

CALGA SAND QUARRY

LOT 151 PEATS RIDGE ROAD, CALGA, NSW, 2250

COMPLIANCE NOISE MONITORING

RWDI # 2102196

January 22, 2021

SUBMITTED TO

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DOCUMENT CONTROL

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1 INTRODUCTION

RWDI was commissioned by Hanson Construction Pty Ltd to conduct quarterly compliance noise monitoring of the Calga Sand Quarry located at Lot 151, Peats Ridge Road in Calga (the Site).

This report summarises the results of the quarterly attended noise monitoring conducted on January 8, 2021 and assess them against the operational noise criteria set in Development Consent DA 94-4-2004. Due to adverse weather conditions unsuitable for environmental noise monitoring, the quarterly measurements intended for late December 2020 had to be postponed until early January 2021.

The Noise Monitoring Program prepared by R.W. Corkery & Co. Pty Ltd summarises all relevant criteria, monitoring locations, and frequency / timing of monitoring.

2 OPERATIONAL NOISE CRITERIA

Table 1 summarises the daytime operational noise criteria as summarised in Condition 2, Schedule 3, of Development Consent DA 94-4-2004 (as consolidated). Noise levels emanating from the Site must not exceed the relevant criteria when measured within 30 m of the dwelling.

Table 1: Operational Daytime Noise Criteria

Assessment Location	Daytime $L_{Aeq,15min}$ Operational Noise Criteria (dBA)
CN-1	41
CN-2	40
CN-3	39
CN-6	36

The relevant assessment locations are shown in **Figure 1**.



Figure 1: Assessment Locations



3 MONITORING METHODOLOGY

Attended noise monitoring was conducted during the daytime assessment period (7.00 am – 6.00 pm) on Friday, January 8, 2021. One 15-minute measurement was conducted at each of the receiver locations listed in **Table 1**.

3.1 Monitoring Locations

All noise measurements were conducted at a location representative of the most affected point within the 30 m perimeter surrounding the dwelling.

3.2 Meteorological Conditions

Based on site observations, weather conditions were suitable for conducting environmental noise measurements during the day of survey (wind less than five meters per second at microphone height and no rain). Wind speed was determined by the RWDI representative using a hand-held digital anemometer AR816.

This was confirmed by meteorological data obtained from the Site's weather station.

Table 2 summarises the meteorological conditions present during the noise survey obtained from the Site's automatic weather station.

Table 2: Meteorological Conditions during Noise Survey (January 8, 2021)

Time Period	Wind Speed (m/s)	Wind Direction	Rain (mm)
11.15 am – 11.30 am	2.7	ESE	0
11.30 am – 11.45 am	2.2	ESE	0
11.45 am – 12.00 pm	1.8	SE	0
12.00 pm – 12.15 pm	1.8	ESE	0
12.15 pm – 12.30 pm	1.8	ESE	0
12.30 pm – 12.45 pm	2.7	SE	0



3.3 Monitoring Equipment

All measurements were conducted using a Bruel and Kjaer Type 2236 Sound Level Meter. This sound level meter conforms to Australian Standard 1259 *Acoustics – Sound Level Meters* as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected and the time weighting was set to “Fast”. The calibration of the meter was checked before and after the measurements with a Bruel and Kjaer Type 4230 sound level calibrator and no significant drift was noted (the sound level meter calibrated 94.0 dBA before and after each of the 15-minute measurements).

The Bruel and Kjaer Type 2236 and Type 4230 have been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures. Calibration Certificates for both Sound Level Meters used for the monitoring are attached to this letter. Note that Calibration Certificates are valid for 2 years.

4 DESCRIPTION OF SITE OPERATIONS

Figure 2 shows the Site layout with the active work locations on the day of the survey.



Figure 2: Site Layout and Active Work Locations (January 8, 2021)

The following mobile plant and equipment were in operation during the time of the monitoring:

- Dozer ripping and pushing sandstone in Stage 3/5 (within yellow perimeter shown in **Figure 2**).
- Excavator loading haul trucks with raw feed from Stage 3/5 to wash plant surge pile.
- One haul truck transferring raw feed from Stage 3/5 to the wash plant surge pile.
- Front-end loader loading sales trucks and loading dump truck with oversize material to be taken to the oversize material stockpile (within yellow perimeter shown in **Figure 2**).
- Water truck operational on all unsealed roadways.
- Front-end loader loading dry screening plant (Powerscreen).
- Dry screening plant (Powerscreen) operating in full production.
- Washplant operating in full production.

5 ASSESSMENT OF NOISE LEVELS

Table 3 summarises the measurement results and compares them against the relevant daytime noise criteria (**Table 1**).

Table 3: Attended Noise Measurement Results (January 8, 2021)

Assessment Location	Start Time	L _{Aeq,15min} due to Site Noise (dBA)	Operational Noise Criteria (dBA)	Comments
CN-1	11.20 am	40	41	Site noise audible during lulls in traffic, 39-41 dBA. Peats Ridge Road traffic passbys ranging 52-65 dBA. Fauna/flora noise 40-63 dBA.
CN-3	11.40 am	inaudible	39	Site noise audible inaudible at all times. Peats Ridge Road traffic passbys ranging 56-76 dBA. Fauna/flora noise 40-51 dBA.
CN-2	11.59 am	inaudible	40	Site noise audible inaudible at all times. Peats Ridge Road traffic passbys ranging 59-69 dBA. Fauna/flora noise 50-56 dBA.
CN-6	12.22 pm	inaudible	36	Site noise audible inaudible at all times. Peats Ridge Road traffic ranging 46-51 dBA. Fauna/flora noise 44-60 dBA.

Table 3 indicates that measured L_{Aeq,15min} noise levels due to quarry operations comply with the relevant daytime noise criteria at all four receivers.



6 CONCLUSIONS

Due to adverse weather conditions unsuitable for environmental noise monitoring, the quarterly measurements intended for late December 2020 had to be postponed until early January 2021.

Attended compliance noise monitoring was conducted on Friday, January 8, 2021. The results of the survey indicated that noise emissions from the Calga Sand Quarry complied with the daytime operational noise criteria set in Development Consent DA 94-4-2004 at all four identified assessment locations.



APPENDIX A: GLOSSARY OF ACOUSTIC TERMINOLOGY

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

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.

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.

Impulsive Noise – Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.

Intermittent Noise – The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Sound Absorption – The ability of a material to absorb sound energy through its conversion into thermal energy.





Sound Level Meter – An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure level.

Sound Pressure Level – The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.

Tonal Noise – Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B: CALIBRATION CERTIFICATE

CERTIFICATE OF CALIBRATION			
CERTIFICATE No.: SLM 42170			
Equipment Description: Sound Level Meter			
Manufacturer:	B & K		
Model No:	2236	Serial No:	2030550
Microphone Type:	4188	Serial No:	1903087
Preamplifier Type:	-	Serial No:	-
Comments:	All tests passed for type 1. (See over for details)		
Owner:	Wilkinson Murray Pty Ltd L4, 272 Pacific Highway Crows Nest, NSW 2065		
Ambient Pressure:	1004 hPa ± 1.5 hPa		
Temperature:	25 °C $\pm 2^\circ$ C Relative Humidity: 36 % $\pm 5\%$		
Date of Calibration:	08/10/2019	Issue Date:	09/10/2019
Acu-Vib Test Procedure:	AVP05 (SLM)		
CHECKED BY:	<i>[Signature]</i>	AUTHORISED SIGNATURE:	<i>[Signature]</i>
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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