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ANNUAL NOISE MONITORING ASSESSMENT 2023 DUBBO QUARRY, DUBBO, NSW

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ABBREVIATIONS AND DEFINITIONS

Ambient Noise	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
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 described using the LA90 descriptor (see below).
dB	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
dB(A)	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
Extraneous noise	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
LA1	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
LA1(1min)	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
LA10	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
LA90	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
LAeq	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
LAeq (period)	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
LAm_{ax}	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.

Source: Noise Guide for Local Government (NSW EPA, 2023)

1. OVERVIEW

1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Dubbo Quarry ("the quarry") at Dubbo, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Dubbo Quarry Noise Management Plan (NMP) (EMM, 2023).
- Development Consent SSD 10417 'Dubbo Quarry Continuation Project' (Minister for Planning, 2023)
- Australian Standard AS 1055:2018 Acoustics — Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics – Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for 2023, and forms part of the annual monitoring program to determine compliance with Operational Noise Criteria stipulated in the Development Consent.

1.2 Site Location and Sensitive Receptors

The quarry is located within the Dubbo Regional Local Government Area (LGA) and is located approximately 1.9 km to the east of the city of Dubbo, NSW. The quarry is accessed via Sheraton Road which connects to the Mitchell Highway approximately 2 km north-west of the quarry. Noise sensitive receivers surrounding the quarry are primarily rural and residential (to the north, east and west of the site). The MAAS Quarry is located directly adjacent to Holcim to the north and is a dominant noise source for some of those receiver locations.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan in **Figure 1**.



Legend

- Noise monitoring location



Figure 1 : Noise monitoring locations at Dubbo Quarry

2. NOISE CRITERIA

Table 2-1 includes the applicable noise criteria outlined in the Development Consent for the 6 residential receivers surrounding the quarry (R1-R5 and R23). The four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA are R2, R3, R4 and R5.

It should be noted that R1 is not monitored as Holcim currently has a negotiated agreement in place with the landowner of this residential property, and R23 is not monitored as no residence currently exists at this location (i.e. vacant land).

Table 2-1: Monitoring locations and noise criteria

Residential assessment location	Easting	Northing	Day ¹		Night ²	
			Stripping activities	All other quarrying operations		
			LAeq (15min)	LAeq (15min)	LAeq (15min)	LAmx
			dBA			
R1 ³	655384	6427170	49	49	40	52
R2	655320	6426775	46	44	35	52
R3	654875	6427538	43	43	37	52
R4	655838	6428439	41	41	35	52
R5	657491	6427569	40	41	35	52
R23 ⁴	655196	6428133	42	42	37	52
All other non-project related privately owned residences	-	-	40	40	35	52

¹ 7 am–6 pm Monday to Saturday.
² 10 pm–7 am Monday to Saturday.
³ Holcim currently has a negotiated agreement in place with the landowner of this residential property.
⁴ No residence currently exists at this location (i.e., vacant land).

3. METHODOLOGY

The monitoring program was developed in accordance with the procedures described in Australian Standard AS 1055:2018 and the Approval Documents referenced in Section 1. The measurements were carried out using a RION Sound Level Meter NL-52 on Monday 13 November and Tuesday 14 November 2023. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672-1:2013/2002 class 1. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with IEC 60942:2003. Drift in calibration did not exceed ± 0.3 dBA.

Each attended noise measurement was conducted for 15-minutes in duration during the day and night periods over two days. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

4. RESULTS AND DISCUSSION

4.1 Location R2

Noise monitoring at location R2 was conducted on Monday 13 November 2023 and Tuesday 14 November 2023. Noise from the quarry was audible during the day period up to a SPL of 38 dBA, and the estimated LAeq contribution remained below criteria. The quarry was not operational during the night period. The results meet the established noise criteria and indicate that noise emissions from Dubbo Quarry did not contribute to noise nuisance at the time of the monitoring.

The results and observations taken during the monitoring events at Location R2 are presented in **Table 4-1**. Measured ambient noise sources include wind, birds, insects, cows, frogs, and a rooster.

Table 4-1: Noise survey results and observations for Location R2

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dubbo Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Dubbo Quarry LAmix Contribution (dBA)	LAmix Criteria (dBA)
		LAmix	LAeq	LA90						
13-11-23	3:12pm to 3:27pm (Day)	69.7	40.7	35.8	WD: 215° WS: 3.6 m/s Rain: Nil	Wind gust 56 Bird 52 Insects 37 Quarry audible <38	<26	44	n/a	n/a
14-11-23	5:18am to 5:33am (Night)	55.6	44.1	36.3	WD: n/a WS: 0 m/s Rain: Nil	Wildlife (birds, rooster, cows, frogs) 36-47 Quarry not operational	n/a ¹	35	n/a ¹	52

¹ Quarry not operational.

4.2 Location R3

Noise monitoring at location R3 was conducted on Monday 13 November 2023 and Tuesday 14 November 2023. Noise from the quarry was inaudible during the day period. The quarry was not operational during the night period. The results meet the established noise criteria and indicate that noise emissions from Dubbo Quarry did not contribute to noise nuisance at the time of the monitoring.

The results and observations taken during the monitoring events at Location R3 are presented in **Table 4-2**. Measured ambient noise sources include wind, rustling leaves, birds, insects, and a rooster.

Table 4-2 Noise survey results and observations for Location R3

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dubbo Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Dubbo Quarry LAmax Contribution (dBA)	LAmax Criteria (dBA)
		LAmax	LAeq	LA90						
13-11-23	2:52pm to 3:07pm (Day)	52.0	38.8	35.0	WD: 215° WS: 1.2 m/s Rain: Nil	Birds 37-42 Wind/rustling leaves 36-43 Quarry inaudible	<25	43	n/a	n/a
14-11-23	4:55am to 5:10am (Night)	52.4	37.4	32.2	WD: n/a WS: 0 m/s Rain: Nil	Birds/insects 33-37 Rooster 41 Quarry not operational	n/a ¹	37	n/a ¹	52

¹ Quarry not operational.

4.3 Location R4

Noise monitoring at location R4 was conducted on Monday 13 November 2023 and Tuesday 14 November 2023. Noise from the quarry was audible during the day period. The quarry was not operational during the night period. The results meet the established noise criteria and indicate that noise emissions from Dubbo Quarry did not contribute to noise nuisance at the time of the monitoring.

The results and observations taken during the monitoring events at Location R4 are presented in **Table 4-3**. Measured ambient noise sources include a bird, wind/rustling leaves, the MARS quarry in between the monitoring location and the Holcim quarry, and a generator running near the house at the monitoring location.

Table 4-3: Noise survey results and observations for Location R4

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dubbo Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Dubbo Quarry LAmax Contribution (dBA)	LAmax Criteria (dBA)
		LAmax	LAeq	LA90						
13-11-23	3:56pm to 4:11pm (Day)	60.5	45.8	41.7	WD: 235° WS: 3.1 m/s Rain: Nil	Bird 42 Wind/rustling leaves 42-46 Adjacent MARS quarry 43-53 Quarry inaudible	<32	41	n/a	n/a
14-11-23	4:29am to 4L44am (Night)	66.2	41.4	39.1	WD: n/a WS: 0 m/s Rain: Nil	Generator running near house (continuous) 38-42 Quarry not operational	n/a ¹	35	n/a ¹	52

¹ Quarry not operational.

4.4 Location R5

Noise monitoring at location R5 was conducted on Monday 13 November 2023 and Tuesday 14 November 2023. Noise from the quarry was audible during the day period. The quarry was not operational during the evening period. The results meet the established noise criteria and indicate that noise emissions from Dubbo Quarry did not contribute to noise nuisance at the time of the monitoring.

The results and observations taken during the monitoring events at Location R5 are presented in **Table 4-4**. Measured ambient noise sources include barking dogs, sheep, wind gusts, an aircraft, a truck, and other road traffic on Wellington Road.

Table 4-4: Noise survey results and observations for Location R5

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Dubbo Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Dubbo Quarry LAmx Contribution (dBA)	LAmx Criteria (dBA)
		Lamax	Laeq	LA90						
13-11-23	2:21pm to 2:36pm (Day)	67.7	43.6	34.4	WD: 210° WS: 3.4 m/s Rain: Nil	Truck on road 55 Barking dogs 44 Sheep 40-42 Wind gust 48 Aircraft 66 Quarry inaudible	<24	41	n/a	n/a
14-11-23	4:02am to 4:17am (Night)	65.4	43.4	27.1	WD: 80° WS: 0.6 m/s Rain: Nil	Road traffic (sporadic) <58 Quarry not operational	n/a ¹	35	n/a ¹	52

¹ Quarry not operational.

5. CONCLUSION

This NMA was completed by Ramboll for the Holcim Dubbo Quarry, Dubbo, NSW as an annual requirement of the NMP.

Monitoring was carried out on Monday 13 and Tuesday 14 November 2023 at four locations selected as representative to the sensitive receptors at the surroundings to Dubbo Quarry.

No audible noise from quarry operations was recorded at any of the four locations during the day, except at R2 where the quarry was audible up to SPL 38 dBA. The estimated quarry contribution at R2 was <26 LAeq(15min) dBA which remains under the criteria of 44 LAeq(15min) dBA. The quarry was not operational during the night period.

The results presented in this NMA show compliance with the relevant noise criteria applicable to operations of the Holcim Dubbo Quarry, Dubbo, NSW.

6. REFERENCES

EMM Consulting Pty Ltd (2023) *Noise Management Plan, Dubbo Quarry, Holcim (Australia) Pty Ltd*.

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