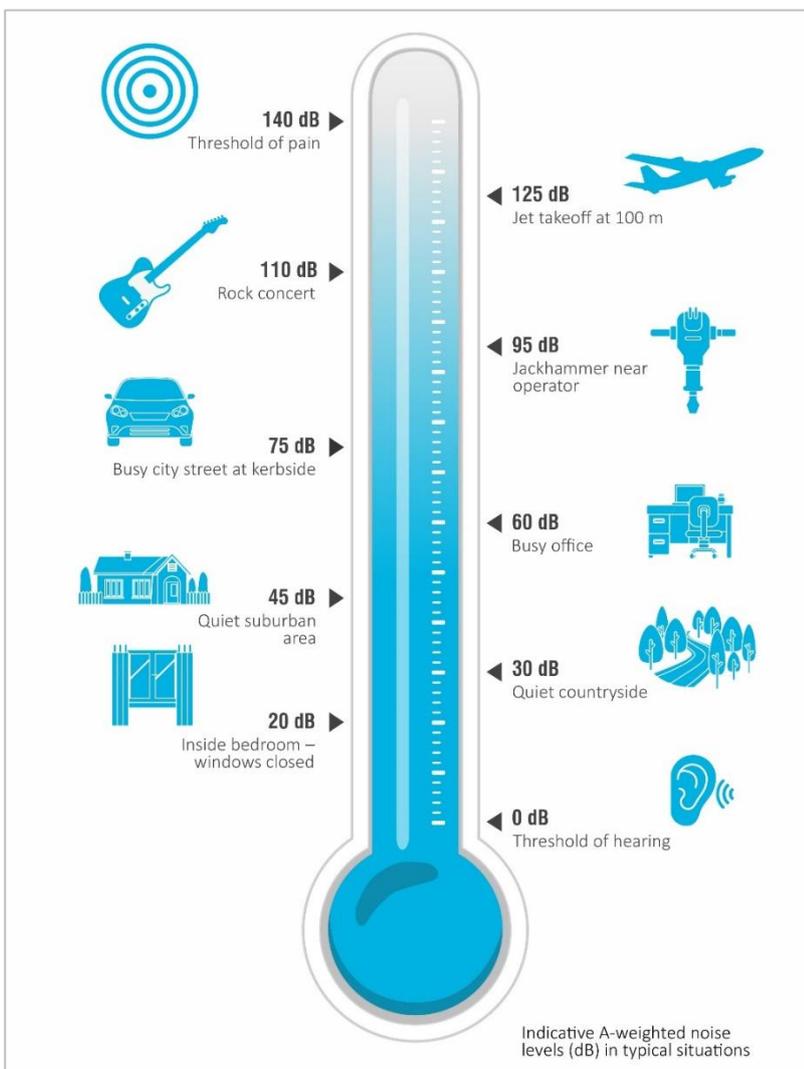


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

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

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

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

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

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter IEC 61672-3:2013 Calibration Certificate

Calibration Number C23317

Client Details	EMM Consulting Level 3, 175 Scott Street Newcastle NSW 2300
Equipment Tested/ Model Number :	NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463
Firmware Version :	2.0
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 22.6°C
Relative Humidity : 46%	Relative Humidity : 46.6%
Barometric Pressure : 100.6kPa	Barometric Pressure : 100.6kPa
Calibration Technician : Max Moore	Secondary Check: Dylan Selge
Calibration Date : 1 Jun 2023	Report Issue Date : 2 Jun 2023
Approved Signatory :	Ken Williams

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

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

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%
5kHz	±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.

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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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23319

Client Details EMM Consulting
Level 3, 175 Scott Street
Newcastle NSW 2300

Equipment Tested/ Model Number : NC-73
Instrument Serial Number : 11248306

Atmospheric Conditions

Ambient Temperature : 23.2°C
Relative Humidity : 50.3%
Barometric Pressure : 101.5kPa

Calibration Technician : Max Moore
Calibration Date : 02 Jun 2023
Secondary Check: Dylan Selge
Report Issue Date : 2 Jun 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.26	989.33

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

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.07%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

August 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP08

August 2023

Version	Date	Prepared by	Reviewed by	Comments
1	30/08/2023	Will Moore	Tony Welbourne	Final

Approved by



Tony Welbourne
Associate Director
31 August 2023

Level 3 175 Scott Street
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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	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels, dB – August 2023 ¹	10
Table 4.2	Measured atmospheric conditions – August 2023	10
Table 4.3	Site noise levels and limits – August 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.4	Historical WCP only noise levels at N17	16
Table 5.5	Historical WCP only noise levels at N19	17
Table 5.6	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.5	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.7	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 28/29 August 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

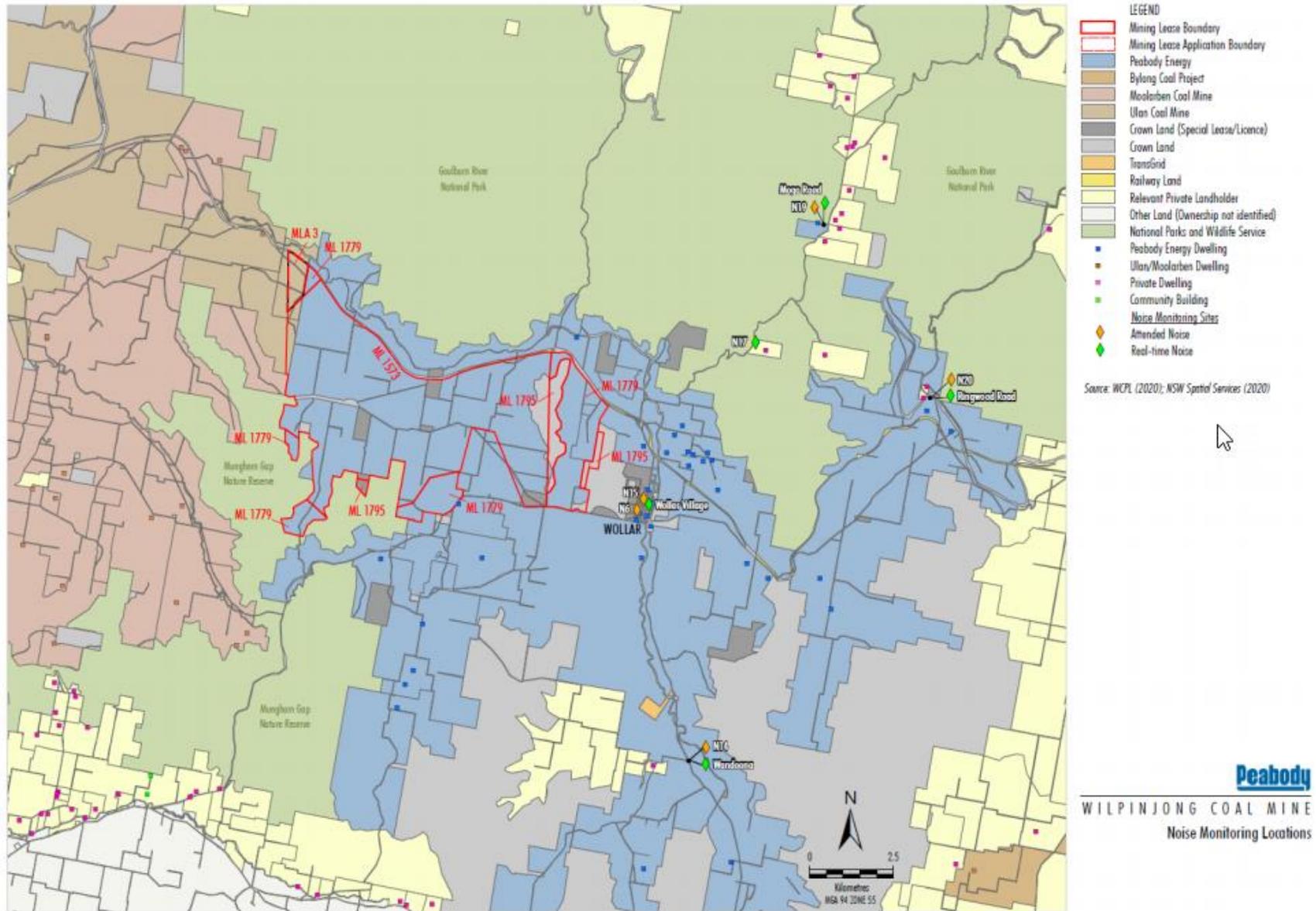


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods, such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

The NPfl reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfl reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfl Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfl Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00701424	01/06/2025	IEC 61672-1:2002
Rion NC-73 acoustic calibrator	11248306	02/06/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels, dB – August 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	28/08/2023 23:18	44	42	39	35	33	28	25
N14	29/08/2023 00:30	45	34	31	29	28	26	24
N15	28/08/2023 23:00	60	56	48	45	35	29	27
N17	28/08/2023 22:24	41	29	23	20	17	16	15
N19	28/08/2023 22:00	37	28	23	19	17	16	14
N20	28/08/2023 23:46	66	60	58	53	42	31	28

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – August 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	28/08/2023 23:18	8	0.9	280	0
N14	29/08/2023 00:30	8	1.1	150	0
N15	28/08/2023 23:00	8	0.0	-	0
N17	28/08/2023 22:24	12	0.0	-	0
N19	28/08/2023 22:00	14	0.0	-	0
N20	28/08/2023 23:46	5	0.9	260	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – August 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ₂	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	28/08/2023 23:18	1.5	68	F	Yes	37	45	IA	IA	Nil	Nil
N14	29/08/2023 00:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	28/08/2023 23:00	1.4	68	F	Yes	37	45	IA	IA	Nil	Nil
N17	28/08/2023 22:24	1.5	75	F	Yes	38	45	IA	IA	Nil	Nil
N19	28/08/2023 22:00	1.8	51	E	Yes	35	45	IA	IA	Nil	Nil
N20	28/08/2023 23:46	0.9	92	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

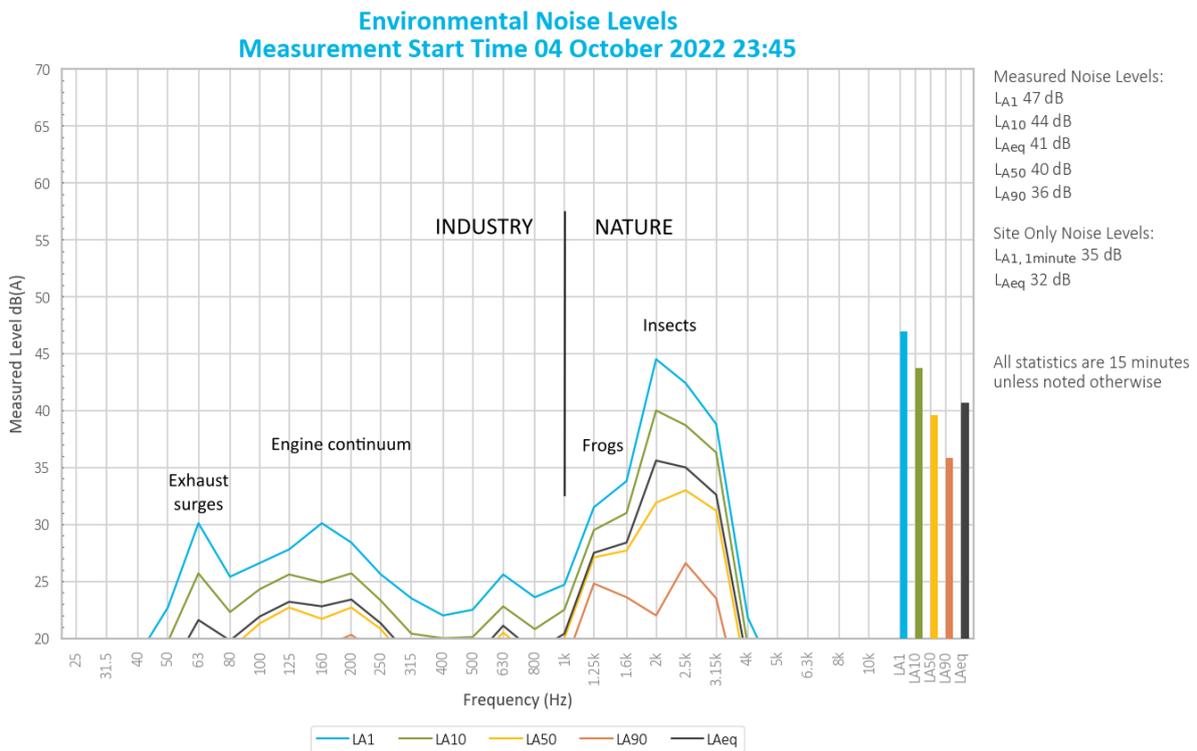


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

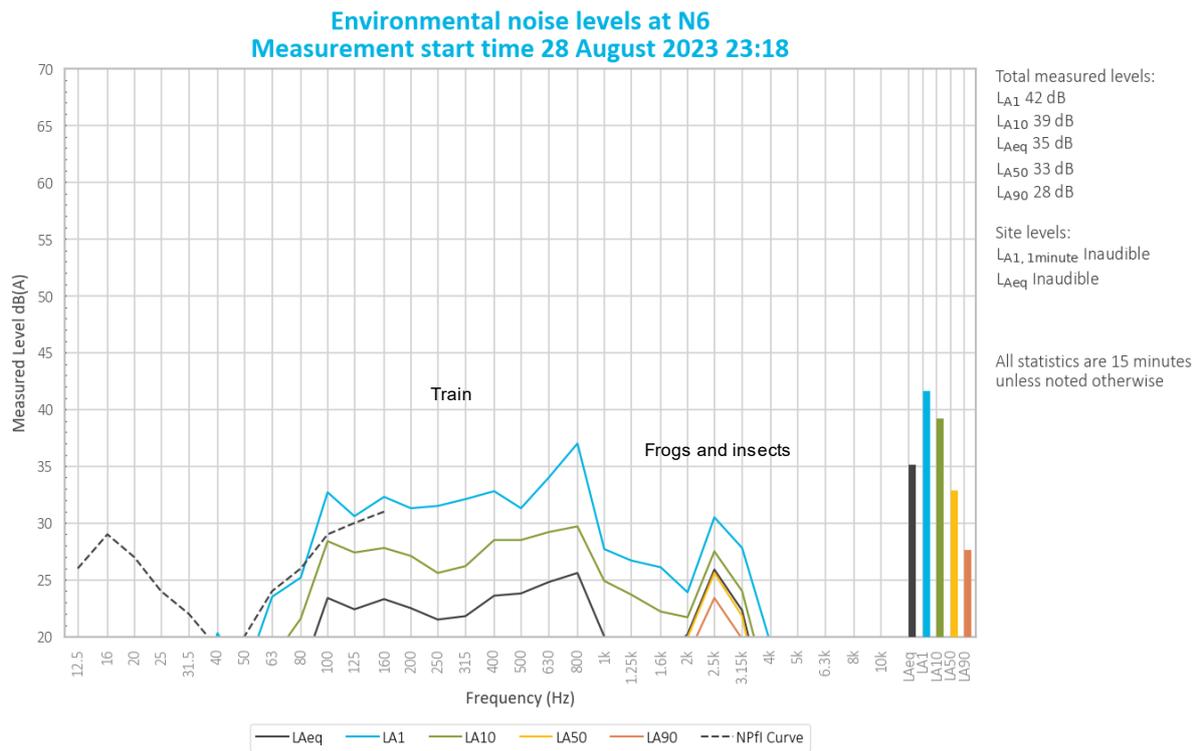


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

A train was primarily responsible for generating measured noise levels. Frogs and insects generated the measured LA50 and LA90.

Noise from an aeroplane and a dog were also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
LAeq	IA	IA	IA	<25	<20	IA	IA	IA	IA	28	<25	<30
LA1,1min	IA	IA	IA	27	<20	IA	IA	IA	IA	38	<25	35

5.3 N14

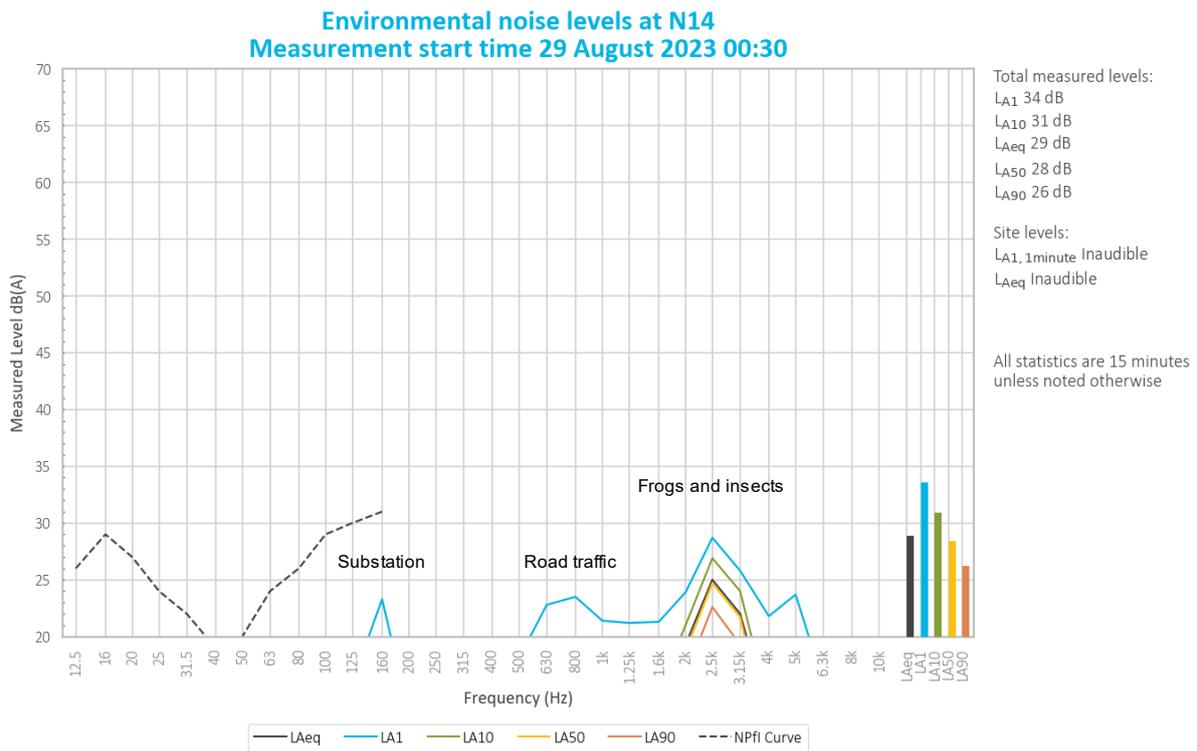


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

Noise from birds, road traffic and a nearby substation were also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
LAeq	IA	<25	<25	<25	IA	IA	IA	IA	IA	IA	<25	<25
LA1,1min	IA	<25	<25	30	IA	IA	IA	IA	IA	IA	26	27

5.4 N15

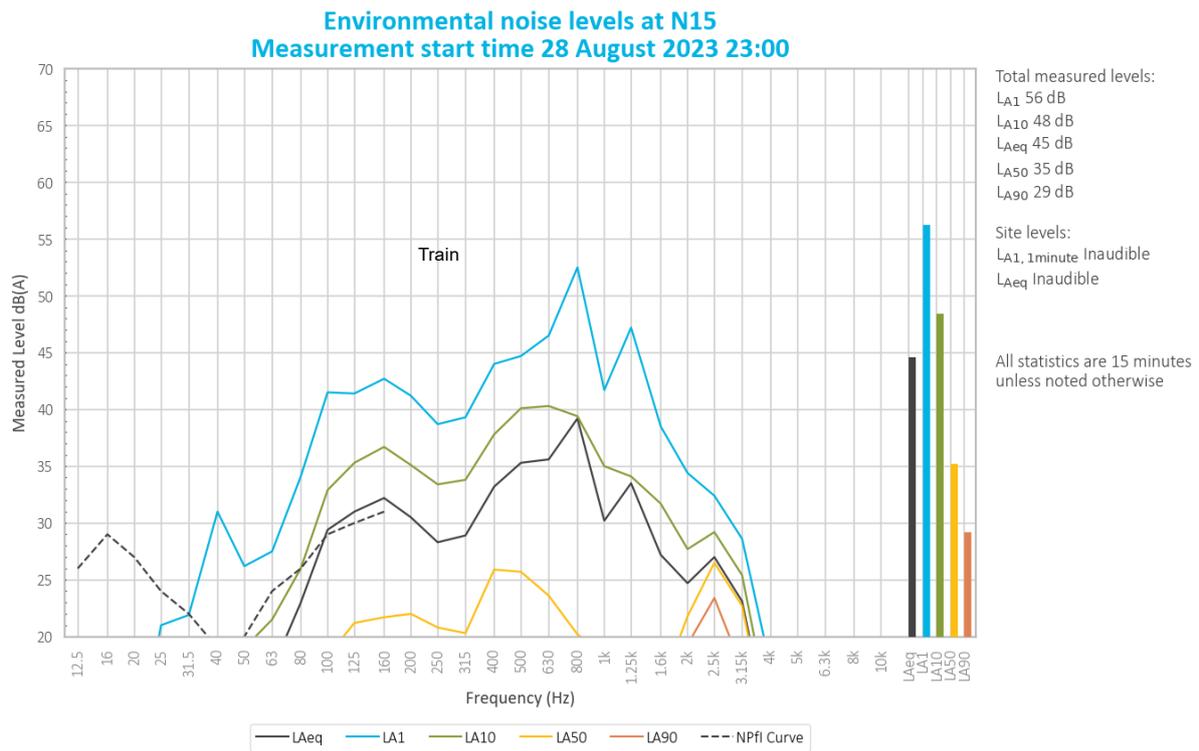


Figure 5.4 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

A train generated measured noise levels. Frogs and insects contributed to the measured L_{A50} and generated the measured L_{A90} .

Noise from an aeroplane was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
L_{Aeq}	IA	<25	IA	<25	<20	IA	IA	<20	IA	<25	27	26
$L_{A1,1min}$	IA	<25	IA	<25	<20	IA	IA	<20	IA	32	36	35

5.5 N17

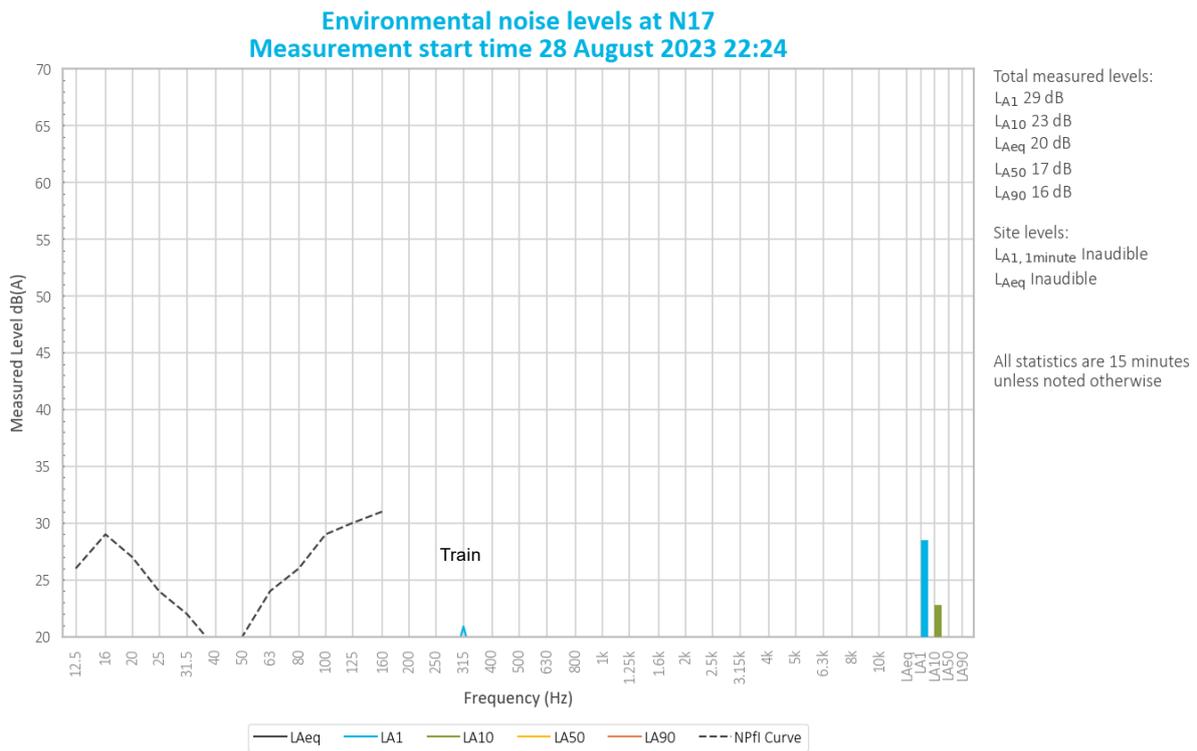


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. A train generated the measured LA1.

Table 5.4 Historical WCP only noise levels at N17

Month	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
LAeq	IA	27	-	-	-	-	IA	27	IA	<30	27	<20
LA1,1min	IA	34	-	-	-	-	IA	30	IA	<30	32	<20

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

5.6 N19

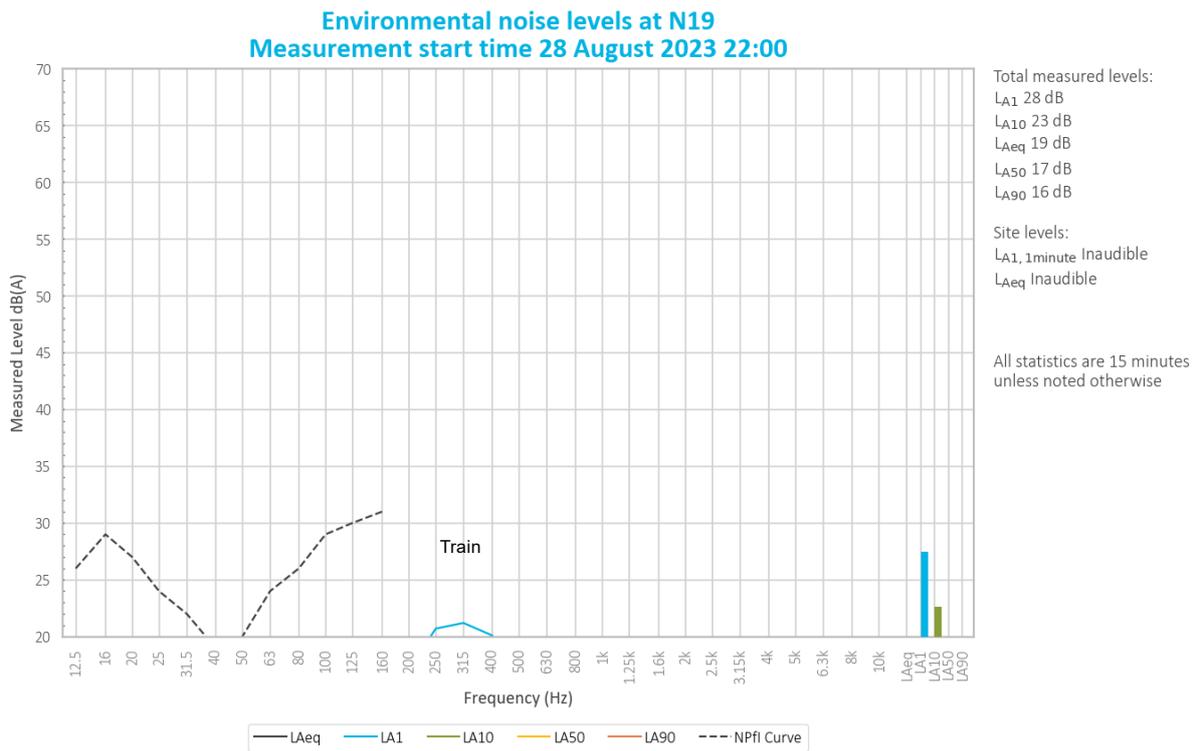


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. A train generated the measured LA1.

Noise from an aeroplane was also noted at low levels.

Table 5.5 Historical WCP only noise levels at N19

Month	Aug 2022	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
LAeq	IA	<25	-	-	-	-	IA	IA	IA	26	IA	IA
LA1,1min	IA	26	-	-	-	-	IA	IA	IA	28	IA	IA

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

5.7 N20

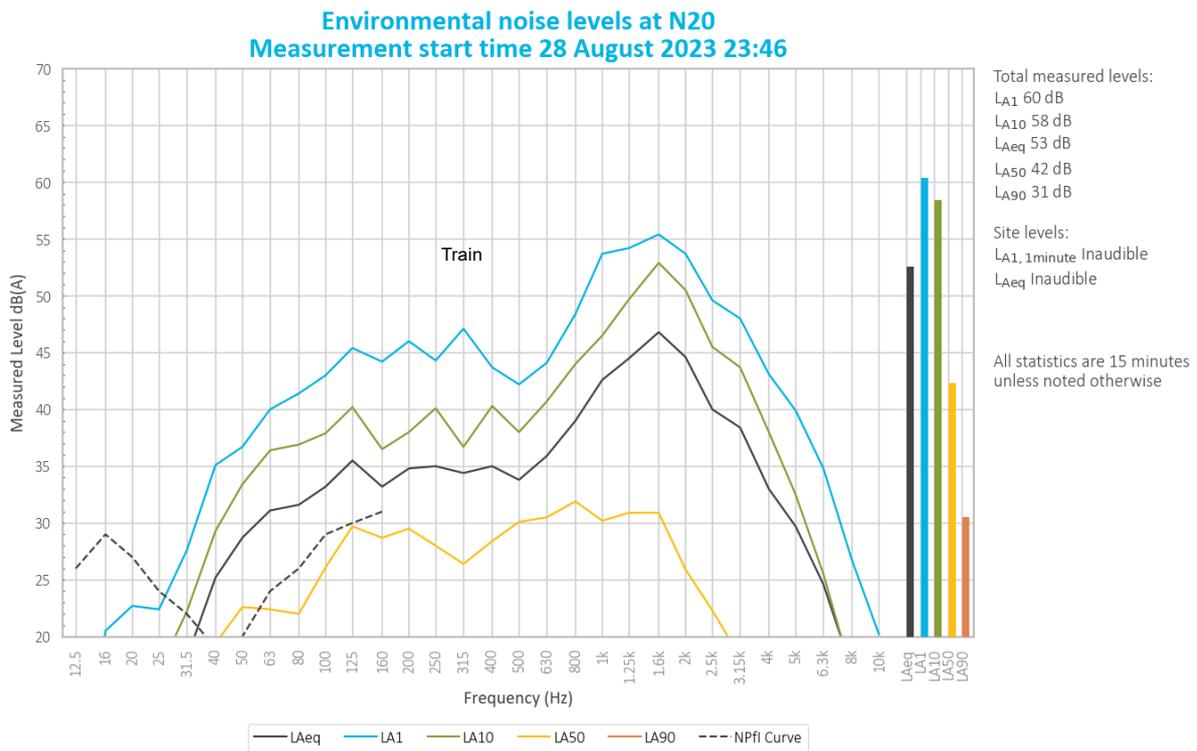


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train generated measured noise levels.

Noise from frogs, insects and running water was also noted at low levels.

Table 5.6 Historical WCP only noise levels at N20

Month	Aug 2022	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 28/29 August 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the August 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

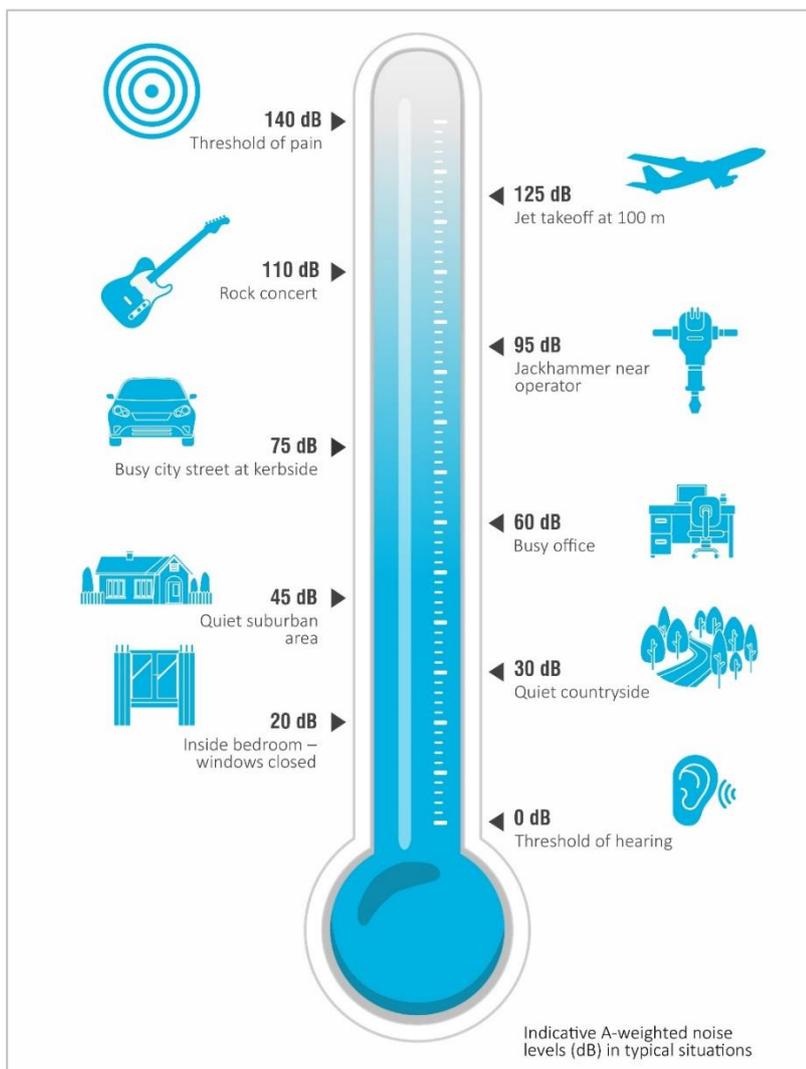


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.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
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



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

Calibration Number **C23317**

Client Details	EMM Consulting Level 3, 175 Scott Street Newcastle NSW 2300
-----------------------	---

Equipment Tested/ Model Number :	NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463
Firmware Version :	2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 22.6°C
Relative Humidity : 46%	Relative Humidity : 46.6%
Barometric Pressure : 100.6kPa	Barometric Pressure : 100.6kPa

Calibration Technician : Max Moore	Secondary Check: Dylan Selge
Calibration Date : 1 Jun 2023	Report Issue Date : 2 Jun 2023

Approved Signatory :  Ken Williams

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

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

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%
5kHz	±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.

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



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23319

Client Details EMM Consulting
Level 3, 175 Scott Street
Newcastle NSW 2300

Equipment Tested/ Model Number : NC-73
Instrument Serial Number : 11248306

Atmospheric Conditions

Ambient Temperature : 23.2°C
Relative Humidity : 50.3%
Barometric Pressure : 101.5kPa

Calibration Technician : Max Moore **Secondary Check:** Dylan Selge
Calibration Date : 02 Jun 2023 **Report Issue Date :** 2 Jun 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.26	989.33

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

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.07%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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.

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

September 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP09

September 2023

Version	Date	Prepared by	Reviewed by	Comments
1	04/10/2023	Will Moore	Tony Welbourne	Final

Approved by



Tony Welbourne

Associate Director

06 October 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	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	11
5	Discussion	13
5.1	Noted noise sources	13
5.2	N6	14
5.3	N14	15
5.4	N15	16
5.5	N15 remeasure	17
5.6	N17	18
5.7	N19	19
5.8	N20	20
6	Summary	21

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels, dB – September 2023 ¹	10
Table 4.2	Measured atmospheric conditions – September 2023	10
Table 4.3	Site noise levels and limits – September 2023	12
Table 5.1	Historical WCP only noise levels at N6	14
Table 5.2	Historical WCP only noise levels at N14	15
Table 5.3	Historical WCP only noise levels at N15	16
Table 5.4	Historical WCP only noise levels at N15	17
Table 5.5	Historical WCP only noise levels at N17	18
Table 5.6	Historical WCP only noise levels at N19	19
Table 5.7	Historical WCP only noise levels at N20	20
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	13
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	14
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	15
Figure 5.4	Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village	16
Figure 5.5	Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village	17
Figure 5.6	Environmental noise levels N17, Mogo Road (1)	18
Figure 5.7	Environmental noise levels N19, Mogo Road (2)	19
Figure 5.8	Environmental noise levels N20, Ringwood Road	20
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 18 September 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

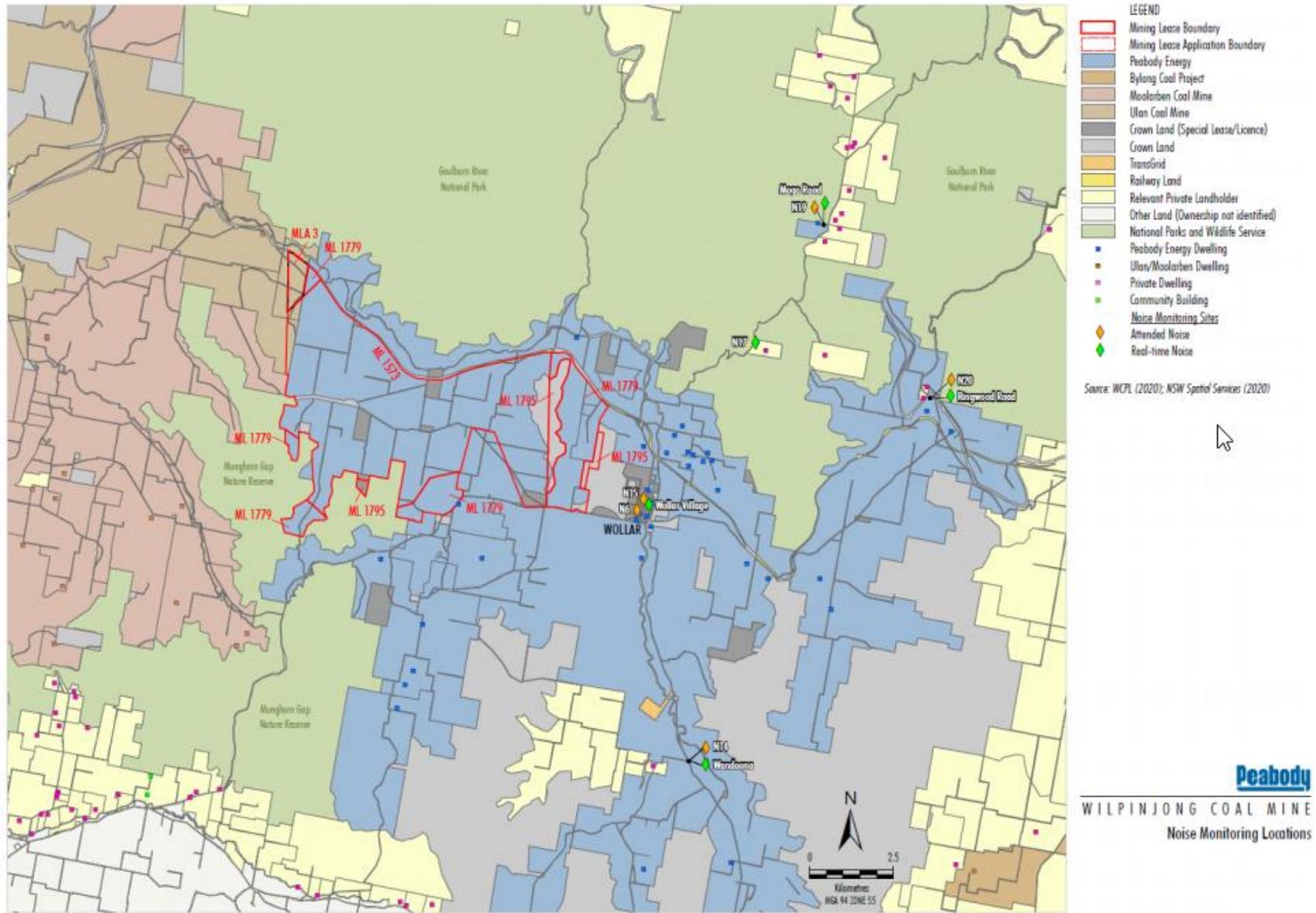


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
L _{A1,1minute}	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
L _{A10}	The A-weighted noise level which is exceeded for 10% of the time.
L _{Aeq}	The energy average A-weighted noise level.
L _{A50}	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
L _{A90}	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
L _{Ceq}	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods, such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	01070590	09/06/2024	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	96080	14/02/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels, dB – September 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	18/09/2023 23:37	56	46	40	38	35	34	32
N14	19/09/2023 00:00	38	34	32	30	30	27	25
N15	18/09/2023 22:45	48	44	41	39	38	37	34
N15 remeasure	18/09/2023 23:15	42	41	37	35	34	32	29
N17	18/09/2023 22:22	39	35	28	26	24	22	20
N19	18/09/2023 22:00	35	25	24	22	22	20	19
N20	19/09/2023 00:30	73	69	66	59	40	24	22

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – September 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	18/09/2023 23:37	13	< 0.5	-	0
N14	19/09/2023 00:00	14	0.6	150	0
N15	18/09/2023 22:45	14	< 0.5	-	0
N15 remeasure	18/09/2023 23:15	13	< 0.5	-	0
N17	18/09/2023 22:22	17	< 0.5	-	0
N19	18/09/2023 22:00	19	0.6	240	0
N20	19/09/2023 00:30	9	1.0	260	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3 There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – September 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	18/09/2023 23:37	0.0	-	G	No	37	45	31	38	N/A	N/A
N14	19/09/2023 00:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	18/09/2023 22:45	0.0	-	G	No	37	45	39	45	N/A	N/A
N15 remeasure	18/09/2023 23:15	0.0	-	G	No	37	45	34	41	N/A	N/A
N17	18/09/2023 22:22	0.0	-	G	No	38	45	<20	<20	N/A	N/A
N19	18/09/2023 22:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N20	19/09/2023 00:30	0.0	-	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute} includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

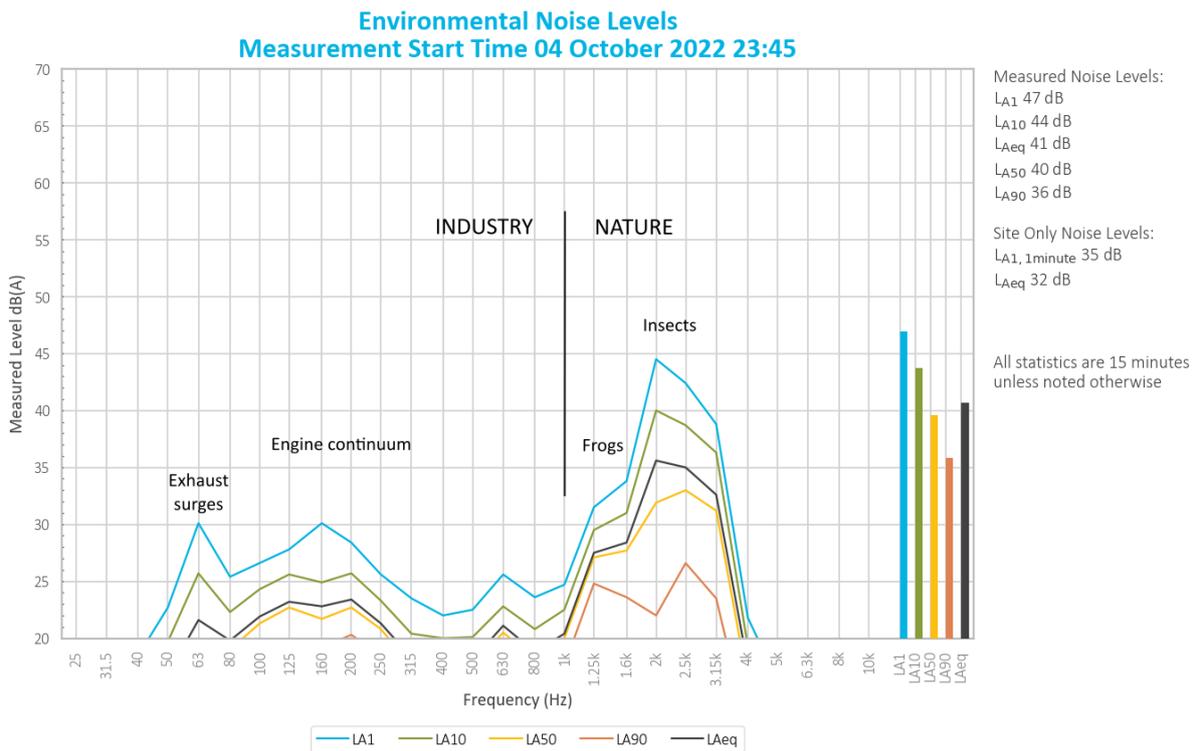


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

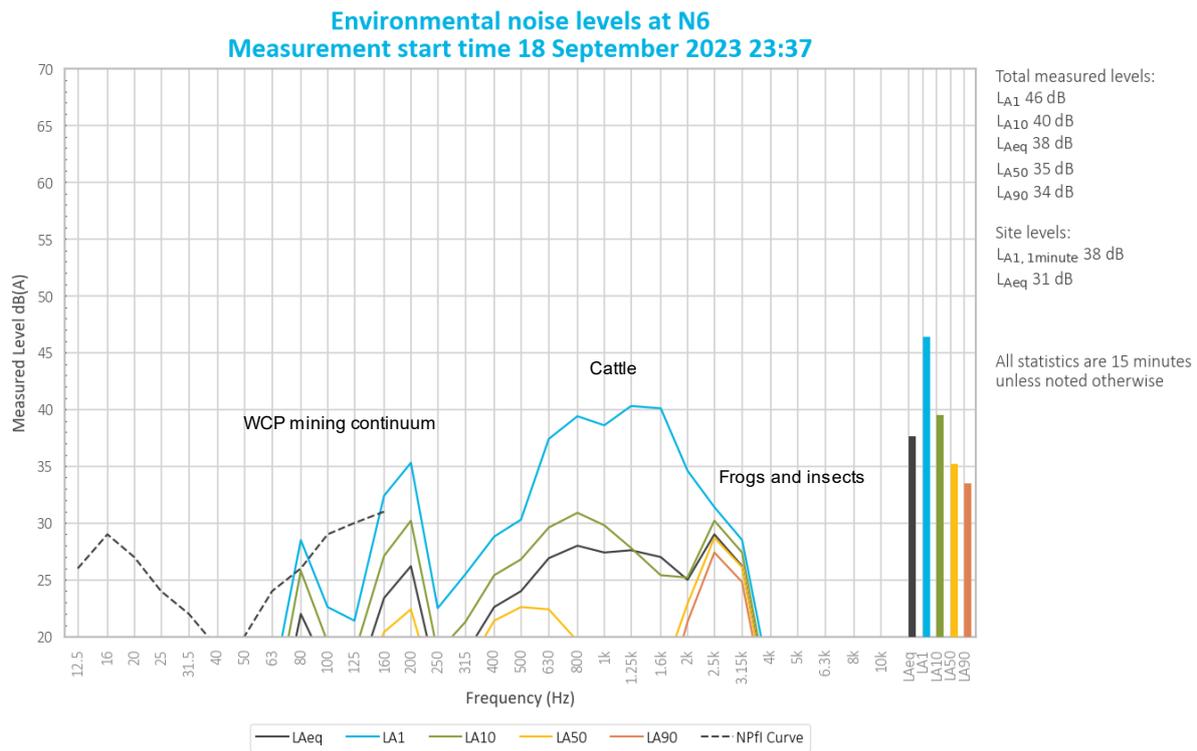


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 31 dB and LA1,1minute of 38 dB.

Cattle generated the measured LA1 and contributed to the LA10 and LAeq. Frogs and insects contributed to the LA10 and LAeq and generated the measured LA50 and LA90.

Table 5.1 Historical WCP only noise levels at N6

Month	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
LAeq	IA	IA	<25	<20	IA	IA	IA	IA	28	<25	<30	IA
LA1,1min	IA	IA	27	<20	IA	IA	IA	IA	38	<25	35	IA

5.3 N14

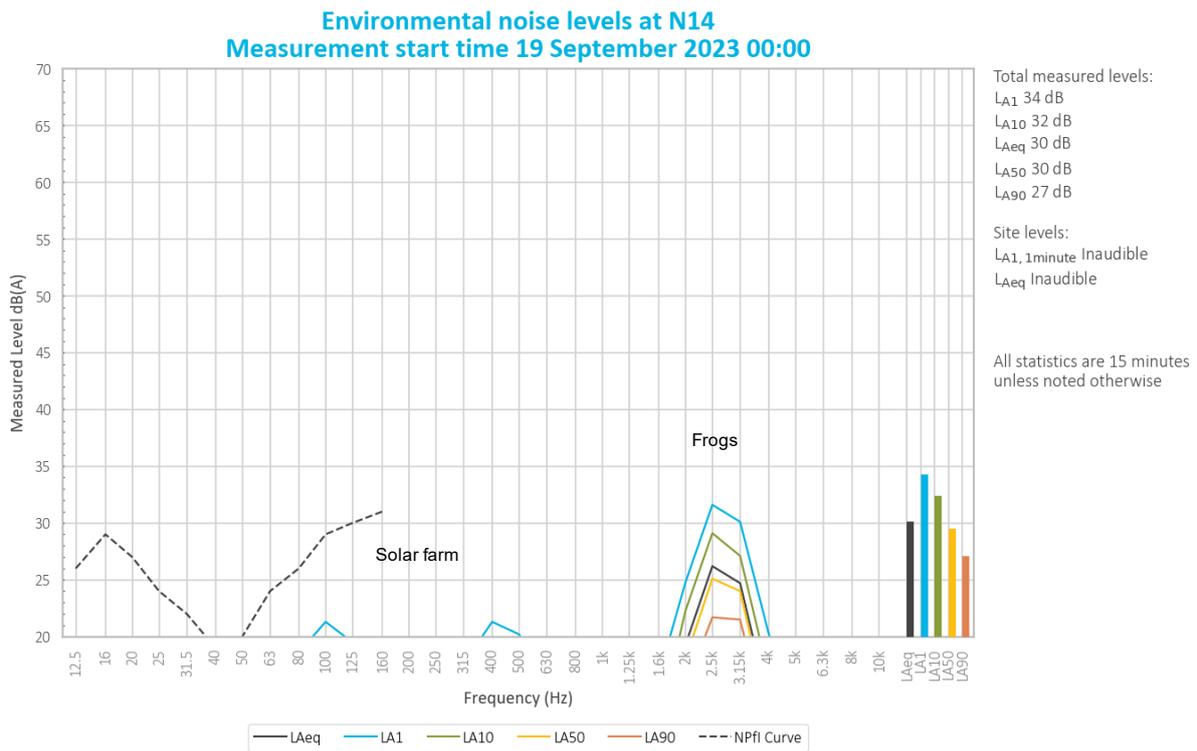


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs generated measured noise levels.

Noise from birds, train and a nearby solar farm was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
LAeq	<25	<25	<25	IA	IA	IA	IA	IA	IA	<25	<25	IA
LA1,1min	<25	<25	30	IA	IA	IA	IA	IA	IA	26	27	IA

5.4 N15

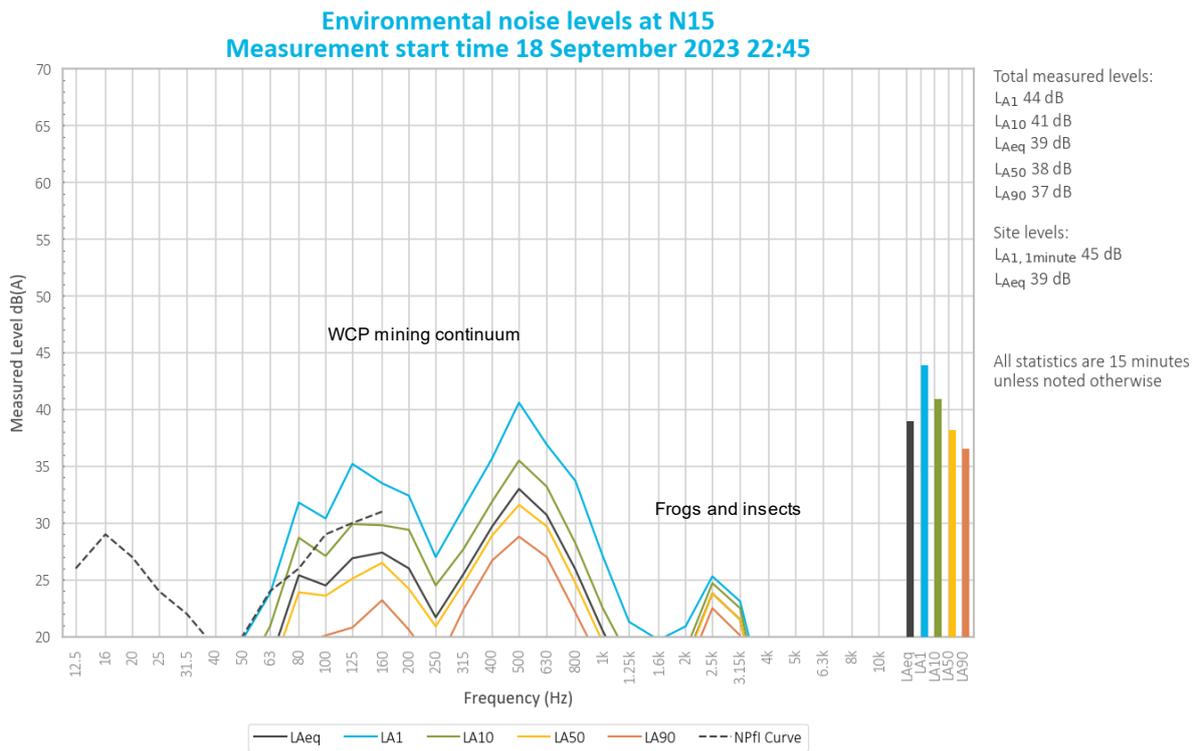


Figure 5.4 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 39 dB, which exceeded the relevant limit by 2 dB. Track noise generated the site only $L_{A1,1minute}$ of 45 dB.

Continuum from WCP generated measured noise levels.

Noise from frogs and insects was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
L_{Aeq}	<25	IA	<25	<20	IA	IA	<20	IA	<25	27	26	IA
$L_{A1,1min}$	<25	IA	<25	<20	IA	IA	<20	IA	32	36	35	IA

5.5 N15 remeasure

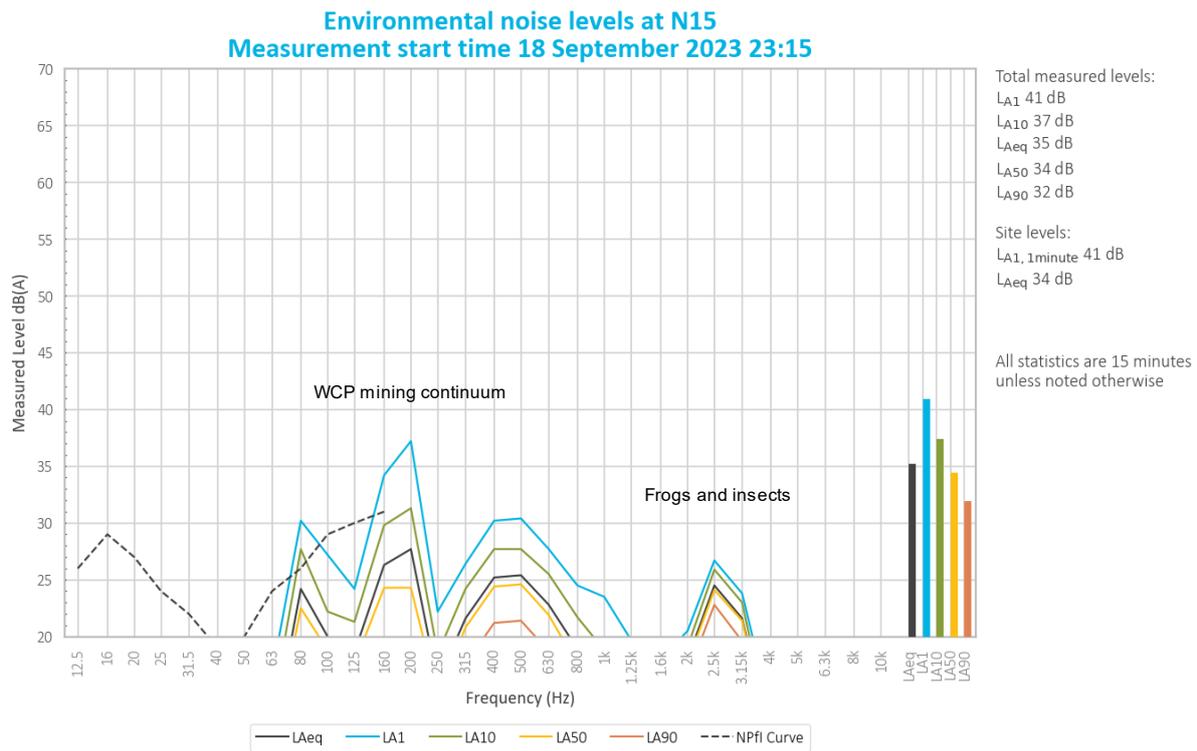


Figure 5.5 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the second measurement, generating a site only L_{Aeq} of 34 dB and a $L_{A1,1minute}$ of 41 dB. Track noise was also noted.

Continuum from WCP primarily generated measured noise levels. Frogs and insects contributed to the measured L_{Aeq} , L_{A50} and L_{A90} .

Noise from bats, cattle and sheep was also noted at low levels.

Table 5.4 Historical WCP only noise levels at N15

Month	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
L_{Aeq}	<25	IA	<25	<20	IA	IA	<20	IA	<25	27	26	IA
$L_{A1,1min}$	<25	IA	<25	<20	IA	IA	<20	IA	32	36	35	IA

5.6 N17

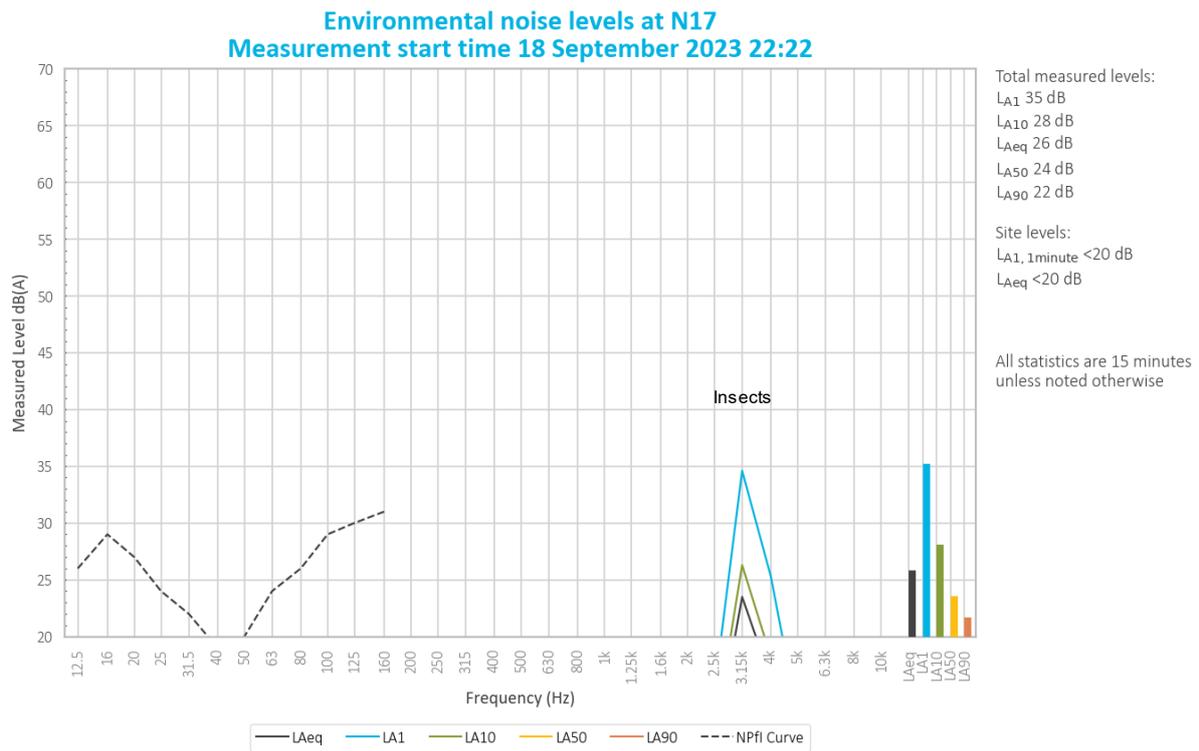


Figure 5.6 Environmental noise levels N17, Mogo Road (1)

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

Insects generated measured noise levels.

Noise from an aeroplane and animals in the bush was also noted at low levels.

Table 5.5 Historical WCP only noise levels at N17

Month	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
LAeq	27	-	-	-	-	IA	27	IA	<30	27	<20	IA
LA1,1min	34	-	-	-	-	IA	30	IA	<30	32	<20	IA

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

5.7 N19

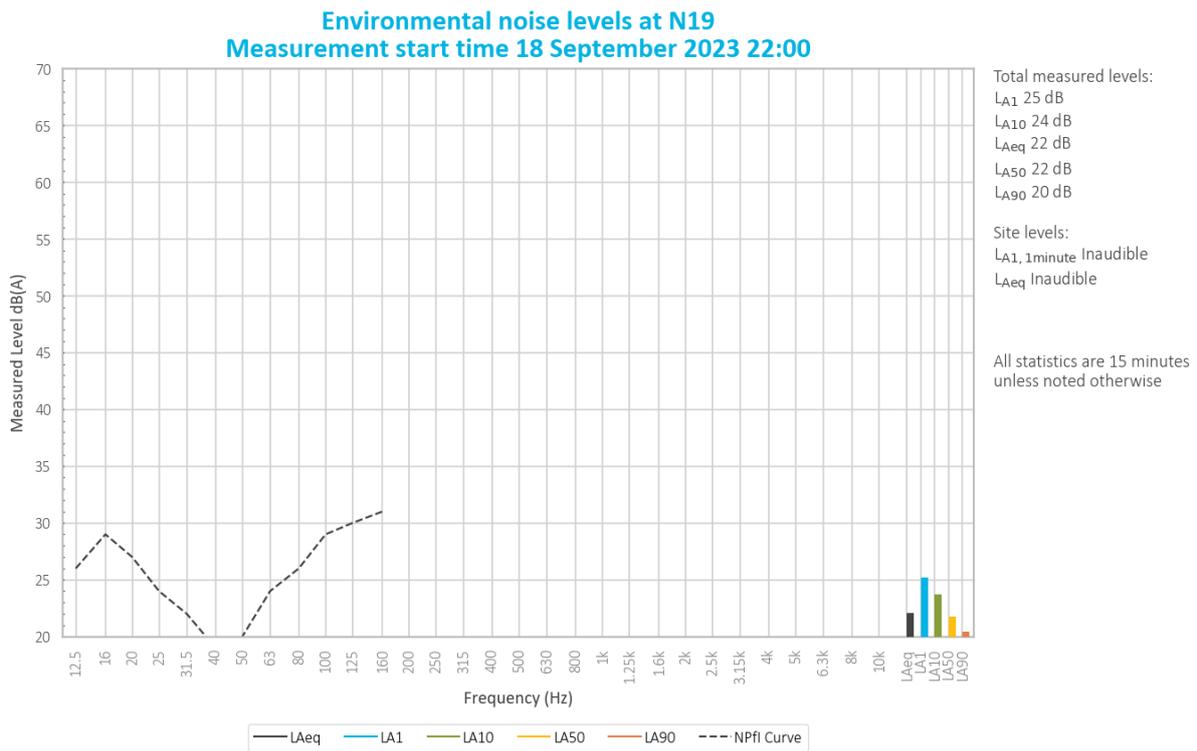


Figure 5.7 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.
 A breeze in nearby foliage generated measured noise levels.
 Noise from birds was also noted at low levels.

Table 5.6 Historical WCP only noise levels at N19

Month	Sept 2022	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
LAeq	<25	-	-	-	-	IA	IA	IA	26	IA	IA	IA
LA1,1min	26	-	-	-	-	IA	IA	IA	28	IA	IA	IA

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

5.8 N20

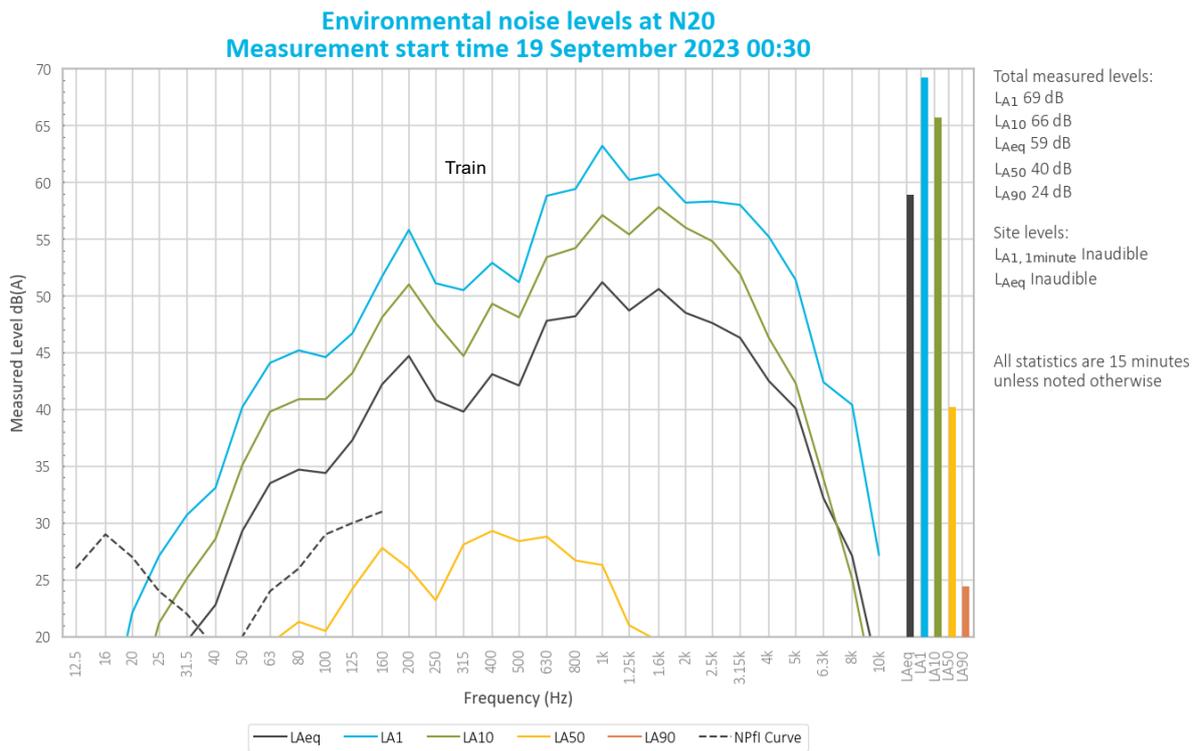


Figure 5.8 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train generated measured noise levels.

Noise from dogs and frogs was also noted at low levels.

Table 5.7 Historical WCP only noise levels at N20

Month	Sept 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 18 September 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations, excluding the first measurement at N15 during the September 2023 survey. A remeasure was taken 15 minutes after the exceedance at N15 and noise levels were compliant.

Noise limits were not applicable due to meteorological conditions at the time of monitoring.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

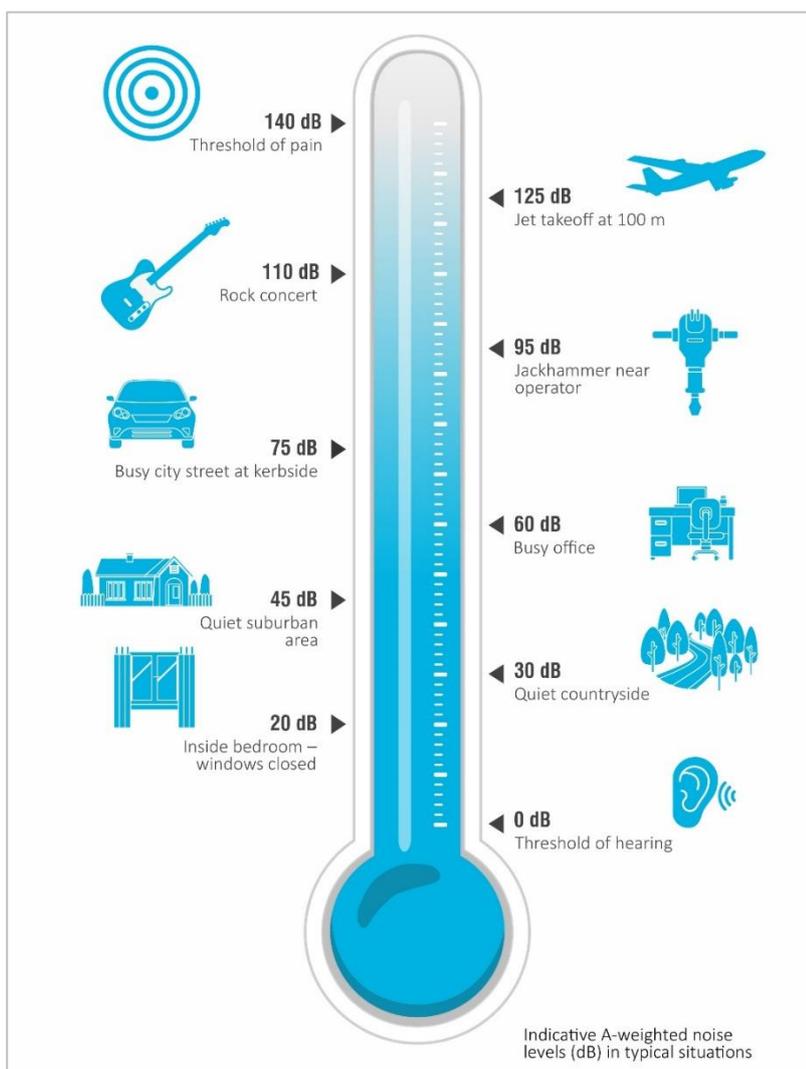


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.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
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 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 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 :	Ken Williams

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

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

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%
3kHz	±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.

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



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23067

Client Details	EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
-----------------------	--

Equipment Tested/ Model Number :	Pulsar Model 105
Instrument Serial Number :	96080

Atmospheric Conditions	
Ambient Temperature :	23°C
Relative Humidity :	50.1%
Barometric Pressure :	100.25kPa

Calibration Technician :	Shaheen Boaz	Secondary Check:	Dhanush Bonu
Calibration Date :	14 Feb 2023	Report Issue Date :	3 Mar 2023

Approved Signatory : *Ken Williams* Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	93.97	1000.30

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.13%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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

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

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

October 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP10

October 2023

Version	Date	Prepared by	Reviewed by	Comments
1	26/10/2023	Will Moore	Robert Kirwan	Final

Approved by



Robert Kirwan

Associate Acoustical Consultant

27 October 2023

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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	Introduction	3
1.1	Background	3
1.2	Attended monitoring locations	3
1.3	Terminology and abbreviations	5
2	Noise limits	6
2.1	Development consent	6
2.2	Environment protection licence	6
2.3	Noise management plan	6
2.4	Noise limits	6
2.5	Additional requirements	7
3	Methodology	8
3.1	Overview	8
3.2	Attended noise monitoring	8
3.3	Modifying factors	9
3.4	Instrumentation	9
4	Results	10
4.1	Total measured noise levels and atmospheric conditions	10
4.2	Site only noise levels	10
5	Discussion	12
5.1	Noted noise sources	12
5.2	N6	13
5.3	N14	14
5.4	N15	15
5.5	N17	16
5.6	N19	17
5.7	N20	18
6	Summary	19

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	3
Table 1.2	Terminology and abbreviations	5
Table 2.1	Noise impact limits, dB	6
Table 3.1	NPfl reference curve adjusted for A-weighting	9
Table 3.2	Attended noise monitoring equipment	9
Table 4.1	Total measured noise levels, dB – October 2023 ¹	10
Table 4.2	Measured atmospheric conditions – October 2023	10
Table 4.3	Site noise levels and limits – October 2023	11
Table 5.1	Historical WCP only noise levels at N6	13
Table 5.2	Historical WCP only noise levels at N14	14
Table 5.3	Historical WCP only noise levels at N15	15
Table 5.5	Historical WCP only noise levels at N17	16
Table 5.6	Historical WCP only noise levels at N19	17
Table 5.7	Historical WCP only noise levels at N20	18
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	4
Figure 5.1	Example graph (refer to Section 5.1 for explanatory note)	12
Figure 5.2	Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village	13
Figure 5.3	Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads	14
Figure 5.4	Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village	15
Figure 5.6	Environmental noise levels N17, Mogo Road (1)	16
Figure 5.7	Environmental noise levels N19, Mogo Road (2)	17
Figure 5.8	Environmental noise levels N20, Ringwood Road	18
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 24 October 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

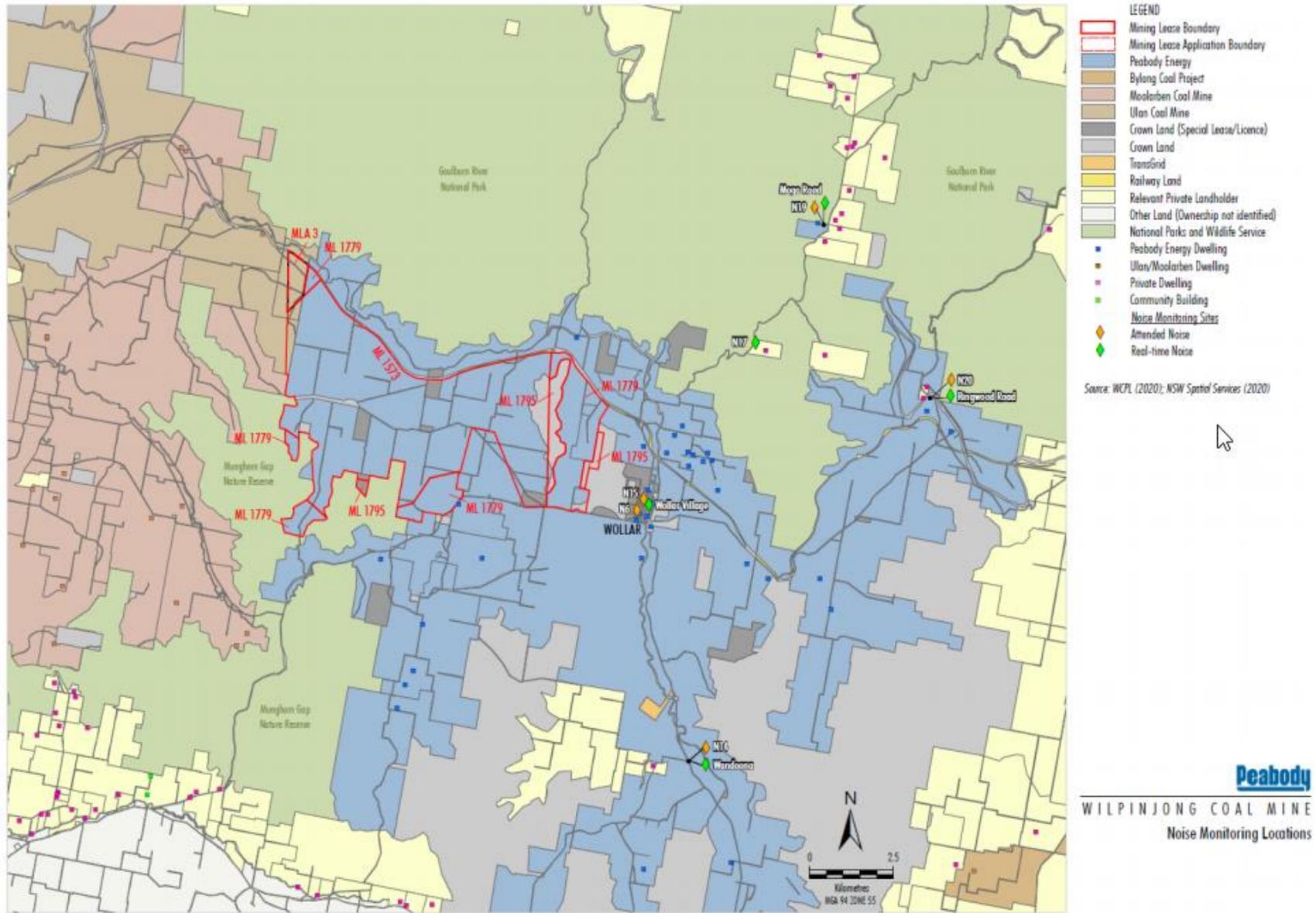


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in December 2022. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods, such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A) as shown in Table 3.1 so that it can be visually compared to the measured site spectra.

Table 3.1 NPfI reference curve adjusted for A-weighting

	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	23/01/2025	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	78226	24/01/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement 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.

Table 4.1 Total measured noise levels, dB – October 2023¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	24/10/2023 22:50	45	38	33	30	28	26	24
N14	24/10/2023 23:45	35	29	25	23	22	20	17
N15	24/10/2023 23:15	37	36	33	30	28	25	22
N17	24/10/2023 22:23	38	36	34	31	31	27	24
N19	24/10/2023 22:00	41	39	34	30	29	19	16
N20	25/10/2023 00:15	43	34	31	26	20	18	16

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

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – October 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
N6	24/10/2023 22:50	17	< 0.5	-	0
N14	24/10/2023 23:45	16	< 0.5	-	0
N15	24/10/2023 23:15	13	< 0.5	-	0
N17	24/10/2023 22:23	21	< 0.5	-	0
N19	24/10/2023 22:00	22	< 0.5	-	0
N20	25/10/2023 00:15	12	1.0	280	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors, 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 NPfl.

4.2.2 Monitoring results

Table 4.3 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – October 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	24/10/2023 22:50	0.0	-	F	Yes	37	45	28	30	Nil	Nil
N14	24/10/2023 23:45	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil
N15	24/10/2023 23:15	0.0	-	F	Yes	37	45	30	36	Nil	Nil
N17	24/10/2023 22:23	0.4	359	F	Yes	38	45	31	38	Nil	Nil
N19	24/10/2023 22:00	0.3	279	F	Yes	35	45	<20	<20	Nil	Nil
N20	25/10/2023 00:15	0.0	-	F	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

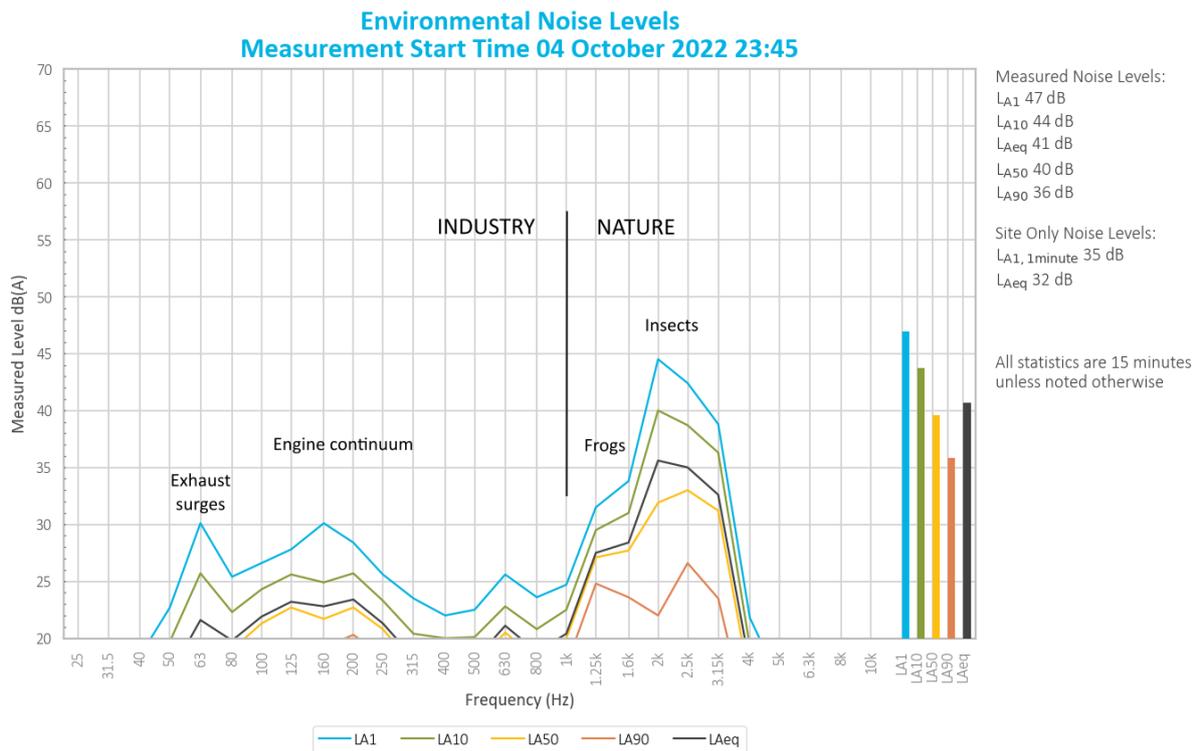


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

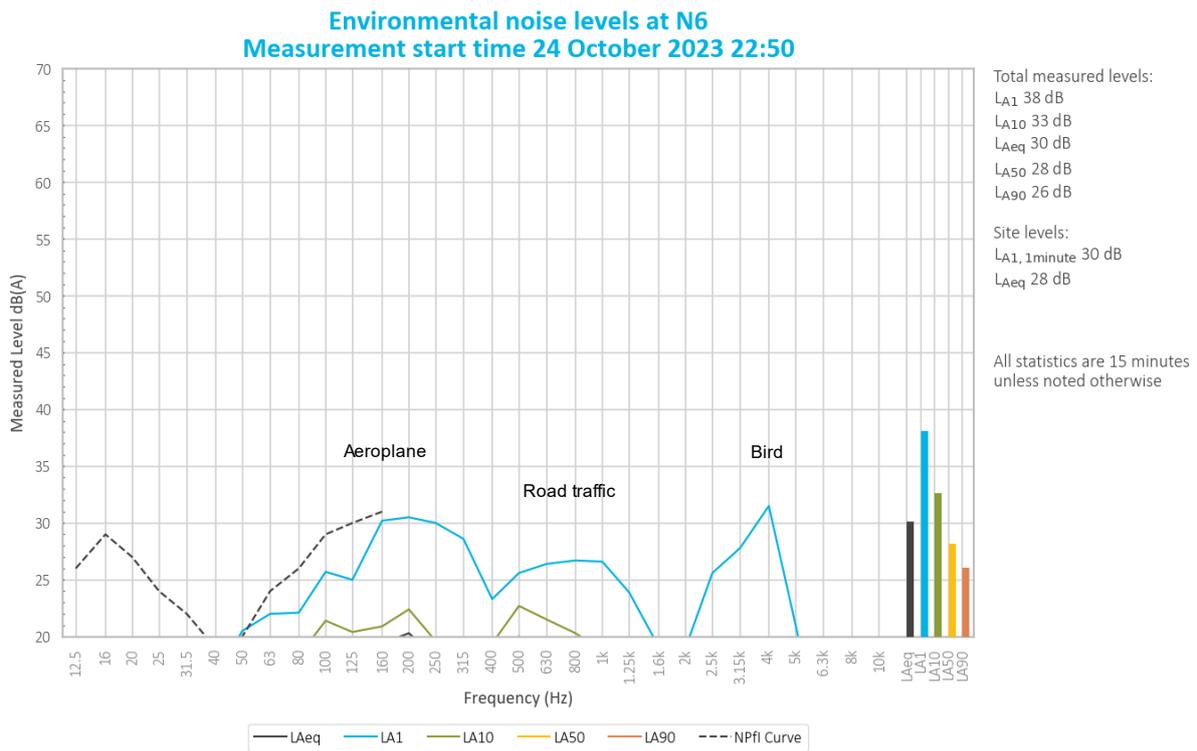


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 28 dB and $L_{A1,1minute}$ of 30 dB.

Birds contributed to the measured L_{A1} . An aeroplane contributed to the measured L_{A1} and L_{A10} . Road traffic contributed to the measured L_{A10} and L_{Aeq} . Continuum from WCP contributed to the measured L_{Aeq} and generated the L_{A50} and L_{A90} .

Noise from bats, frogs and insects was noted at low levels.

Table 5.1 Historical WCP only noise levels at N6

Month	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023
L_{Aeq}	IA	<25	<20	IA	IA	IA	IA	28	<25	<30	IA	31
$L_{A1,1min}$	IA	27	<20	IA	IA	IA	IA	38	<25	35	IA	38

5.3 N14

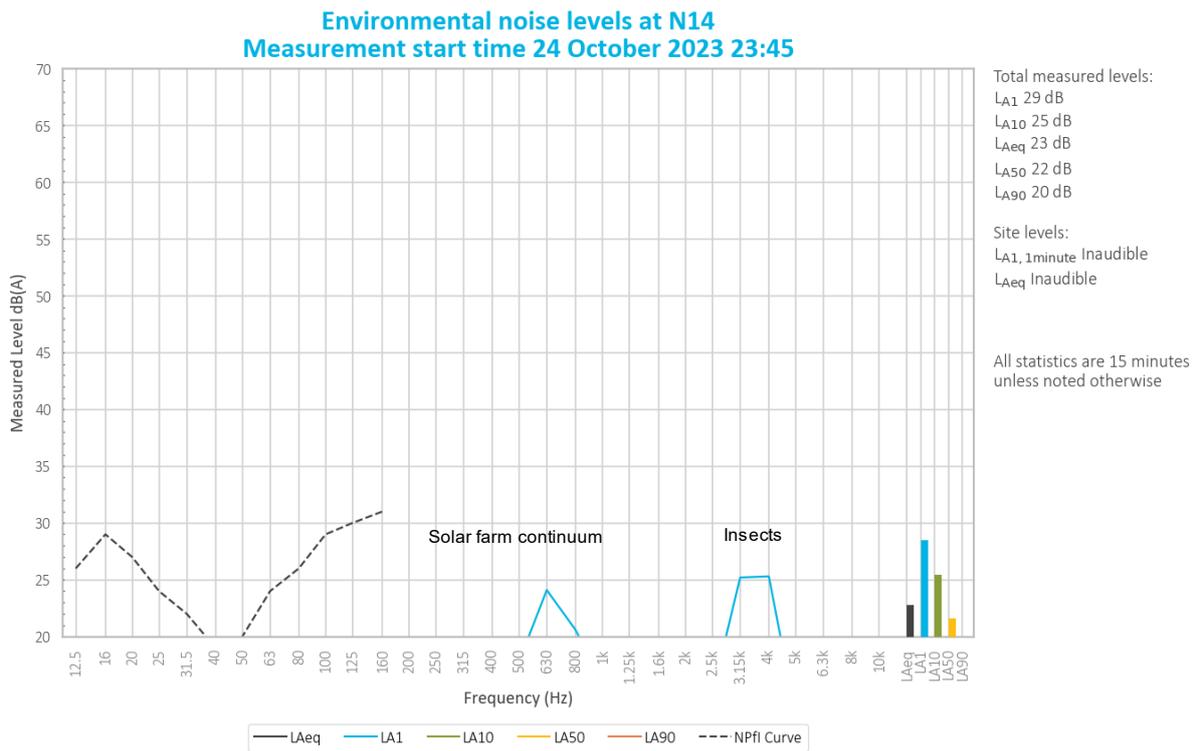


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Insects primarily generated measured noise levels. Continuum from a nearby solar farm contributed to the measured LAeq, LA50 and LA90.

Noise from bats, birds and frogs was also noted at low levels.

Table 5.2 Historical WCP only noise levels at N14

Month	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023
LAeq	<25	<25	IA	IA	IA	IA	IA	IA	<25	<25	IA	IA
LA1,1min	<25	30	IA	IA	IA	IA	IA	IA	26	27	IA	IA

5.4 N15

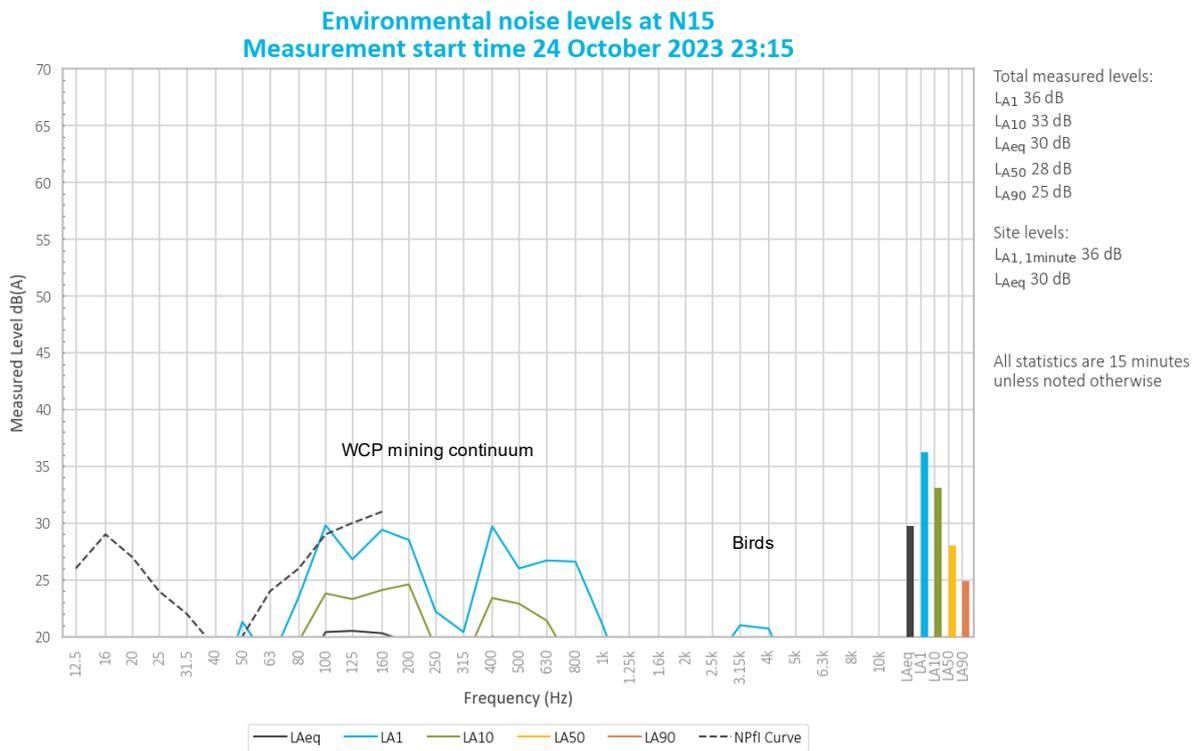


Figure 5.4 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 30 dB and $L_{A1,1minute}$ of 36 dB.

Continuum from WCP generated measured noise levels.

Noise from birds, dogs, frogs, road traffic and a train was also noted at low levels.

Table 5.3 Historical WCP only noise levels at N15

Month	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023 ¹
L_{Aeq}	IA	<25	<20	IA	IA	<20	IA	<25	27	26	IA	39/34
$L_{A1,1min}$	IA	<25	<20	IA	IA	<20	IA	32	36	35	IA	45/41

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

5.5 N17

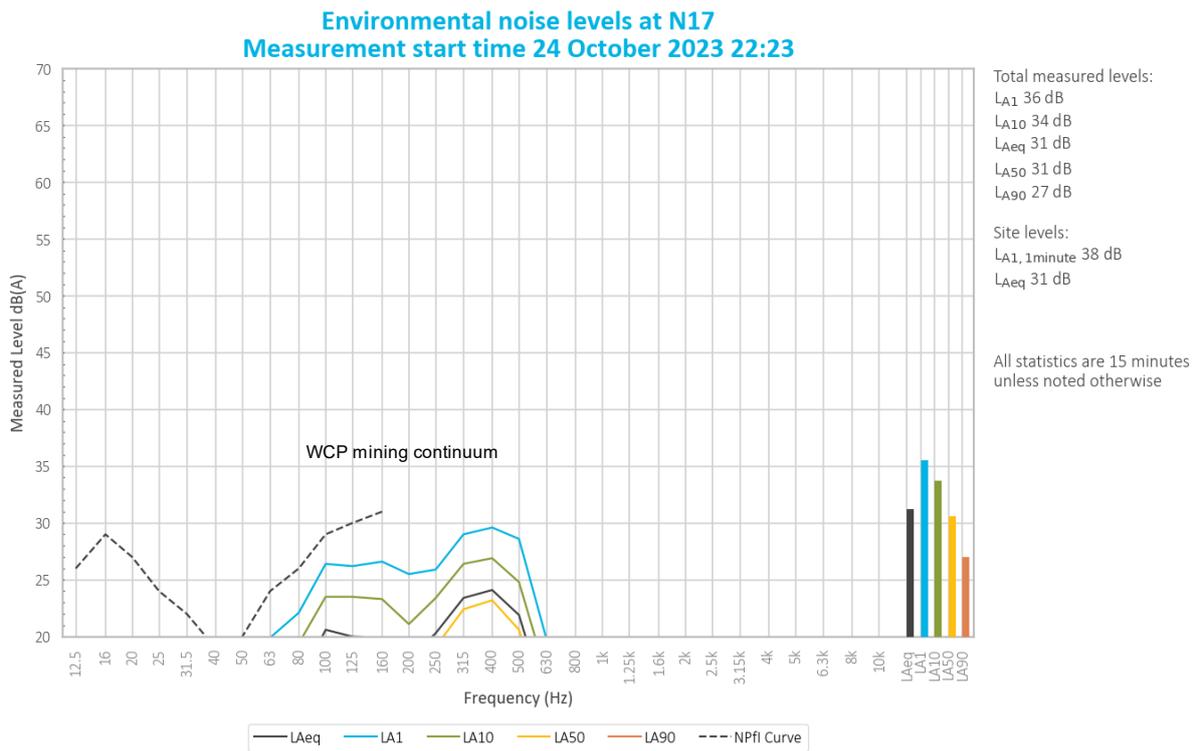


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} of 31 dB and $L_{A1,1minute}$ of 38 dB. Track noise was also noted.

Continuum from WCP generated measured noise levels.

Noise from insects was also noted at low levels.

Table 5.4 Historical WCP only noise levels at N17

Month	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023
L_{Aeq}	-	-	-	-	IA	27	IA	<30	27	<20	IA	<20
$L_{A1,1min}$	-	-	-	-	IA	30	IA	<30	32	<20	IA	<20

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

5.6 N19

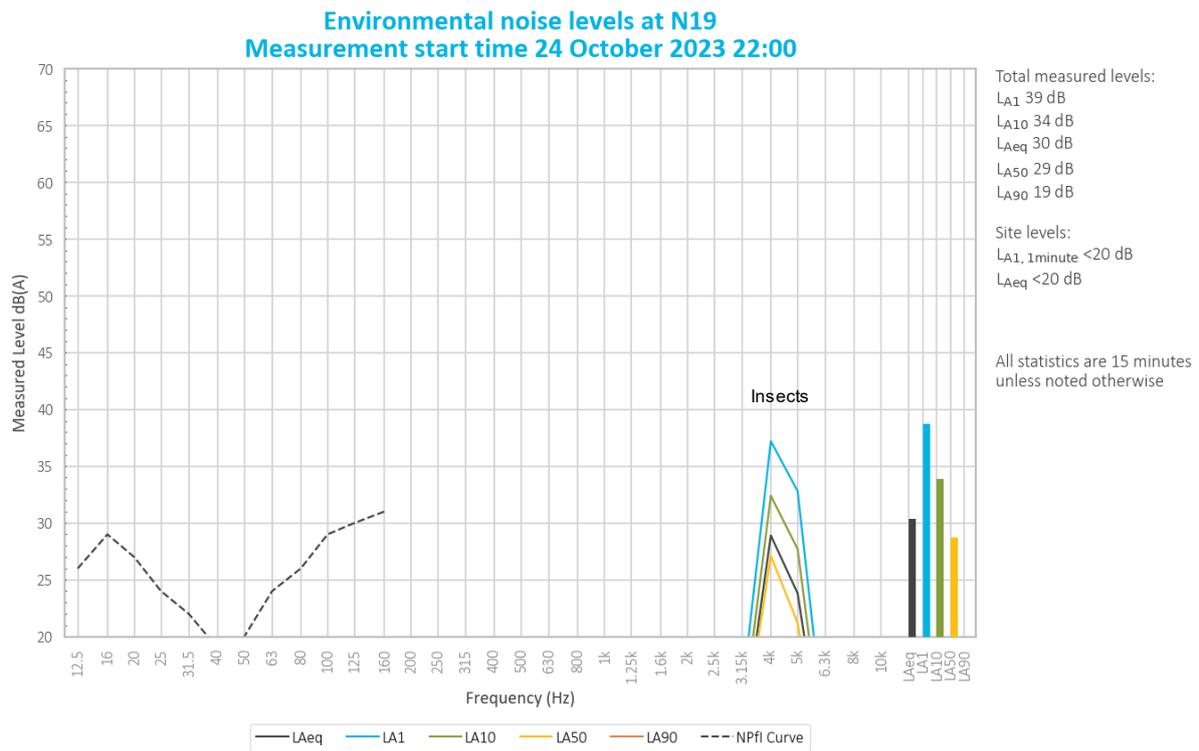


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

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

Insects generated measured noise levels.

Table 5.5 Historical WCP only noise levels at N19

Month	Oct 2022 ¹	Nov 2022 ¹	Dec 2022 ¹	Jan 2023 ¹	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023
LAeq	-	-	-	-	IA	IA	IA	26	IA	IA	IA	IA
LA1,1min	-	-	-	-	IA	IA	IA	28	IA	IA	IA	IA

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

5.7 N20

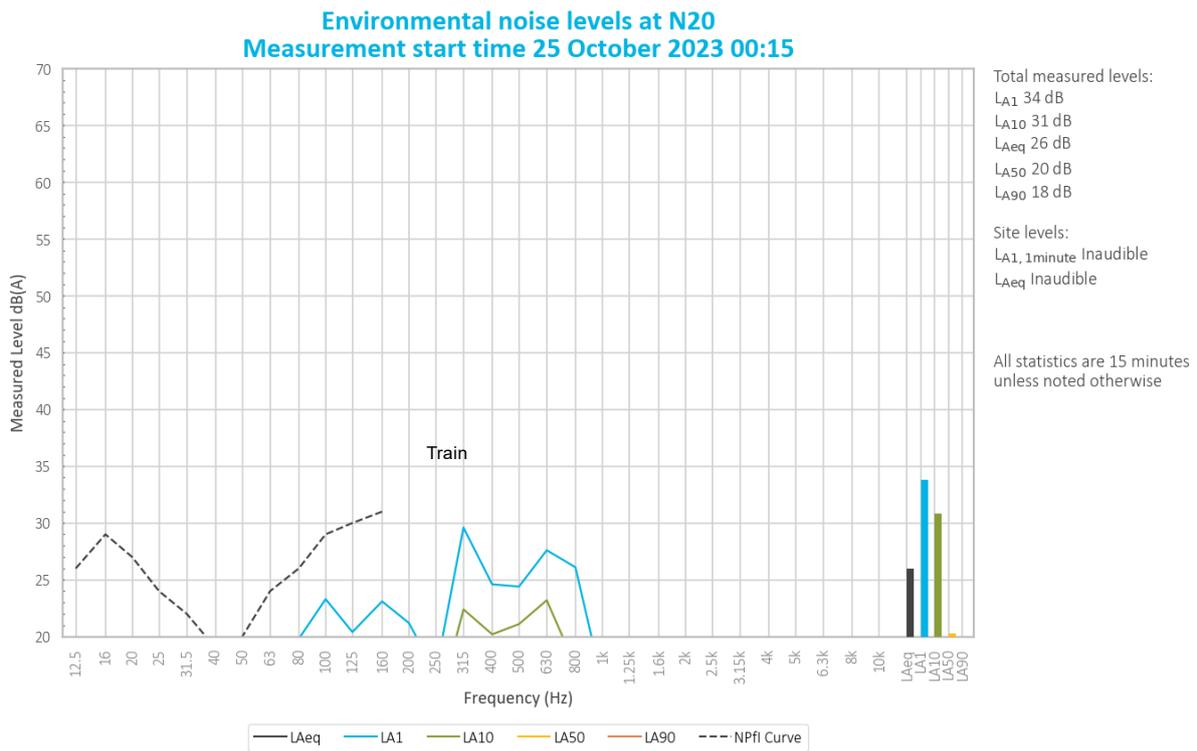


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train generated measured noise levels.

Noise from insects was also noted at low levels.

Table 5.6 Historical WCP only noise levels at N20

Month	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 24 October 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the October 2023 survey.

Noise limits were not applicable due to meteorological conditions at the time of monitoring.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

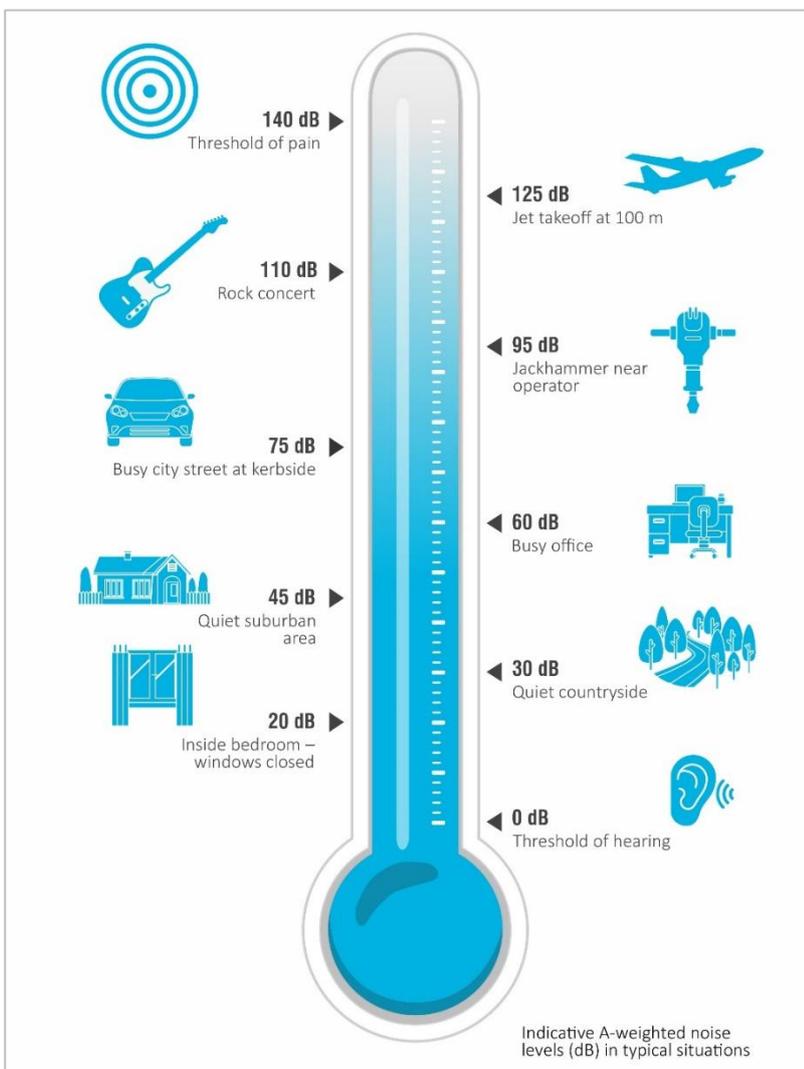


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C23032

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

Equipment Tested/ Model Number : Rion NA-28
Instrument Serial Number : 30131882
Microphone Serial Number : 04739
Pre-amplifier Serial Number : 11942
Firmware Version : 2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 23.5°C
Relative Humidity : 47.3%	Relative Humidity : 46.1%
Barometric Pressure : 100.14kPa	Barometric Pressure : 100.16kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 23 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

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

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%
8kHz	±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.

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



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23033

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

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

Atmospheric Conditions

Ambient Temperature : 24.4°C
Relative Humidity : 50.2%
Barometric Pressure : 100.2kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 24 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.17	1000.40

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.13%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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

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

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

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

November 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP11

November 2023

Version	Date	Prepared by	Reviewed by	Comments
V1	28/11/2023	Will Moore	Tony Welbourne	Final

Approved by



Tony Welbourne

Associate Director

29 November 2023

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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	Introduction	1
1.1	Background	1
1.2	Attended monitoring locations	1
1.3	Terminology and abbreviations	3
2	Noise limits	4
2.1	Development consent	4
2.2	Environment protection licence	4
2.3	Noise management plan	4
2.4	Noise limits	4
2.5	Additional requirements	5
3	Methodology	6
3.1	Overview	6
3.2	Attended noise monitoring	6
3.3	Modifying factors	7
3.4	Instrumentation	7
4	Results	8
4.1	Total measured noise levels and atmospheric conditions	8
4.2	Site only noise levels	9
5	Discussion	11
5.1	Noted noise sources	11
5.2	N6	12
5.3	N14	13
5.4	N15	14
5.5	N17	15
5.6	N19	16
5.7	N20	17
6	Summary	18

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	Noise impact limits, dB	4
Table 3.1	NPfl reference curve adjusted for A-weighting, dB	7
Table 3.2	Attended noise monitoring equipment	7
Table 4.1	Total measured noise levels, dB – November 2023 ¹	8
Table 4.2	Measured low-frequency L _{eq} noise levels, dB(Z) - November 2023 ¹	8
Table 4.3	Measured atmospheric conditions – November 2023	9
Table 4.4	Site noise levels and limits – November 2023	10
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended 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 (1)	15
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	16
Figure 5.7	Environmental noise levels N20, Ringwood Road	17
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 27 November 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

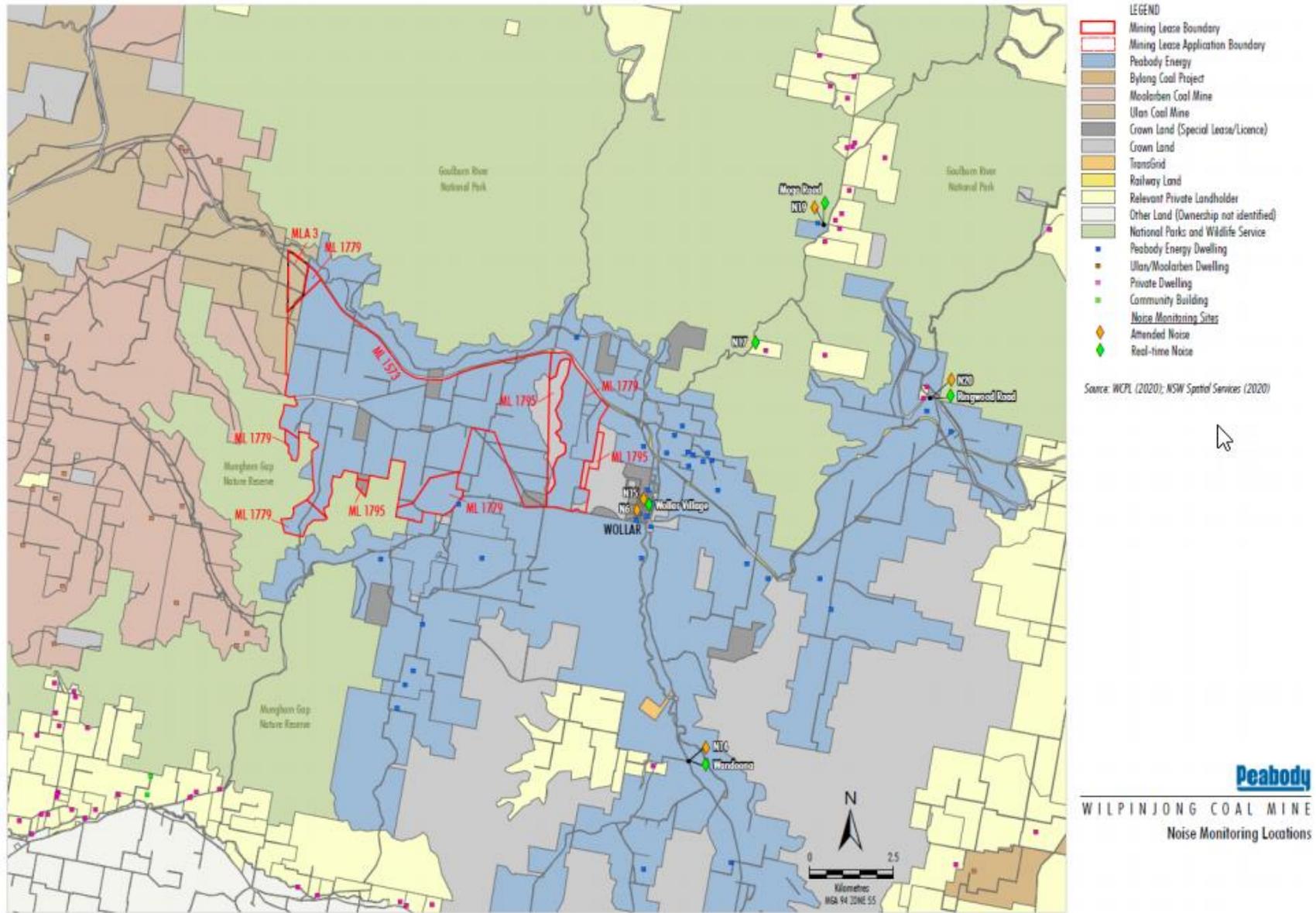


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in March 2023. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

The NPfl reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A), as shown in Table 3.1, so that it can be compared to the A-weighted graphs in Section 5.

Table 3.1 NPfl reference curve adjusted for A-weighting, dB

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfl Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfl Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	23/01/2025	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	78226	24/01/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement 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.

Table 4.1 Total measured noise levels, dB – November 2023 ¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	27/11/2023 22:48	52	40	36	35	34	33	28
N14	27/11/2023 23:45	53	50	48	46	46	43	38
N15	27/11/2023 23:15	43	40	37	33	31	29	27
N17	27/11/2023 22:22	44	43	41	40	40	39	36
N19	27/11/2023 22:00	46	43	38	35	34	32	29
N20	28/11/2023 00:15	48	37	32	30	28	27	25

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

Low-frequency linear spectra measured from all sources during each attended 15-minute measurement are shown in Table 4.2. If low-frequency noise levels from site triggered a modifying factor, additional analysis is provided in Section 4.2 of this report.

Table 4.2 Measured low-frequency L_{eq} noise levels, dB(Z) - November 2023 ¹

Location	Start date and time	Frequency (Hz)											
		12.5	16	20	25	31.5	40	50	63	80	100	125	160
N6	27/11/2023 22:48	54	48	42	37	33	31	32	30	28	26	22	21
N14	27/11/2023 23:45	55	51	47	44	40	37	36	34	36	34	28	25
N15	27/11/2023 23:15	-	48	46	50	42	48	42	39	35	37	38	35
N17	27/11/2023 22:22	-	-	-	35	30	27	26	24	23	21	15	12
N19	27/11/2023 22:00	-	-	-	36	32	30	29	27	26	24	20	16
N20	28/11/2023 00:15	55	51	49	46	41	39	36	37	38	35	32	29

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

2. "-" indicates noise levels were below the sound level meter minimum measurable levels.

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.3. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.3 Measured atmospheric conditions – November 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
N6	27/11/2023 22:48	23	1.1	70	8
N14	27/11/2023 23:45	23	0.8	110	8
N15	27/11/2023 23:15	24	<0.5	-	8
N17	27/11/2023 22:22	23	<0.5	-	7
N19	27/11/2023 22:00	21	<0.5	-	5
N20	28/11/2023 00:15	21	1.9	100	8

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.2.2 Monitoring results

Table 4.4 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.4 Site noise levels and limits – November 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	27/11/2023 22:48	3.0	48	D	Yes	37	45	IA	IA	Nil	Nil
N14	27/11/2023 23:45	2.7	64	D	Yes	35	45	IA	IA	Nil	Nil
N15	27/11/2023 23:15	2.4	52	D	Yes	37	45	IA	IA	Nil	Nil
N17	27/11/2023 22:22	1.1	38	E	Yes	38	45	IA	IA	Nil	Nil
N19	27/11/2023 22:00	0.7	306	E	Yes	35	45	IA	IA	Nil	Nil
N20	28/11/2023 00:15	3.7	67	D	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

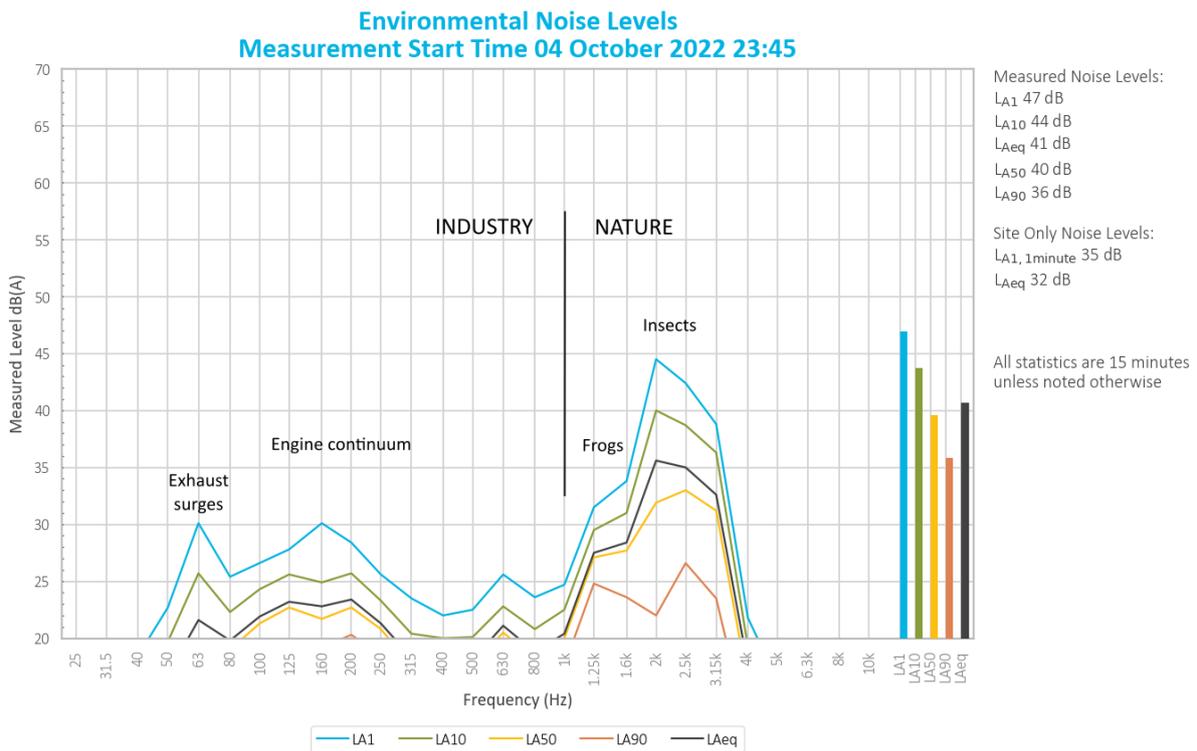


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

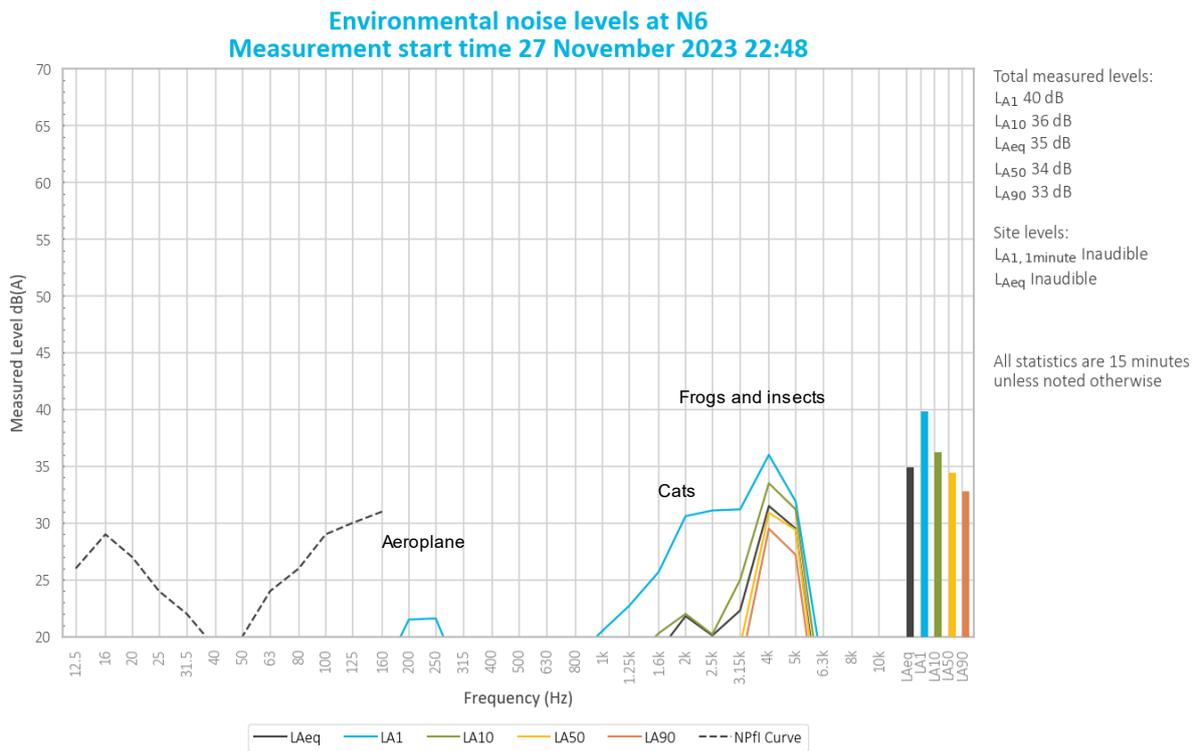


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels. Cats contributed to the measured LA1.

Noise from an aeroplane, breeze in foliage and gunshots was noted at low levels.

5.3 N14

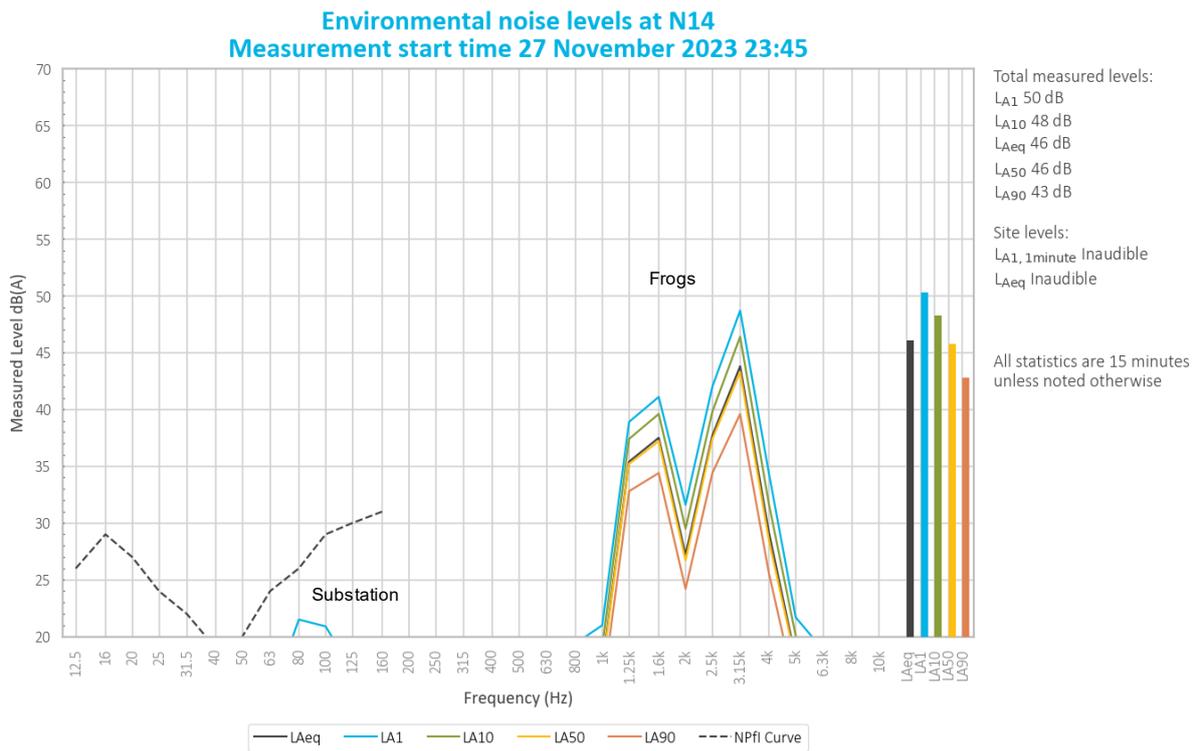


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs generated measured noise levels.

Local substation continuum was also noted.

5.4 N15

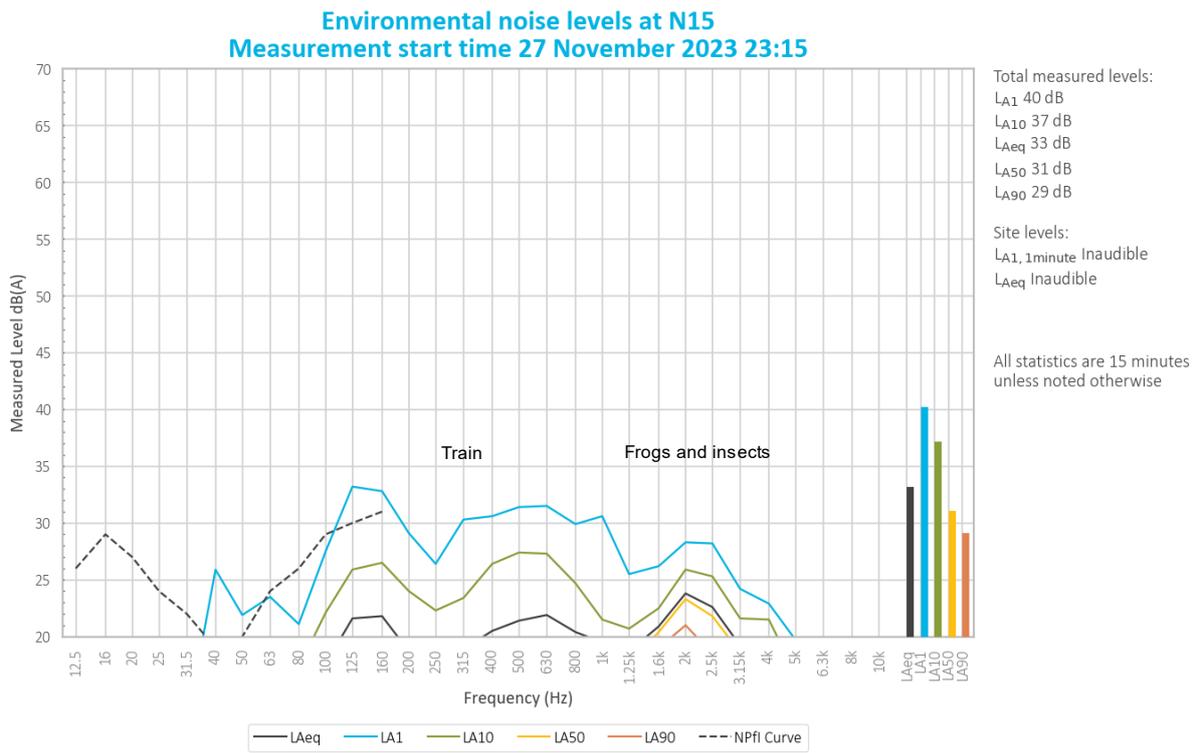


Figure 5.4 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. A train generated the measured LA1 and LA10.

5.5 N17

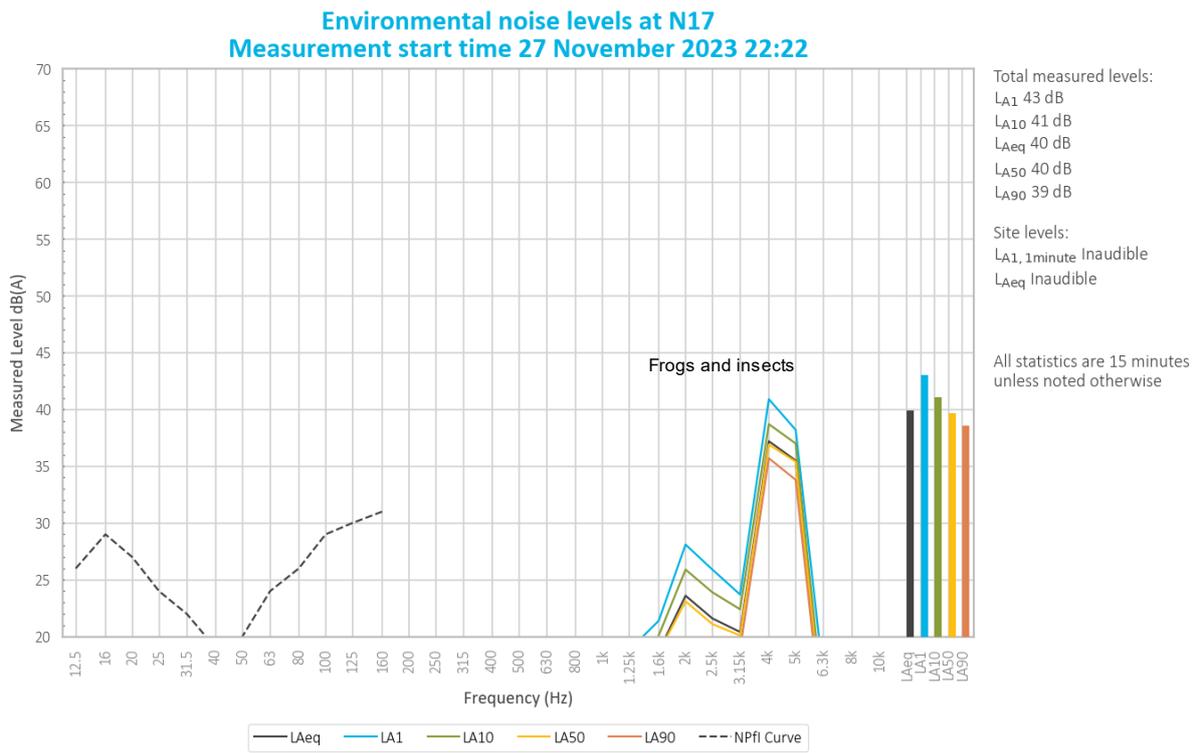


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

5.6 N19

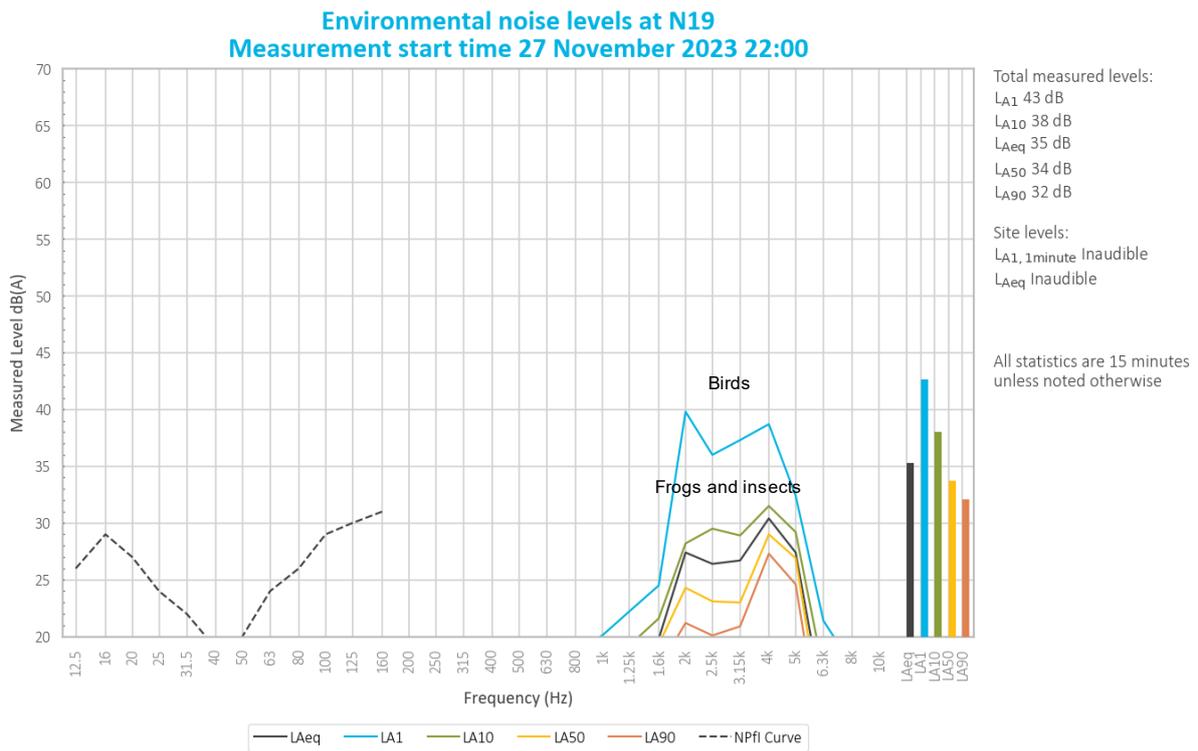


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. Birds generated the measured LA1.

5.7 N20

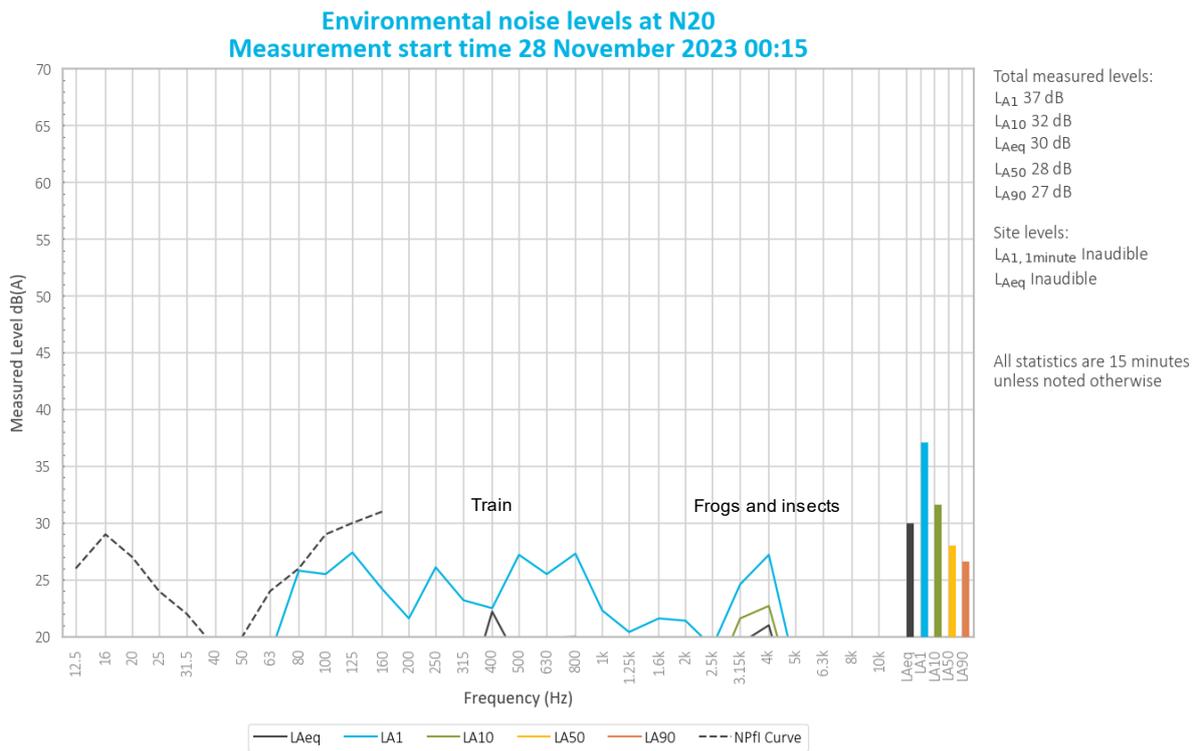


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Frogs and insects primarily generated measured noise levels. A train generated the measured LA1.

Noise from birds and a breeze in foliage was also noted at low levels.

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 27 November 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the November 2023 survey.

Noise limits may not be applicable due to meteorological conditions at the time of monitoring.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
Up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

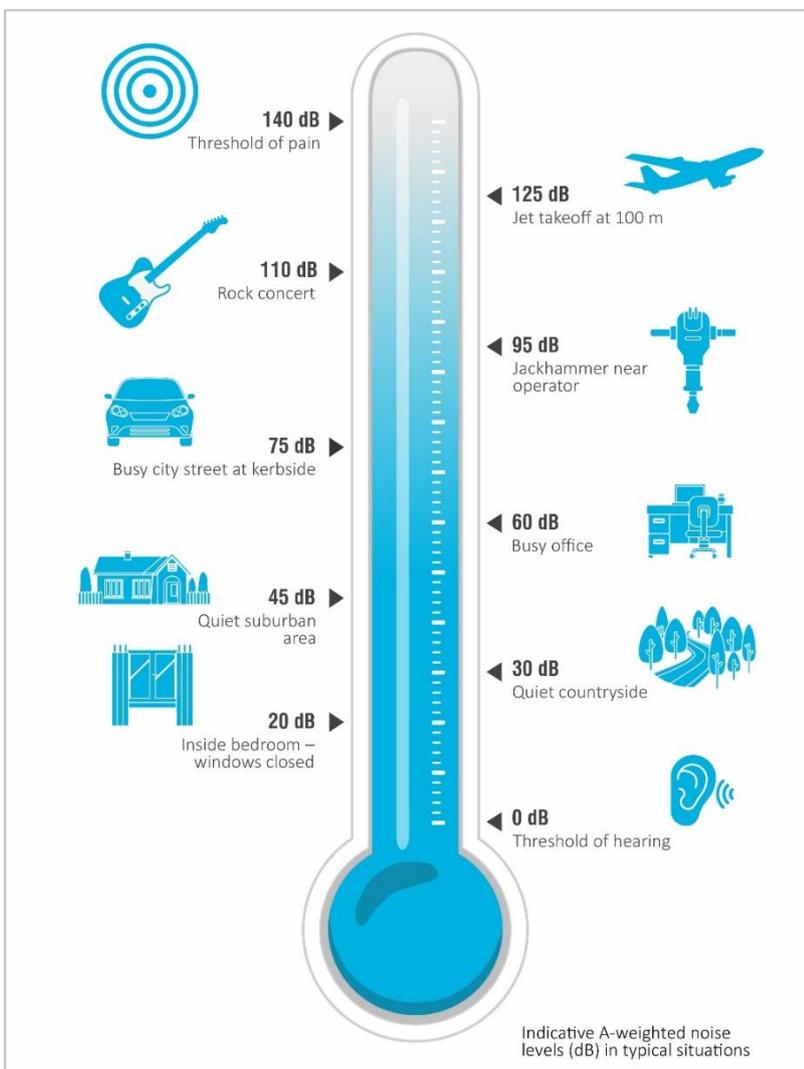


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.2 Environmental protection licence

L5 Noise limits

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

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

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

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C23032

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

Equipment Tested/ Model Number : Rion NA-28
Instrument Serial Number : 30131882
Microphone Serial Number : 04739
Pre-amplifier Serial Number : 11942
Firmware Version : 2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 23.5°C
Relative Humidity : 47.3%	Relative Humidity : 46.1%
Barometric Pressure : 100.14kPa	Barometric Pressure : 100.16kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 23 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

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

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%
8kHz	±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.

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



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23033

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

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

Atmospheric Conditions

Ambient Temperature : 24.4°C
Relative Humidity : 50.2%
Barometric Pressure : 100.2kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 24 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.17	1000.40

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.13%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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PAGE 1 OF 1

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Wilpinjong Coal Mine

Environmental noise monitoring

Prepared for Wilpinjong Coal Pty Ltd

December 2023

Wilpinjong Coal Mine

Environmental noise monitoring

Wilpinjong Coal Pty Ltd

E221231 RP12

December 2023

Version	Date	Prepared by	Reviewed by	Comments
V1	11/12/2023	Will Moore	Tony Welbourne	Final

Approved by



Tony Welbourne

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11 December 2023

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TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.2	Attended monitoring locations	1
1.3	Terminology and abbreviations	3
2	Noise limits	4
2.1	Development consent	4
2.2	Environment protection licence	4
2.3	Noise management plan	4
2.4	Noise limits	4
2.5	Additional requirements	5
3	Methodology	6
3.1	Overview	6
3.2	Attended noise monitoring	6
3.3	Modifying factors	7
3.4	Instrumentation	7
4	Results	8
4.1	Total measured noise levels and atmospheric conditions	8
4.2	Site only noise levels	9
5	Discussion	11
5.1	Noted noise sources	11
5.2	N6	12
5.3	N14	13
5.4	N15	14
5.5	N17	15
5.6	N19	16
5.7	N20	17
6	Summary	18

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	Noise impact limits, dB	4
Table 3.1	NPfl reference curve adjusted for A-weighting, dB	7
Table 3.2	Attended noise monitoring equipment	7
Table 4.1	Total measured noise levels, dB – December 2023 ¹	8
Table 4.2	Measured low-frequency L _{eq} noise levels, dB(Z) - December 2023 ¹	8
Table 4.3	Measured atmospheric conditions – December 2023	9
Table 4.4	Site noise levels and limits – December 2023	10
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended 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 (1)	15
Figure 5.6	Environmental noise levels N19, Mogo Road (2)	16
Figure 5.7	Environmental noise levels N20, Ringwood Road	17
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP, the site), an open cut coal mine near Wollar NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the night period of 5 December 2023 at six monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location ID	Description	Coordinates (MGA 55)	
		Easting	Northing
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south	777300	6415717
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular	778792	6408625
N15	Track off Barigan Street near Wollar Public School, Wollar Village	777452	6416159
N17	Mogo Road, off Araluen Road, Wollar	780771	6420641
N19	North Mogo Road, Mogo	782645	6424151
N20	Ringwood Road, off Wollar Road, Wollar	785964	6419051

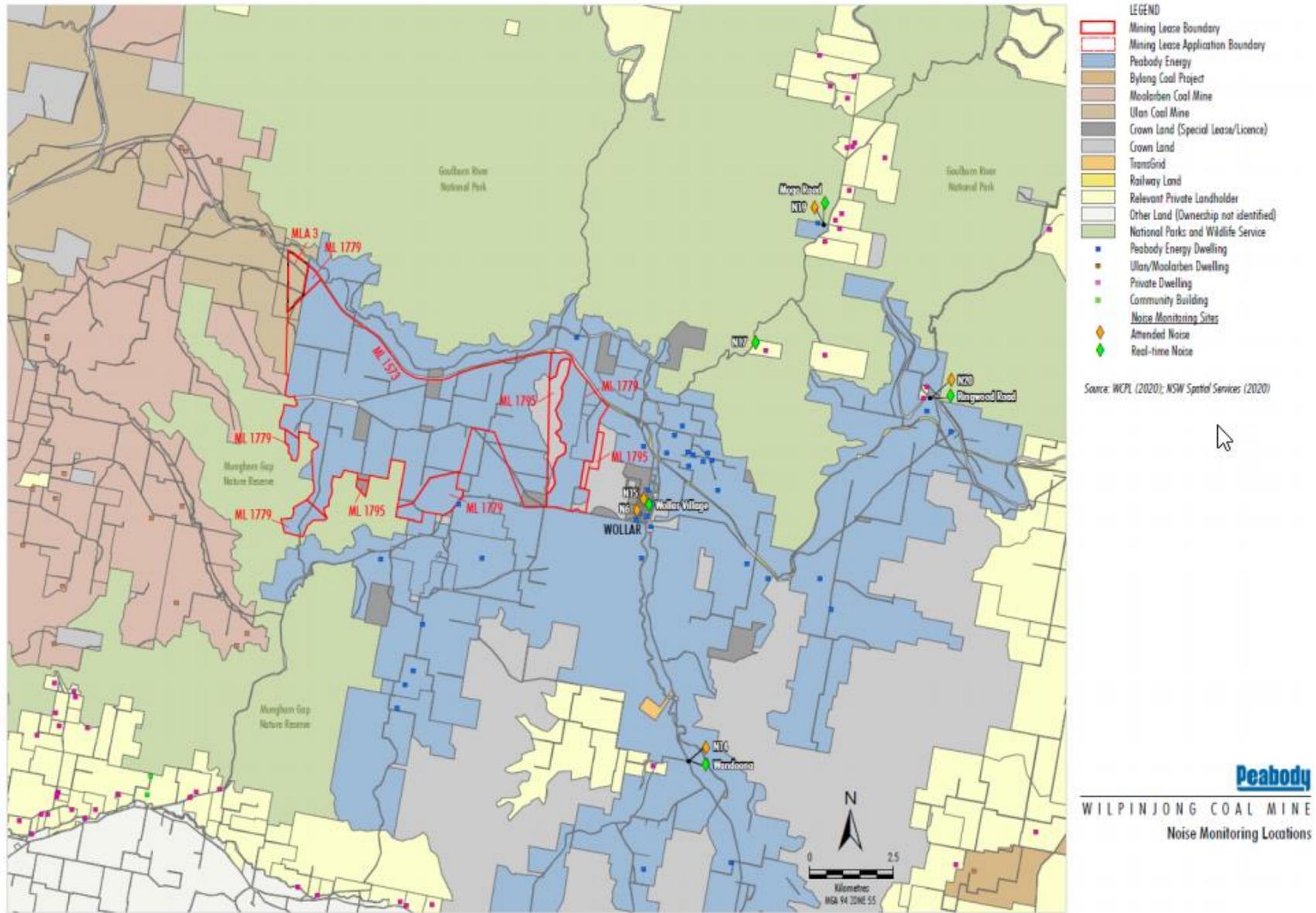


Figure 1.1 Attended noise monitoring locations

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 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy 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.
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	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

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). Relevant sections of the consent are reproduced in Appendix B.1.

2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently in March 2023. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in June 2021. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the consent and EPL are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	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 consent, 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 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. 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 have 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 done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the WCP automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15minute}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include 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.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

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} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

The NPfI reference curve has been added to the graphs in Section 5 to provide site noise level context. The reference curve has been converted from dB(Z) to dB(A), as shown in Table 3.1, so that it can be compared to the A-weighted graphs in Section 5.

Table 3.1 NPfI reference curve adjusted for A-weighting, dB

Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
NPfI Reference (Z)	92	89	86	77	69	61	54	50	50	48	48	46	44
NPfI Reference (A)	22	26	29	27	24	22	19	20	24	26	29	30	31

3.4 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.2. Calibration certificates are provided in Appendix C.

Table 3.2 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	00701424	01/06/2025	IEC 61672-1:2002
Pulsar 106 acoustic calibrator	81334	21/06/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each attended 15-minute measurement 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.

Table 4.1 Total measured noise levels, dB – December 2023 ¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
N6	5/12/2023 23:19	43	35	34	32	31	28	25
N14	6/12/2023 00:23	52	49	47	44	44	40	31
N15	5/12/2023 23:00	53	42	40	37	36	31	26
N17	5/12/2023 22:24	48	47	46	43	41	39	38
N19	5/12/2023 22:00	48	44	43	42	42	39	32
N20	5/12/2023 23:46	43	31	29	27	27	25	23

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

Low-frequency linear spectra measured from all sources during each attended 15-minute measurement are shown in Table 4.2. If low-frequency noise levels from site triggered a modifying factor, additional analysis is provided in Section 4.2 of this report.

Table 4.2 Measured low-frequency L_{eq} noise levels, dB(Z) - December 2023 ¹

Location	Start date and time	Frequency (Hz)											
		12.5	16	20	25	31.5	40	50	63	80	100	125	160
N6	5/12/2023 23:19	-	-	-	37	34	34	37	36	37	36	31	30
N14	6/12/2023 00:23	54	47	41	38	33	34	39	32	30	28	23	22
N15	5/12/2023 23:00	-	-	41	39	37	38	41	37	39	38	34	32
N17	5/12/2023 22:24	-	-	-	37	33	32	32	32	37	31	25	21
N19	5/12/2023 22:00	-	-	-	36	33	32	33	32	29	26	19	15
N20	5/12/2023 23:46	-	-	-	-	-	25	23	17	15	14	13	11

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

2. "-" indicates noise levels were below the sound level meter minimum measurable levels.

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.3. The wind speed, direction, and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.3 Measured atmospheric conditions – December 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
N6	5/12/2023 23:19	22	<0.5	-	1
N14	6/12/2023 00:23	21	<0.5	-	3
N15	5/12/2023 23:00	21	<0.5	-	0
N17	5/12/2023 22:24	24	<0.5	-	0
N19	5/12/2023 22:00	26	1.0	240	1
N20	5/12/2023 23:46	24	<0.5	-	3

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

4.2 Site only noise levels

4.2.1 Modifying factors

Measured site-only levels were assessed for the application of modifying factors in accordance with the NPfl and methodology described in Section 3.3. There were no modifying factors 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 NPfl.

4.2.2 Monitoring results

Table 4.4 provides site noise level levels in the absence of other sources, where possible, and includes weather data from the site ASW. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.4 Site noise levels and limits – December 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Site limits, dB		Site levels, dB		Exceedances, dB	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{A1,1minute}	L _{Aeq,15minute} ²	L _{A1,1minute}	L _{Aeq,15minute}	L _{A1,1minute}
N6	5/12/2023 23:19	0.0	-	G	No	37	45	<30	<30	N/A	N/A
N14	6/12/2023 00:23	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N15	5/12/2023 23:00	0.6	282	G	No	37	45	<30	<30	N/A	N/A
N17	5/12/2023 22:24	0.0	-	G	No	38	45	<20	23	N/A	N/A
N19	5/12/2023 22:00	0.0	-	G	No	35	45	IA	IA	N/A	N/A
N20	5/12/2023 23:46	0.0	-	G	No	35	45	IA	IA	N/A	N/A

- Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. N/A in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in consent.
 4. Degrees magnetic north, “-” indicates calm conditions.

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 and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was done and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1,000 Hz, while industrial noise is observed at frequencies less than 1,000 Hz.

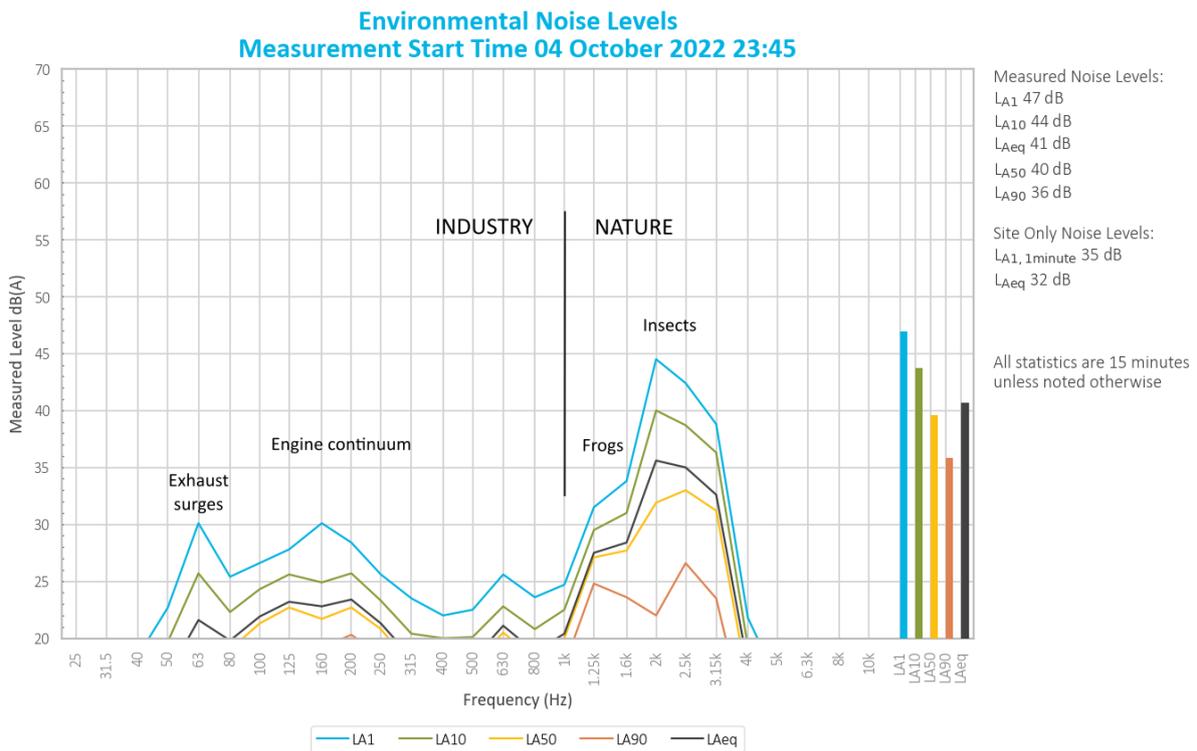


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 N6

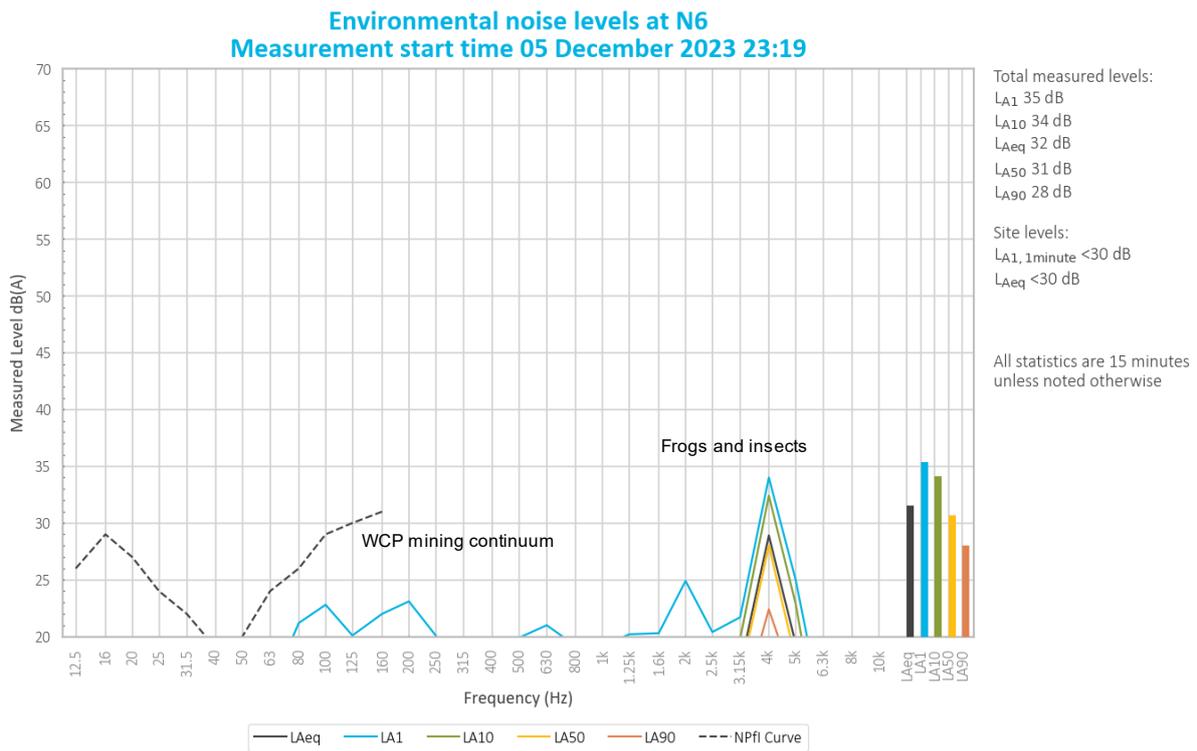


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible throughout the measurement, generating a site only L_{Aeq} and $L_{A1,1minute}$ of less than 30 dB. Track noise was also noted.

Frogs and insects generated measured noise levels.

Noise from birds and dogs was noted at low levels.

5.3 N14

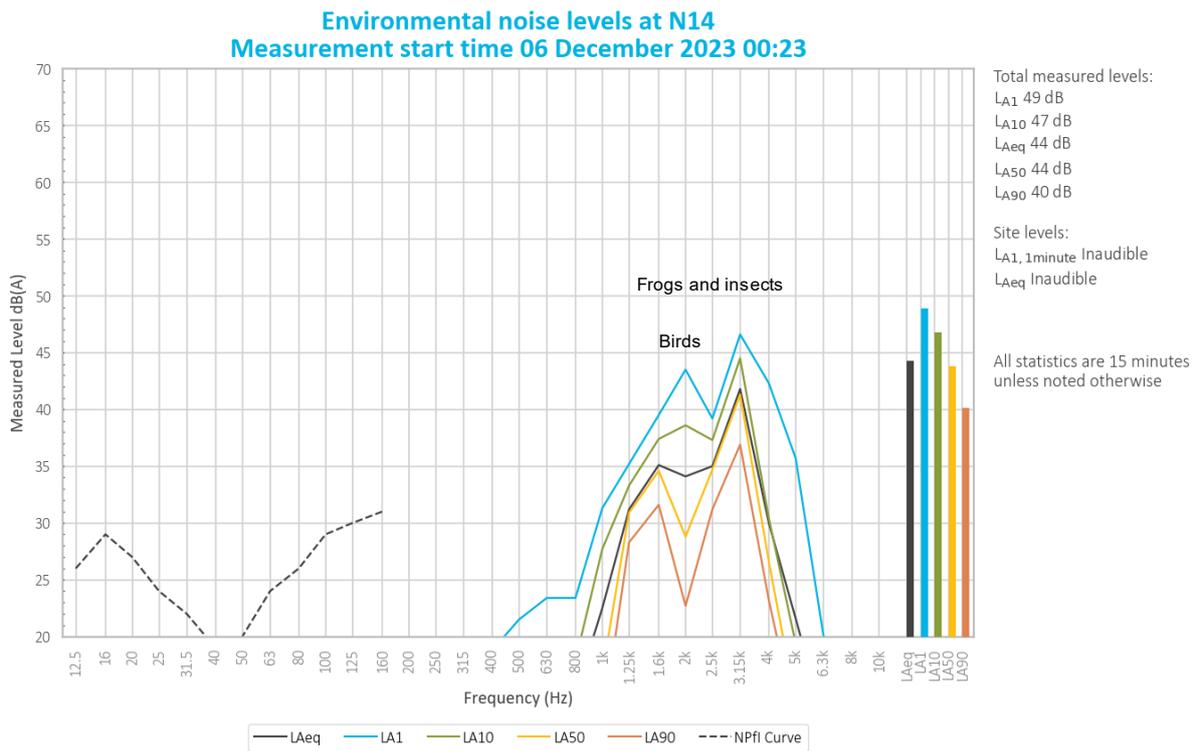


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

Local substation continuum and noise from birds and livestock was also noted.

5.4 N15

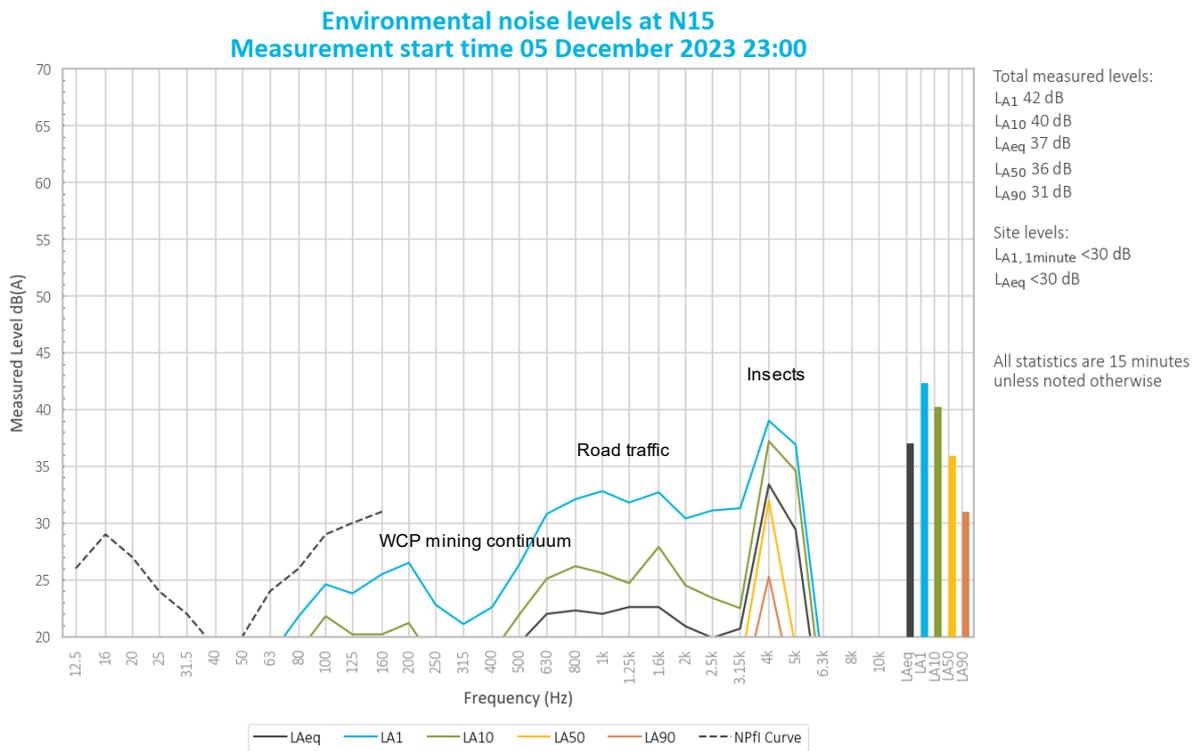


Figure 5.4 Environmental noise levels N15, track off Barigan Street near Wollar School, Wollar Village

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

Insects primarily generated measured noise levels. Road traffic contributed to the L_{A1} .

Local continuum and noise from birds and dogs was also noted.

5.5 N17

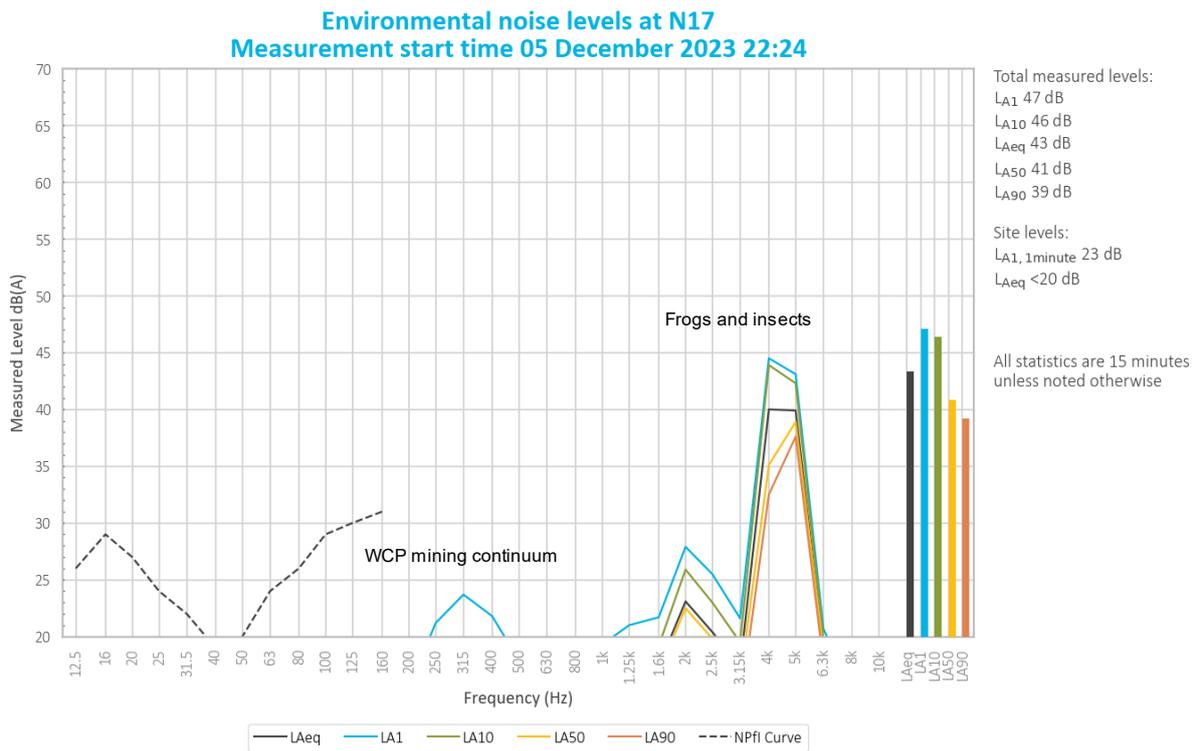


Figure 5.5 Environmental noise levels N17, Mogo Road (1)

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of less than 20 dB and a LA1,1minute of 23 dB.

Frogs and insects generated measured noise levels.

Noise from an aeroplane was noted at low levels.

5.6 N19

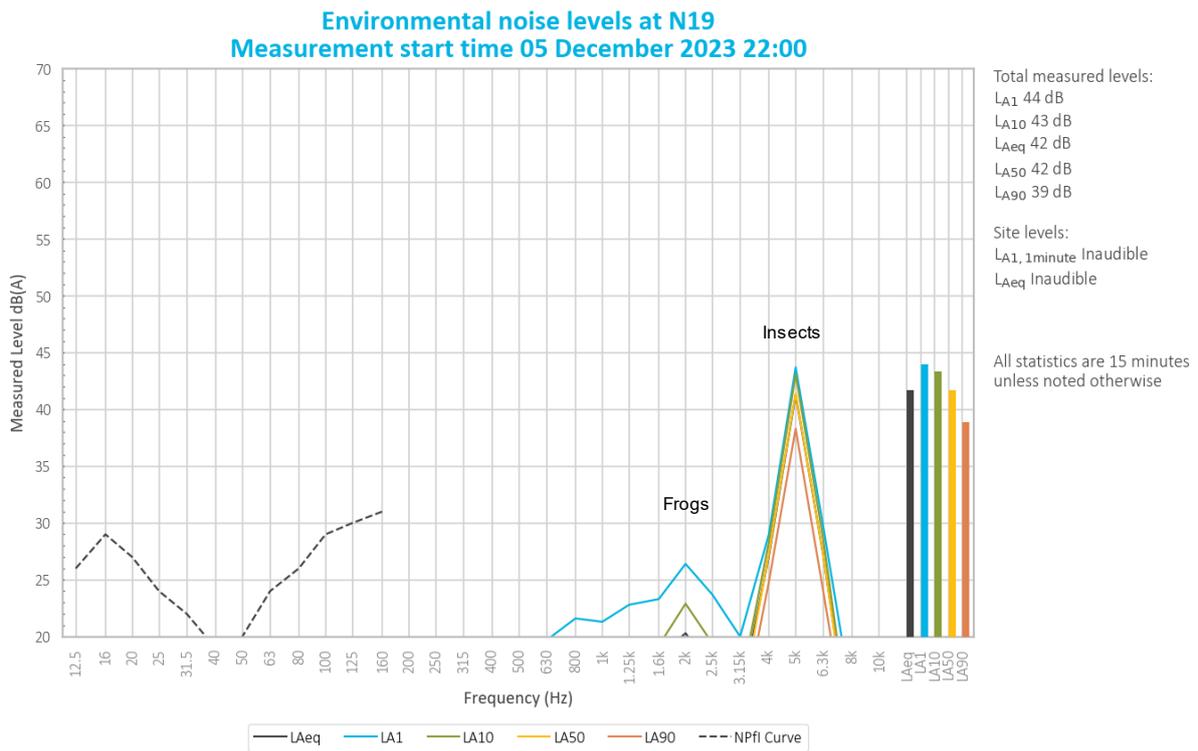


Figure 5.6 Environmental noise levels N19, Mogo Road (2)

WCP was inaudible during the measurement.

Insects generated measured noise levels.

Noise from frogs and road traffic was also noted.

5.7 N20

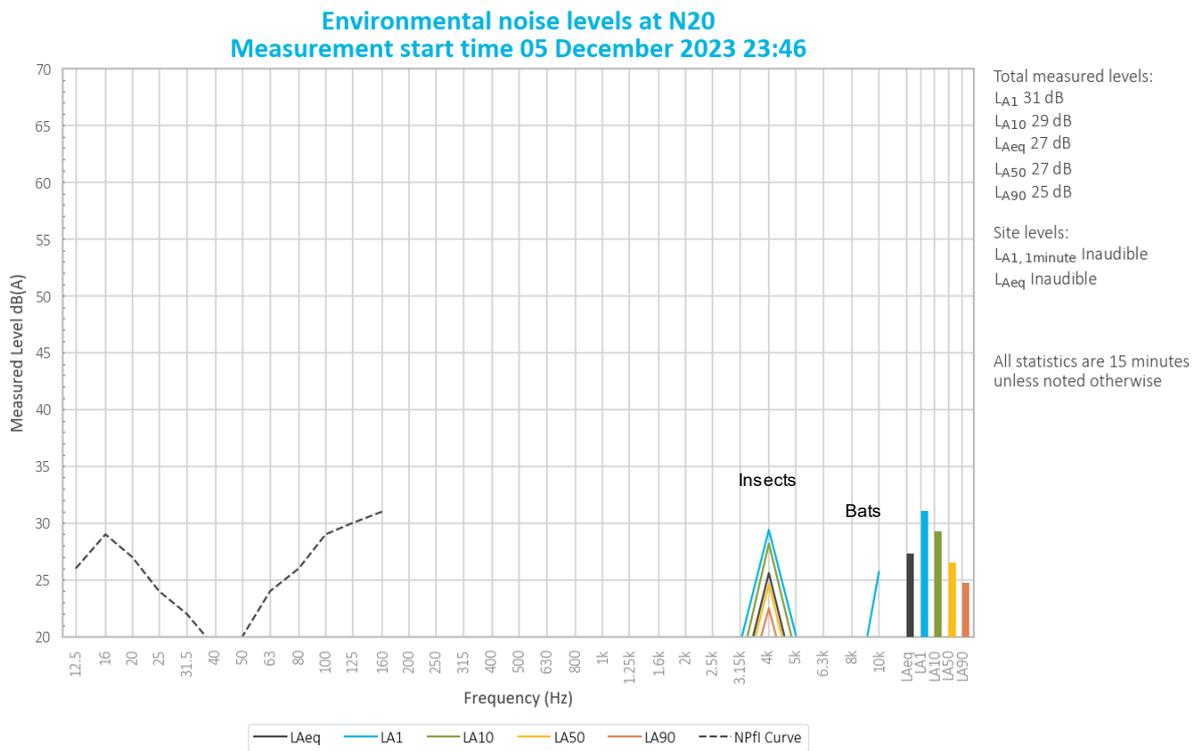


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Insects generated measured noise levels.

Noise from bats and livestock was also noted at low levels.

6 Summary

EMM was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits from the relevant EPL and consent.

Attended environmental noise monitoring described in this report was done during the night period of 5 December 2023 at six monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the December 2023 survey.

Noise limits may not be applicable due to meteorological conditions at the time of monitoring.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
Up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

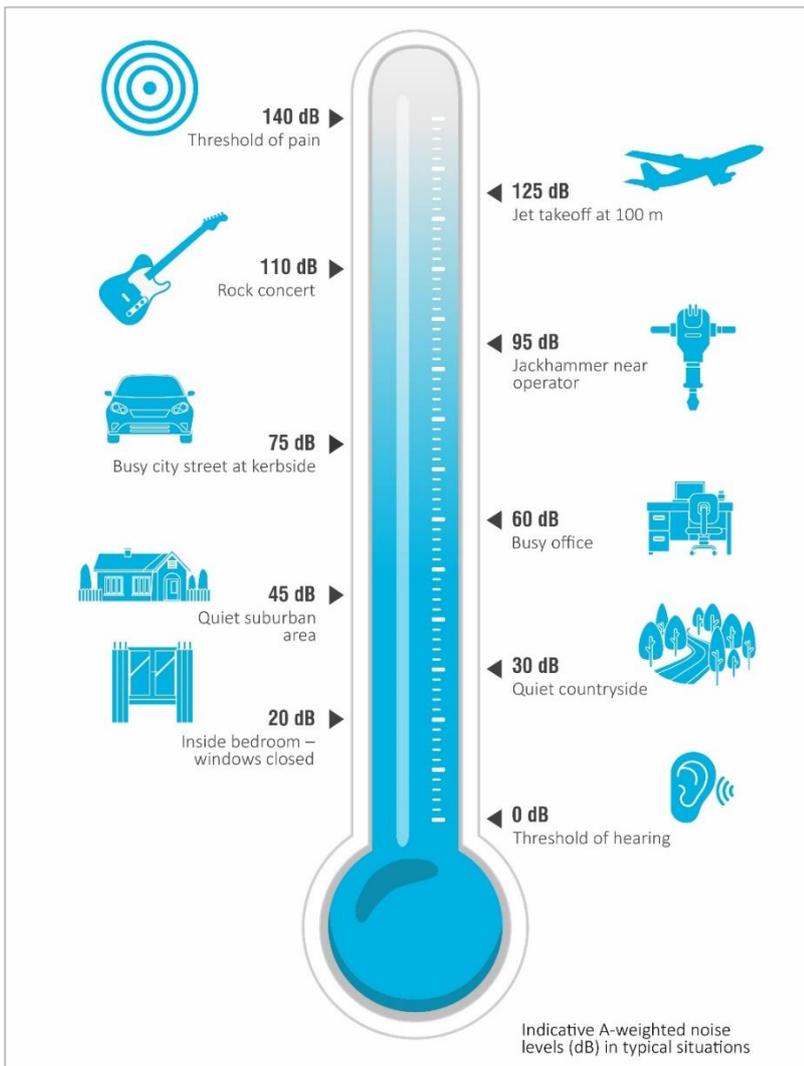


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development consent

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

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

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

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

MITIGATION UPON REQUEST

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

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

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

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

NOISE

Noise Criteria

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

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (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.

**APPENDIX 6
NOISE COMPLIANCE ASSESSMENT**

Applicable Meteorological Conditions

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

Determination of Meteorological Conditions

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

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
 - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

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

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

B.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
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

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

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

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

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

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

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

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

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
 - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
 - c) With the noise limits in condition L5.1, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
 - b) at a point other than the most affected point at a location.
- L5.7 For the purpose of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

6 Noise Monitoring Program

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

6.1 Monitoring Locations

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

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

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

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

Table 7 Noise Monitoring Locations

Location	Site	Type	Easting 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

Location	Site	Type	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 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	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

Notes:

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

6.2 Meteorological Monitoring

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

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

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

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

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

6.3 Operator-attended Noise Monitoring

6.3.1 Purpose

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

6.3.2 Summary

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

Table 8 Operator-attended Noise Monitoring Summary

Element	Description
Locations	<ul style="list-style-type: none">As per Table 7,Figure 3 and Figure 4
Period	<ul style="list-style-type: none">Night-time period (10 pm to 7 am) being the most sensitive time period for noise.
Frequency	<ul style="list-style-type: none">12 times per year¹ (i.e. one night per month); plus12 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:

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

WCPL will:

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

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

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

6.3.6 Applicable Meteorological Conditions

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

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

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

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

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter IEC 61672-3:2013 Calibration Certificate

Calibration Number C23317

Client Details	EMM Consulting Level 3, 175 Scott Street Newcastle NSW 2300
Equipment Tested/ Model Number :	NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463
Firmware Version :	2.0
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 22.6°C
Relative Humidity : 46%	Relative Humidity : 46.6%
Barometric Pressure : 100.6kPa	Barometric Pressure : 100.6kPa
Calibration Technician : Max Moore	Secondary Check: Dylan Selge
Calibration Date : 1 Jun 2023	Report Issue Date : 2 Jun 2023
Approved Signatory :	Ken Williams

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

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

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%
5kHz:	±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.

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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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23389

Client Details EMM Consulting
Level 3, 175 Scott Street
Newcastle NSW 2300

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

Atmospheric Conditions

Ambient Temperature : 22.6°C
Relative Humidity : 35.5%
Barometric Pressure : 101.43kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 21 Jun 2023
Secondary Check: Dhanush Bonu
Report Issue Date : 21 Jun 2023

Approved Signatory : *Ken Williams* Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.18	1000.30

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

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.07%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

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



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

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Accredited for compliance with ISO/IEC 17025 - Calibration.

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