# Ardmore Park Quarry – Acoustic Report

## CEAL Limited

## 5152 Oallen Ford Road, Bungonia, NSW, 2580

20180 Multiquip Aggregates Acoustic Report

8 September 2020

Version: Final

# Ardmore Park Quarry – Acoustic Report

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# TABLE OF CONTENTS



## TABLES



## FIGURES

# 1 INTRODUCTION

Pulse Acoustic Consultancy Pty Ltd (Pulse Acoustics) was engaged to undertake a noise compliance assessment of the Ardmore Park Quarry and Bungonia bypass road located in Bungonia, NSW. Ardmore Park Quarry and its associated Project Approval 07_0155 (Mod 2) and EPL 13213 are currently owned by CEAL Limited, trading as Multiquip Quarries.

The quarry compliance assessment took place on the morning of 25 August 2020. The measurements were taken during a temperature inversion in order to measure a worst case scenario for the nearby residential receptors. The assessment measures sand extraction and processing, rock crushing and earthmoving activities being undertaken. As part of the assessment, attended noise monitoring was conducted in the vicinity of residential receivers surrounding the Ardmore Park Quarry.

Noise compliance of truck movements along the Bungonia bypass road was also investigated with attended monitoring. The noise impacts of the quarry facility and bypass road were assessed against the noise limits identified in the Notice of Modification for Ardmore Park Quarry and the Environment Protection Licence.

Road traffic noise contributions from quarry trucks were measured at the closest residential dwelling to Jerrara Road.

This report contains a status of compliance with the noise criteria during the attended measurements that were conducted. A glossary of the terminology utilised within this report has been provided in Appendix A.

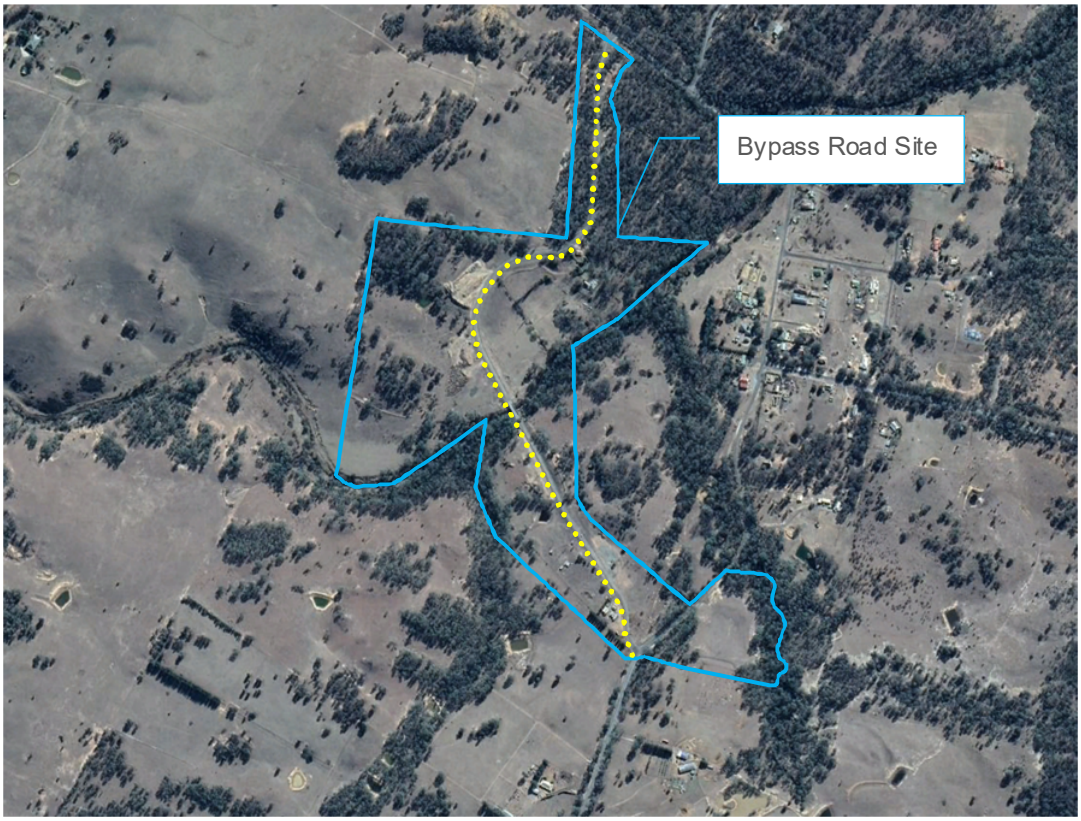
## 2 SITE IDENTIFICATION

This report considers two sites, the Ardmore Park Quarry in which extractive industries occur, and the Bungonia bypass road in which vehicles travelling to and from site can travel around the village of Bungonia.

The Ardmore Park Quarry is located on Lot 24 in DP 1001312, 5152 Oallen Ford Road, Bungonia. The quarry site location is shown in Figure 2-1. The location of the bypass road around the village of Bungonia is located approximately 4km to the north of the quarry, as shown in Figure 2-2.

**Figure 2-1 Ardmore Park Quarry Location**

**Figure 2-2 Bungonia Bypass Road Location**



# 3 NEAREST SENSITIVE RECEPTORS

As outlined in Environment Protection Licence 13213, receivers are located around the Ardmore Park Quarry and the Bungonia bypass road. Details on the considered receptors around the quarry are contained in section 3.1, while the list of receivers around the bypass road is shown in section 3.2.

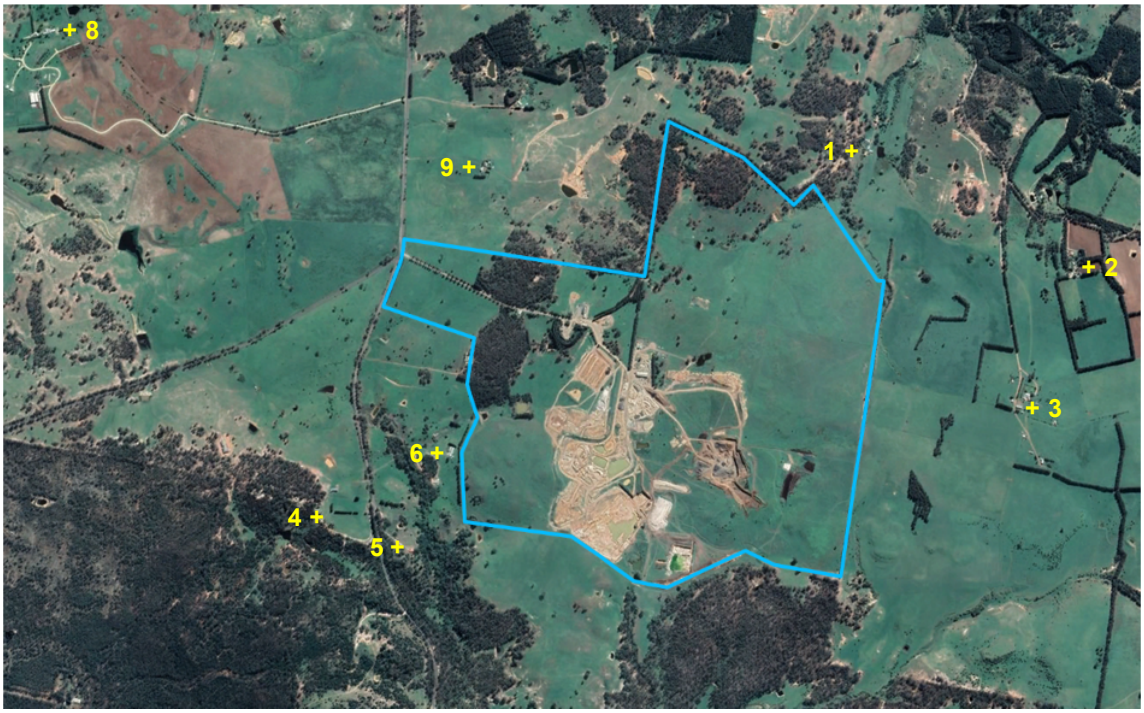
## 3.1 Nearest Receivers – Quarry Operations

The closest receivers to the quarry site are listed in Table 3-1, with their locations shown in Figure 3-1. These receptors are identified in section L3 of the Environment Protection Licence 13213.

**Table 3-1 Nearest Potentially Affected Receivers – Quarry Operations Table**

| Receptor ID | Address | Lot and DP | Type of Receiver |
|---|---|---|---|
| 1 | "Reevesdale" 346 Inverary Road, Bungonia | Lot 1 in DP 1012650 | Residential |
| 2 | "Inverary" 590 Inverary Road, Bungonia | Lot 2 in DP 1095479 | Residential |
| 3 | "Inverary Park" 40 Broadhead Lane, Bungonia | Lot 2 in DP 84966 | Residential |
| 4 | "Damar Lodge" 5025 Oallen Ford, Bungonia | Lot 5 in DP 865000 | Residential |
| 5 | "The Osiers" 5028 Oallen Ford, Bungonia | Lot 2 in DP 852175 | Residential |
| 6 | "Lochmoor Lodge" 5046 Oallen Ford, Bungonia | Lot 21 in DP 1001312 | Residential |
| 8 | "Lumley Park" 5223 Oallen Ford Road, Bungonia | Lot 2 in DP 735523 | Residential |
| 9 | The primary private residence at 5194 Oallen Ford, Bungonia | Lot 2 in DP 846549 | Residential |

**Figure 3-1 Nearest Affected Operational Receivers – Quarry Operations Satellite**



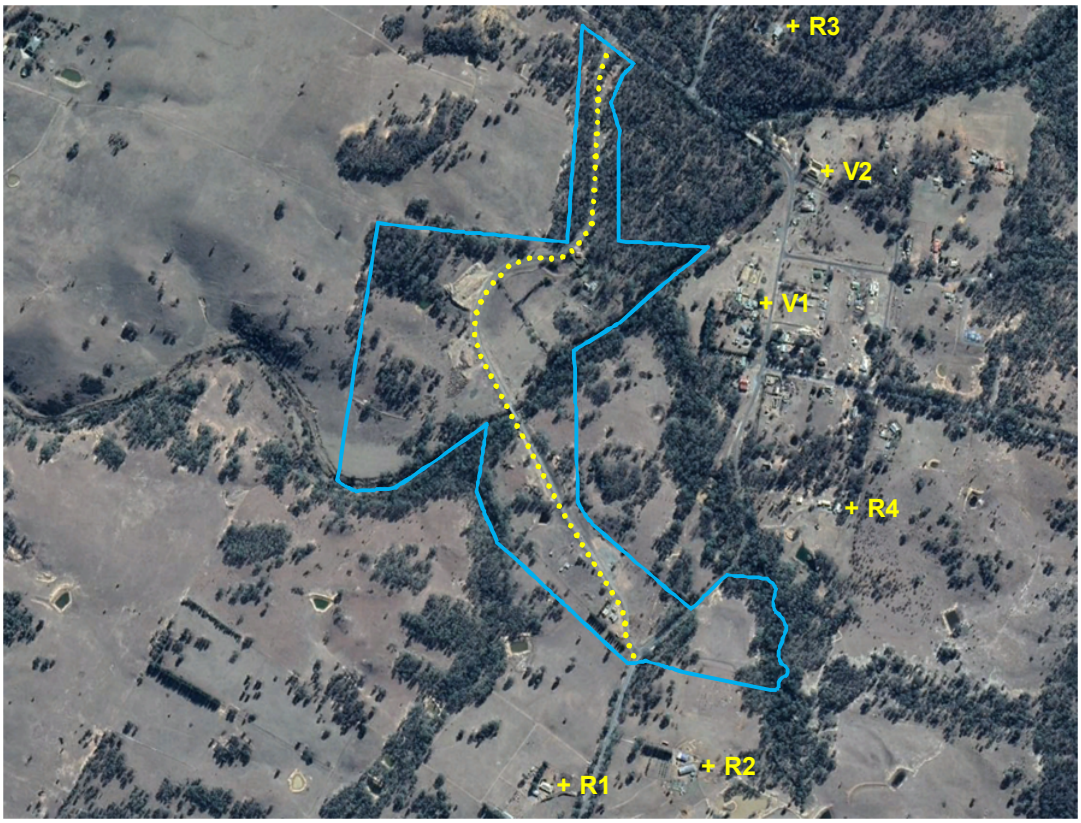
## 3.2 Nearest Receivers – Bungonia Bypass Road

The nearest sensitive receptors to the Bungonia bypass road are listed in Table 3-2, with their positions shown in Figure 3-1. The receptors are identified as the potentially most impacted by the bypass road in the Environment Protection Licence 13213.

**Table 3-2 Nearest Potentially Affected Receivers – Bungonia Bypass Table**

| Receptor ID | Address | Lot and DP | Type of Receiver |
|---|---|---|---|
| R1 | 5477 Oallen Ford Road, Bungonia | Lot 3 in DP 735523 | Residential |
| R2 | 5492 Oallen Ford Road, Bungonia | Lot 1 in DP 264643 | Residential |
| R3 | 1455 Jerrara Road, Bungonia | Lot 146 in DP 750022 | Residential |
| R4 | 5544 Oallen Ford, Bungonia | Lot 112 in DP 750007 | Residential |
| V1 | 28-30 King Street, Bungonia | Lot 8 in DP 758184 | Residential |
| V2 | 1 Eliza Champion Street, Bungonia | Lot 1 in DP 758184 | Residential |

**Figure 3-2 Nearest Affected Road Traffic Receivers – Bungonia Bypass Satellite**



# 4 ACOUSTIC CRITERIA

The acoustic criteria for the quarry and bypass road are contained in Table 4-1 below.

**Table 4-1 Noise Assessment Criteria – Nearest Potentially Affected Receivers**

| Receptor ID | Address | Day $L_{Aeq(15\ minutes)}$ | Evening $L_{Aeq(15\ minutes)}$ | Night $L_{Aeq(15\ minutes)}$ | Night $L_{A1(1\ min)}$ |
|---|---|---|---|---|---|
| **Residence 1** | "Reevesdale" 346 Inverary Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 2** | "Inverary" 590 Inverary Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 3** | "Inverary Park" 40 Broadhead Lane, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 4** | "Damar Lodge" 5025 Oallen Ford Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 5** | "The Osiers" 5028 Oallen Ford Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 6** | "Lochmoor Lodge" 5046 Oallen Ford Road, Bungonia | 36 | 35 | 35 | 45 |
| **Residence 8** | "Lumley Park" 5224 Oallen Ford Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence 9** | The primary private residence at 5194 Oallen Ford Road, Bungonia | 36 | 35 | 35 | 45 |
| **Residence R1** | 5477 Oallen Ford Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence R2** | 5492 Oallen Ford Road, Bungonia | 35 | 35 | 35 | 45 |
| **Residence R3** | 1455 Jerrara Road, Bungonia | 36 | 35 | 35 | 45 |
| **Residence R4** | 5544 Oallen Ford, Bungonia | 35 | 35 | 35 | 45 |
| **Residence V1** | 28-30 King Street, Bungonia | 38 | 35 | 35 | 45 |
| **Residence V2** | 1 Eliza Champion Street, Bungonia | 36 | 35 | 35 | 45 |

It is noted that from Table 4-1 above, criteria for residences 1-6 and 8-9 refer to noise from the quarry itself. Criteria for residences R1-R4 and V1-V2 refer to noise from the Bungonia bypass road. Given the Mod 2 approval, and the Environment Protection Licence, the following noise limits are recommended for road traffic noise from selected public roads.

**Table 4-2 Road Noise Criteria**

| Receptor ID | $L_{Aeq(15\ minutes)}$ |
|---|---|
| Oallen Ford Road | 55 |
| Mountain Ash Road | 55 |
| Jerrara Road | 55 |
| Tarago Road | 55 |
| Windellama Road | 55 |

# 5 NOISE MONITORING

Noise compliance monitoring was carried out using attended noise measurements in the vicinity of the residential receptors surrounding the quarry, bypass road and Jerrara Road. Attended noise measurements were selected as the assessment method, as being present during the measurements enabled the most accurate way to quantify noise emissions from the subject site. In particular, it was aimed to quantify site noise and separate out background noise sources such as birds and general road traffic noise.

Measurements were conducted on the morning of 25 August 2020. This day was selected in particular as a strong temperature inversion took place during the earliest measurements from 7am to 8:30am. The measurements therefore represent a worst case scenario that occasionally occurs during winter months.

During the measurements, the quarry was fully operational including sand extraction and processing, rock crushing and earthmoving activities. Wind conditions were below 5m/s throughout measurements from the Ardmore Park site. Details of the methodology and measured noise results have been detailed below.

## 5.1 Instrumentation

Instrumentation for the survey comprised of a Brüel & Kjær Type 2250 sound level meter. Calibration of the meter was checked prior to and following measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. The microphone was positioned between 1.2 m and 1.5 m above ground level and was fitted with a windsock.

## 5.2 Attended Noise Measurements – Quarry Site

Attended measurements from the Ardmore Park Quarry were taken in the vicinity of the potentially most impacted receivers, as shown in Figure 5-1. During the measurements, the site was operational with sand extraction and processing, rock crushing and earthmoving activities being undertaken. Earthmoving activities included road maintenance and the removal of overburden within the southern sand extraction area. The sand activities peak up to 3000 T/day.

Equipment that was operational on site during the attended measurements is listed below

- CDE M4500 Sand Wash Plant x 1
- Precision screen stacker x 1
- 40T Dump Trucks x 6
- 46T Excavator x 1
- 45T Excavator x 1
- D85 Bulldozer
- Komatsu WA480 Front End Loader x 2
- Sandvik mechanical screen x 2
- Tesab Jaw Crusher
- Kleeman Impact Crusher

- 15000L Water Truck
- Fuel Truck
- Kenworth 610 Trucks x 2
- 500 Kva Diesel Generator

### 5.2.1 Measurement Results

Table 5-1 presents the results of the conducted quarry site measurements. The table displays the $L_{eq}$, $L_{90}$, $L_{10}$ and $L_1$ levels from the conducted noise measurements. These descriptors refer to the noise levels of all noise sources including birds, road traffic and wind through trees as well as site noise.

Additionally, each noise measurement includes the "Estimated $L_{Aeq}$ Site at monitoring point". This descriptor refers to the equivalent $L_{Aeq}$ continuous sound level of the quarry sources alone, excluding the background noise sources such as birds, road traffic and insects. As per section 7 of the Noise Policy for Industry, "a noise limit applies to the noise from a particular development/activity and not to general ambient noise". The "Estimated $L_{Aeq}$ Site at monitoring point" is therefore used to determine compliance with the site criteria. The site $L_{Aeq}$ is calculated using the numerical results of the total measurements, and observations during the 15 minute periods, both when site noise is audible and site noise is not audible. The estimated $L_{Aeq}$ level from the site must be equal to, or less than the total measured $L_{Aeq}$ noise level. More details can be found in the acoustic glossary in Appendix A.

### 5.2.2 Measurement Locations

The first six measurements were conducted at the residential receptor at 40 Broadhead Lane (receiver 3). The seventh measurement was made at the boundary with 5046 Oallen Ford Road (receiver 6).

For the two noise measurement locations, the attended measurements are made at either the receiver in question, or closer to the site activities, providing a conservative assessment.

**Figure 5-1 Attended Measurement Locations**


**Table 5-1 Operational Attended Noise Measurements, dB(A)**

| Location | Measured Noise Level dBA (15minutes) $L_{eq}$ | $L_{90}$ | $L_{10}$ | $L_1$ | Comments |
|---|---|---|---|---|---|
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>7:16 | 42 | 38 | 44 | 49 | Background noise consisted of chirping birds, calling crows, magpie songs and occasional cows mooing.<br><br>0:01 Steady state pump throughout measurement < 39 dB(A)<br>4:11 Excavator bump < 42 dB(A)<br>12:20 Horn brief < 42 dB(A)<br>12:40 Excavator revving < 44 dB(A)<br>14:06 Truck revving up hill < 48 dB(A)<br>14:28 Excavator bucket bang < 42 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 39 dB(A) |

| | | | | | |
|---|---|---|---|---|---|
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>7:34 | 43 | 40 | 44 | 47 | Background noise was provided by bird chirps, crows, magpie songs and occasional roosters and cows. A very close magpie at 9:14 (<57 dBA) lifted the overall LAeq of the measurement.<br><br>0:01 Steady state pump throughout measurement < 39 dB(A)<br>4:57 Excavator bucket bang < 43 dB(A)<br>5:20 Excavator bucket bang < 42 dB(A)<br>7:45 Rock crushing activities begin, steady state noise <40 dB(A)<br>8:15 Excavator bucket bang < 45 dB(A)<br>8:34 Reverse alarm broadband < 43 dB(A)<br>12:05 Excavator rev < 43 dB(A)<br>12:20 Excavator bucket bang < 43 dB(A)<br>13:05 Excavator bang < 44 dB(A)<br>14:04 Horn < 40 dB(A)<br>14:40 Truck drive < 40 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 40 dB(A) |
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>7:52 | 44 | 40 | 45 | 50 | Background noise was provided by bird chirps, crows, magpie songs and occasional roosters. A crow flew close by at 2:42 (<55 dBA) lifting the overall LAeq of the measurement.<br><br>0:01 Steady state pump and rock crushing throughout measurement < 40 dB(A)<br>3:10 Excavator bang x 3 < 45 dB(A)<br>4:14 Crushing sound < 45 dB(A)<br>5:40 Banging x 3 < 46 dB(A)<br>12:10 Reverse alarm < 40 dB(A)<br>13:14 Slight tick down in pump and rock crushing noise < 39 dB(A)<br>13:49 Reverse broadband < 42 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 40 dB(A) |

| | | | | | |
|---|---|---|---|---|---|
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>8:10 | 37 | 33 | 40 | 44 | Background noise environment consisted of bird chirping, close birds, crows, magpies and the occasional vehicle from Oallen Ford Road.<br><br>0:01 Steady state pump and rock crushing throughout measurement < 38 dB(A)<br>1:02 Excavator bang < 37 dB(A)<br>1:43 Slight tick down in pump and rock crushing noise < 37 dB(A)<br>3:12 Bucket bang < 37 dB(A)<br>4:25 Truck rev < 42 dB(A)<br>5:10 Noticeable drop off in pump and rock crushing noise < 34 dB(A)<br>5:25 Crush sound < 38 dB(A)<br>8:00 Banging noise x 2<br>8:15 Screw/pneumatic type noise < 39 dB(A)<br>12:00 Crush noise <38 dB(A)<br>12:10 Continual drop off in pump and rock crushing noise < 31 dB(A)<br>14:25 Bucket bang < 34 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 34 dB(A) |
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>8:34 | 35 | 29 | 38 | 46 | Background noise environment consisted of bird chirping, close birds, crows, magpies and the occasional vehicle from Oallen Ford Road.<br><br>0:01 Steady state pump and rock crushing throughout measurement < 29 dB(A)<br>0:50 Shed opening < 42 dB(A)<br>2;14 Shed banging < 37 dB(A)<br>2:51 Shed bang <37 dB(A)<br>3:50 Excavator bucket bang < 30 dB(A)<br>4:34 Bang excavator < 31 dB(A)<br>5:25 2 x bucket bangs < 31 dB(A)<br>5:35 2 x bucket bangs < 44 dB(A)<br>10:35 Excavator revving < 31 dB(A)<br>11:45 Bucket bang x 2 < 38 dB(A)<br>13:05 Bucket bang < 34 dB(A)<br>12:00 Crush noise <38 dB(A)<br>13:10 Pump and rock crushing noise levelled out < 28 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 29 dB(A) |

| | | | | | |
|---|---|---|---|---|---|
| Measurement Location 3<br>Tuesday<br>25/8/2020<br>8:53 | 33 | 29 | 35 | 41 | Background noise environment consisted of bird chirping, crows, occasional light wind gust and the occasional vehicle from Oallen Ford Road.<br><br>0:01 Steady state pump and rock crushing throughout measurement < 28 dB(A)<br>1:05 Excavator revving < 31 dB(A)<br>2;10 Bucket bang < 30 dB(A)<br>5:35 Excavator bang <31 dB(A)<br>12:10 Bucket bang < 28 dB(A)<br>13:50 Excavator rev < 27 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 28 dB(A) |
| Measurement Location 6<br>Tuesday<br>25/8/2020<br>9:31 | 34 | 29 | 36 | 43 | Background noise environment consisted of constant bird chirping, cockatoos, magpies, sheep, light winds through distant trees, magpie songs and vehicle pass bys on Oallen Ford Road.<br><br>0:01 Steady state pump and rock crushing throughout measurement < 27 dB(A)<br>3:10 Truck revving < 28 dB(A)<br>7:11 Excavator bang < 28 dB(A)<br>12:55 Truck driving <32 dB(A)<br>14:15 Excavator bang < 30 dB(A)<br>14:20 Excavator bang < 32 dB(A)<br><br>Estimated $L_{Aeq}$ Site at monitoring point < 28 dB(A) |

### 5.2.3 Comments on Quarry Measurements

Table 5-2 presents a summary of the estimated site contributions at the two noise measurement points. Site activities including sand washing (including pump operations), rock crushing and truck loading were relatively consistent throughout the measurements, although rock crushing did not commence until 7:50am. The dramatic decline in noise levels after 8:30am was principally due to a temperature inversion lifting and did not reflect changes in site activity.

It is shown in Table 5-2 that after the temperature inversion lifted, compliance with the project criteria was easily achieved. Given the quarries location and daytime operating hours, a temperature inversion of this magnitude would occur infrequently throughout the year. Pulse Acoustics is of the opinion that under the current conditions of consent, an exceedance of the noise criteria caused by such an unusual environmental event is not unreasonable.

Additionally, it is understood that updated conditions of consent are imminent for the quarry and will begin in the next few weeks. The incoming daytime noise criteria will be raised to 40 dB(A) and require compliance with the limits when temperature inversions are occurring. The measured results on site during the temperature inversion are within the incoming noise limits.

**Table 5-2 Summary – Operator Attended Noise Measurements**

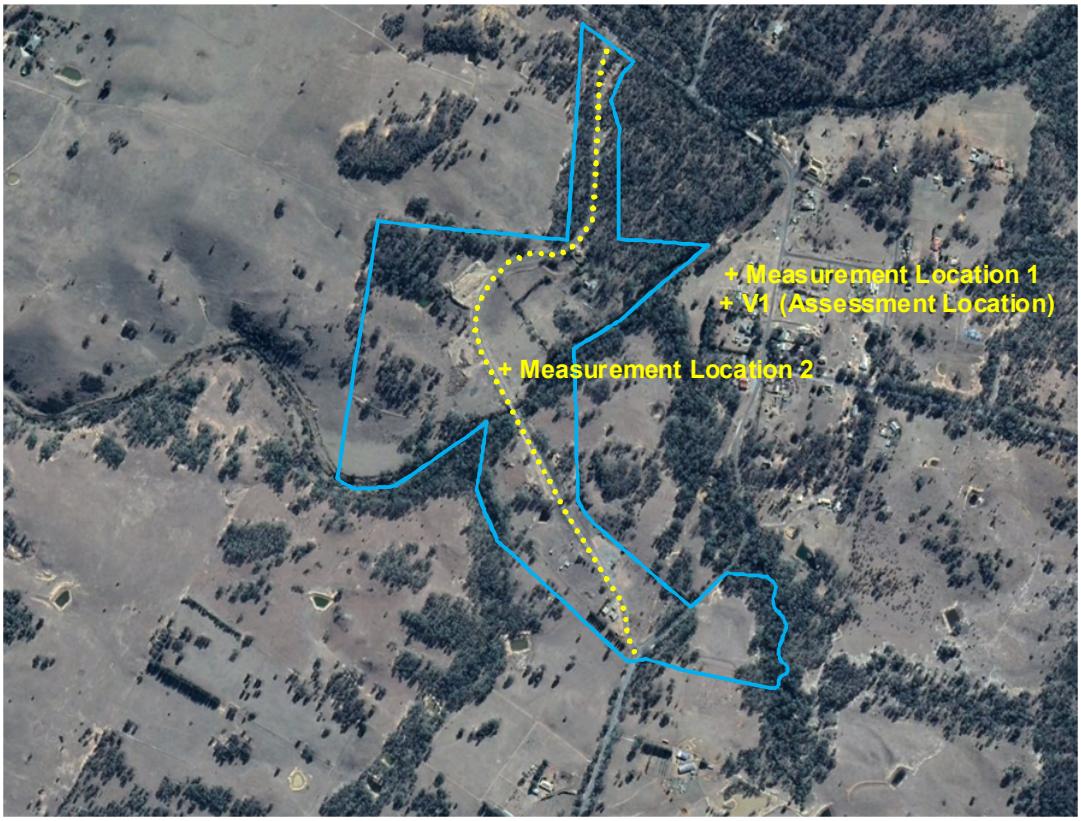
| Date | Time | Measurement Location | Criteria | Estimated $L_{Aeq}$ Site | Complies |
|---|---|---|---|---|---|
| 25/8/20 | 7:16 | 3 | 35 | < 39 dB(A) | Inversion |
| 25/8/20 | 7:34 | 3 | 35 | < 40 dB(A) | Inversion |
| 25/8/20 | 7:52 | 3 | 35 | < 40 dB(A) | Inversion |
| 25/8/20 | 8:10 | 3 | 35 | < 34 dB(A) | Yes |
| 25/8/20 | 8:34 | 3 | 35 | < 29 dB(A) | Yes |
| 25/8/20 | 8:53 | 3 | 35 | < 28 dB(A) | Yes |
| 25/8/20 | 9:31 | 6 | 36 | < 28 dB(A) | Yes |

## 5.3 Attended Measurements – Bypass Road

Four attended measurements of road traffic noise were taken in the vicinity of the Bungonia bypass road. The first two measurements were taken at measurement location 1, while the second two measurements were taken at measurement location 2. Measurement location 1 allowed an easy comparison of noise levels with the residential receiver at 28-30 King Street. However at this location, the ambient noise levels were relatively high and it was difficult to gauge a noise contribution from the trucks along the bypass. The next two measurements took place along side the bypass, which made it easier to obtain the noise contributions from trucks along the bypass. Measured noise levels from location 2 were then back calculated to the assessment point, the closest residential receptor to the Bungonia bypass road, 28-30 King Street (Receiver V1).

Measurements at Location 1 are presented in Table 5-3, while measurements at Location 2 are shown in Table 5-4. The location of the measurement points and assessment location are shown in Figure 5-2.

**Figure 5-2 Bypass Road Measurement and Assessment Locations**




The first and third measurement period consisted of one truck pass by each, while the second and fourth periods featured two vehicle movements.

Table 5-4 summarises the estimated site contributions of the four bypass road noise measurements. The estimated $L_{Aeq}$ noise contributions from Multiquip traffic using the bypass road at 28-30 King Street was found to comply with the project criteria at the closest receptor.

**Table 5-3 Summary Road Traffic Attended Measurements – Measurement Location 1**

| Date | Time | No of truck pass bys | Site noise LAeq at measurement point | Assessment point criteria | Estimated $L_{Aeq}$ assessment point | Complies |
|---|---|---|---|---|---|---|
| 25/8/20 | 10:30-10:45 | 1 | < 25 dB (A) | 38 | < 25 dB(A) | Yes |
| 25/8/20 | 10:46-11:01 | 2 | < 29 dB(A) | 38 | < 29 dB(A) | Yes |

**Table 5-4 Summary Road Traffic Attended Measurements – Measurement Location 2**

| Date | Time | No of truck pass bys | Site noise LAeq at measurement point | Assessment point criteria | Estimated $L_{Aeq}$ assessment point | Complies |
|---|---|---|---|---|---|---|
| 25/8/20 | 11:11-11:26 | 1 | < 44 dB (A) | 38 | < 25 dB(A) | Yes |
| 25/8/20 | 11:26-11:41 | 2 | < 46 dB(A) | 38 | < 27 dB(A) | Yes |

## 5.4 Attended Measurements – Jerrara Road

One attended measurement of 30 minutes took place outside 328 Jerrara Road Marulan to measure road traffic noise from trucks driving to and from the quarry. Within the 30 minute period, five trucks passed by 328 Jerrara Road, with four of the vehicles heading to Marulan and the last truck heading to site. The measured noise levels were then back calculated to the assessment point, the closest residential receptor to Jerrara Road, 328 Jerrara Road. The location of the measurement point and assessment location are shown in Figure 5-3.

**Figure 5-3 Jerrara Road Measurement and Assessment Locations**

It is shown in Table 5-4 that the $L_{Aeq}$ noise contribution from Multiquip vehicles at the measurement point was 50 dB(A). When back calculated to 1m from the façade of the 328 Jerrara Road property, the estimated site contribution is 45 dB(A). The estimated $L_{Aeq}$ noise contributions from Multiquip trucks using Jerrara Road was found to comply with the project criteria at the closest receptor.

**Table 5-5 Summary Road Traffic Attended Measurements**

| Date | Time | No of truck pass bys | LAeq from Multiquip trucks at measurement point | Assessment point criteria | Estimated $L_{Aeq}$ assessment point | Complies |
|---|---|---|---|---|---|---|
| 25/8/20 | 12:01-12:31 | 5 | < 50 dB (A) | 55 | < 45 dB(A) | Yes |

# 6 CONCLUSIONS

Pulse Acoustics conducted a noise compliance assessment of the Ardmore Park Quarry and the Bungonia bypass road located in Bungonia, NSW. This document details the noise limits, conducted attended measurements and determined outcomes of the August 2020 assessment. The measurements were taken during a temperature inversion in order to measure a worst case scenario for the nearby residential receptors.

Noise compliance of the quarry was investigated, with attended measurements conducted in the vicinity of residential properties surrounding the Ardmore Park Quarry. Noise measurements took place during sand extraction and processing, rock crushing and earthmoving activities. It was shown that after the temperature inversion lifted, compliance with the project criteria was achieved at the neighbouring receivers.

Four 15 minute measurements were conducted to assess noise from the Bungonia bypass road at 28-30 King Street. Noise from the bypass road was found to comply with the project criteria during all measurements at the considered receptor.

One attended measurement of 30 minutes took place outside 328 Jerrara Road Marulan to measure road traffic noise from trucks driving to and from the quarry. The estimated $L_{Aeq}$ noise contributions from Multiquip trucks using Jerrara Road was found to comply with the project criteria at the closest receptor.

# APPENDIX A: ACOUSTIC GLOSSARY

The following is a brief description of the acoustic terminology used in this report.

| | |
|---|---|
| *Ambient Sound* | The totally encompassing sound in a given situation at a given time usually composed of sound from all sources near and far. |
| *Audible Range* | The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits. |
| *Character, acoustic* | The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictates a sound's character. |
| *Decibel [dB]* | The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds;<br>0dB the faintest sound we can hear<br>30dB a quiet library or in a quiet location in the country<br>45dB typical office space. Ambience in the city at night<br>60dB Martin Place at lunch time<br>70dB the sound of a car passing on the street<br>80dB loud music played at home<br>90dB the sound of a truck passing on the street<br>100dB the sound of a rock band<br>115dB limit of sound permitted in industry<br>120dB deafening |
| *dB(A)* | *A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise. |
| *Frequency* | Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz. |
| *Loudness* | A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on |
| $L_{max}$ | The maximum sound pressure level measured over a given period. |
| $L_{min}$ | The minimum sound pressure level measured over a given period. |
| $L_1$ | The sound pressure level that is exceeded for 1% of the time for which the given sound is measured. |
| $L_{10}$ | The sound pressure level that is exceeded for 10% of the time for which the given sound is measured. |
| $L_{90}$ | The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the $L_{90}$ noise level expressed in units of dB(A). |
| $L_{eq}$ | The "equivalent noise level" is the summation of noise events and integrated over a selected period of time. |