NARRABRI MINE NOISE MONITORING

Quarter Ending September 2023
Summary Noise Report

Prepared for:

Narrabri Coal Operations Pty Ltd
10 Kurrajong Creek Road
Baan Baa NSW 2390

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Narrabri Coal Operations Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.18063-R22-Narrabri-v1.0	16 October 2023	Adam Sirianni	Martin Davenport	Martin Davenport

CONTENTS

DOCUMENT REFERENCES

TABLES

CONTENTS

FIGURES

APPENDICES

1 Introduction

Narrabri Coal Operations Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct operational noise monitoring for the Narrabri Mine located near Narrabri, New South Wales (NSW) in accordance with the approved Noise Management Plan (NMP) dated June 2018, the Narrabri Mine Project Approval (PA) 08_0144 and the Environment Protection Licence 12789 (EPL 12789).

The objectives of the noise monitoring programme for this operating period were as follows:

- Conduct operator attended noise surveys at 8 locations (as listed in **Section 3.3**) surrounding the mine during the day, evening and night-time periods.
- Quantify all sources of noise within each of the attended noise surveys, including their measured and/or estimated contribution and maximum level of individual noise sources.
- Assess the noise emissions of Narrabri Mine and determine compliance with respect to the limits contained in Section 2 of the NMP and the relevant approvals.

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 PERFORMANCE ASSESSMENT AND DISCUSSION

The following provides a summary of the attended noise measurements undertaken at each monitoring location. Further details are provided for each location in **Section 5** of this report.

Table 1 Performance Assessment – Operations

EPL ID	Location	Date	Narrabri Mine Contribution dBA				Noise Criteria[1]	Measurement Periods	Standard Weather			Compliant
			LAeq 15 min Day	LAeq 15 min Evening	LAeq 15 min Night	LA1 (1 min) Night			Day	Evening	Night	
N5	Oakleigh[2]	11/09/2023[3]	I/A	31	I/A	I/A	Day, Evening and Night – LAeq(15minute) 35 dBA Night LA1(1minute) – 45 dBA	Day - 1.5 hrs Evening - 0.5 hrs Night – 1hrs	Y	Y	Y	Y
		12/09/2023[3]	38	28	35	45			Y	Y[4]	Y[4]	Y[5]
		13/09/2023[3]	I/A	I/A	30	37			Y	N	N	Y
N6	Newhaven	11/09/2023[3]	28	<25	27	30			Y	N	Y	Y
		12/09/2023[3]	N/M	I/A	27	32			Y	Y[4]	Y[4]	Y
		13/09/2023[3]	29	I/A	26	32			Y	N	N	Y
N8	Haylin View[2]	11/09/2023[3]	23	29	<25	25			Y	Y	Y	Y
		12/09/2023[3]	27	26	35	49			Y	Y[4]	Y[4]	Y[5]
		13/09/2023[3]	I/A	26	N/M	N/M			N	N	N	Y
N9	High Range[2]	11/09/2023[3]	24	I/A	22	23			Y	N	Y	Y
		12/09/2023[3]	31	I/A	30	33			Y	Y[4]	Y[4]	Y
		13/09/2023[3]	I/A	I/A	22	27			Y	N	N	Y
-	Bow Hills[1]	11/09/2023[3]	I/A	I/A	<25	25		Day 15 min Evening 15 min Night 15 min	Y	Y	Y	Y
-	Ardmona	11/09/2023	N/M	I/A	I/A	I/A			Y	Y	Y	Y
-	Merriman[2]	13/09/2023	I/A	30	32	34			Y	N	N	Y
-	Matilda[2]	12/09/2023	N/M	28	30	44			Y	Y[4]	Y[4]	Y

I/A = Inaudible, N/M = Not Measurable

Note 1: A private agreement between NCOPL and the residents of N1 Bow Hills of 50 dBA LAeq(15minute) is in place. This new level of 50 dBA LAeq(15minute) replaces the levels identified in Conditions 1-3, Schedule 4 of PA 08_0144 Mod 2 and the identical limits contained in condition L3 of Environment Protection Licence No 12789.

Note 2: Property is owned by Narrabri Coal Operations. Noise limits contained in Conditions 1-3, Schedule 4 of PA 08_0144 Mod 2 and the identical limits contained in condition L3 of Environment Protection Licence No 12789 are not applicable.

Note 3: Evening and Night monitoring conducted on this date, Day monitoring conducted during the following day period.

Note 4: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Field observations were indicative of noise enhancing conditions likely to be present during this period.

Note 5: The Noise Criteria for EPL Monitoring Locations N5 (Oakleigh) and N8 (Haylin View) does not apply as these properties are owned by Narrabri Coal and are therefore not privately owned residences.

3 Noise Criteria

3.1 Project Approval, EPL and NMP

Noise monitoring at the Narrabri Mine was conducted in accordance with EPL 12789, the PA requirements and the NMP. The site specific EPL and PA noise limits are summarised in Section 2 of the NMP and are reproduced in **Table 2**. These criteria do not apply where the mine has an agreement with the relevant owner/s of the residence to generate higher noise levels, or where the property is mine owned.

Table 2 Project Approval and EPL Noise Criteria

Location	Day	Emergency Day	Night	
	$L_{Aeq(15minute)}$	$L_{Aeq(15minute)}$	$L_{Aeq(15minute)}$	$L_{A1(1minute)}$
All Privately owned Residences	35	35	35	45

3.2 Non-compliances & Exemptions

In accordance with Section 11.1.3 of the NSW Industrial Noise Policy (INP) a development is deemed to be in non-compliance with a noise consent or licence condition if the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence. This may occur for two reasons:

- The noise from the Narrabri Mine is excessive, in which case Narrabri Mine will be not complying with its consent or licence condition.
- The noise was increased by extreme, non-standard weather effects—in which case the Narrabri Mine is not considered to be in noncompliance with its consent or licence condition.

In this latter case, further monitoring at a later date is required to determine compliance under "normal" meteorological conditions.

The INP states in Section 9.2 that *"it is not practicable to meet the noise limit under all inversion events; hence exceedances under extreme temperature inversions are not considered to be a non-compliance with consent or licence conditions."*

Non-standard weather effects include:

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

As stated in EPL 12789 *"Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions and temperature inversion conditions (stability category) are to be determined by direct measurement over a minimum 50m height interval as referred to in Part E2 of Appendix E of the "New South Wales Industrial Noise Policy" dated January 2000 ISBN 0 7313 2715 2."*

Weather and Temperature inversion monitoring is undertaken continuously in accordance with EPL 12789 with monitoring locations displayed in **Figure 1**. Monitoring Location W1 records wind speed and direction at 10m above ground level. Temperature inversion monitoring is undertaken continuously by directly measuring temperature at two elevations 50m apart (10m & 60m from ground level) at monitoring location W2. All weather data reported in **Table 5** to **Table 20** have been recorded at these monitoring locations.

3.3 Attended Monitoring

Attended Noise monitoring is to be undertaken on a quarterly basis at residential areas. The attended monitoring will take place at the following locations:

3.3.1 EPL Monitoring Locations

- N5 Oakleigh – 16293 Kamilaroi Highway Baan Baa
- N6 Newhaven – 184 Greylands Road Turrawan
- N8 Haylin View – 791 Mayfield Road, Baan Baa
- N9 High Range – 92 Davis Road Turrawan

It is noted that the Narrabri Mine own the properties Oakleigh (N5), Haylin View (N8) and High Range (N9).

3.3.2 NMP Monitoring Locations

- N1 Bow Hills – 16652 Kamilaroi Highway Baan Baa
- N3 Ardmona – 16462 Kamilaroi Highway Baan Baa
- N7 Merriman – 16896 Kamilaroi Highway Baan Baa
- $N8_{(NMP)}$ Matilda – 773 Mayfield Road Baan Baa

It is noted that the Narrabri Mine owns the properties Merriman (N7) and Matilda ($N8_{(NMP)}$) and has a private agreement with the landholder of Bow Hills (N1) for increased noise limits.

The following details the requirements of the monitoring:

3.3.3 EPL Monitoring Requirements

- At each one of the monitoring locations N5, N6, N8 and N9;
- Occur quarterly in a reporting period;
- Occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:

  i) 1.5 hours during the day;

  ii) 30 minutes during the evening; and

  iii) 1 hour during the night.
- Occur for three consecutive operating days.

3.3.4 NMP Monitoring Requirements

- At each one of the monitoring locations N1, N3, N7 and N8$_{(NMP)}$
- Occur quarterly in a reporting period; and
- Occur during a day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum 15 minutes.

4 Operational Noise Monitoring Methodology

4.1 General Requirements

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1 – 2019 *Electroacoustics—Sound level meters*, AS IEC 60942 2017 *Electroacoustics – Sound calibrators* and carried current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ±0.5 dBA. Calibration certificates for all instruments employed during the monitoring campaign are presented in **Appendix B.**

4.2 Methodology - Operator Attended Noise Monitoring

Operator attended noise measurements were conducted during the day, evening and night-time periods for a minimum of 1.5 hours during the day; 30 minutes during the evening and 1 hour during the night at the three EPL nominated noise monitoring locations and for 15 minutes during the day, evening and night at each of the NMP nominated noise monitoring location representing the most affected receiver locations, listed in **Table 3** and shown in **Figure 1**. During the operator attended noise measurements, the character and relative contribution of ambient noise sources and mine contributions were determined.

Table 3 Noise Monitoring Locations

Monitoring Location	Monitoring Requirements	Receiver Type	Address	Monitoring Location - MGA Zone 55	
				Easting (m)	Northing (m)
N5[1,2]	EPL	Residence	Oakleigh – 16293 Kamilaroi Highway Baan Baa	779526	6617751
N6[1,2]	EPL	Residence	Newhaven – 184 Greylands Road Turrawan	776564	6624643
N8[1]	EPL	Residence	Haylin View – 791 Mayfield Road Baan Baa	777428	6617316
N9[1]	EPL	Residence	High Range – 92 Davis Road Turrawan	775879	6625895
N1	NMP	Residence	Bow Hills – 16652 Kamilaroi Highway Baan Baa	780114	6620641
N3[2]	NMP	Residence	Ardmona – 16462 Kamilaroi Highway Baan Baa	780233	6618836
N7[2]	NMP	Residence	Merriman – 16896 Kamilaroi Highway Baan Baa	779290	6623143
$N8_{(NMP)}$[2]	NMP	Residence	Matilda – 773 Mayfield Road Baan Baa	777815	6617045

Note: 1. EPL monitoring locations
2. NMP monitoring locations

The objective of the operator attended noise monitoring was to measure the $L_{A1(1minute)}$ and the $L_{Aeq(15minute)}$ noise level contribution from the Narrabri Mine at the nearest potentially affected receptors in order to determine the noise contribution of operational activities associated with Narrabri Mine over each 15 minute measurement period. In addition, the operator quantifies and characterises the overall levels of ambient noise in the area (i.e. L_{Amax}, L_{A1}, L_{A10}, L_{A90}, and L_{Aeq}) over the 15 minute measurement interval.

Operator attended noise measurements were conducted using one-third octave integrating Brüel & Kjær Type 2270 and 2250L sound level meters (s/n 3008204 and s/n 3005904). Attended noise measurements were undertaken by SLR staff Sean O'Shea and Adam Sirianni.

Figure 1 Attended Noise Monitoring Location

Table 4 presents a summary of which days of the week the quarterly monitoring was conducted, in accordance with condition M7.4 of EPL 12789 and Section 5 of the NMP.

Table 4 Days of the Week Quarterly EPL Monitoring was Conducted – Q3 2023

Period	Day of the Week (Excluding Weekends and Public Holidays)				
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
EPL Monitoring Locations					
Day		12 September 2023	13 September 2023	14 September 2023	
Evening	11 September 2023	12 September 2023	13 September 2023		
Night[1]	11 September 2023	12 September 2023	13 September 2023		
NMP Monitoring Locations					
Day	11 September 2023	12 September 2023	13 September 2023		
Evening	11 September 2023	12 September 2023	13 September 2023		
Night[1]	11 September 2023	12 September 2023	13 September 2023		

Note 1: Taken to mean the night-time period from 10:00 pm on the stated day to 7:00 am the following day.

5 Results and Discussion

5.1 Results of Operator Attended Monitoring

Results of the operator attended noise surveys at N5, N6, N9, N1, N3, N7 and $N8_{(NMP)}$ are provided **Table 5** to **Table 20**.

Ambient noise levels presented include all noise sources such as transport (roads, rail and aircraft), fauna (insects, frogs, birds and bats), the natural environment (wind in trees), domestic noises, other industrial operations as well as Narrabri Mine noise emissions.

Weather data during the monitoring period has been obtained from the weather station located on the Narrabri Mine site and observed conditions.

The tables also provide the following information:

- Date and start time, operator and equipment details.
- Monitoring location.
- Wind velocity (m/s) and temperature (°C) at weather station W1, as detailed in **Section 3.2**.
- Typical maximum (L_{Amax}) and contributed $L_{Aeq(15minute)}$ noise levels.

5.1.1 Operator Attended Noise Survey Results – EPL Monitoring Location N5

Results of the operator attended noise surveys at N5 are provided in **Table 5**, **Table 6** and **Table 7**. Monitoring location N5 represents residential receptors located to the southeast of the site in Oakleigh.

Table 5 Operator Attended EPL Noise Survey Results – N5 – Oakleigh (Day 1)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 1 12/09/2023 08:59 0.6 – 2.6 m/s SE 16-21°C 3008204	35 dBA LAeq(15minute)	1	D[2]	57	45	39	29	36	25	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Birds 57-76 Aircraft 47-50 Traffic 35-47
		2	C[2]	48	40	34	27	32	25	I/A	
		3	A[2]	52	43	34	28	33	24	I/A	
		4	A[2]	76	56	39	27	45	23	I/A	
		5	A[2]	61	53	38	25	39	22	I/A	
		6	A[2]	49	40	34	26	31	23	I/A	
Evening 1 11/09/2023 20:57 1.3 – 1.7 m/s SE 11-12°C 3008204	35 dBA LAeq(15minute)	1	D[2]	50	47	43	22	38	20	29 LAeq	**Site Related Noise Events:** Dozer operations 29-36 General surface activity 25-27 **Other Noise Events:** Traffic 40-51 Aircraft 41-48
		2	E[2]	51	48	45	28	40	24	31 LAeq	
Night 1 11/09/2023 22:03 1.8 – 2.6 m/s SSE 9-10°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E[2]	53	48	41	25	37	21	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 44-52 Impact 53 Train 54
		2	E[2]	52	49	41	21	38	19	I/A	
		3	E[2]	49	44	37	19	33	18	I/A	
		4	E[2]	54	51	43	20	39	19	I/A	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 6 Operator Attended EPL Noise Survey Results – N5 – Oakleigh (Day 2)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 2 13/09/2023 07:06 0.8 – 2.2 m/s SE 11-17°C 3008204	35 dBA LAeq(15minute)	1	D[2]	56	47	45	39	43	36	38 LAeq	**Site Related Noise Events:** Dozer operations 38-50 General surface activity 30-38 Onsite horn 45 Onsite alarm 39-40 **Other Noise Events:** Traffic 47-54 Birds 50-64
		2	D[2]	61	51	46	39	44	37	38 LAeq	
		3	D[2]	59	47	42	36	40	33	35 LAeq	
		4	D[2]	58	46	42	36	40	33	35 LAeq	
		5	B[2]	64	54	44	30	42	27	31 LAeq	
		6	A[2]	54	45	37	31	35	28	29 LAeq	
Evening 2 12/09/2023 20:50 0.9 – 1.2 m/s WSW 10-11°C 3008204	35 dBA LAeq(15minute)	1	F[2]	48	44	39	23	34	20	28 LAeq	**Site Related Noise Events:** Dozer operations 30-33 General surface activity 25-27 **Other Noise Events:** Traffic 41-48
		2	F[2]	41	39	34	25	31	23	28 LAeq	
Night 2 12/09/2023 22:01 0.0 – 0.7 m/s SE 10-11°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	F[2]	49	46	41	28	37	25	29 LAeq 35 LA1	**Site Related Noise Events:** Dozer operations 30-46 General surface activity 27-33 Onsite alarm 35 **Other Noise Events:** Traffic 40-54 Train 49-60 Horn 53
		2	F[2]	60	56	49	30	45	27	33 LAeq 39 LA1	
		3	F[2]	50	46	42	32	39	28	35 LAeq 43 LA1	
		4	F[2]	54	52	46	29	42	26	35 LAeq 45 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 7 Operator Attended EPL Noise Survey Results – N5 – Oakleigh (Day 3)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 3 14/09/2023 08:57 0.8 – 1.7 m/s SE/NW 19-24°C 3008204	35 dBA LAeq(15minute)	1	A[2]	58	47	37	27	36	24	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Birds 58-67 Traffic 40-44 Aircraft 40-48
		2	A[2]	59	47	36	27	35	24	I/A	
		3	A[2]	67	56	45	27	43	24	I/A	
		4	A[2]	53	46	35	26	34	24	I/A	
		5	A[2]	65	54	41	28	41	25	I/A	
		6	A[2]	60	45	36	28	35	25	I/A	
Evening 3 13/09/2023 19:43 1.1 – 2.3 m/s SE 14-16°C 3008204	35 dBA LAeq(15minute)	1	G	46	42	36	19	32	17	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 43-48
		2	G	48	40	34	18	30	17	I/A	
Night 3 13/09/2023 23:25 1.1 – 2.2 m/s E/SE 11-12°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	G	43	40	36	21	31	18	25 LAeq 30 LA1	**Site Related Noise Events:** General surface activity 20-25 Dozer operations 26-37 **Other Noise Events:** Traffic 43-46
		2	G	44	38	33	24	30	20	<25 LAeq 25 LA1	
		3	G	43	38	33	24	31	21	28 LAeq 37 LA1	
		4	G	46	40	34	29	32	26	30 LAeq 35 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.2 Operator Attended Noise Survey Results – EPL Monitoring Location N6

Results of the operator attended noise surveys at N6 are provided in **Table 8**, **Table 9** and **Table 10**. Monitoring location N6 represents residential receptors located to the northwest of the site in Newhaven.

Table 8 Operator Attended EPL Noise Survey Results – N6 – Newhaven (Day 1)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 1 12/09/2023 07:00 3.0 – 3.8 m/s SE 10-14°C 3008204	35 dBA LAeq(15minute)	1	D[1]	53	48	45	38	42	34	I/A	**Site Related Noise Events:** Main exhaust vent fan 25-35 Dozer operations 30-33 **Other Noise Events:** Traffic 40-52 Birds 47-56 Train horn 46
		2	D[1]	56	44	39	33	37	30	28 LAeq	
		3	D[1]	55	45	38	33	36	30	27 LAeq	
		4	D[1]	51	42	37	31	35	29	N/M	
		5	D	50	43	37	30	34	27	N/M	
		6	D	56	43	36	29	34	26	N/M	
Evening 1 11/09/2023 19:44 2.5 – 2.9 m/s SE 13°C 3008204	35 dBA LAeq(15minute)	1	E[1]	52	49	45	25	41	22	N/M	**Site Related Noise Events:** Main exhaust vent fain faintly audible Dozer operations 25-27 **Other Noise Events:** Traffic 44-52 Aircraft 39
		2	F[1]	52	47	40	24	36	21	<25 LAeq	
Night 1 11/09/2023 23:47 2.1 – 2.8 m/s SSE 9°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E[1]	54	45	37	24	35	22	27 LAeq 30 LA1	**Site Related Noise Events:** Dozer operations 25-30 General surface activity 25-27 **Other Noise Events:** Traffic 51-54 Train horn 43
		2	E[1]	47	34	27	22	26	20	25 LAeq 29 LA1	
		3	E[1]	43	38	27	21	26	20	<25 LAeq 28 LA1	
		4	E[1]	48	41	32	21	29	20	<25 LAeq 27 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 9 Operator Attended EPL Noise Survey Results – N6 – Newhaven (Day 2)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 2 13/09/2023 09:02 1.2 – 3.2 m/s W 20-23°C 3008204	35 dBA LAeq(15minute)	1	B[1]	67	47	37	27	39	24	I/A	**Site Related Noise Events:** General surface activity faintly audible **Other Noise Events:** Traffic 38-43 Birds 60-67 Aircraft 40 Wind 35-38
		2	B[1]	61	51	39	27	38	22	I/A	
		3	B[1]	61	47	39	29	37	26	N/M	
		4	B[1]	55	44	36	28	34	25	N/M	
		5	A[1]	52	43	37	27	34	23	N/M	
		6	A[1]	62	46	40	29	37	26	I/A	
Evening 2 12/09/2023 19:30 1.4 – 1.6 m/s WSW 11-13°C 3008204	35 dBA LAeq(15minute)	1	E[1]	53	48	42	27	39	22	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Train 40 Traffic 46-53 Animals 35-44
		2	D[1]	53	47	43	24	38	18	I/A	
Night 2 12/09/2023 23:51 0.7 – 1.2 m/s SW 7-8°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E[1]	51	44	38	24	34	21	27 LAeq 32 LA1	**Site Related Noise Events:** Dozer operations 30-32 General surface activity 27-28 **Other Noise Events:** Traffic 44-52 Animals 41-44
		2	D[1]	52	49	39	22	37	20	<25 LAeq 32 LA1	
		3	E[1]	50	48	40	23	37	20	N/M	
		4	D[1]	49	46	42	26	38	22	N/M	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 10 Operator Attended EPL Noise Survey Results – N6 – Newhaven (Day 3)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 3 14/09/2023 07:05 1.5 – 2.6 m/s SE 12-19°C 3008204	35 dBA LAeq(15minute)	1	F	53	46	43	35	40	31	I/A	**Site Related Noise Events:** Main exhaust vent fan 25-35 Dozer operations 30-35 **Other Noise Events:** Traffic 40-50 Birds 41-56
		2	E	50	45	42	31	38	26	29 LAeq	
		3	D	49	43	34	28	32	25	N/M	
		4	D	54	44	37	26	34	24	N/M	
		5	C	47	39	33	26	31	22	I/A	
		6	D	56	44	34	26	33	25	I/A	
Evening 3 13/09/2023 20:34 1.6 – 2.4 m/s SSE 16-17°C 3008204	35 dBA LAeq(15minute)	1	G	57	43	38	18	33	17	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Birds 53-57 Traffic 44-54
		2	G	54	48	40	19	36	18	I/A	
Night 3 13/09/2023 22:00 1.1 – 1.8 m/s SE 13-14°C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	G	45	42	40	27	36	25	25 LAeq 27 LA1	**Site Related Noise Events:** Main exhaust vent fan 25-27 Dozer operations 27-32 **Other Noise Events:** Traffic 40-50 Train 41-45 Aircraft 45 Train horn 38
		2	G	50	45	39	26	35	24	26 LAeq 32 LA1	
		3	G	45	41	36	24	32	22	25 LAeq 32 LA1	
		4	F	38	31	29	24	26	21	25 LAeq 28 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

5.1.3 Operator Attended Noise Survey Results – EPL Monitoring Location N8

Results of the operator attended noise surveys at N8 are provided in **Table 11**, **Table 12** and **Table 13**. Monitoring location N8 represents residential receptors located to the southeast of the site in Haylin View.

Table 11 Operator Attended EPL Noise Survey Results – N8 – Haylin View (Day 1)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 1 12/09/2023 11:07 0.4 – 2.7 m/s NE 21-23°C 3005904	35 dBA LAeq(15minute)	1	A[2]	47	40	32	24	30	22	23 LAeq	**Site Related Noise Events:** General surface activity 20-25 **Other Noise Events:** Farming activities 49-77 Birds 53-62 Traffic 32-41 Insects 30-40 Aircraft 38-53
		2	A[2]	55	42	32	24	31	22	22 LAeq	
		3	A[2]	53	44	36	25	33	22	N/M	
		4	A[2]	74	57	38	25	46	23	N/M	
		5	A[2]	77	54	34	24	45	22	22 LAeq	
		6	A[2]	53	48	39	25	36	23	N/M	
Evening 1 11/09/2023 20:44 1.3 – 1.7 m/s SE 11-12°C 3005904	35 dBA LAeq(15minute)	1	E[2]	42	35	30	21	27	18	25 LAeq	**Site Related Noise Events:** Dozer operations 25-34 General surface activity 20-25 **Other Noise Events:** Traffic 36-42 Aircraft 30-37
		2	D[2]	38	33	31	24	29	22	29 LAeq	
Night 1 11/09/2023 22:32 1.8 – 2.6 m/s SE 9-10°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E[2]	46	33	30	23	28	20	<25 LAeq 25 LA1	**Site Related Noise Events:** General surface activity 20-25 **Other Noise Events:** Traffic 38-48 Animals 39-47 Train 40-44
		2	E[2]	44	41	36	19	30	19	N/M	
		3	E[2]	48	43	37	20	33	19	N/M	
		4	E[2]	33	26	23	21	22	19	N/M	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 12 Operator Attended EPL Noise Survey Results – N8 – Haylin View (Day 2)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 2 13/09/2023 09:23 1.2 – 3.2 m/s W 21-23°C 3005904	35 dBA LAeq(15minute)	1	B[2]	73	57	35	25	44	22	26 LAeq	**Site Related Noise Events:** General surface activity 25-30 **Other Noise Events:** Birds 40-63 Traffic 30-35 Farming activities 73 Aircraft 453-56
		2	B[2]	63	42	33	24	34	21	26 LAeq	
		3	B[2]	54	46	34	25	34	22	27 LAeq	
		4	A[2]	56	43	33	24	33	22	27 LAeq	
		5	A[2]	54	42	31	24	31	22	27 LAeq	
		6	A[2]	56	48	38	25	36	23	26 LAeq	
Evening 2 12/09/2023 20:42 0.9 – 1.2 m/s SW 10-11°C 3005904	35 dBA LAeq(15minute)	1	F[2]	39	34	30	23	27	21	26 LAeq	**Site Related Noise Events:** Dozer operations 30-34 General surface activity 20-25 **Other Noise Events:** Birds 30-38 Animals 30-34 Traffic 32-37
		2	F[2]	37	33	30	25	28	23	26 LAeq	
Night 2 12/09/2023 22:01 0 – 0.7 m/s SE 10-11°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	F[2]	48	37	33	28	31	26	30 LAeq 35 LA1	**Site Related Noise Events:** Dozer operations 30-50 General surface activity 30-38 Onsite alarm 33 **Other Noise Events:** Birds 34-38 Traffic 36-40 Aircraft 44
		2	F[2]	45	41	36	30	34	27	32 LAeq 40 LA1	
		3	F[2]	50	46	40	30	36	26	35 LAeq 49 LA1	
		4	F[2]	48	42	37	30	35	27	34 LAeq 45 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 13 Operator Attended EPL Noise Survey Results – N8 – Haylin View (Day 3)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 3 14/09/2023 12:20 3.8 – 4.6 m/s SE 25-26°C 3005904	35 dBA LAeq(15minute)	1	C[2]	47	43	38	25	34	22	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Animals 30-32 Birds 53-63 Aircraft 43-52 Traffic 30-33
		2	B[2]	52	45	39	25	35	21	I/A	
		3	B[2]	53	45	39	25	35	22	I/A	
		4	C[2]	63	46	41	27	37	22	I/A	
		5	B[2]	63	52	45	30	43	24	I/A	
		6	B[2]	52	48	41	27	38	24	I/A	
Evening 3 13/09/2023 20:45 2.8 – 4.1 m/s SSE 17-19°C 3005904	35 dBA LAeq(15minute)	1	G	63	45	35	23	34	21	26 LAeq	**Site Related Noise Events:** General surface activity 25-28 **Other Noise Events:** Traffic 30-33 Animals 52-62 Aircraft 44-47
		2	G	48	41	32	20	29	18	I/A	
Night 3 13/09/2023 22:00 0.9 – 2.3 m/s SE 15-16°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	G	46	25	22	18	21	18	I/A	**Site Related Noise Events:** General surface activity barely audible **Other Noise Events:** Animals 40-45 Traffic 35-38 Aircraft 40-46 Impact 50
		2	G	49	44	35	19	32	18	I/A	
		3	G	51	27	23	19	22	18	N/M	
		4	F	49	25	20	18	22	18	I/A	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.4 Operator Attended Noise Survey Results – EPL Monitoring Location N9

Results of the operator attended noise surveys at N9 are provided in **Table 14**, **Table 15** and **Table 16**. Monitoring location N9 represents residential receptors located to the northwest of the site in High Range.

Table 14 Operator Attended EPL Noise Survey Results – N9 – High Range (Day 1)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 1 12/09/2023 09:12 0.6 – 2.6 m/s SE 16-21°C 3005904	35 dBA LAeq(15minute)	1	C[2]	69	62	51	29	49	26	I/A	**Site Related Noise Events:** Main exhaust vent fan 20-25 **Other Noise Events:** Animals 40-44 Birds 60-69 Traffic 45-50 Aircraft 48-50
		2	A[2]	55	41	32	26	32	23	N/M	
		3	A[2]	69	58	38	27	43	24	I/A	
		4	A[2]	68	58	34	24	43	21	N/M	
		5	A[2]	56	46	36	23	34	21	N/M	
		6	A[2]	65	49	35	24	37	22	24 LAeq	
Evening 1 11/09/2023 19:51 2.5 – 2.9 m/s SSE 13°C 3005904	35 dBA LAeq(15minute)	1	F[2]	51	48	42	22	38	20	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 40-51 Aircraft 40-42
		2	F[2]	46	42	37	20	32	19	I/A	
Night 1 12/09/2023 00:02 2.4 – 3.0 m/s SE 9°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E[2]	44	38	30	21	27	19	22 LAeq 23 LA1	**Site Related Noise Events:** Dozer operations 20-23 **Other Noise Events:** Traffic 40-49 Animals 32-39 Birds 30-35
		2	E[2]	41	36	29	21	26	19	N/M	
		3	E[2]	46	40	32	21	29	20	I/A	
		4	E[2]	49	45	39	23	35	21	I/A	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 15 Operator Attended EPL Noise Survey Results – N9 – High Range (Day 2)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 2 13/09/2023 07:29 0.7 – 2.2 m/s SE 13-20°C 3005904	35 dBA LAeq(15minute)	1	D	65	45	42	35	39	30	I/A	**Site Related Noise Events:** Main exhaust vent fan 30-34 **Other Noise Events:** Animals 40-45 Birds 49-68 Traffic 37-43 Aircraft 40-46
		2	D	67	49	38	29	39	25	31 LAeq	
		3	D	68	52	40	29	40	26	N/M	
		4	E	68	57	42	27	43	25	27 LAeq	
		5	D	57	44	35	26	34	23	28 LAeq	
		6	D	63	46	38	25	37	22	26 LAeq	
Evening 2 12/09/2023 19:40 1.4 – 1.6 m/s WSW 11-13°C 3005904	35 dBA LAeq(15minute)	1	E[2]	56	43	39	22	35	20	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 40-42 Animals 43-56 Aircraft 43
		2	D[2]	45	40	36	23	32	20	I/A	
Night 2 12/09/2023 23:21 0 – 1.2 m/s SW 7-8°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	D[2]	45	42	35	25	32	23	30 LAeq 32 LA1	**Site Related Noise Events:** Dozer operations 28-32 General surface activity 25-33 **Other Noise Events:** Animals 38-44 Traffic 35-51
		2	D[2]	51	45	40	25	36	21	29 LAeq 33 LA1	
		3	E[2]	49	37	33	24	29	21	27 LAeq 28 LA1	
		4	D[2]	42	38	33	23	29	21	27 LAeq 30 LA1	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

Table 16 Operator Attended EPL Noise Survey Results – N9 – High Range (Day 3)

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 3 14/09/2023 10:10 0.8 – 4.2 m/s E/SE 24°C 3005904	35 dBA LAeq(15minute)	1	A[2]	60	44	35	24	34	22	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 35-41 Birds 55-72 Aircraft 50-58
		2	A[2]	59	53	40	27	40	24	I/A	
		3	A[2]	72	58	40	25	45	23	I/A	
		4	B[2]	71	49	35	26	41	23	I/A	
		5	B[2]	70	62	36	27	46	23	I/A	
		6	C[2]	61	44	37	28	36	24	I/A	
Evening 3 13/09/2023 19:24 1.1 – 2.3 m/s S/SE 15-17°C 3005904	35 dBA LAeq(15minute)	1	G	49	44	43	29	40	22	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 40-44 Insects 40-49
		2	G	46	43	42	28	39	22	I/A	
Night 3 13/09/2023 23:51 1.5 – 2.7 m/s SE 11-12°C 3005904	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	G	55	34	30	21	28	19	22 LAeq 27 LA1	**Site Related Noise Events:** General surface activity 20-25 Dozer operations 25-27 **Other Noise Events:** Traffic 37-50 Animals 36-55
		2	G	40	35	29	20	26	18	I/A	
		3	G	48	45	41	20	36	18	I/A	
		4	G	51	47	40	27	37	22	I/A	

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable.

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.5 Operator Attended Noise Survey Results – NMP Monitoring Location N1 (Bow Hills)

Results of the operator attended noise surveys at N1 are provided in **Table 17.** Monitoring location N1 represents residential receptors located to the east of the site in Bow Hills.

Table 17 Operator Attended NMP Noise Survey Results – N1 – Bow Hills

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 12/09/2023 13:06 2.2 m/s ESE 23°C 3005904	35 dBA LAeq(15minute)	1	A[2]	64	55	39	30	41	27	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 40-47 Birds 40-51 Animals 40-53 Aircraft 63
Evening 11/09/2023 21:36 2.2 m/s SSE 10°C 3005904	35 dBA LAeq(15minute)	1	E[2]	69	58	49	24	47	22	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 50-62 Train horn 69 Train 40-48
Night 11/09/2023 22:01 2.0 m/s SSE 10°C 3005904	35 dBA LAeq(15minute)	1	E[2]	59	54	49	25	44	24	<25 LAeq 25 LA1	**Site Related Noise Events:** General surface activity 20-25 **Other Noise Events:** Traffic 52-59

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: A private agreement between NCOPL and the residents of N1 Bow Hills of 50 dBA LAeq(15minute) is in place. This new level of 50 dBA LAeq(15minute) replaces the levels identified in Conditions 1-3, Schedule 4 of PA 08_0144 Mod 2 and the identical limits contained in condition L3 of Environment Protection Licence No 1278

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.6 Operator Attended Noise Survey Results – NMP Monitoring Location N3 (Ardmona)

Results of the operator attended noise surveys at N3 are provided in **Table 18.** Monitoring location N3 represents residential receptors located to the southeast of the site in Ardmona.

Table 18 Operator Attended NMP Noise Survey Results – N3 – Ardmona

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 11/09/2023 13:16 2.7 m/s S 20°C 3008204	35 dBA LAeq(15minute)	1	A[1]	91	87	75	37	73	29	N/M	**Site Related Noise Events:** Dozer operations faintly audible **Other Noise Events:** Traffic 80-91 Birds 45-53
Evening 11/09/2023 20:28 1.9 m/s SSE 13°C 3008204	35 dBA LAeq(15minute)	1	F[1]	88	76	57	19	63	18	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 80-88 Animals 44-51
Night 11/09/2023 23:18 2.4 m/s SE 9°C 3008204	35 dBA LAeq(15minute)	1	E[1]	93	79	60	22	68	20	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 77-93

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.7 Operator Attended Noise Survey Results – NMP Monitoring Location N7 (Merriman)

Results of the operator attended noise surveys at N7 are provided in **Table 19.** Monitoring location N7 represents residential receptors located to the northeast of the site in Merriman.

Table 19 Operator Attended NMP Noise Survey Results – N7 – Merriman

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 13/09/2023 11:13 1.3 m/s NW 24°C 3005904	35 dBA LAeq(15minute)	1	A[2]	57	47	38	30	36	28	I/A	**Site Related Noise Events:** Inaudible **Other Noise Events:** Traffic 44-47 Birds 50-57 Insects 38-41
Evening 13/09/2023 20:11 2.1 m/s SE 15°C 3005904	35 dBA LAeq(15minute)	1	G	55	52	44	27	40	24	30 LAeq	**Site Related Noise Events:** Dozer operations 28-33 General surface activity 25-30 **Other Noise Events:** Animals 40-49 Traffic 40-55
Night 13/09/2023 23:25 1.3 m/s ESE 12°C 3005904	35 dBA LAeq(15minute)	1	G	58	49	44	29	39	27	32 LAeq 34 LA1	**Site Related Noise Events:** Dozer operations 30-34 **Other Noise Events:** Animals 45-58 Traffic 35-45

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

5.1.8 Operator Attended Noise Survey Results – NMP Monitoring Location N8$_{(NMP)}$ (Matilda)

Results of the operator attended noise surveys at N8$_{(NMP)}$ are provided in **Table 20**. Monitoring location N8$_{(NMP)}$ represents residential receptors located to the south of the site in Matilda.

Table 20 Operator Attended NMP Noise Survey Results – N8 – Matilda

Period Date/Start Time Weather SLM Details	Criteria[1]	Measurement Number	Stability Category	Primary Noise Descriptor						Narrabri Mine Contribution, (dBA)	Description
				LAmax (dBA)	LA1 (dBA)	LA10 (dBA)	LA90 (dBA)	LAeq (dBA)	LAmin (dBA)		
Day 12/09/2023 10:47 1.7 m/s SE 22°C 3008204	35 dBA LAeq(15minute)	1	A[2]	53	47	37	23	34	21	N/M	**Site Related Noise Events:** General surface activity barely audible **Other Noise Events:** Birds 40-53 Animals 40-43 Aircraft 42
Evening 12/09/2023 20:23 1.6 m/s SW 11°C 3008204	35 dBA LAeq(15minute)	1	F[2]	63	45	34	24	33	21	28 LAeq	**Site Related Noise Events:** Dozer operations 28-35 General surface activity 25-27 **Other Noise Events:** Traffic 35-40 Impact 63
Night 12/09/2023 23:15 Calm 8°C 3008204	35 dBA LAeq(15minute)	1	-[2]	44	37	33	28	31	25	30 LAeq 44 LA1	**Site Related Noise Events:** Dozer operations 30-44 General surface activity 27-29 **Other Noise Events:** Animals 32-39

Note: N/M = Not Measurable, I/A = Inaudible

Note 1: Mine owned receiver – criteria not applicable

Note 2: Due to technical issues at inversion monitoring location W2, weather information at this location was not recorded during this time. Stability category has been adopted from monitoring location W1.

6 Conclusion

SLR was engaged by Narrabri Coal Operations Pty Ltd to conduct attended noise monitoring for the Narrabri Mine in accordance with the Narrabri Mines' Noise Management Plan, Environment Protection Licence and Project Approval.

Operator attended noise monitoring was conducted at eight locations in order to determine the noise performance of the Narrabri Mine, with compliance achieved at all privately owned receiver locations.

APPENDIX A

Acoustic Terminology

Sound Level or Noise Level

The terms "sound" and "noise" are almost interchangeable, except that in common usage "noise" is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2 "A" Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an "A-weighting" filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as "linear", and the units are expressed as dB(lin) or dB.

3 Sound Power Level

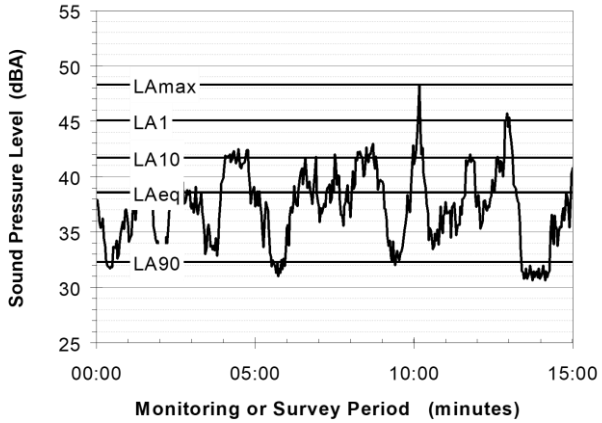
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceed for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the "repeatable minimum" LA90 noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or "average" levels representative of the other descriptors (LAeq, LA10, etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than "broad band" noise. 7. Impulsiveness

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

7 Frequency Analysis

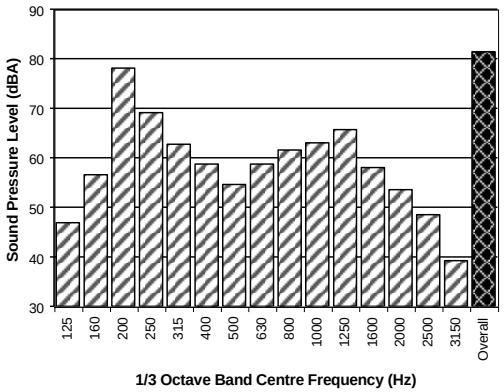
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



APPENDIX B

Calibration Certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM32569

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	B&K		
Type No:	2270	**Serial No:**	3008204
Mic. Type:	4189	**Serial No:**	2983643
Pre-Amp. Type:	ZC0032	**Serial No:**	29477
Filter Type:	1/3 Octave	**Test No:**	F032568

Owner: SLR Consulting Australia Pty Ltd
120 High Street
North Sydney, NSW 2060

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1003	hPa ±1 hPa	**Date of Receipt :**	11/05/2022
Temperature	22	°C ±1° C	**Date of Calibration :**	13/05/2022
Relative Humidity	69	% ±5%	**Date of Issue :**	13/05/2022

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

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

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

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Page 1 of 2 Calibration Certificate
AVCERT10.14 Rev.2.0 14/04/2021

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	*Clause*	*Result*
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self-Generated Noise	11.1	Observed
Electrical Noise	11.2	Observed
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Not Applicable
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the 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 specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications 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.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 61260-3:2016 and were conducted to test the following performance characteristics:

Tests performed	*Clause*	*Result*
Test of relative attenuation at filter midband frequency	10	Pass
Linear operating range including range control if fitted	11	N/A
Test of lower limit of linear operating range	12	Pass
Measurement of relative attenuation (filter shape)	13	Pass

The filter submitted for testing successfully completed the tests listed above for the environmental conditions under which the tests were performed. If the filter type has successfully completed the pattern-evaluation tests of IEC 61260-2 then it can be stated that the filter set continues to conform to the specifications of IEC 61260-1.

A full technical report is available on request.

HBK HOTTINGER BRÜEL & KJÆR

NATA WORLD RECOGNISED ACCREDITATION

Australian Calibration Laboratory
Suite 4.03, Level 4, 3 Thomas Holt Drive, Macquarie Park NSW 2113, Australia
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301

CERTIFICATE OF CALIBRATION

Certificate No: CAU2200578

CALIBRATION OF:

Sound Level Meter:	Bruel & Kjaer	2250	No: 3005904
Microphone:	Bruel & Kjaer	4950	No: 2913815
Preamplifier:	Bruel & Kjaer	ZC-0032	No: 20518
Supplied Calibrator:	None	None	No: N/A
Software version:	BZ7130 Version 4.6	Pattern Approval:	-
Instruction manual:	BE1853-11	Identification:	N/A

CUSTOMER:

SLR Consulting Australia Pty Ltd
202 Submarine School
North Sydney NSW 2060

CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23 °C
Environment conditions:	*see actual values in **Environmental conditions** sections*

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1.
Procedures from IEC 61672-3:2013 were used to perform the periodic tests.
The measurements included in this document are traceable to Australian/National standards.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.3 - DB: 8.30) and test procedure 2250-L-4950.

RESULTS:

	Initial calibration		Calibration prior to repair/adjustment
	Calibration without repair/adjustment	X	Calibration after repair/adjustment

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of Calibration: 15/08/2022

Certificate issued: 15/08/2022

Sajeeb Tharayil
Calibration Technician

Craig Robert Patrick
Approved signatory

Summary

Preliminary inspection	Passed
Environmental conditions, Prior to calibration	Passed
Reference information	Passed
Indication at the calibration check frequency	Passed
Acoustical signal tests of a frequency weighting, C weighting	Passed
Self-generated noise, Microphone installed	Passed
Self-generated noise, Electrical	Passed
Electrical signal tests of frequency weightings, A weighting	Passed
Electrical signal tests of frequency weightings, C weighting	Passed
Electrical signal tests of frequency weightings, Z weighting	Passed
Frequency and time weightings at 1 kHz	Passed
Long-term stability, Reference	Passed
Level linearity on the reference level range, Upper	Passed
Level linearity on the reference level range, Lower	Passed
Toneburst response, Time-weighting Fast	Passed
Toneburst response, Time-weighting Slow	Passed
Toneburst response, LAE	Passed
C-weighted peak sound level, 8 kHz	Passed
C-weighted peak sound level, 500 Hz	Passed
Overload indication	Passed
Long-term stability, 1. relative	Passed
High-level stability	Passed
Long-term stability, 2. relative	Passed
Environmental conditions, Following calibration	Passed

The sound level meter submitted for testing successfully completed the 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 specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Conformance to a performance specification is demonstrated when the following criteria are both satisfied: (a) a measured deviation from a design goal does not exceed the applicable acceptance limit and (b) the corresponding uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty of measurement given in IEC 61672-1:2013 for the same coverage probability of 95 %.

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