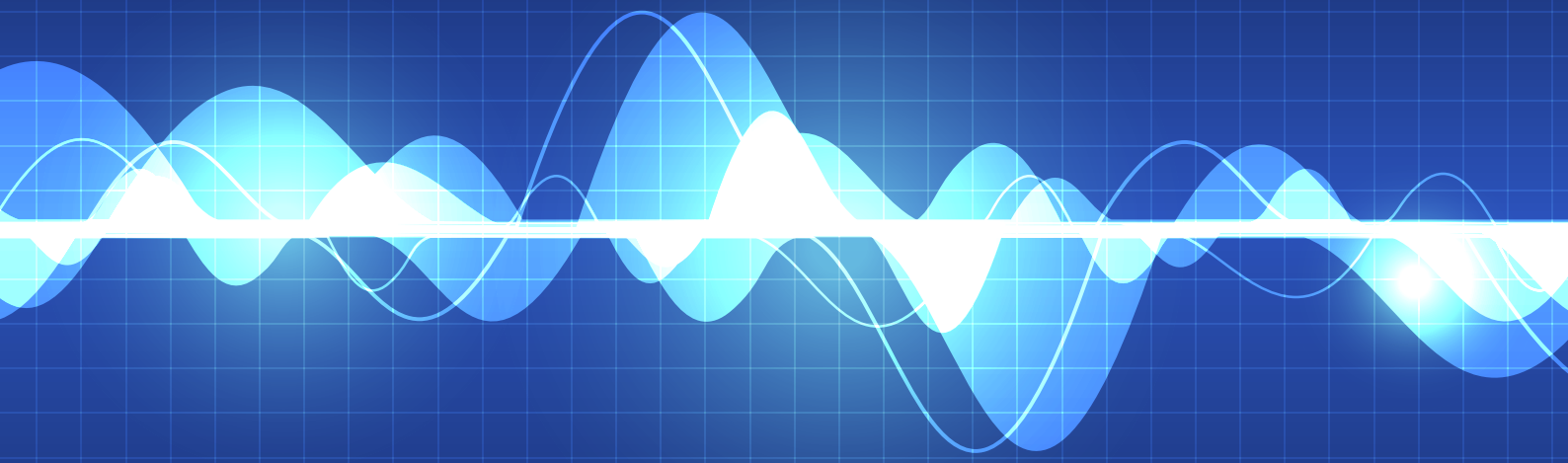
# Chain Valley Colliery

## Quarterly attended noise monitoring
## Quarter 3 - 2019

**Prepared for Great Southern Energy Pty Ltd (trading as DeltaCoal)**
**5Ŝ0ember 2019**



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# Chain Valley Colliery

Quarterly attended noise monitoring - Quarter 3 2019

Prepared for Great Southern Energy Pty Ltd (trading as DeltaCoal)
December 2019

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# Chain Valley Colliery

## Quarterly attended noise monitoring - Quarter 3 2019

**Report Number**

H180389 RP3

**Client**

Great Southern Energy Pty Ltd (trading as DeltaCoal)

**Date**

11 December 2019

**Version**

v2 Final

**Prepared by**

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Acoustic Consultant
11 December 2019

**Approved by**

**Katie Teyhan**
Associate
11 December 2019

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# 1 Introduction

EMM Consulting Pty Limited (EMM) was engaged to undertake operator-attended noise surveys on behalf of DeltaCoal Pty Limited (DeltaCoal).

The purpose of the monitoring was to address requirements of the approved Chain Valley Colliery Noise Management Plan (NMP), prepared to satisfy the requirements of the Development Consent SSD-5465 (DC) and Environment Protection License (EPL) 1770.

The NMP requires noise monitoring to occur on a quarterly basis. This report presents the results and findings of attended noise monitoring conducted during the third quarter (Q3) of 2019, on 11 September 2019.

The following material was referenced as part of this assessment:

- Department of Planning and Environment (DPE), Development Consent SSD-5465, as modified on 16 December 2015 (current as of the monitoring date 11 September 2019);
- Environment Protection Authority (EPA), Environment Protection License 1770, as varied on 2 April 2019 (current as of the monitoring date 11 September 2019);
- Chain Valley Colliery Noise Management Plan (NMP), approved by DPE on 12 March 2014 (current as at the monitoring date 11 September 2019);
- NSW EPA, Industrial Noise Policy (INP), 2000;
- NSW EPA, Industrial Noise Policy application notes, 2017; and
- NSW EPA, Noise Policy for Industry (NPfI), 2017.

A glossary of acoustic terms relevant to this report is provided in Appendix A.

# 2 Noise limits

## 2.1 Operational and sleep disturbance noise limits

Chain Valley Colliery noise limits are provided in Table 1, Condition 7 of Schedule 3 of the DC and Conditions L5.1 and L5.2 of the EPL. Extracts of the relevant sections of the DC and EPL pertaining to noise are provided in Appendix B and Appendix C, respectively. Assessment locations relevant noise impact assessment criteria are summarised in Table 2.1.

**Table 2.1 Noise impact assessment criteria**

| Assessment location | NMP ID | Day $L_{Aeq,15\ minute}$, dB | Evening $L_{Aeq,15\ minute}$, dB | Night $L_{Aeq,15\ minute}$, dB | Night $L_{A1,1\ minute}$, dB |
|---|---|---|---|---|---|
| R8 (EPL Point 9) | ATN001 | 38 | 38 | 38 | 45 |
| R11 (EPL Point 12) | ATN002 | 49 | 49 | 49 | 54 |
| R12 (EPL Point 13) | R12[1] | 49 | 49 | 49 | 53 |
| R13 (EPL Point 14) | R13 | 43 | 43 | 43 | 49 |
| R15 (EPL Point 16) | ATN003 | 36 | 36 | 36 | 45 |
| R19 (EPL Point 20) | ATN006 | 37 | 37 | 37 | 45 |
| R22 (EPL Point 23) | ATN007 | 46 | 46 | 46 | 46 |
| All other privately-owned land | - | 35 | 35 | 35 | 45 |

Notes: 1. Noise monitoring at R12 (EPL Point 13) is completed in conjunction with ATN002 as the monitoring location is representative of both ATN002 and R12.

It is of note that the noise limits outlined in Development Consent SSD-5465 and EPL 1770 are inconsistent, with EPL 1770 appearing to contain a typographical error for the noise limits applicable at monitoring location ATN007 (also known as EPL Point 23 or R22).

For monitoring location ATN007, Development Consent SSD-5465 outlines noise limits of $L_{Aeq,15\ minute}$ 46 dB for the daytime, evening and night-time periods, along with a $L_{A1,1\ minute}$ noise criteria of 46 dB. However, for ATN007, EPL 1770 outlines noise limits of $L_{Aeq,15\ minute}$ 46 dB for the daytime and evening periods and a night-time noise limit of $L_{Aeq,15\ minute}$ 36 dB, with a $L_{A1,1\ minute}$ noise criteria of 45 dB

The DC specifies the following meteorological conditions under which noise limits do not apply:

- during periods of rain or hail;
- average wind speed at microphone height exceeds 5 m/s;
- wind speeds greater than 3 m/s at 10 m above ground level; or
- temperature inversion conditions greater than 3°C/100 m.

The EPL specifies the following meteorological conditions under which noise limits do not apply:

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

For this assessment, the recorded $L_{Amax}$ has been used as a conservative estimate of the $L_{A1,1\ minute}$. The INP application notes (EPA 2013) state that the EPA accepts sleep disturbance analysis based on either the $L_{A1,1\ minute}$ or $L_{Amax}$ metrics, with the $L_{Amax}$ resulting in a more conservative assessment of site noise emissions.

The DC and EPL state that modifying factor corrections shall be applied to the measured mine noise levels before comparison to the relevant noise limits, where applicable, in accordance with Section 4 of the INP. The INP application notes state that Section 4 of the INP has been withdrawn and that Fact Sheet C of the NPfI (EPA 2017) now applies for the application of modifying factors.

## 2.2 Low frequency noise criteria

Condition 5 in Appendix 8 of the DC and L5.9 of the EPL state that noise generated by Chain Valley Colliery is to be measured in accordance with the relevant requirements of the INP. The INP application notes state that modifying factor adjustments outlined in Fact Sheet C of the NPfI are to be used when assessing certain characteristics of a noise source such as low frequency noise.

Fact sheet C of the NPfI (EPA 2017) provides guidelines for applying modifying factor corrections to account for low frequency noise emissions. The NPfI specifies that a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels identifies the potential for an unbalanced noise spectrum and potential increased annoyance at a residential receiver.

Where a difference of 15 dB or more between site 'C-weighted' and site 'A-weighted' noise emission levels is identified, the one-third octave noise levels recorded should be compared to the threshold values in Table C2 of the NPfI (EPA 2017), which has been reproduced in Table 2.2.

**Table 2.2 One-third octave low frequency noise threshold levels**

| | One-third octave $L_{Zeq,15\ minute}$ threshold levels | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 |

The following modifying factor corrections for low frequency noise are to be applied to the site $L_{Aeq,\ 15\ minute}$ noise contribution where the site 'C-weighted' and site 'A-weighted' noise emission level is 15 dB or more and:

- where any of the one-third octave noise levels in Table 2.2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period; or
- where any of the one-third octave noise levels in Table 2.2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB positive adjustment applies for the daytime period.

Hence, where possible throughout each survey the operator has estimated the difference between site 'C-weighted' and site 'A-weighted' noise emission levels by matching audible sounds with the response of the sound analyser ($L_{Ceq}$-$L_{Aeq}$). Where this was found to be 15 dB or greater, the measured one-third octave frequencies have been compared to the values in Table 2.2 to identify the relevant modifying factor correction (if applicable). This method for the application of modification factors for low frequency noise has been applied to this assessment as presented in Section 4.

It is of note that the NPfI (EPA 2017) states that low frequency noise corrections only apply under the standard or noise-enhancing (i.e. applicable) meteorological conditions.

# 3 Assessment methodology

## 3.1 Attended noise monitoring

To quantify noise emissions from Chain Valley Colliery, 15-minute operator-attended noise monitoring surveys were completed at representative locations, in accordance with the approved NMP.

Noise monitoring locations required as per the NMP, as well as two additional locations (R12 and R13) as per the EPL, and their coordinates are listed in Table 3.1 and are shown in Figure 3.1.

**Table 3.1 Attended noise monitoring locations**

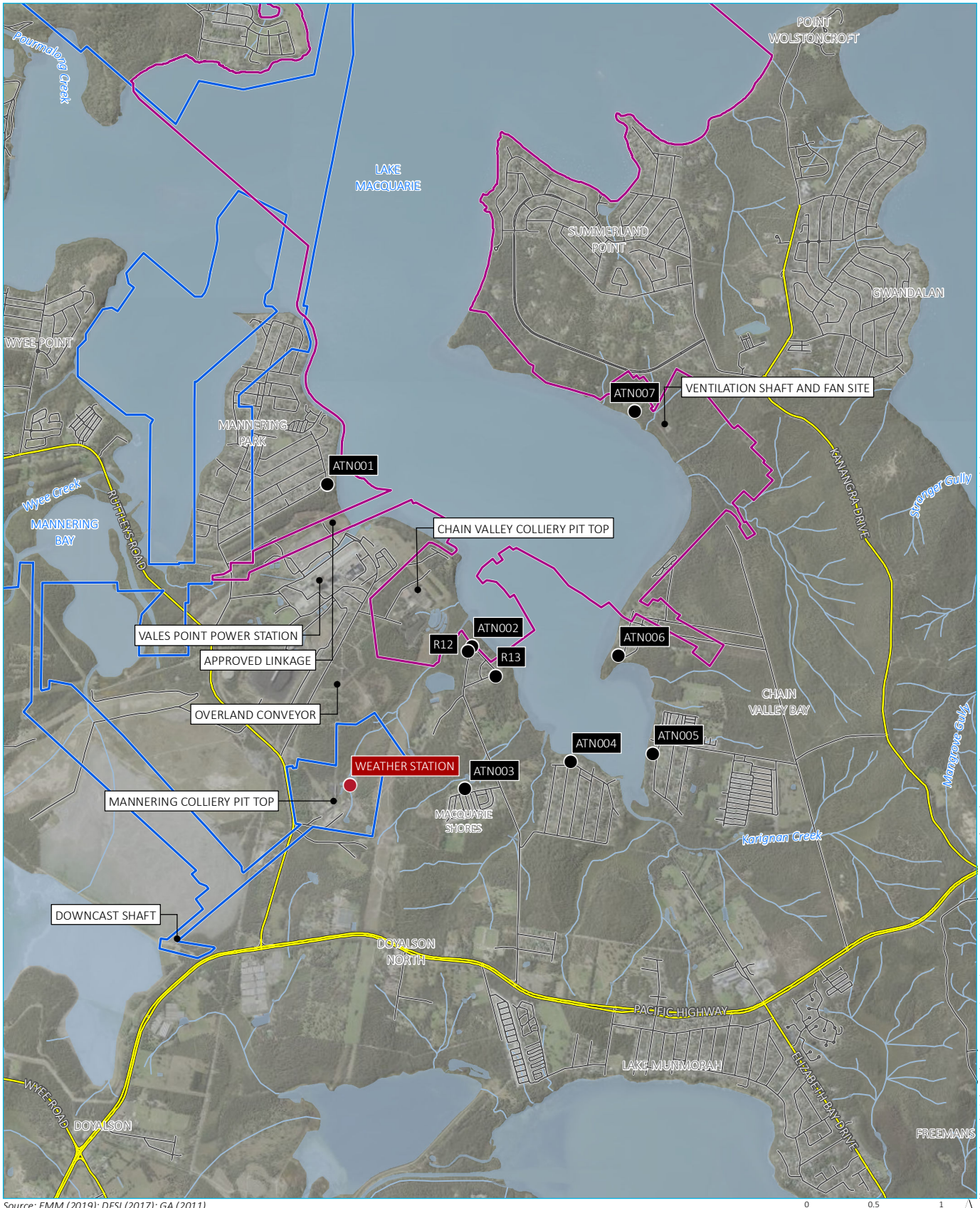
| Monitoring location | Assessment location | Description | Coordinates (MGA56) | |
|---|---|---|---|---|
| | | | Easting | Northing |
| ATN001[1] | R9 | Griffith Street, Mannering Park | 364140 | 6330594 |
| ATN002 | R11 | Lakeshore Avenue, Kingfisher Shores | 365218 | 6329388 |
| ATN003 | R15 | Short Street, Macquarie Shores | 365165 | 6328323 |
| ATN004 | R14 | Lloyd Avenue, Chain Valley Bay | 365949 | 6328530 |
| ATN005 | R17 | Teragalin Drive, Chain Valley Bay | 366560 | 6328590 |
| ATN006 | R19 | Sunset Parade, Chain Valley Bay | 366305 | 6329321 |
| ATN007[2] | R22 | Cams Boulevard, Chain Valley Bay | 366425 | 6331135 |
| R12[3] | R12 | Lakeshore Avenue, Kingfisher Shores | 365185 | 6329352 |
| R13[4] | R13 | Karoola Avenue, Kingfisher Shores | 365391 | 6329169 |

Notes:
1. Noise monitoring at ATN001 (for R9) is also representative of monitoring location R8, however R8 has higher (less stringent) noise limits.
2. Due to access issues, noise monitoring for ATN007 was conducted at an intermediate location with site contributions calculated back to ATN007.
3. Noise monitoring at R12 is conducted as required by the EPL. This is completed in conjunction with ATN002 as the monitoring location is representative of both ATN002 and R12.
4. Noise monitoring at R13 is conducted as required by the EPL.

## 3.2 Instrumentation

Brüel & Kjær (B&K) 2250 and 2270 Type 1 sound analysers (s/n 2759405 and 3027603, respectively) were used to conduct 15-minute attended measurements and record one-third octave frequency and statistical noise indices. The sound analysers were calibrated before and on completion of the survey using a B&K Type 4230 calibrator (s/n 1276091). Instrumentation calibration certificates are provided in Appendix D.

Where possible throughout each survey, the operator has quantified the contribution of site noise and other significant noise sources. This was done by matching audible sounds with the response of the sound analyser (where applicable) and/or via post-analysis of data (e.g. low-pass filtering).




Source: EMM (2019); DFSI (2017); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

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KEY

- Chain Valley Colliery development consent boundary
- Mannering Colliery project approval boundary
- Noise monitoring location
- Weather station
- Main road
- Local road
- Watercourse/drainage line
- Waterbody

Site boundary and noise monitoring locations

Chain Valley Colliery noise monitoring
Figure 3.1

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## 3.3 Determination of stability category

For the purpose of this assessment and as required by the DC, EPL and NMP, stability categories were determined for each 15-min attended monitoring periods. This was completed using the sigma-theta (ST) method as per Appendix E of the INP (EPA 2000). The ST data for the monitoring period was obtained from Mannering Colliery's meteorological station located approximately 1 km to the south of Chain Valley Colliery.

Table E1 of the INP (EPA 2000) is reproduced in Table 3.2 and presents the stability categories and associated ranges in temperature lapse rates.

**Table 3.2 Stability categories and temperature lapse rates**

| Stability category | Temperature lapse rate (ΔT) (°C/100 m) |
|---|---|
| A | $\Delta T < -1.9$ |
| B | $-1.9 \leq \Delta T < -1.7$ |
| C | $-1.7 \leq \Delta T < -1.5$ |
| D | $-1.5 \leq \Delta T < -0.5$ |
| E | $-0.5 \leq \Delta T < 1.5$ |
| F | $1.5 \leq \Delta T < 4.0$ |
| G | $\Delta T \geq 4.0$ |

Source: INP (EPA 2000).

# 4 Review of data and discussion

Results of attended noise measurements are summarised in Table 4.1. Chain Valley Colliery noise contribution was determined for each survey using in-field observations and post-analysis of data as required (e.g. removing higher frequencies that are not mine related i.e. above 630 Hz). Attended noise monitoring was completed on 11 September 2019.

The meteorological data for the monitoring period was sourced from Mannering Colliery's meteorological station to determine applicability of noise limits in accordance with the DC and EPL. In accordance with the DC, noise limits were not applicable during four of the 27 measurements due the presence of an F atmospheric stability category or wind speeds greater than 3m/s at the time of the measurements. In accordance with the EPL, noise limits were not applicable during two of the 27 measurements due to the presence of wind speeds greater than 3m/s at the time of the measurements.

Low frequency noise was conservatively assessed by comparison of the total measured one-third octave $L_{Aeq}$ noise levels to the NPfI one-third octave low frequency noise thresholds. Measured noise levels exceeded the relevant LFN threshold levels during the evening and night-time measurements at ATN007. Therefore, in accordance with the NPfI, a 2 dB positive adjustment was found to be relevant and was applied to estimated site $L_{Aeq,15\ minute}$ noise contributions for these measurements (as shown in Table 4.1).

Monitoring identified that site noise was inaudible during 20 of the 27 measurements. Typically, when a particular source is not audible above local ambient noise levels, the likely contribution of that source is generally at least 10 dB below the measured background ($L_{A90}$) level. Given that site noise was inaudible, site $L_{Aeq,15\ minute}$ noise contributions were likely below the relevant limits at these locations.

At the five monitoring locations where site noise was audible, including ATN002 (evening), ATN003 (evening), ATN007 (day/evening/night), R12 (evening) and R13 (night), Chain Valley Colliery noise contributions were below (satisfied) the relevant noise limits as outlined in the DC and NMP. A technical non-compliance was recorded at ATN007 with respect to the EPL noise limits.

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q3 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN001 | 11/9 | 14:53 (Day) | 43 | 45 | 56 | 51 | 70 | 80 | 68 | Nil | IA | N/A | 35 | N/A | 3.3 m/s @ 76° A class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** Vales Point Power Station (VPPS) noise consistently audible. Bird noise and wind in trees frequently audible. Car passbys and resident noise occasionally audible. |
| ATN001 | 11/9 | 18:00 (Eve.) | 43 | 44 | 56 | 55 | 70 | 78 | 67 | Nil | IA | N/A | 35 | N/A | 0.4 m/s @ 61° C class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise consistently audible. Bird noise frequently audible. Dogs barking and car passbys occasionally audible. |
| ATN001 | 11/9 | 22:00 (Night) | 40 | 42 | 43 | 43 | 45 | 54 | 64 | Nil | IA | IA | 35 | 35 | 0.4 m/s @ 29° F class stability N/Y | 'N/A' / Nil | **Site noise inaudible.** VPPS noise and a nearby air conditioner consistently audible. Distant dog barking frequently audible. Distant traffic and wind in trees occasionally audible. |
| ATN002 | 11/9 | 15:47 (Day) | 36 | 40 | 49 | 52 | 61 | 67 | 62 | Nil | IA | N/A | 49 | N/A | 2.4 m/s @ 78° A class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Residents talking, car passbys and local traffic frequently audible. Dogs barking briefly audible. |
| ATN002 | 11/9 | 19:16 (Eve.) | 38 | 40 | 44 | 44 | 53 | 64 | 65 | Nil | <35 | N/A | 49 | N/A | 0.5 m/s @ 25° C class stability Y/Y | Nil/Nil | **CVC forklift noise audible on one occasion.** VPPS noise, insects and frogs consistently audible. Resident noise, car passbys and local traffic frequently audible. |
| ATN002 | 11/9 | 23:36 (Night) | 41 | 42 | 44 | 45 | 47 | 54 | 66 | Nil | IA | IA | 49 | 54 | 1.2 m/s @ 0° D class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise, insects and frogs consistently audible. Bird noise occasionally audible. Distant dogs barking briefly audible. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q3 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN003 | 11/9 | 15:05 (Day) | 32 | 34 | 42 | 43 | 51 | 67 | 57 | Nil | IA | N/A | 36 | N/A | 3.4 m/s @ 75° A class stability N/N | 'N/A' / 'N/A' | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Wind in foliage, residents talking and local traffic frequently audible. |
| ATN003 | 11/9 | 18:54 (Eve.) | 37 | 38 | 40 | 42 | 44 | 47 | 61 | Nil | <35 | N/A | 36 | N/A | 0.3 m/s @ 56° C class stability Y/Y | Nil/Nil | **CVC forklift noise audible on two occasions.** VPPS noise, insects and frogs consistently audible. Resident noise, distant and local traffic frequently audible. Dogs barking occasionally audible. |
| ATN003 | 11/9 | 23:14 (Night) | 35 | 38 | 42 | 44 | 48 | 52 | 64 | Nil | IA | IA | 36 | 45 | 1.3 m/s @ 3° E class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and insects consistently audible. Bird noise briefly audible. |
| ATN004 | 11/9 | 15:37 (Day) | 32 | 34 | 52 | 55 | 63 | 73 | 63 | Nil | IA | N/A | 35 | N/A | 2.8 m/s @ 81° A class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise consistently audible. Bird noise frequently audible. Car passbys, local traffic and dogs barking occasionally audible. |
| ATN004 | 11/9 | 19:02 (Eve.) | 33 | 35 | 45 | 50 | 56 | 63 | 60 | Nil | IA | N/A | 35 | N/A | 0.3 m/s @ 48° C class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and insects consistently audible. Resident noise, car passbys, local traffic, distant dogs barking and aircraft noise occasionally audible. |
| ATN004 | 11/9 | 23:03 (Night) | 33 | 36 | 39 | 41 | 45 | 50 | 60 | Nil | IA | IA | 35 | 45 | 1.1 m/s @ 4° E class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and insects consistently audible. Bat noise frequently audible. Distant traffic occasionally audible. |
| ATN005 | 11/9 | 16:02 (Day) | 35 | 39 | 43 | 45 | 49 | 59 | 58 | Nil | IA | N/A | 35 | N/A | 2.2 m/s @ 65° A class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Distant traffic, dogs barking, resident noise and wind in trees occasionally audible. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q3 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN005 | 11/9 | 19:26 (Eve.) | 37 | 39 | 41 | 43 | 44 | 62 | 59 | Nil | IA | N/A | 35 | N/A | 0.5 m/s @ 40° B class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise consistently audible. Distant traffic frequently audible. Bird noise and distant dogs barking occasionally audible. |
| ATN005 | 11/9 | 23:27 (Night) | 38 | 41 | 42 | 44 | 45 | 59 | 61 | Nil | IA | IA | 35 | 45 | 1.4 m/s @ 1° E class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and insects consistently audible. Lapping water frequently audible. Bat noise occasionally audible. |
| ATN006 | 11/9 | 16:25 (Day) | 35 | 37 | 53 | 48 | 62 | 81 | 61 | Nil | IA | N/A | 37 | N/A | 2.9 m/s @ 66° B class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Resident noise frequently audible. |
| ATN006 | 11/9 | 19:48 (Eve.) | 37 | 39 | 42 | 43 | 48 | 65 | 61 | Nil | IA | N/A | 37 | N/A | 0.1 m/s @ 150° A class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and insects consistently audible. Bird noise and distant traffic frequently audible. |
| ATN006 | 11/9 | 23:48 (Night) | 36 | 38 | 41 | 42 | 46 | 59 | 60 | Nil | IA | IA | 37 | 45 | 1.0 m/s @ 349° E class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise, running water in nearby drain and insects consistently audible. Bat noise, aircraft noise and distant traffic occasionally audible. |
| ATN007[6] | 11/9 | 17:03 (Day) | 51 | 52 | 53 | 53 | 55 | 63 | 73 | Nil | 43 | N/A | 46 | N/A | 1.3 m/s @ 60° B class stability Y/Y | Nil/Nil | **CVC vent fan noise consistent and dominant.** Bird noise frequently audible. Distant traffic occasionally audible. |
| ATN007[6] | 11/9 | 18:00 (Eve.) | 51 | 52 | 53 | 53 | 54 | 55 | 73 | 2 dB | 45 (43+2) | N/A | 46 | N/A | 0.4 m/s @ 61° C class stability Y/Y | Nil/Nil | **CVC vent fan noise consistent and dominant.** Bird noise and insects frequently audible. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q3 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| ATN007[6] | 11/9 | 22:20 (Night) | 42 | 43 | 44 | 44 | 45 | 52 | 66 | 2 dB | 45 (43+2) | 44 | 46 | 46 | 0.7 m/s @ 10° F class stability N/Y | 'N/A' / Nil | **CVC vent fan noise consistent and dominant.** Distant traffic frequently audible. Bird noise occasionally audible. |
| R12 | 11/9 | 15:47 (Day) | 36 | 40 | 49 | 52 | 61 | 67 | 62 | Nil | IA | N/A | 49 | N/A | 2.4 m/s @ 78° A class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Residents talking, car passbys and local traffic frequently audible. Dogs barking briefly audible. |
| R12 | 11/9 | 19:16 (Eve.) | 38 | 40 | 44 | 44 | 53 | 64 | 65 | Nil | <35 | N/A | 49 | N/A | 0.5 m/s @ 25° C class stability Y/Y | Nil/Nil | **CVC forklift noise audible on one occasion.** VPPS noise, insects and frogs consistently audible. Resident noise, car passbys and local traffic frequently audible. |
| R12 | 11/9 | 23:36 (Night) | 41 | 42 | 44 | 45 | 47 | 54 | 66 | Nil | IA | IA | 49 | 53 | 1.2 m/s @ 0° D class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise, insects and frogs consistently audible. Bird noise occasionally audible. Distant dogs barking briefly audible. |
| R13 | 11/9 | 16:09 (Day) | 35 | 41 | 51 | 54 | 61 | 68 | 58 | Nil | IA | N/A | 43 | N/A | 2.9 m/s @ 61° B class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS noise and bird noise consistently audible. Residents talking, car passbys and local traffic frequently audible. Dogs barking occasionally audible. |
| R13 | 11/9 | 19:35 (Eve.) | 38 | 41 | 43 | 44 | 47 | 51 | 60 | Nil | IA | N/A | 43 | N/A | 0.3 m/s @ 57° B class stability Y/Y | Nil/Nil | **Site noise inaudible.** VPPS consistently audible. Birds, local traffic and other fauna occasionally audible. |

## Table 4.1 Chain Valley Colliery attended noise monitoring results – Q3 2019

| Location | Date | Start time | Total noise levels, dB | | | | | | | Site contributions, dB | | | Noise limits, dB | | Meteorological conditions[3] limits apply (DC/EPL) (Y/N) | Exceedance, dB (DC/EPL) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_{Amin}$ | $L_{A90}$ | $L_{Aeq}$ | $L_{A10}$ | $L_{A1}$ | $L_{Amax}$ | $L_{Ceq}$ | LFN mod. factor[1] | $L_{Aeq}$ | $L_{Amax}$[2] | $L_{Aeq}$ | $L_{Amax}$[2] | | | |
| R13 | 11/9 | 23:55 (Night) | 38 | 40 | 43 | 45 | 47 | 57 | 60 | Nil | <40 | <40 | 43 | 49 | 1.0 m/s @ 346° E class stability Y/Y | Nil/Nil | **CVC bangs audible on one occasion.** VPPS noise consistently audible. Bird noise frequently audible. Distant traffic occasionally audible. |

Notes:
1. Modifying factor correction for low frequency noise in accordance with Fact sheet C of the NPfI (refer to Section 2.2).
2. For assessment purposes the $L_{Amax}$ and the $L_{A1,1\ minute}$ are interchangeable.
3. Meteorological data were taken as an average over 15 minutes from Mannering Colliery's weather station (Refer to Section 5.1).
4. IA = inaudible.
5. N/A = not applicable.
6. Due to access issues, noise monitoring for ATN007 was conducted at intermediate locations. Total noise levels shown were measured at the alternative locations and site contributions were calculated back to ATN007.

# 5 Conclusion

EMM has completed a review of mine noise from Chain Valley Colliery within the surrounding community based on attended measurements conducted on 11 September 2019.

The applicability of noise limits was assessed with reference to Mannering Colliery's meteorological station located to the south of the site. In accordance with the DC, noise limits were not applicable during four of the 27 measurements due the presence of an F atmospheric stability category or wind speeds greater than 3m/s at the time of the measurements. In accordance with the EPL, noise limits were not applicable during two of the 27 measurements due to the presence of wind speeds greater than 3m/s at the time of the measurements.

The assessment of noise contributions from site included consideration of modifying factors for noise characteristics where relevant and in accordance with the INP. Modifying factor adjustments were applicable at ATN007 during the evening and night-time measurements. Therefore, in accordance with the NPfI, a 2 dB positive adjustment was applied to estimated site $L_{Aeq,15\ minute}$ noise contributions for these measurements.

Chain Valley Colliery noise contributions were below (satisfied) the noise limits as outlined in the DC and NMP, where applicable, at all monitoring locations for this round (Q3) of noise monitoring. A technical non-compliance was recorded at ATN007 with respect to the EPL noise limits.

# References

Chain Valley Colliery Noise Management Plan, 2014.

NSW Department of Planning and Environment, Development Consent SSD5465, 2015.

NSW Environment Protection Authority, Environment Protection License 1770, 2019.

NSW Environment Protection Authority, Industrial Noise Policy, 2000.

NSW Environment Protection Authority, Industrial Noise Policy Application notes, 2017.

NSW Environment Protection Authority, Noise Policy for Industry, 2017.

Appendix A

# Glossary of acoustic terms

Several technical terms are discussed in this report. These are explained in Table A.1.

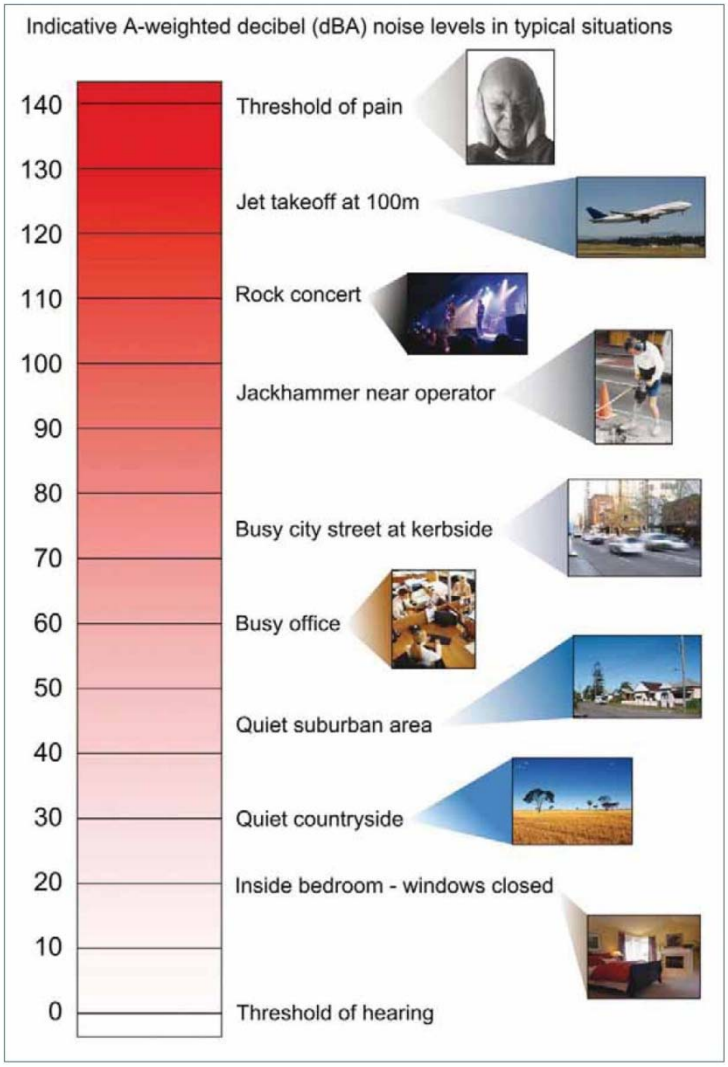
## Table A.1 Glossary of acoustic terms

| Term | Description |
|---|---|
| dB | Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear. |
| $L_{A1}$ | The 'A-weighted' noise level which is exceeded 1% of the time. |
| $L_{A1,1\ minute}$ | The 'A-weighted' noise level exceeded for 1% of the specified time period of 1 minute. |
| $L_{A10}$ | The 'A-weighted' noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise level. |
| $L_{A90}$ | Commonly referred to as the background noise level. The 'A-weighted' noise level exceeded 90% of the time. |
| $L_{Aeq}$ | The energy average noise from a source. This is the equivalent continuous 'A-weighted' sound pressure level over a given period. The $L_{Aeq,15\ minute}$ descriptor refers to an $L_{Aeq}$ noise level measured over a 15-minute period. |
| $L_{Amin}$ | The minimum 'A-weighted' noise level received during a measuring interval. |
| $L_{Amax}$ | The maximum root mean squared 'A-weighted' sound pressure level (or maximum noise level) received during a measuring interval. |
| $L_{Ceq}$ | The equivalent continuous 'C-weighted' sound pressure level over a given period. The $L_{Ceq,15\ minute}$ descriptor refers to an $L_{Ceq}$ noise level measured over a 15 minute period. C-weighting can be used to measure low frequency noise. |
| Day period | Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm. |
| Evening period | Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm. |
| Night period | Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am. |
| Temperature inversion | A meteorological condition where the atmospheric temperature increases with altitude. |

It is useful to have an appreciation of decibels (dB), the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels. Examples of common noise levels are provided in Figure A.1.

## Table A.2 Perceived change in noise

| Change in sound pressure level (dB) | Perceived change in noise in surrounding environment |
|---|---|
| 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 |




Source: *Road Noise Policy (Department of Environment, Climate Change and Water 2011)*

## Figure A.1 Common noise levels

Appendix B

# Project approval extract

4. Prior to 31 March 2014, and every 12 months thereafter, unless the Secretary directs otherwise, the Applicant shall commission a suitably qualified person, whose appointment has been approved by the Secretary, to conduct an Independent Traffic Audit of the development. This audit must:
   (a) be undertaken without prior notice to the Applicant, and in consultation with RMS, NCC, WSC and the CCC;
   (b) assess the impact of the development on the performance and safety of the road network, including a review of:
      - haulage records;
      - accident records on the haulage route, infringements relating to the code of conduct and any incidents involving haulage vehicles;
      - community complaints register; and
   (c) assess the effectiveness of the Road Transport Protocol; and, if necessary, recommend measures to reduce or mitigate any adverse (or potentially adverse) impacts.

5. Within 1 month of receiving the audit report, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the report to the Secretary, with a detailed response to any of the recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report.

   A summary of the audit report must be included in the Annual Review.

**Alternative Coal Transport Options**

6. Prior to 31 December 2014, and every three years thereafter, the Applicant shall prepare and submit to the Secretary for approval, a study of the reasonable and feasible options to reduce or eliminate the use of public roads to transport coal from the development. The assessment must include:
   (a) an analysis of the capital, construction and operating costs of the alternative transport options; and
   (b) quantified social and environmental impacts associated with road and rail transport.

**NOISE**

**Noise Impact Assessment Criteria**

7. The Applicant shall ensure that the noise generated by the development at any residence on privately-owned land does not exceed the criteria for the location in Table 1 nearest to that residence.

*Table 1: Noise Criteria dB(A)*

| ***Location*** | ***Day*** | ***Evening*** | ***Night*** | |
|---|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{A1(1\ min)}$ |
| R8 | 38 | 38 | 38 | 45 |
| R11 | 49 | 49 | 49 | 54 |
| R12 | 49 | 49 | 49 | 53 |
| R13 | 43 | 43 | 43 | 49 |
| R15 | 36 | 36 | 36 | 45 |
| R19 | 37 | 37 | 37 | 45 |
| R22 | 46 | 46 | 46 | 46 |
| all other privately-owned land | 35 | 35 | 35 | 45 |

*Notes:*

- *To interpret the locations referred to in Table 1, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and transport noise generated by the development;

(b) regularly assess the noise monitoring and meteorological data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent;
(c) minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 8);
(d) use its best endeavours to achieve the long-term noise goals in Table 2, where reasonable and feasible, and report on progress towards achieving these goals in each Annual Review;
(e) carry out a comprehensive noise audit of the development in conjunction with each independent environmental audit; and
(f) prepare an action plan to implement any additional reasonable and feasible onsite noise mitigation measures identified by each audit;

to the satisfaction of the Secretary.

*Table 2: Long-term Noise Goals dB(A)*

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ | $L_{Aeq(15\ min)}$ |
| R11 – R13 | 41 | 41 | 41 |
| R22 | 40 | 40 | 40 |

*Notes:*

- *To interpret the locations referred to in Table 2, see Appendix 6 and the EIS; and*
- *Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy. Appendix 8 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.*

**Noise Management Plan**

9. The Applicant shall prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:
(a) be prepared in consultation with the EPA and submitted to the Secretary for approval within 4 months of the date of this consent, unless otherwise agreed by the Secretary;
(b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;
(c) describe the proposed noise management system in detail including the mitigation measures that would be implemented to minimise noise during construction and operations, including on and off site road noise generated by vehicles associated with the development; and
(d) include a monitoring program that:
- uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
- evaluates and reports on:
  - the effectiveness of the on-site noise management system; and
  - compliance against the noise operating conditions; and
- defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

The Applicant shall implement the approved management plan as approved from time to time by the Secretary.

**AIR QUALITY**

**Odour**

10. The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.

**Air Quality Criteria**

11. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedance of the criteria listed in Tables 3, 4 and 5 at any residence on privately-owned land.

*Table 3: Long-term criteria for particulate matter*

| Pollutant | Averaging period | [d] Criterion |
|---|---|---|
| Total suspended particulate (TSP) matter | Annual | [a] 90 µg/m$^3$ |
| Particulate matter < 10 µm ($PM_{10}$) | Annual | [a] 30 µg/m$^3$ |

**APPENDIX 8**
**NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 1 of the conditions are to apply under all meteorological conditions except the following:
   (a) during periods of rain or hail;
   (b) average wind speed at microphone height exceeds 5 m/s;
   (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
   (d) temperature inversion conditions greater than 3°C/100 m.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station described in condition 15 of schedule 3.

**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 4 times in each calendar year (ie at least once every 3 months), 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.

Appendix C

# EPL extract

## L4 Waste

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 exemption under Clause 92 of the Protection of the Environment Operations (Waste) Regulation 2014. | As specified in each particular resource recovery exemption | NA |

## L5 Noise limits

L5.1 Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.

**POINT 12**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 49 |
| Evening | Evening-LAeq (15 minute) | - | 49 |
| Night | Night-LAeq (15 minute) | - | 49 |
| Night | Night-LA1 (1 minute) | - | 54 |

**POINT 13**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 49 |
| Evening | Evening-LAeq (15 minute) | - | 49 |
| Night | Night-LAeq (15 minute) | - | 49 |
| Night | Night-LA1 (1 minute) | - | 53 |

**POINT 14**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 43 |
| Evening | Evening-LAeq (15 minute) | - | 43 |
| Night | Night-LAeq (15 minute) | - | 43 |
| Night | Night-LA1 (1 minute) | - | 49 |

**POINT 16**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 36 |
| Evening | Evening-LAeq (15 minute) | - | 36 |
| Night | Night-LAeq (15 minute) | - | 36 |
| Night | Night-LA1 (1 minute) | - | 45 |

**POINT 20**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 37 |
| Evening | Evening-LAeq (15 minute) | - | 37 |
| Night | Night-LAeq (15 minute) | - | 37 |
| Night | Night-LA1 (1 minute) | - | 45 |

# Environment Protection Licence



**POINT 23**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 46 |
| Evening | Evening-LAeq (15 minute) | - | 46 |
| Night | Night-LAeq (15 minute) | - | 36 |
| Night | Night-LA1 (1 minute) | - | 45 |

**POINT 9**

| Time period | Measurement parameter | Measurement frequency | Noise level dB(A) |
|---|---|---|---|
| Day | Day-LAeq (15 minute) | - | 38 |
| Evening | Evening-LAeq (15 minute) | - | 38 |
| Night | Night-LAeq (15 minute) | - | 38 |
| Night | Night-LA1 (1 minute) | - | 45 |

L5.2 The licensee must ensure that noise generated on the premises does not exceed:

a) 35 LAeq(15min) during the day, evening or night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1; and
b) 45 LA1(1min) during the night at any privately owned land nearest to the residence apart from those receivers identified in Condition 5.1.

Note: The licensee may provide to the EPA written evidence of any agreement with a landholder which is subject to the above noise limits. The written evidence may be submitted with a licence variation to remove the landholder from the above tables.

L5.3 For the purpose of condition L5.1 and condition L5.2:
(a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays;
(b) Evening is defined as the period 6pm to 10pm, and
(c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

L5.4 The noise limits set out in condition L5.1 and condition L5.2 apply under all meterorological conditions except for any one of the following:
(a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
(b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
(c) Stability category G temperature inversion conditions.

L5.5 For the purpose of condition L5.4:
(a) the meteorological data to be used for determining meteorological conditions is the data recorded at the meteorological station identified in this licence as EPA Identification Point 26.
(b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the *NSW industrial Noise Policy* (EPA 2000)

Note: The weather station must be designed, commissioned and operated in a manner to obtain the necessary parameters required under the above condition.

L5.6 For the purpose of determining the noise generated at the premises the licensee must use a Class 1 or Class 2 noise monitoring device as defined by AS IEC61672.1 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing.

L5.7 To determine compliance:

1. With the $L_{Aeq(15\ min)}$ noise limits in condition L5.1 and condition L5.2, the licensee must locate noise monitoring equipment;

(a) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more then 30 metres from the property boundary that is closest to the premises;

(b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises, or, where applicable,

(c) within approximately 50 metres if the boundary of a national park or nature reserve.

2. With the LA1(1 minute) noise limits in condition L5.1 and L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade.

3. With the noise limits in condition L5.1 and condition L5.2, the noise monitoring equipment must be located;

(a) at the most affected point at a location where there is no dwelling at the location, or

(b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).

L5.8 A non-compliance of condition L5.1 or condition L5.2 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 L5.7 1(a) and L5.7 1(b), and /or
b) at a point other than the most affected point at a location.

L5.9 For the purposes 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.

# 4 Operating Conditions

Appendix D

# Calibration certificates

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO:** 24152

**EQUIPMENT TESTED:** Sound Level Calibrator

**Manufacturer:** B & K
**Type No:** 4230 **Serial No:** 1276091
**Owner:** EMM Consulting
Level 1, 146 Hunter Street
Newcastle, NSW 2300

**Tests Performed:** Measured output pressure level was found to be:

| Parameter | Pre-Adj | Adj Y/N | Output: (db re 20 µPa) | Frequency: (Hz) | THD&N (%) |
|---|---|---|---|---|---|
| **Level 1:** | NA | N | 93.81 | 989.84 | 1.58 |
| **Level 2:** | NA | N | NA | NA | NA |
| **Uncertainty:** | | | ±0.11 dB | ±0.05% | ±0.20 % |
| Uncertainty (at 95% c.l.) k=2 | | | | | |

**CONDITION OF TEST:**
**Ambient Pressure:** 1004 hPa ±1.5 hPa **Relative Humidity:** 47% ±5%
**Temperature:** 20 °C ±2° C
**Date of Calibration:** 14/02/2019 **Issue Date:** 15/02/2019
**Acu-Vib Test Procedure:** AVP02 (Calibrators)
**Test Method: AS IEC 60942 - 2017**
**CHECKED BY:** ..... **AUTHORISED SIGNATURE:** .....
Jack Kielt

.Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.
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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The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA

DANAK
CAL Reg.No. 307
Member of EA MLA

# CERTIFICATE OF CALIBRATION

No: CDK1902917



## CALIBRATION OF

| | | | |
|---|---|---|---|
| Sound Level Meter: | Brüel & Kjær Type 2270 | No: 3027603 | Id: - |
| Microphone: | Brüel & Kjær Type 4189 | No: 3195772 | |
| Preamplifier: | Brüel & Kjær Type ZC-0032 | No: 28589 | |
| Supplied Calibrator: | None | | |
| Software version: | BZ7222 Version 4.7.5 | Pattern Approval: | PTB1.63-4093056 / 1.63-4093058 |
| Instruction manual: | BE1712-22 | | |

## CUSTOMER

EMM Consulting
Suite 1, Level 10, 87 Wickham Terrace
4000 Spring Hill
Queensland, Australia

## CALIBRATION CONDITIONS

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

Environment conditions: *See actual values in **Environmental conditions** sections.*

## SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2270 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 8.0 - DB: 7.30) by using procedure B&K proc 2270, 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: 2019-04-12

Date of issue: 2019-04-12

Susanne Jørgensen
Calibration Technician

M. Önder
Approved Signatory

# CERTIFICATE OF CALIBRATION

**CERTIFICATE NO.:** **SLM 22129 & FILT 4384**

| | | | |
|---|---|---|---|
| **Equipment Description:** | Sound Level Meter | | |
| **Manufacturer:** | B & K | | |
| **Model No:** | 2250 | **Serial No:** | 2759405 |
| **Microphone Type:** | 4189 | **Serial No:** | 2888134 |
| **Filter Type:** | 1/3 Octave | **Serial No:** | 2759405 |
| **Comments:** | All tests passed for class 1.<br>(See over for details) | | |
| **Owner:** | EMGA Mitchell Mclennan<br>Ground Floor, Suite 01, 20 Chandos St<br>St Leonards NSW 2065 | | |
| **Ambient Pressure:** | 1008 hPa ±1.5 hPa | | |
| **Temperature:** | 25 °C ±2° C | **Relative Humidity:** | 48% ±5% |
| **Date of Calibration:** | 07/02/2018 | **Issue Date:** | 09/02/2018 |

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

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

Jack Kitt

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

NATA
ACCREDITATION

Accredited Lab. No. 9262
Acoustic and Vibration Measurements

ACU-VIB
ELECTRONICS

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