

CALGA SAND QUARRY
ATTENDED COMPLIANCE NOISE MONITORING
21 DECEMBER 2018

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HANSON CONSTRUCTION MATERIALS PTY LTD
LOT 151 PEATS RIDGE ROAD
CALGA NSW 2250

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GLOSSARY OF ACOUSTIC TERMS

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, which are demonstrated in the graph below, 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.

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.

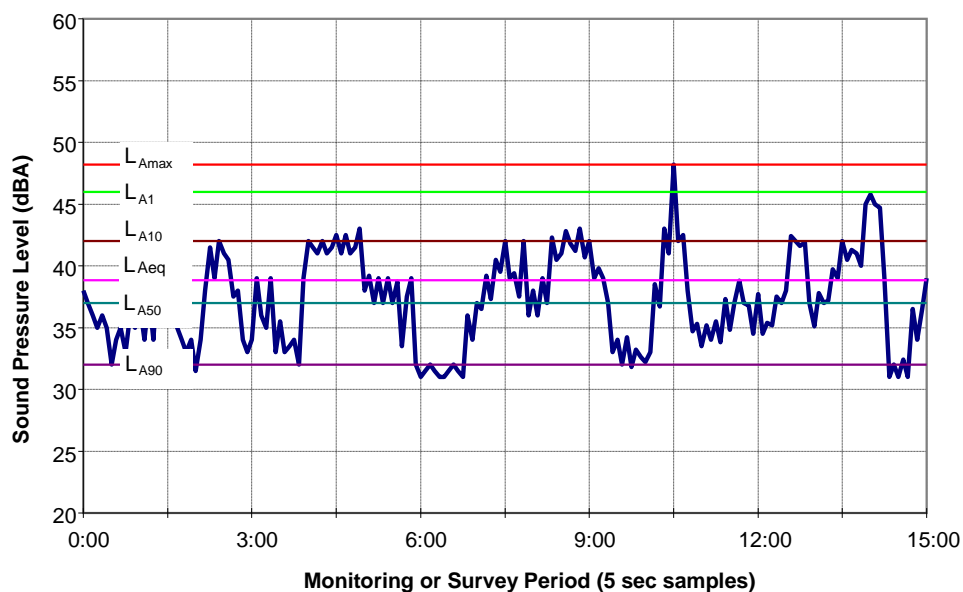
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

This report summarises the results of the quarterly attended noise monitoring conducted on 21 December 2018 and assessed against the consent criteria as summarised in Condition 2, Schedule 3, of consolidated Development Consent DA 94-4-2004.

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

2 SITE DESCRIPTION

Attended noise monitoring was conducted on Friday, 21 December 2018. Measurements were made at each of the following locations (shown in Figure 2-1):

- CN-1 Power Residence;
- CN-2 King Residence;
- CN-3 Kashouli Residence; and
- CN-6 Cauchi Residence.

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 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.

Figure 2-1 Noise Monitoring Locations



3 OPERATIONAL NOISE CRITERIA

Daytime operational noise is assessed as an $L_{Aeq,15min}$ noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and represents the level of a continuous sound with the same average sound energy over the sampling period as the actual noise environment with its fluctuating sound levels.

Noise levels emanating from the premises must not exceed the relevant criteria when measured within 30 m of the residence.

Table 3-1 summarises the daytime noise criteria.

Table 3-1 Operational Daytime Noise Criteria

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

4 METEOROLOGICAL DATA

Based on site observations, weather conditions were appropriate for conducting environmental noise measurements during the day of survey. This was confirmed by meteorological data obtained from the site's weather station.

Table 4-1 summarises meteorological conditions during the noise survey obtained from the site's weather station.

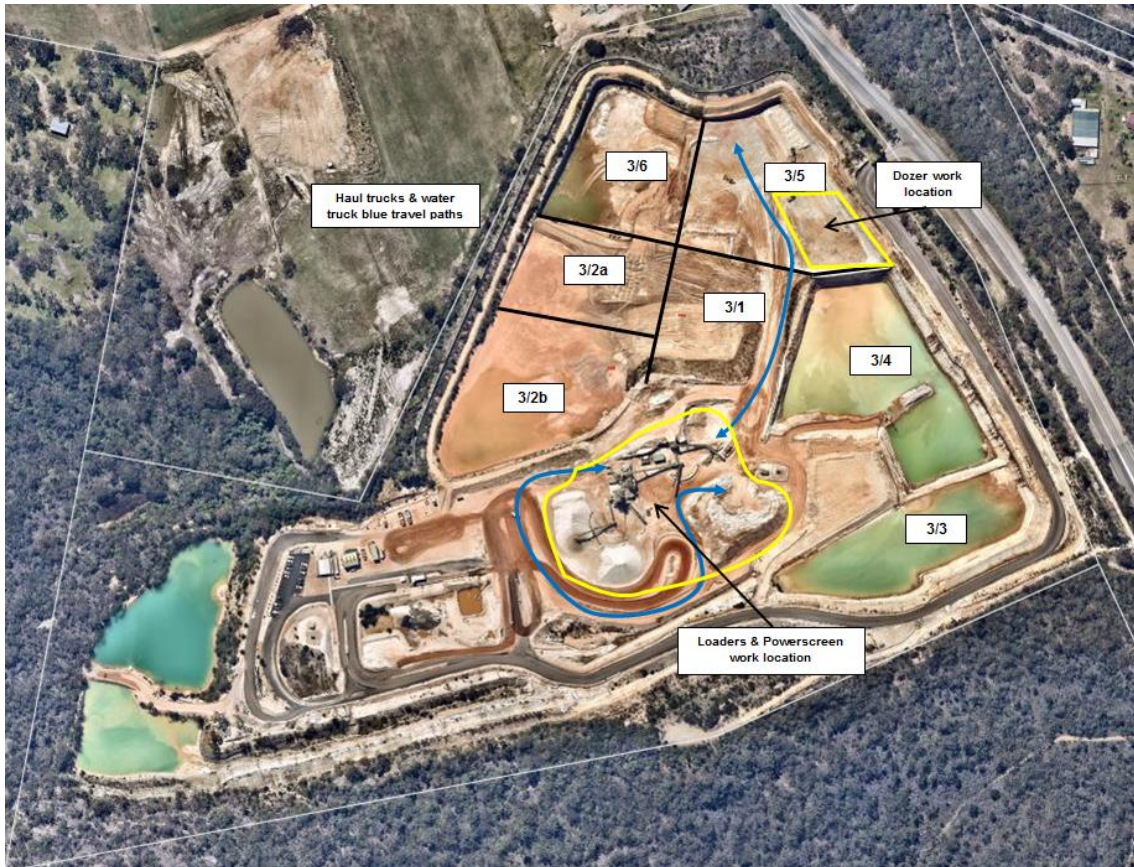
**Table 4-1 Meteorological Conditions during Noise Survey
(Friday, 21 December 2018)**

Time Period	Wind Speed (m/s)	Wind Direction	Rain (mm)
10.30am – 10.45am	2.7	N	0
10.45am – 11.00am	2.7	N	0
11.00am – 11.15am	1.8	N	0
11.15am – 11.30am	3.1	N	0
11.30am – 11.45am	2.7	N	0
11.45am – 12.00pm	1.8	N	0

5 DESCRIPTION OF SITE OPERATIONS

Figure 5-1 presents an aerial of the quarry site with the works generally taking place during the monitoring survey.

Figure 5-1 Quarry Site Layout and Operational Areas



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.
- Excavator loading haul trucks with raw feed from Stage 3/5 to wash plant surge pile.
- Haul trucks x 2ea transferring raw feed from Stage 3/5 to wash plant surge pile.
- Front end loader, loading sales trucks and loading dump truck with oversize to be taken to oversize stockpile – within yellow perimeter.
- Water truck was in operation to suppress dust on all unsealed roads.
- Front end loader, loading dry screening plant (Powerscreen).
- Dry screening plant (Powerscreen) was in full production.
- Wash plant was in full production.

6 ASSESSMENT OF NOISE LEVELS

Table 6-1 summarises the measurement results and compares them against the relevant daytime noise criteria.

Table 6-1 Attended Noise Measurement Results (Friday, 21 December 2018)

Location	Time	$L_{Aeq,15min}$ due to Quarry Operations (dBA)	Daytime Criteria $L_{Aeq,15min}$ (dBA)	Comments
CN-1	10.38am – 10.53am	36	41	Site noise just audible during lulls in traffic, est. 31-40dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 57-62dBA and L_{Amax} 62-69dBA, respectively.
CN-3	10.56am – 11.11am	32	39	Site noise just audible during lulls in traffic, est. 31-33dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 52-58dBA and L_{Amax} 61-67dBA, respectively.
CN-2	11.20am – 11.35am	32	40	Site noise just audible during lulls in traffic, est. 31-32dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 54-60dBA and L_{Amax} 62-65dBA, respectively.
CN-6	11.42am – 11.57am	Inaudible	36	Site noise inaudible at all times. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 42-46dBA and L_{Amax} 47-55dBA, respectively.

Table 6-1 shows that measured $L_{Aeq,15min}$ noise levels due to quarry operations comply with the relevant daytime noise criteria at all four receivers.

7 CONCLUSION

Attended compliance noise monitoring was conducted on Friday, 21 December 2018. The results of the survey indicated that noise emissions from the Calga Sand Quarry plant complied with the daytime limits at all four identified receivers.