Mannering Colliery

Monthly attended noise monitoring - March 2023

Prepared for Great Southern Energy Pty Ltd (trading as Delta Coal)

April 2023

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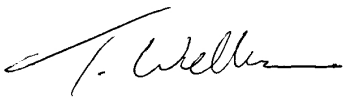
E220750 RP1

April 2023

Version	Date	Prepared by	Reviewed by	Comments
2	14 April 2023	Teanuanua Villierme	Tony Welbourne	

Approved by



Tony Welbourne
Associate Director
14 April 2023

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Tables

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1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Great Southern Energy Pty Ltd (trading as Delta Coal) to conduct a monthly noise survey of operations at Mannering Colliery (MC, the site) located at Ruttleys Road, Doyalson North NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

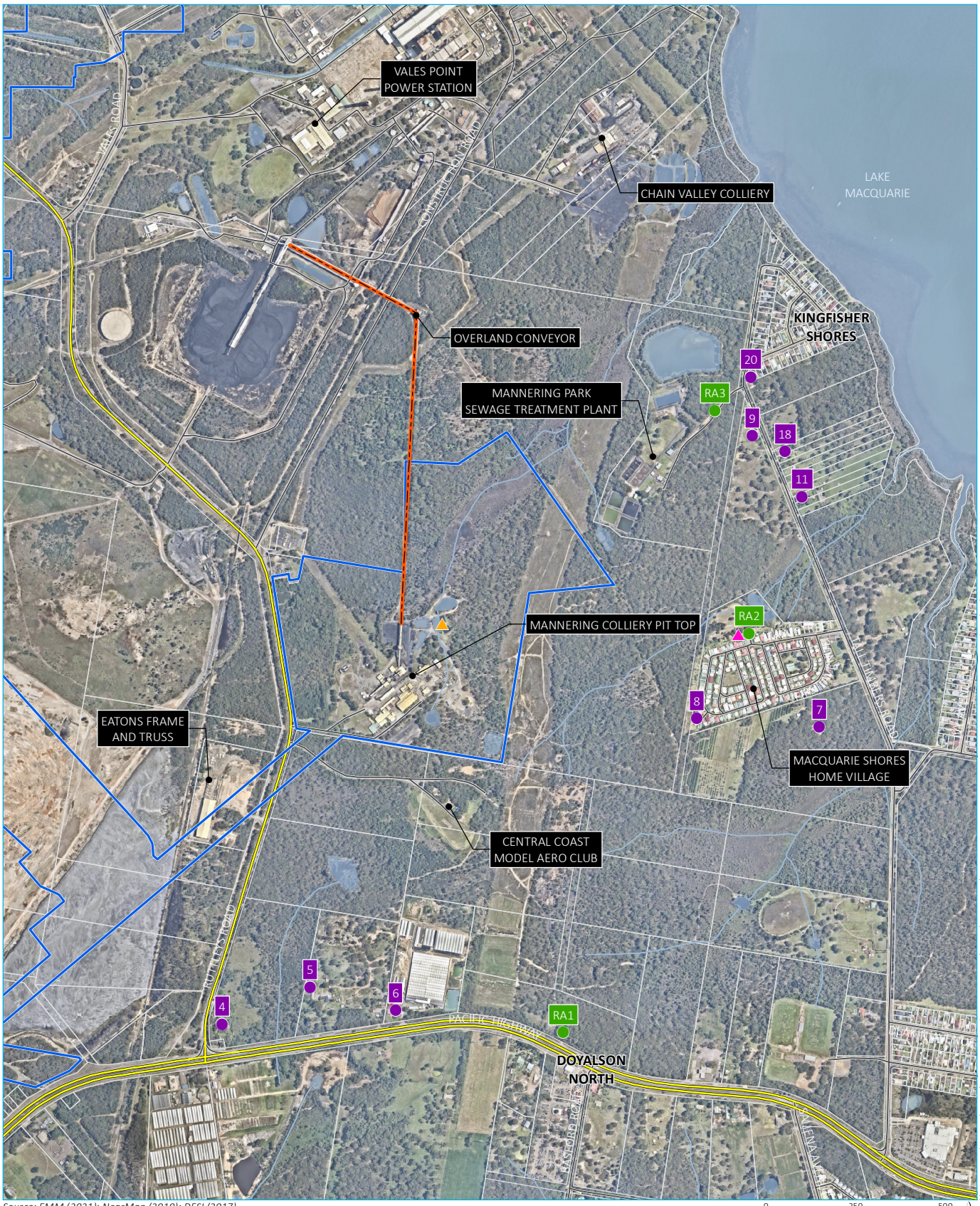
Attended environmental noise monitoring described in this report was done during the evening and night periods of Tuesday 21 and Wednesday 22 March 2023 at three monitoring locations.

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 descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
RA1	Pacific Highway, Doyalson North	364646	6327221
RA2	Macquarie Shores Home Village, Doyalson North	365164	6328332
RA3	Tall Timbers Road (northern end), Kingfisher Shores	365069	6328953



Source: EMM (2021); NearMap (2019); DFSI (2017)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Mannering Colliery project approval boundary
- Alignment of overland conveyor to VPPS
- Main road
- Local road
- Watercourse/drainage line
- Waterbody
- Cadastral boundary
- Assessment location
- Attended monitoring location
- Continuous monitoring location
- Meteorological station

Attended noise monitoring and assessment locations

Mannering Colliery
Figure 1.1

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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.
$L_{Aeq,15minute}$	The energy average A-weighted noise level over the specified time period of 15 minutes.
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.
NPfI	NSW EPA Noise Policy for Industry (2017)
Standard meteorological conditions	Stability categories A-D with wind speed up to 0.5 m/s at 10 m above ground level during the day, evening, or night period, as defined in Table D1 of the NPfI.

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
Noise-enhancing meteorological conditions	Stability categories A-D with wind speed up to 3 m/s at 10 m above ground level during the day, evening, or night period, or stability category F with wind speed up to 2 m/s at 10 m above ground level during the night period, as defined in Table D1 of the NPfI. This does not necessarily imply that meteorological conditions were enhancing site noise at the monitoring location.
Very noise-enhancing meteorological conditions	Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions, as defined in the NPfI. This does not necessarily imply that meteorological conditions were enhancing site noise at the monitoring location.
Temperature inversion	A meteorological condition where the atmospheric temperature increases with altitude.

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 Project approval

Mannering Colliery noise limits are provided in Table 1, Condition 2 of Schedule 3 of the project approval (PA) PA MP06_0311. Relevant sections of the project approval are reproduced in Appendix B.1.

2.2 Environment protection licence

Environment Protection Licence 191 (EPL) references the PA with respect to noise limits. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

The approved Noise Management Plan (NMP) was prepared in line with the Mod 5 approval and in accordance with the NPfI. Three attended noise monitoring locations representative of the PA noise assessment locations have been adopted in the NMP for the purpose of determining compliance with relevant noise limits. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on the NMP 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 $L_{A1,1minute}$
RA1	40	36	36	46
RA2	40	40	40	45
RA3	40	39	39	49

2.5 Meteorological conditions

The PA (Mod 5) states the following:

> Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017).

Section 5.2 of the NPfI states that noise limits applicable under 'very noise-enhancing' conditions should be the limits that apply under 'standard' or 'noise-enhancing' conditions plus 5 dB. This implies that there will be no periods when noise limits do not apply due to meteorological conditions. Refer to Table 1.2 for the definition of 'standard', 'noise-enhancing' and 'very noise -enhancing' meteorological conditions.

As per the PA (Mod 5) and NMP, and in accordance with the NPfI, this assessment has adopted a +5 dB adjustment to the limits shown in Table 2.1 when monitoring is undertaken during the following 'very noise- enhancing' conditions:

- wind speeds greater than 3 m/s at 10 m above ground level

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

When monitoring has been undertaken during 'very noise-enhancing' conditions and a +5 dB adjustment to the limits has been adopted, this is indicated in Table 4.3.

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the 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.

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 EPA requirements. Meteorological data was obtained from the Mannering Colliery on-site 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 evening and night periods 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 noise levels from site could not be established due to masking by other noise sources in a similar frequency range, but site noise was determined to be at least 5 dB lower than relevant limits, then a maximum estimate of site noise 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) are often used in noise survey reports. 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 survey reports are 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 $L_{A1,1minute}$. 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 Meteorological data

This assessment determined stability categories throughout attended monitoring period using the sigma-theta (ST) method as per Fact Sheet D of the NPfI (EPA 2017). This data was sourced from the site's AWS, in accordance with PA requirements.

3.4 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 adjustments have been reported and added to measured site-only L_{Aeq} noise levels.

Low-frequency modifying factor adjustments 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.

3.5 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
Brüel & Kjær 2250 sound level meter	3029363	3/11/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	79952	29/9/2023	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.

Table 4.1 Total measured noise levels – March 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
RA1	21/03/2023 20:51	75	67	61	57	52	37	32
RA2	21/03/2023 21:15	42	39	37	35	35	33	30
RA3	21/03/2023 21:34	54	45	35	35	32	30	28
RA1	21/03/2023 22:00	76	67	60	56	48	37	32
RA3	21/03/2023 22:21	59	47	35	37	34	33	31
RA2	22/03/2023 2:15	45	37	35	34	34	33	31

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

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

Table 4.2 Atmospheric conditions measured at microphone height – March 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north[1]	Cloud cover 1/8s
RA1	21/03/2023 20:51	20	<0.5	-	4
RA2	21/03/2023 21:15	20	1	155	7
RA3	21/03/2023 21:34	20	<0.5	-	8
RA1	21/03/2023 22:00	20	<0.5	-	8
RA3	21/03/2023 22:21	20	<0.5	-	8
RA2	22/03/2023 2:15	19	<0.5	-	8

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 levels in the absence of other sources, where possible, and includes weather data from the site AWS. Noise limits are applicable under all weather conditions but are adjusted during very noise-enhancing weather conditions as defined by the NPfI (refer to Section 2.5).

Table 4.3 Site noise levels and limits – March 2023

Location	Start date and time	Wind		Stability class	Standard limits apply?[1]	Limit, dB		Site level, dB[2]		Exceedance, dB	
		Speed m/s	Direction			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
RA1	21/03/2023 20:51	0.8	193	F	Yes	36	N/A	IA	N/A	Nil	N/A
RA2	21/03/2023 21:15	0.8	155	F	Yes	40	N/A	IA	N/A	Nil	N/A
RA3	21/03/2023 21:34	1.2	165	F	Yes	39	N/A	IA	N/A	Nil	N/A
RA1	21/03/2023 22:00	0.7	229	F	Yes	36	46	IA	IA	Nil	Nil
RA3	21/03/2023 22:21	0.6	262	F	Yes	39	49	IA	IA	Nil	Nil
RA2	22/03/2023 2:15	0.5	207	F	Yes	40	45	30	32	Nil	Nil

Notes: 1. If no, adjusted noise limits (standard limit + 5 dB) apply during 'very noise-enhancing' meteorological conditions as stated in Section 2.5.

2. Site-only $L_{Aeq,15minute}$, includes modifying factor adjustments if applicable.

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.

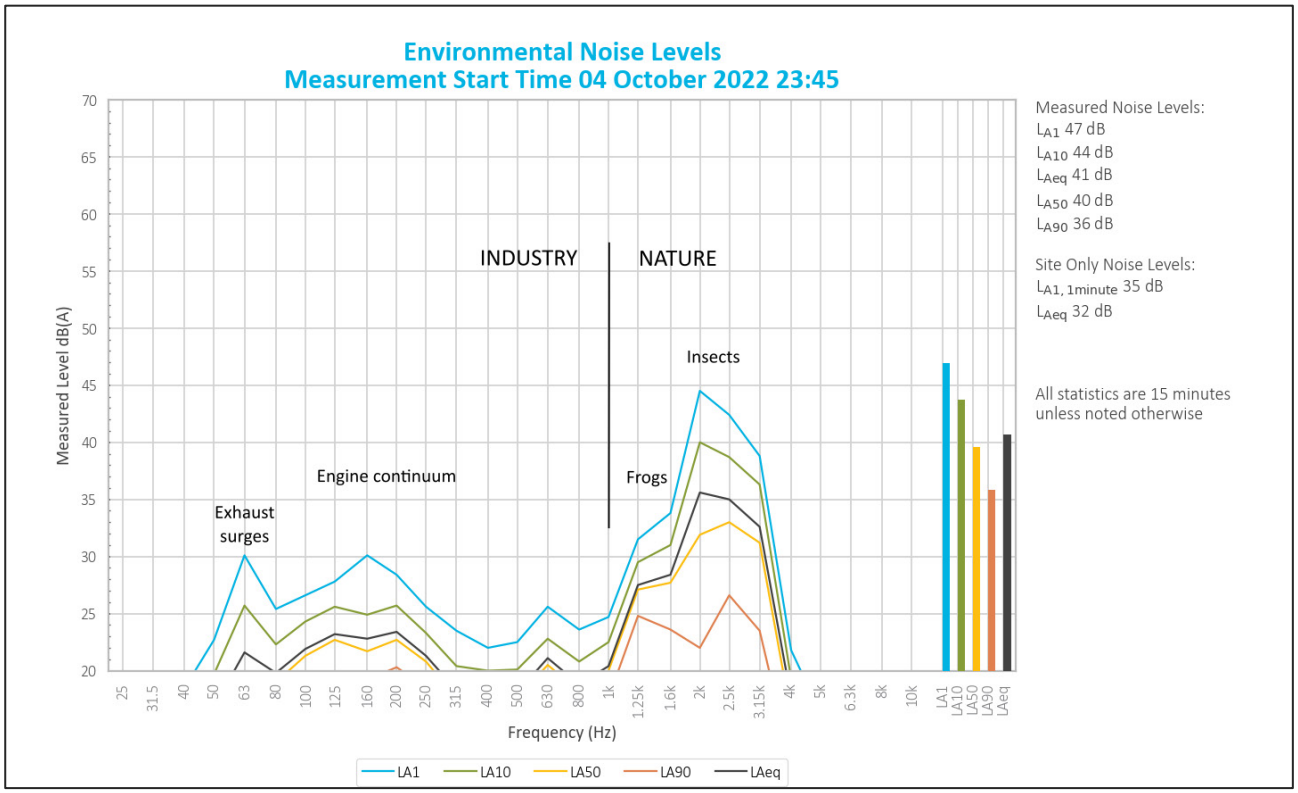

Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.2 RA1 – Evening

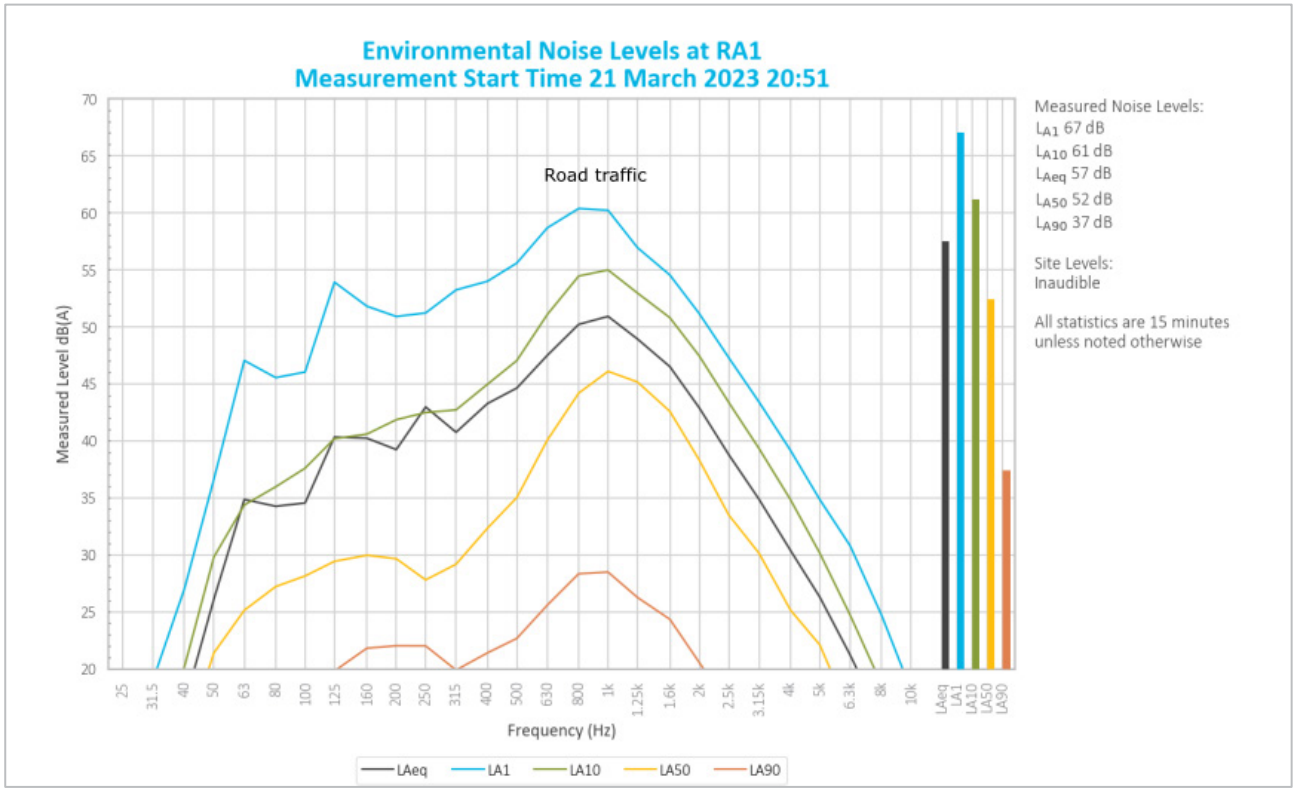

Figure 5.2 Environmental Noise Levels – RA1, Pacific Highway

Mannering Colliery operations were inaudible during the entire measurement.

Road traffic noise generated all measured levels.

5.3 RA2 – Evening

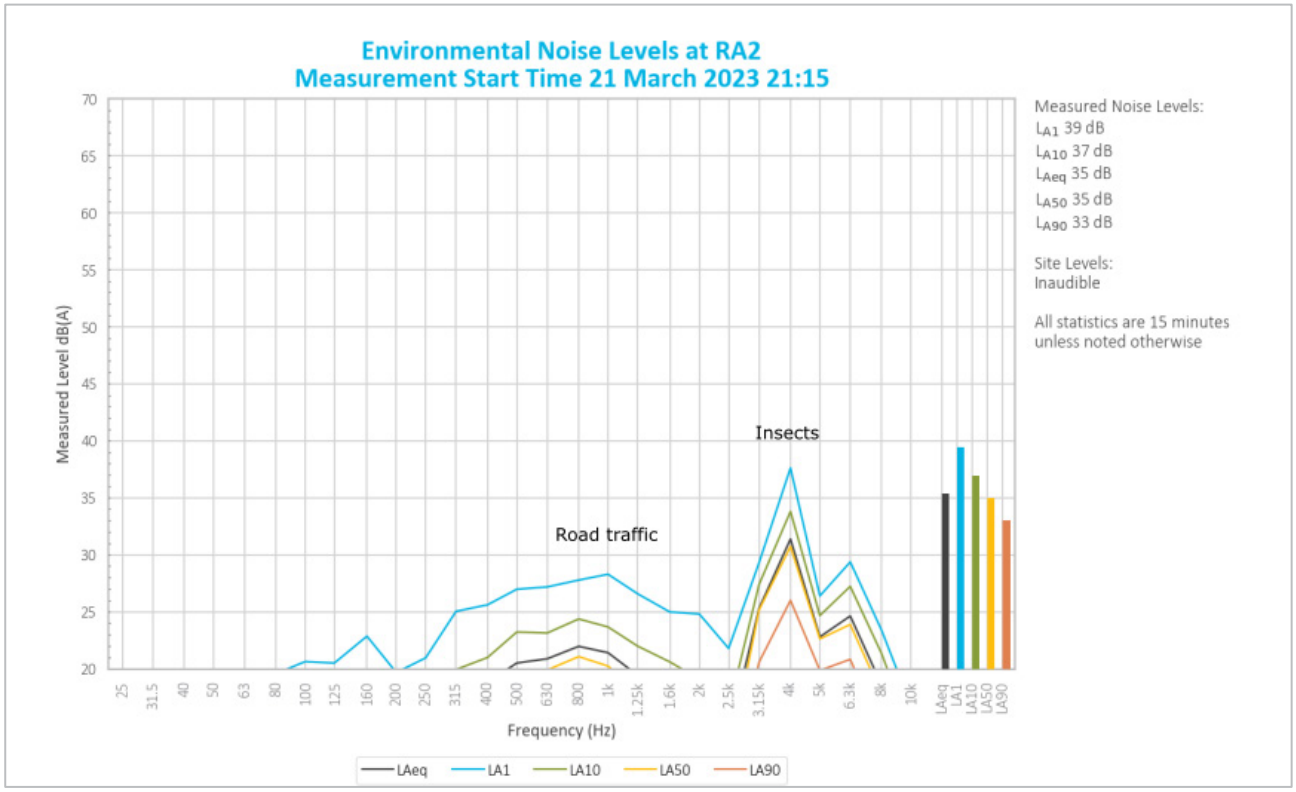

Figure 5.3 Environmental Noise Levels – RA2, Macquarie Shores

Mannering Colliery operations were inaudible during the entire measurement.

Road traffic noise and insects were primarily responsible for the measured L_{A1}, L_{A10}, L_{A50}, L_{Aeq} and L_{A90}.

5.4 RA3 – Evening

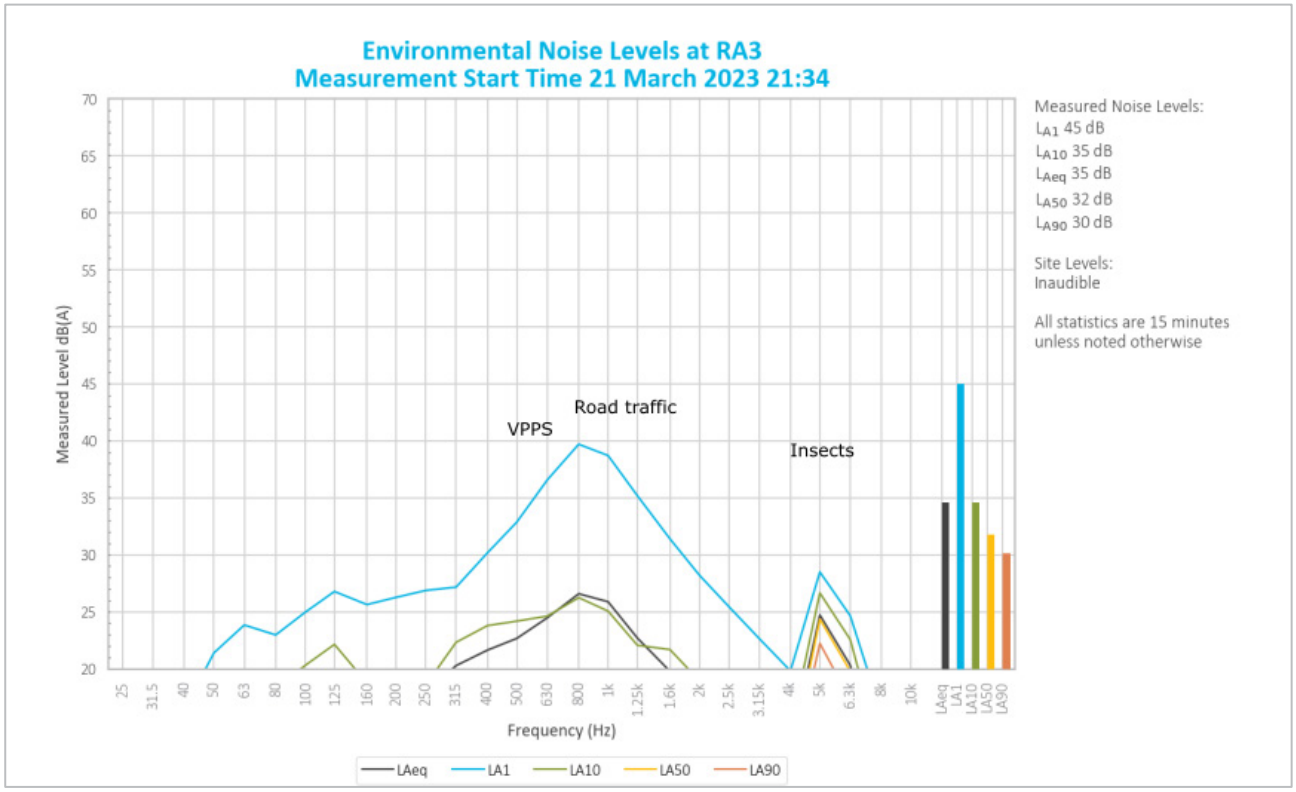

Figure 5.4 Environmental Noise Levels – RA3, Kingfisher Shores

Mannering Colliery operations were inaudible during the entire measurement.

Road traffic noise generated the measured L_{A1} and L_{A10}. Road traffic noise, Vales Point Power Station (VPPS) hum primarily contributed to the measured L_{Aeq}. VPPS hum and insects were primarily responsible for the measured L_{A50} and L_{A90}.

5.5 RA1 – Night

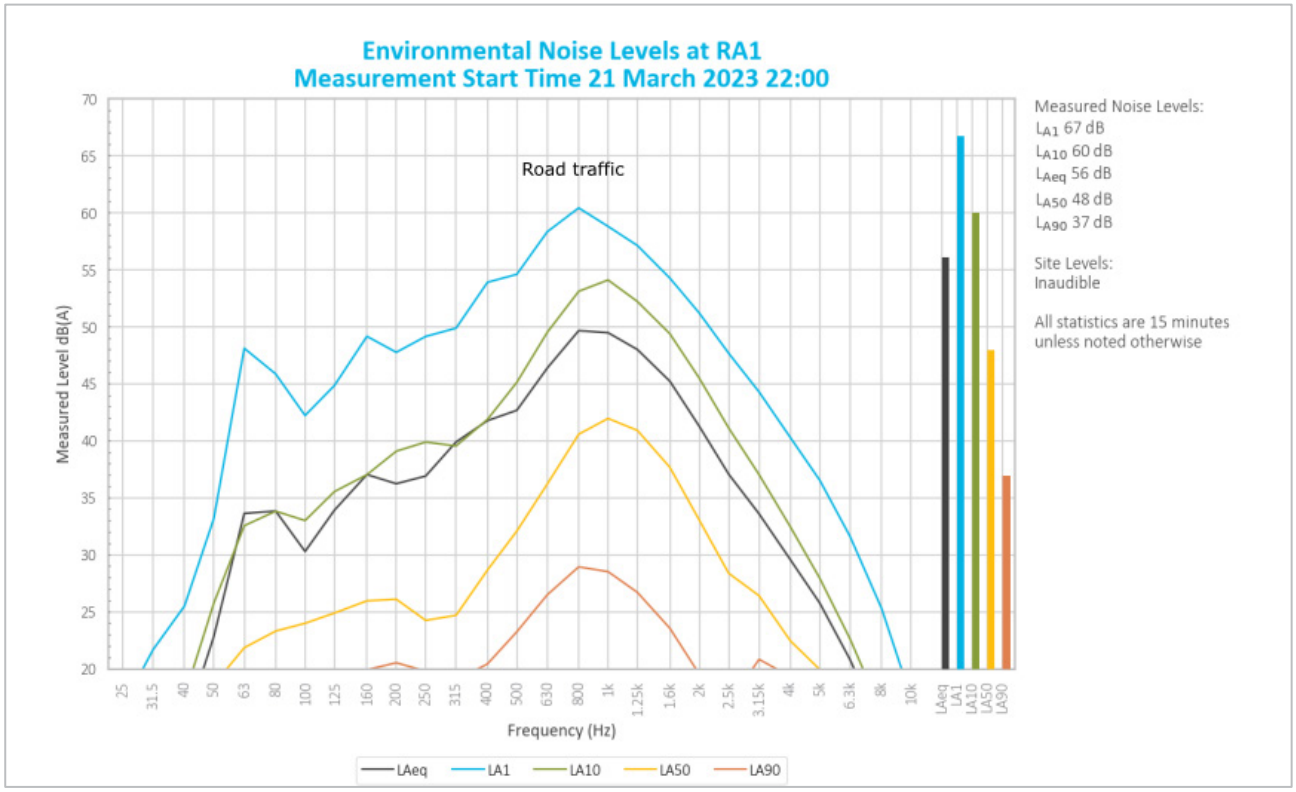

Figure 5.5 Environmental Noise Levels – RA1, Pacific Highway

Mannering Colliery operations were inaudible during the entire measurement.

Road traffic noise generated all measured levels.

5.6 RA3 – Night

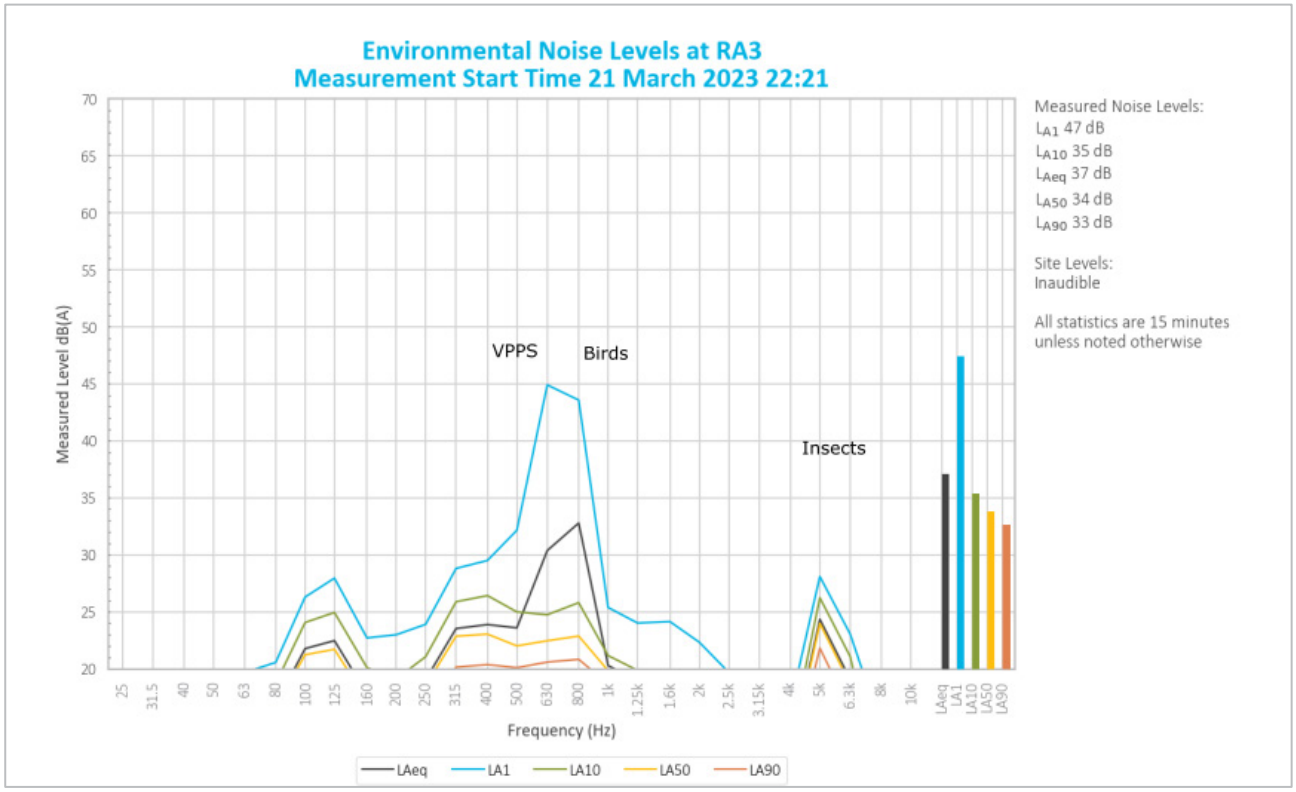

Figure 5.6 Environmental Noise Levels – RA3, Kingfisher Shores

Mannering Colliery operations were inaudible during the entire measurement.

VPPS hum, insects and birds were responsible for measured levels.

5.7 RA2 – Night

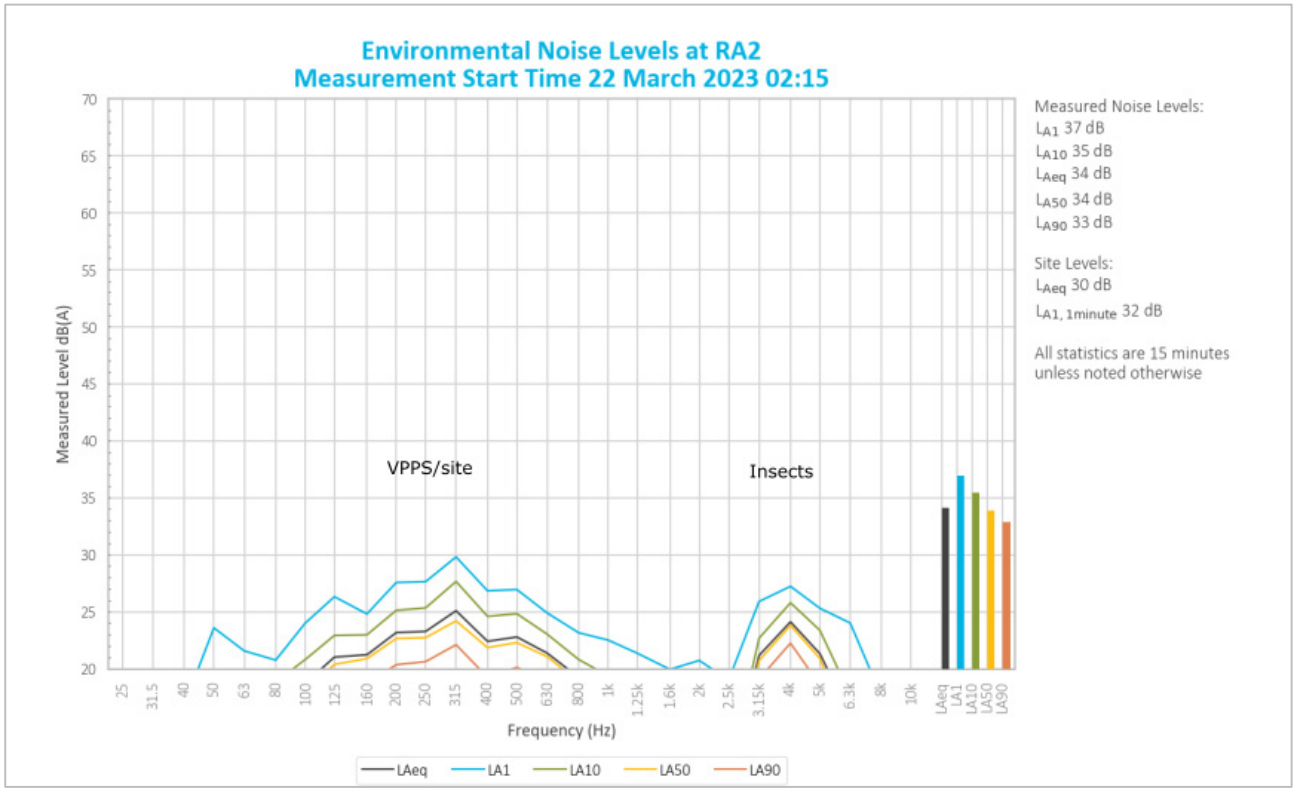

Figure 5.7 Environmental Noise Levels – RA2, Macquarie Shores

Mannering Colliery CHPP hum was consistently audible throughout the entire measurement, generating a site-only $L_{Aeq,15\ minute}$ of 30 dB. Mannering Colliery CHPP hum was also responsible for the site-only $L_{A1,1minute}$ of 32 dB.

VPPS hum, distant traffic and insects were primarily responsible for all measured levels.

6 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Great Southern Energy Pty Ltd (trading as Delta Coal) to conduct a monthly noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified noise limits.

Attended environmental noise monitoring described in this report was done during the evening and night periods of Tuesday 21 and Wednesday 22 March 2023 at three 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

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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

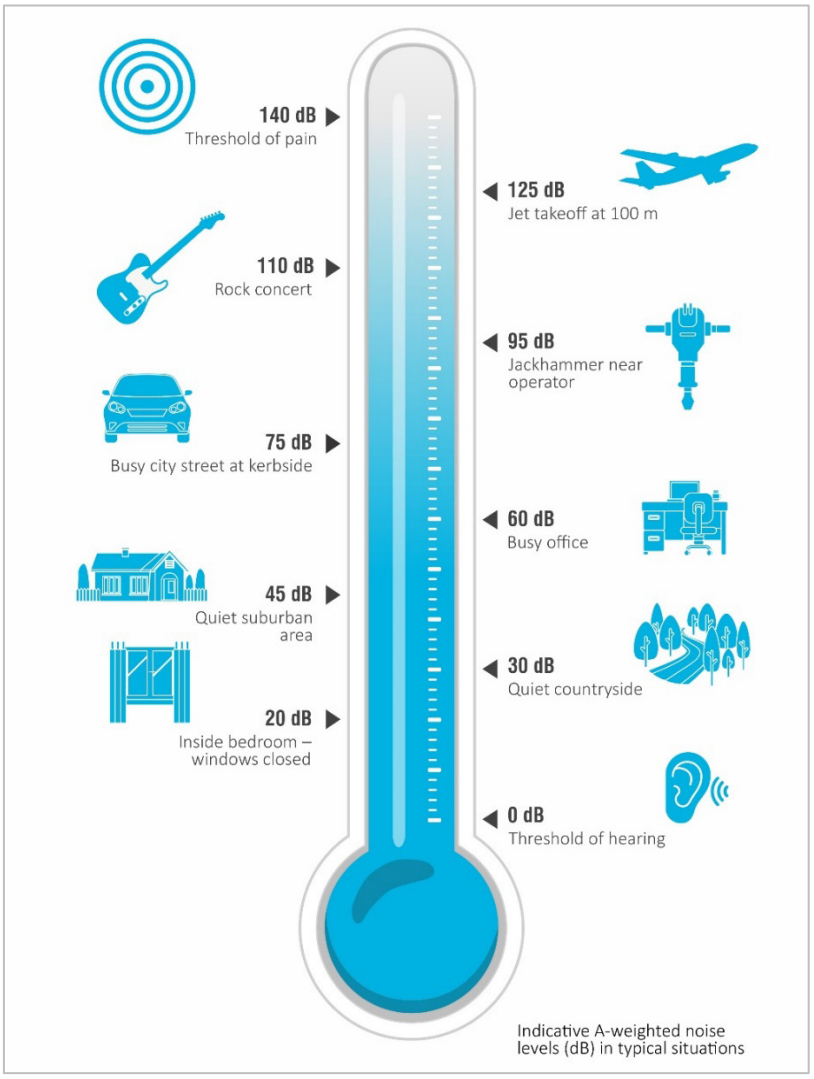

Figure A.1 Common noise levels

Appendix B
Regulator documents

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SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Construction Noise

1. The Applicant must ensure that the noise generated by any construction work is managed in accordance with the requirements outlined in the *Interim Construction Noise Guideline* (DECC, 2009).

Operational Noise Criteria

2. Except for the carrying out of construction works, the Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 1 at any residence[a] on privately-owned land.

***Table 1**: Operational noise criteria dB(A)*

Noise Assessment Location	***Day*** $L_{Aeq\ (15\ min)}$	***Evening*** $L_{Aeq\ (15\ min)}$	***Night*** $L_{Aeq\ (15\ min)}$	***Night*** $L_{A1\ (1\ min)}$
4 – di Rocco	40	36	36	46
5 - Keighran	40	39	39	49
6 – Swan	40	37	37	47
7 – Druitt	40	35	35	45
8 – Macquarie Shores Home Village	42	42	42	47
9 - Jeans	40	37	37	47
11 - Jeans	40	36	36	46
18 - Jeans	40	36	36	46
20 – Knight and all other privately-owned residences	40	36	36	46

[a] *The Noise Assessment Locations referred to in Table 1 are shown in Appendix 4.*

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the *NSW Noise Policy for Industry* (EPA, 2017).

3. The noise criteria in Table 1 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise Operating Conditions

3A. The Applicant must:

(a) take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;

(b) implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;

(c) operate a comprehensive noise management system commensurate with the risk of impact;

(d) take all reasonable steps to minimise the noise impacts of the development during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);

(e) carry out regular attended noise monitoring (at least once a month, unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent;

Environment Protection Licence

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

Code	Waste	Description	Activity	Other Limits
NA	Waste	Any other waste received on the premises for storage, treatment, processing, sorting or disposal and which receipt is not a scheduled activity under Schedule 1 of the POEO Act, as in force from time to time.		
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2014	As specified in each particular resource recovery exemption	N/A

L4.2 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

L4.3 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection licence.

L5 Noise limits

Note: Noise limits are not specified as a condition of this licence. Noise limits are prescribed with the conditions of Project Approval 06_0311 granted under the *Environmental Planning and Assessment Act 1979.* Under the *Environmental Planning and Assessment Act 1979* the Department of Planning is the appropriate authority in respect of the administration and regulation of the Project Approval.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

The above noise monitoring locations are representative of residential receivers most likely to be affected by CVC operational noise. Adherence with the relevant noise criteria at these locations will indicate that noise criteria will be met at other surrounding noise-sensitive locations.

4.2.3 Mannering Colliery

Consistent with the Noise Impact Assessment (EMM 2019) undertaken as part of the Project Approval MP06_0311 MOD 5, rural and residential receivers have been divided into three (3) receiver areas (RA's) with similar geographical and acoustic features. The following points are considered representative of each receiver area:

- RA1, rural residential properties south of MC and fronting the Pacific Highway. The dominant noise source in this area is road traffic. Birds, insects and other industrial sources are also audible at times.
- RA2, privately-owned relocatable residences within the MSHV, east of MC. The dominant noise sources in this RA are birds, insects, traffic and other industrial sources. Activities at MC are also noted to be audible at times.
- RA3, various rural residential residences on Tall Timbers Road at Kingfisher Shores and adjacent to the Chain Valley Bay suburban area. The dominant noise sources in this RA are birds, insects, other industrial sources and traffic movements. Activities at MC are also noted to be audible at times.

The attended noise monitoring locations for MC and relevant noise criteria are identified below in **Table 6**.

Table 6: Noise Monitoring Locations and Limits for Mannering Colliery

Location	Receivers Represented MP06_0311 ID	Coordinates	Day $L_{Aeq(15\ min)}$ dB (A)	Evening $L_{Aeq(15\ min)}$ dB (A)	Night $L_{Aeq(15\ min)}$ dB (A)	Night $L_{A1(1\ min)}$ dB (A)
RA1	4, 5, 6	364646E 6327221N	40	36	36	46
RA2	7, 8	365164E 6328332N	40	40	40	45
RA3	9, 11, 18, 20	365069E 6328953N	40	39	39	49

The above noise monitoring locations are representative of residential receivers most likely to be affected by MC operational noise. Adherence with the relevant noise criteria at these locations will indicate that noise criteria will be met at other surrounding noise-sensitive locations.

Appendix C
Calibration certificates

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HBK HOTTINGER BRÜEL & KJÆR
The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA

DANAK
CAL Reg.No. 307
Member of EA MLA

CERTIFICATE OF CALIBRATION

No: CDK2007931

CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 3029363	Id: -
Microphone:	Brüel & Kjær Type 4189	No: 3260501	
PreAmplifier:	Brüel & Kjær Type ZC-0032	No: 30109	
Supplied Calibrator:	None		
Software version:	BZ7222 Version 4.7.6	Pattern Approval:	-
Instruction manual:	BE1712-22		

CUSTOMER

EMM Consulting
Ground Floor, Suite 1
20 Chandos Street
2065 St Leonards
New South Wales, Australia

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C

Environment conditions: *See actual values in sections.*

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC 61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 8.2 - DB: 8.20) by using procedure B&K proc 2250, 4189 (IEC 61672:2013).

RESULTS

Calibration Mode: **Calibration as received.**

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: 2020-11-26

Date of issue: 2020-11-26

Lene Petersen
Calibration Technician

Erik Bruus
Approved Signatory

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C33872

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek
Type No: SV-36 **Serial No:** 79952
Owner: EMM Consulting Pty Ltd
L3, 175 Scott Street
Newcastle, NSW 2300
Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level1:	NA	N	94.09 dB	1000.00 Hz	1.12 %
Level2:	NA	N	114.06 dB	1000.00 Hz	0.71 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure 1004 hPa ±1 hPa
Temperature 23 °C ±1° C
Relative Humidity 55 % ±5%

Date of Receipt : 26/09/2022
Date of Calibration : 29/09/2022
Date of Issue : 29/09/2022

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

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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Accredited Lab No. 9262
Acoustic and Vibration Measurements

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