



CALGA SAND QUARRY
ATTENDED COMPLIANCE NOISE MONITORING
11 DECEMBER 2013

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ROCLA MATERIALS PTY LTD
72 ORCHARDLEIGH STREET
GUILDFORD NSW 2161

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Version	Status	Date	Prepared By	Reviewed By
A	Final	24 December 2013	Roman Haverkamp	Sam Demasi

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Wilkinson Murray Pty Limited · ABN 39 139 833 060

Level 4, 272 Pacific Highway, Crows Nest NSW 2065, Australia • **Offices in Orange, Qld & Hong Kong**

† +61 2 9437 4611 • † +61 2 9437 4393 • e acoustics@wilkinsonmurray.com.au • w www.wilkinsonmurray.com.au

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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.

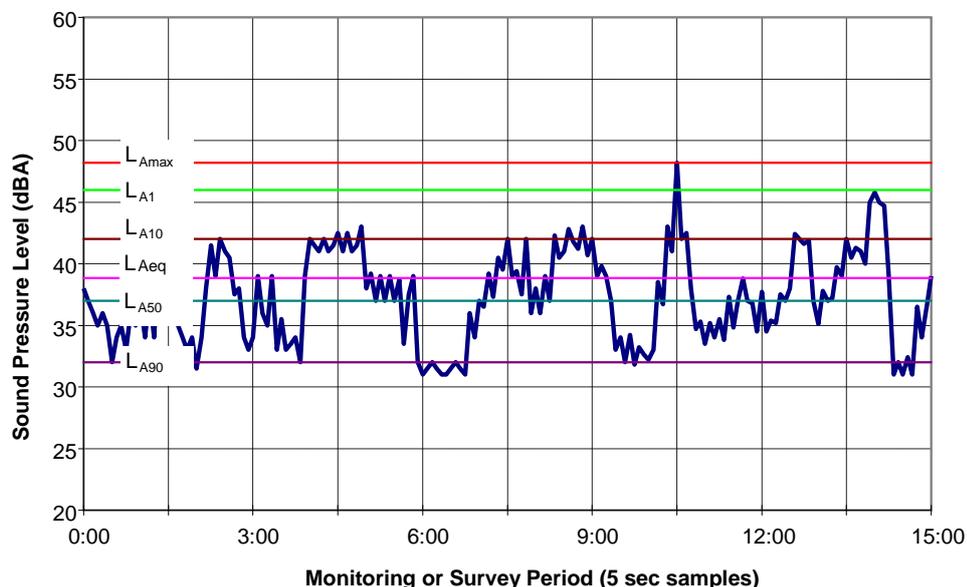
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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 11 December 2013 and carried out in accordance with Condition 3(7) of 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.

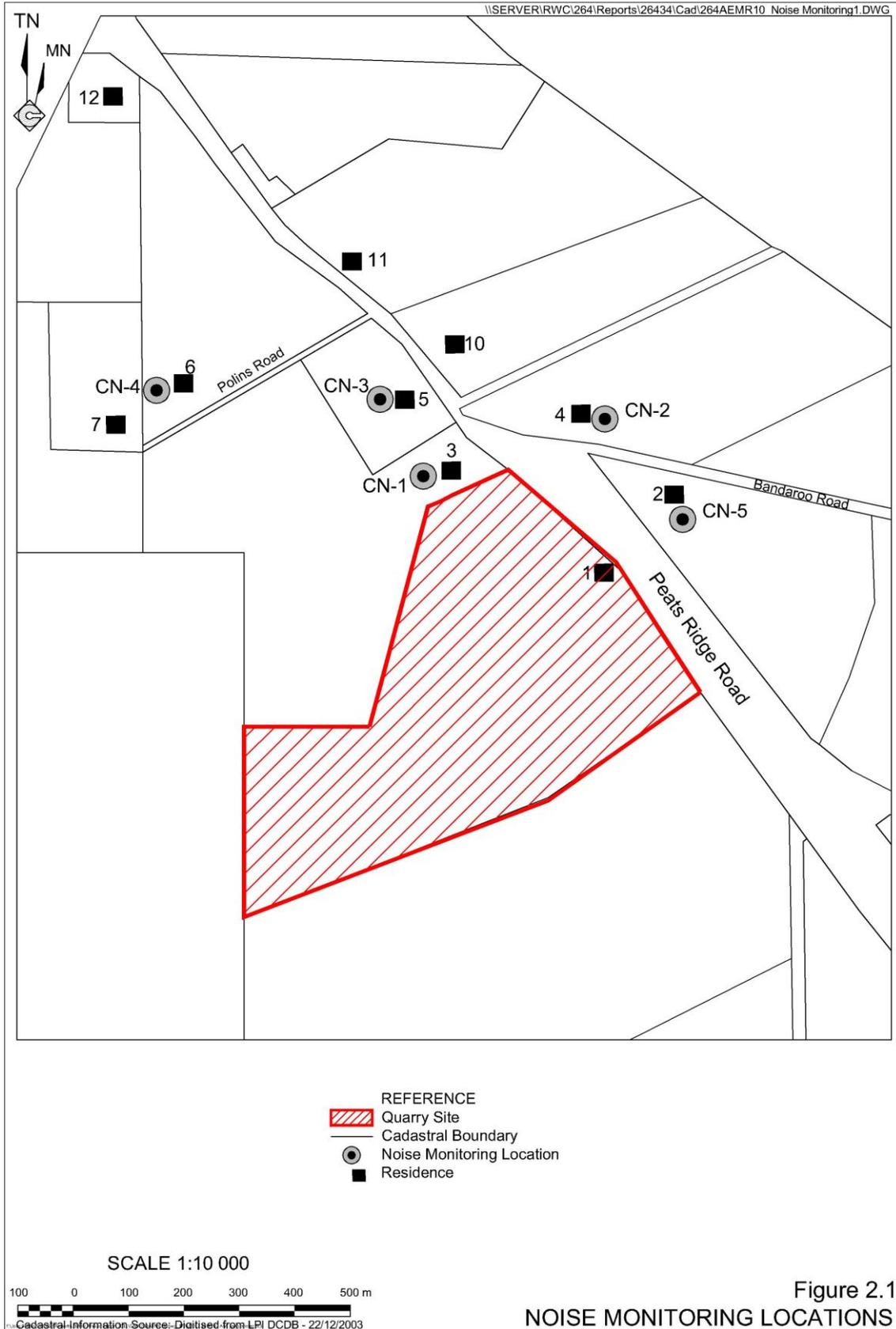
2 SITE DESCRIPTION

Attended noise monitoring was conducted in the morning of Wednesday, 11 December 2013. Measurements were made at each of the following locations (shown in Figure 2-1):

- CN-1 Gazzana Residence;
- CN-2 King Residence;
- CN-3 Kashouli Residence; and
- CN-4 Townsend Residence.

Noise levels were measured with a Bruel & Kjaer Type 2236 sound level meter. This sound level meter conforms to Australian Standard 1259 "Acoustics – Sound Level Meters" as Type 1 precision sound level meter which has an accuracy suitable for laboratory use. The A-Weighting filter of the meter was selected and the time weighting was set to 'fast'. The meter was field calibrated both before and after the measurements with a Bruel & Kjaer Sound Level Calibrator Type 4230. No significant drift in the sound level meter calibration level was recorded.

The B&K 2236 sound level meter and the B&K 4230 calibrator have been laboratory calibrated within the previous two years in accordance with Wilkinson Murray Quality Assurance procedures.



3 OPERATIONAL NOISE CRITERIA

The Noise Monitoring Program presents noise criteria for the operation of plant or equipment on the premises as required by the Office of Environment and Heritage (OEH) licence (EPL 11295). It states that noise levels emanating from the premises must not exceed the relevant criteria when measured within 30m of the residences or noise sensitive areas.

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.

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-4	35

* Source: EPL 11295

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.

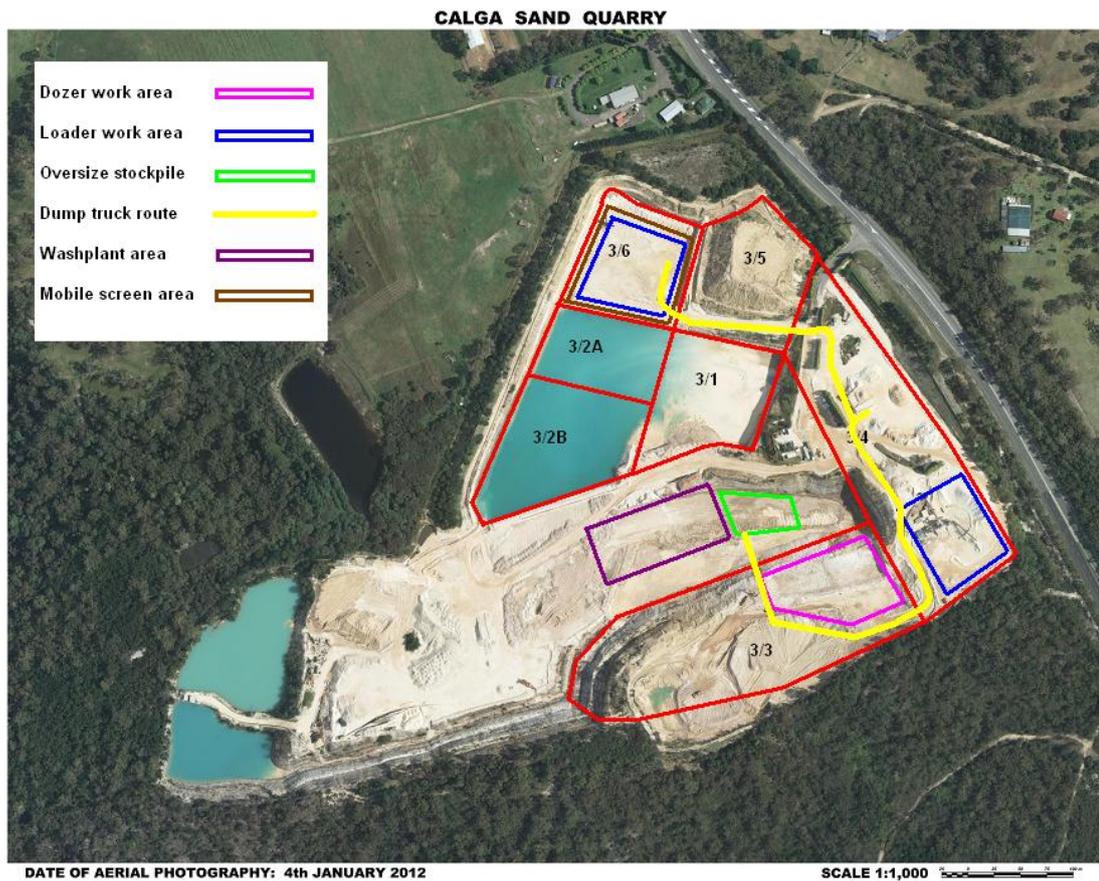
**Table 4-1 Meteorological Conditions during Noise Survey
(Wednesday, 11 December 2013)**

Time Period	Wind Speed (m/s)	Wind Direction	Rain (mm)
10.30am – 10.45am	1.8	W	0
10.45am – 11.00am	2.2	SW	0
11.00am – 11.15am	2.2	SW	0
11.15am – 11.30am	3.6	WNW	0
11.30am – 11.45am	1.8	WNW	0
11.45am – 12.00pm	2.7	WNW	0

5 DESCRIPTION OF SITE OPERATIONS

Figure 5-1 presents an aerial of the quarry site.

Figure 5-1 Quarry Site Layout and Operational Areas



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

- Dozer ripping and pushing sandstone in Stage 3/3.
- Excavator loading dump trucks with raw feed from Stage 3/3.
- Dump trucks taking raw feed from Stage 3/3 to Site B washplant on Stage 2 and brickies raw feed stockpile at Mobile screen area.
- Front end loader loading sales trucks from Site A washplant and Mobile screen area.
- Front end loader feeding Jaw crusher at Site B washplant area.
- Jaw crusher feeding crushed material onto transfer conveyor.
- Diesel operated transfer conveyor transferring crushed material into Site B washplant.
- Site B Washplant 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 (Wednesday, 11 December 2013)

Location	Time	$L_{Aeq,15min}$ due to Quarry Operations (dBA)	Daytime Criteria $L_{Aeq,15min}$ (dBA)	Comments
CN-1	10.42am – 10.57am	Non-measurable	41	Distant mobile plant noise barely audible for very brief periods of time, est. 40-45dBA when audible. Cicadas dominant throughout measurement, 66-80dBA.
CN-3	11.00am – 11.15am	Inaudible	39	Noise from the quarry was inaudible at all times. Cicadas dominant throughout measurement, 60-65dBA.
CN-2	11.20am – 11.35am	Non-measurable	40	Distant mobile plant noise barely audible for very brief period of time, est. 45-50dBA when audible. Cicadas dominant throughout measurement, 59-60dBA.
CN-4	11.41am – 11.56am	Inaudible	35	Noise from the quarry was inaudible at all times. Cicadas dominant throughout measurement, 70-72dBA.

Table 6-1 shows that $L_{Aeq,15min}$ noise levels due to quarry operations were found to be either inaudible or non-measurable due to cicada noise. Based on passed compliance measurements conducted for the Project and on-site activities on the day of the measurements, compliance with the daytime criteria is expected at all four receivers.

7 CONCLUSION

Attended compliance noise monitoring was conducted on Wednesday, 11 December 2013. The results of the survey indicated that noise emissions from the Calga Sand Quarry were either inaudible or non-measurable due to cicada noise. However, based on passed compliance measurements conducted for the Project and on-site activities on the day of the measurements, compliance with the daytime limits set in the Noise Monitoring Program is expected at all four receivers.