ACOUSTICS AND AIR

CALGA SAND QUARRY

ATTENDED COMPLIANCE NOISE MONITORING
16 FEBRUARY 2012

REPORT NO. 01127-E
VERSION A

FEBRUARY 2012

PREPARED FOR

ROCLA MATERIALS PTY LTD
72 ORCHARDLEIGH STREET
GUILDFORD NSW 2161

WILKINSON MURRAY

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	28 February 2012	Roman Haverkamp	John Wassermann

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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.

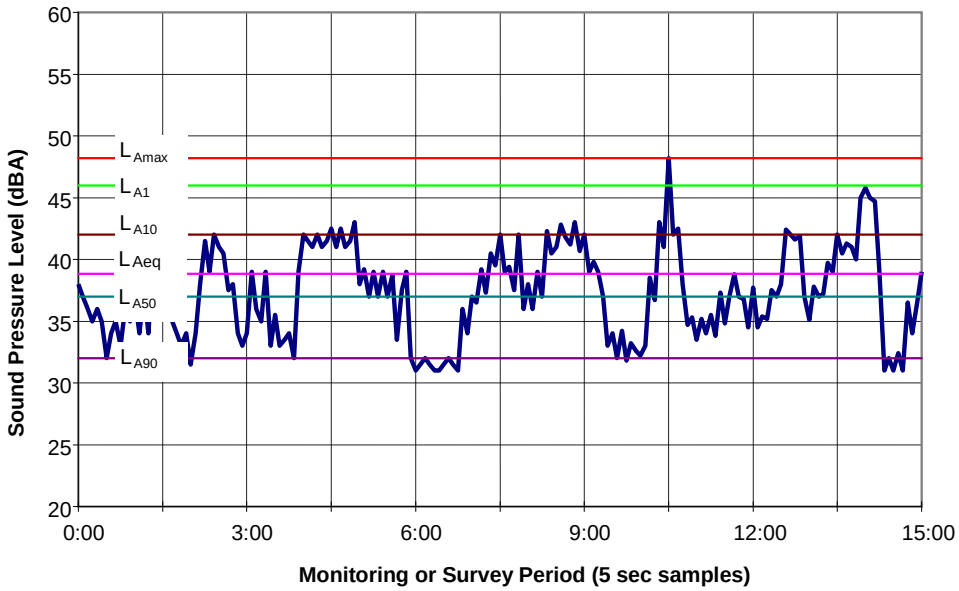
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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 10^{th} percentile (lowest 10^{th} 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 the 16 February 2012 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 ATTENDED NOISE MONITORING

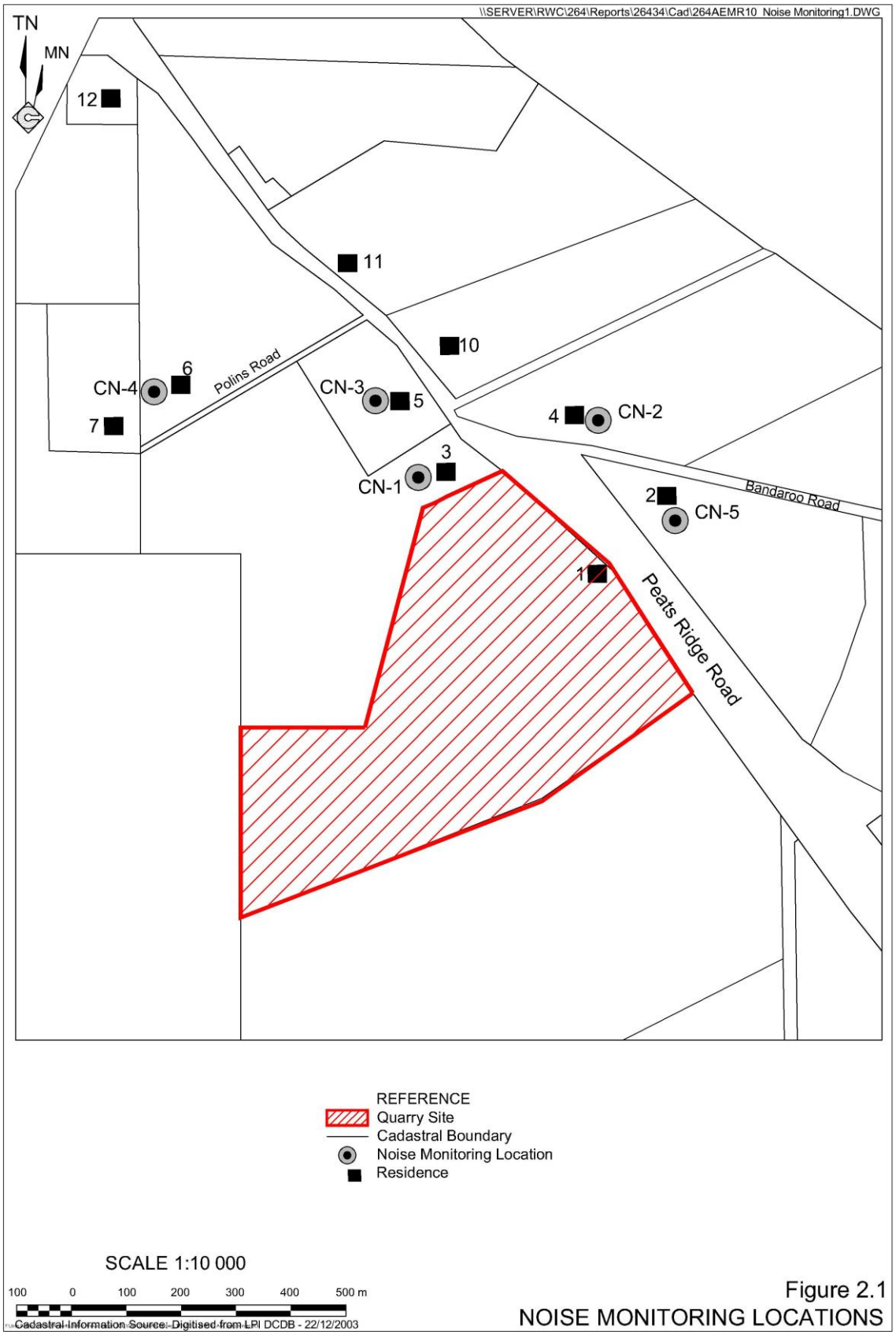
Attended noise monitoring was conducted in the morning of Thursday, 16 February 2012. Measurements were made at each of the following locations (shown in Figure 2-1):

- 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.

Figure 2-1 Noise Monitoring Locations



3 OPERATIONAL NOISE CRITERIA

The NMP 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.

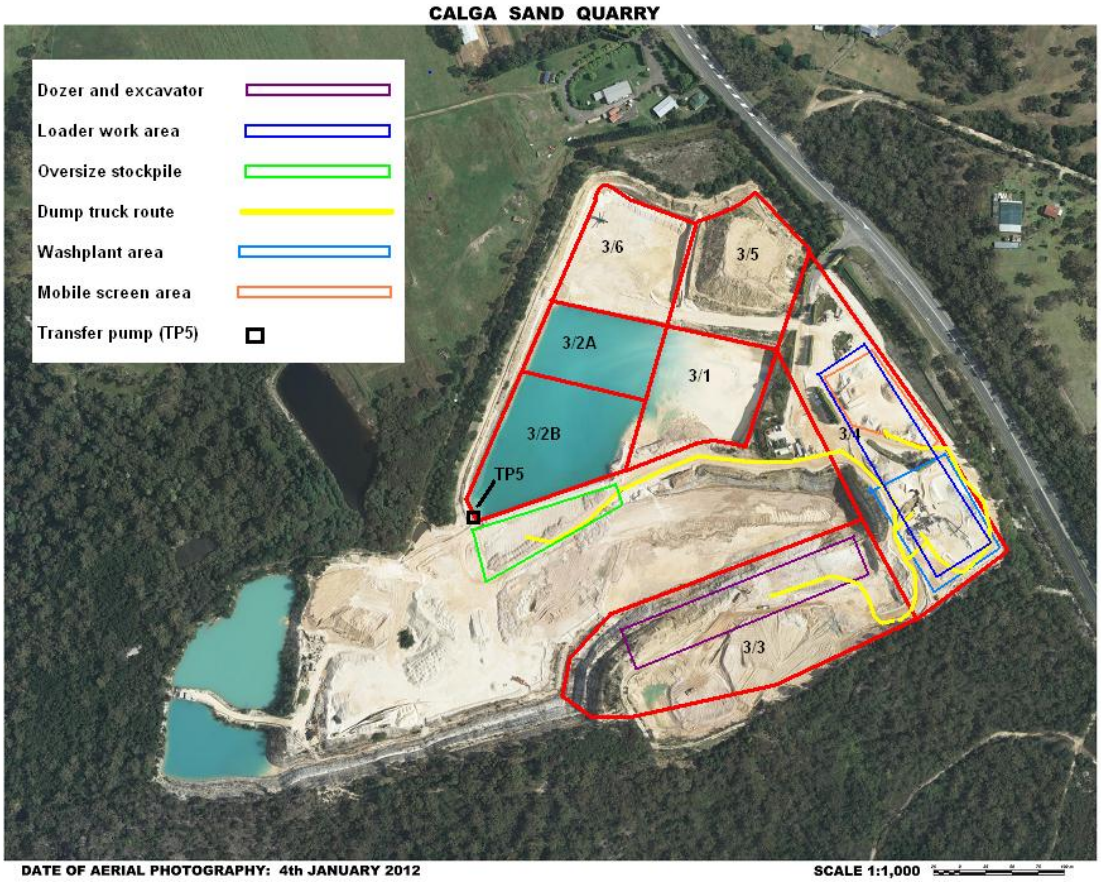
Table 4-1 Meteorological Conditions during Noise Survey (Thursday, 16 February 2012)

Time Period	Wind Speed (m/s)	Wind Direction	Rain (mm)
2.30pm – 2.45pm	2.2	NE	0
2.45pm – 3.00pm	2.2	NNE	0
3.00pm – 3.15pm	0.4	NNE	0
3.15pm – 3.30pm	0	---	0
3.30pm – 3.45pm	0	---	0
3.45pm – 4.00pm	0	---	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 truck with raw feed from 3/3 to go to washplant and brickies raw feed stockpile;
- Dump truck taking raw feed from 3/3 to washplant and brickies raw feed stockpile;
- Front-end-loader producing brickies sand, loading sales trucks and loading dump trucks with oversize to be taken to oversize stockpile;
- Front-end-loader feeding washplant from surge pile, loading oversize from washplant onto dump truck and loading sales trucks;
- Transfer pump 5 (TP5) was in constant operation; and
- Washplant and dry screening plant were 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 (Thursday, 16 February 2012)

Location	Time	$L_{Aeq,15min}$ due to Quarry Operations (dBA)	Daytime Criteria $L_{Aeq,15min}$ (dBA)	Comments
CN-1	2.43pm – 2.58pm	35	41	Constant engine noise from quarry audible most of the time 31-36dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 52-53dBA and L_{Amax} 61-66dBA respectively. Cicadas constantly audible 42-49dBA.
CN-3	3.02pm – 3.17pm	31	39	Engine noise from the quarry just audible for short periods of time during lulls in traffic 31dBA (estimated). Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 50-52dBA and L_{Amax} 58-61dBA respectively. Cicadas constantly audible 41-42dBA.
CN-4	3.20pm – 3.35pm	n/a*	35	Quarry operations inaudible at all times during measurement. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 47-49dBA and L_{Amax} 53dBA respectively. Cicadas constantly audible 41-42dBA.
CN-2	3.40pm – 3.55pm	33	40	Constant engine noise from quarry audible most of the time 32-33dBA. Typical and heavy traffic on Peats Ridge Road measured with L_{Amax} 50-52dBA and L_{Amax} 57-64dBA respectively. Cicadas constantly audible 40-42dBA.

*Note: n/a = inaudible

Table 4-1 shows that measured $L_{Aeq,15min}$ noise levels due to quarry operations complied with the relevant daytime noise criteria at all the four receivers.

7 CONCLUSION

Attended compliance noise monitoring was conducted on 16 February 2012. The results of the survey indicated that noise emissions from the Calga Sand Quarry operation complied with the daytime limits set in the Noise Monitoring Program at all four identified receivers.