

# Annual Noise Monitoring Assessment

Miller's Quarry  
Forbes, NSW  
October 2023

Prepared for: Regional Quarries Australia Pty Limited  
October 2023  
MAC231914-05RP1



# Document Information

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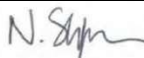

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Regional Quarries Australia Pty Limited (Regional Quarries) to complete a Noise Monitoring Assessment (NMA) for the Miller's Quarry (the quarry), Forbes, NSW.

The NMA involved quantifying the noise contribution of the quarry by direct attended measurements to determine quarry noise emissions so that effective management and controls can be implemented where required. It is noted that this assessment has been completed as part of an internal noise management initiative and does not form part of the noise monitoring program to address conditions of the Environmental Protection License (EPL).

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- Environment Protection Licence EPL 1474 (EPL);
- Standards Australia AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters – Specifications; and
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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## 2 Default Noise Limits

**Table 1** reproduces the operational noise limits for the two nearest residential assessed receivers. It is noted that Miller's Quarry does not have noise related criteria within the EPL. Therefore, minimum assumed background levels (as per Section 2.3 of the NPI) have been adopted to establish Project Noise Trigger Levels (PNTLs) for this NMA per Table 2.1 referenced from the NPI and is considered conservative.

Table 1 Noise Limits, dBA			
Receivers	Receiver Address <sup>1</sup>	Adopted RBL, LA90	Day Period <sup>2</sup> PNTL
			LAeq(15min)
NM1	225 Gaymards Lane, Forbes, NSW, 2871	35	40
NM2	23 Allbett Lane, Forbes, NSW, 2871		

Note 1: Receiver addresses are considered the two nearest receivers to Miller's Quarry.

Note 2: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sunday and public holidays; Evening – the period from 6pm to 10pm; Night – the remaining periods.

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### 3 Methodology

#### 3.1 Locality

Miller's Quarry is located at 191 Gaymards Lane, Forbes, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The two nearest residential receivers have been assessed for this NMA and monitoring locations with respect to the quarry are presented in the locality plan shown in **Figure 1**.

#### 3.2 Assessment Methodology

The attended noise survey was conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Tuesday 10 October 2023. The acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Daytime measurements were of 15-minutes in duration. Where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to calculate the  $L_{Aeq}(15min)$  quarry noise contribution for comparison against the relevant noise criteria.



Prevailing meteorological conditions for the monitoring period were sourced from the nearest Bureau of Meteorology (BoM) station (Forbes Airport AWS, NSW, no.65103). Results obtained during non-prevailing meteorological conditions (ie F Class Stability in conjunction with a 2m/s drainage or G Class Stability) are considered not applicable against relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

FIGURE 1  
LOCALITY PLAN  
MAC231914-05  
Miller's Quarry, Forbes, NSW



**KEY**

-  Boundary
-  Receivers



## 4 Results

The monitoring and assessment results are presented in individual tables for each assessment location.

### 4.1 Meteorological Conditions

Weather data for the noise assessment was sourced from the nearest BoM Station (no.65103) as well as operator measured conditions on site at nominated receiver locations. The data was used to determine prevailing meteorological conditions at the time of the attended measurements, which are presented in **Table 2**.

Table 2 Prevailing Meteorological Conditions				
Date & Time	Bureau of Meteorology Station Forbes Airport AWS, NSW (no.65103)		Operator Measured Weather Monitoring Location (1.8m AGL)	
	Wind Direction	Wind (m/s)	Wind Direction	Wind (m/s)
	10/10/2023 11:57	SW	2.4	S
10/10/2023 12:17	SSE	1.6	S	0.6

### 4.2 Assessment Results - Location NM1

The results of the attended noise measurements at location NM1 for the October 2023 survey are summarised in **Table 3** with the adopted limits, the calculated quarry noise contribution and prevailing meteorological conditions at the time of each measurement.

Table 3 Operator-Attended Noise Survey Results – Location NM1							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Limit (PNTL)	Meteorology <sup>1</sup>	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Aeq</sub> (15 mins)		
10/10/2023	11:57	85	62	30	40	WD: S WS: 0.2m/s Rain: Nil	Birds 34-58
	(Day) <sup>2</sup>						Traffic 30-85
Quarry Mobile Plant 26-34							
Miller's Quarry L <sub>Aeq</sub> (15min) Contribution							30

Note 1: Meteorological data obtained from direct measurement by the operator.

Note 2: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sunday and public holidays.

### 4.3 Assessment Results - Location NM2

The results of the attended noise measurements at location NM2 for the October 2023 survey are summarised in **Table 4** with the adopted limits, the calculated quarry noise contribution and prevailing meteorological conditions at the time of each measurement.

**Table 4 Operator-Attended Noise Survey Results – Location NM2**

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Limit (PNTL)	Meteorology <sup>1</sup>	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Aeq</sub> (15 mins)		
10/10/2023	12:18 (Day) <sup>2</sup>	59	40	29	40	WD: S WS: 0.6m/s Rain: Nil	Livestock 34-40 Birds 32-59 Wind in vegetation 28-30 Traffic 28-34 Dog bark 27-31 Quarry Mobile Plant 27-36
Miller's Quarry L <sub>Aeq</sub> (15min) Contribution							31

Note 1: Meteorological data obtained from direct measurement by the operator.

Note 2: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sunday and public holidays.

## 5 Discussion

### 5.1 Discussion of Results – Location NM1

Monitoring conducted on Tuesday 10 October 2023 identified that noise emissions from quarry mobile plant were audible during the assessment period at location NM1. The estimated quarry contribution was measured at 30dBA, therefore quarry emissions remained below the adopted PNTL (criteria) of 40dB LAeq(15min). Extraneous sources such as birds, traffic and livestock were audible during the measurement period.

### 5.2 Discussion of Results – Location NM2

Monitoring conducted on Tuesday 10 October 2023 identified that noise emissions from quarry mobile plant were audible during the assessment period at location NM2. The estimated quarry contribution was measured at 31dBA, therefore quarry emissions remained below the adopted PNTL (criteria) of 40dB LAeq(15min). Extraneous sources such as birds, livestock, dog barking, traffic and wind in vegetation were audible during the measurement period.

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## 6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Regional Quarries Australia Pty Limited. The assessment was completed to provide annual monitoring data so that Miller's Quarry can actively quantify and manage site noise emissions.

Attended monitoring conducted on Tuesday 10 October 2023 identified that Miller's Quarry noise emissions were audible on both occasions during the attended measurement period. A review of monitoring data and operator attended observations determined that Miller's Quarry contributions remained below the adopted PNTL (criteria) during the monitoring period.

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# Appendix A – Glossary of Terms

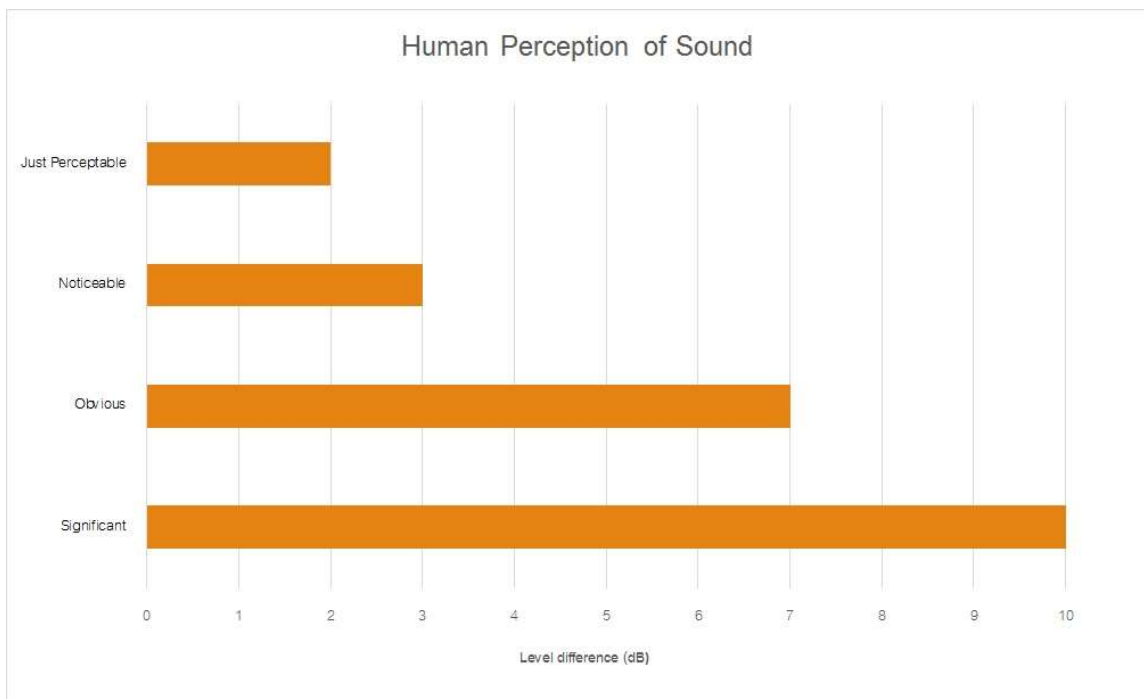
A number of technical terms have been used in this report and are explained in **Table A1**.

<b>Table A1 Glossary of Acoustical Terms</b>	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dba	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.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAm <sub>ax</sub>	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (L <sub>w</sub> or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$ . Where W is the sound power in watts to the reference level of $10^{-12}$ watts.
Sound pressure level (L <sub>p</sub> or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L <sub>w</sub> in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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