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QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 1 2023

TEVEN QUARRY, TEVEN, NSW

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TEVEN QUARRY, TEVEN, NSW

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Description	**Data collected on 10 and 11 January 2023 for Teven Quarry during Quarter 1 2023 in Teven, NSW, as part of the noise monitoring program**

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CONTENTS

Tables

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).
LAmax	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

Source: Noise Guide for Local Government (NSW EPA, 2013)

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 Teven Quarry ("the quarry") at Teven, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Teven Quarry Noise Management Plan (NMP) (Holcim Australia, 2021).
- Environment Protection Licence (EPL) number 3293 (NSW EPA, 2021).
- Development Consent Application Number SSD_6422 (Minister for Planning and Environment, 2015).
- 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 in accordance with the NMP for the quarterly period January to March 2023 and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

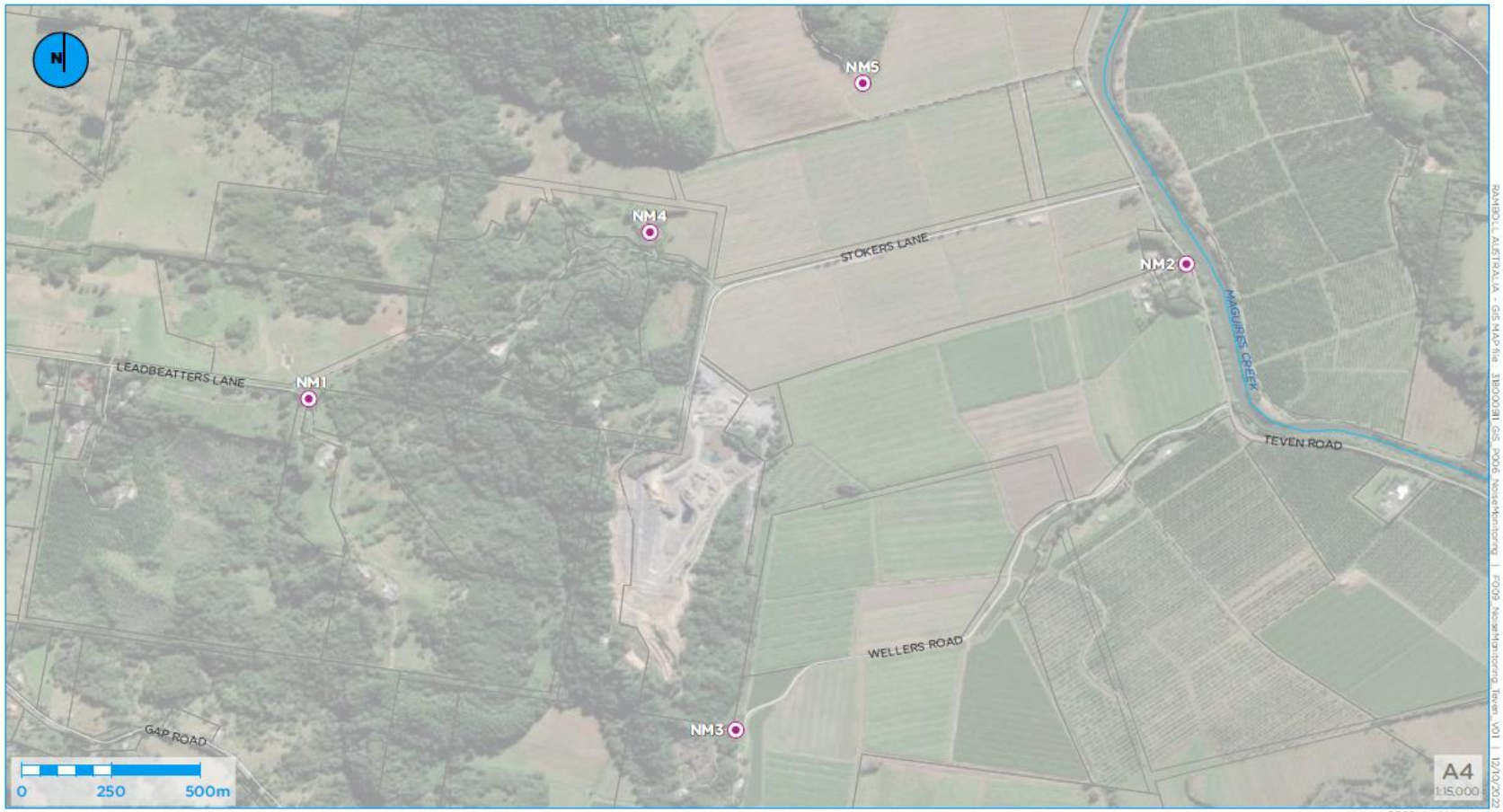
1.2 Site Location and Sensitive Receptors

The quarry is in Teven, NSW, approximately 7 km west of Ballina, NSW. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography. Five monitoring locations have been selected as part of the NMA and in accordance with the EPL and Development Consent and are shown in **Table 1-1**.

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Locations	Nearest Receiver	Locality and Sensitive Receptors
NM1	R7	West of the quarry situated at a rural residential property at the end of Leadbeatters Lane
NM2	R3/R4	East of the quarry situated at a rural residential property on Teven Road
NM3	R2	South of the quarry situated at a rural residential property at the end of Wellers Road
NM4	R10	North of the quarry situated at a rural residential property adjacent the site off Stokers Lane
NM5	R14	Northeast of the quarry situated at a rural residential property of Teven Road

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



Legend

- Noise monitoring location

Figure 1 : Noise monitoring locations at Teven Quarry

2. NOISE CRITERIA

Table 2-1 summaries the applicable noise criteria outlined in the NMP and Development Consent for residential receivers (NM1, NM2, NM3, NM4, NM5) surrounding the quarry.

Table 2-1: Monitoring locations and noise criteria

Receivers	Monitoring Locations	Day[1]	Evening[2]
		LAeq (15min)	LAeq (15min)
		Db(A)	
R3, R4, R13, R15, R16, R17, R18, R20	NM2	38	35
All other receivers	NM1, NM3, NM4, NM5	37	35

[1] 7 am–6 pm Monday to Saturday and 8 am–6 pm Sunday and public holidays

[2] 6 pm–10 pm Monday to Sunday

3. METHODOLOGY

The monitoring program was created in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Tuesday 10 January 2023 and Wednesday 11 January 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 also carried a current NATA calibration and complies with IEC 60942:2003. Drift in calibration did not exceed ±0.3 dBA.

Attended noise monitoring was conducted for 15-minute periods at each location over two days. As per the NMP, two sets of measurements were completed during the day, and two sets of measurements were completed during the evening, at each monitoring location. It is noted that the quarry was not operational during the evening periods, however, monitoring was conducted as per requirements of the EPL.

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, or estimated to be less than criteria value.

4. RESULTS AND DISCUSSION

4.1 Location NM1

Noise monitoring at location NM1 was completed on Tuesday 10 January 2023 and Wednesday 11 January 2023. The quarry was not audible during any monitored period during the day and evening. These results indicate that noise emissions from Teven Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring event at Location NM1 are presented in Table 4-1. Noise sources included wind, cars, birds and insects.

Table 4-1: Noise survey results and observations for Location NM1

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Teven Quarry Contribution (LA1sec) (dBA)	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90				
11-01-23	9:56 (Day)	70.2	51.3	42.2	WD: 315° WS: 1.2 m/s Rain: Nil	Wind 43-49 Insects 41-55 Birds 48-60 Car 54 Quarry inaudible	Inaudible	37
11-01-23	10:12 (Day)	71.5	54.0	49.5	WD: 315° WS: 2.1 m/s Rain: Nil	Wind 41-54 Insects 47-59 Birds 52-66 Quarry inaudible	Inaudible	37
10-01-23	19:00 (Evening)	61.7	51.4	43.5	WD: 270° WS: 1.4 m/s Rain: Nil	Wind 44-61 Birds 46-51 Insects 46-49 Quarry inaudible	Inaudible	35
10-01-23	19:16 (Evening)	70.1	48.2	42.1	WD: 270° WS: 1.7 m/s Rain: Nil	Wind 43-52 Insects 44-47 Car 45-51 Quarry inaudible	Inaudible	35

4.2 Location NM2

Noise monitoring at location NM2 was completed on Tuesday 10 January 2023 and Wednesday 11 January 2023. The quarry was not audible during any monitored period during the day and evening periods. These results indicate that noise emissions from Teven Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location NM2 are presented in Table 4-2. Noise sources measured included birds, machinery, insects, fish jumping and cars and trucks passing on Teven Road.

Table 4-2: Noise survey results and observations for Location NM2

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Teven Quarry Contribution (LA1sec) (dBA)	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90				
11-01-23	12:07 (Day)	83.6	61.4	44.7	WD: 315° WS: 1.1 m/s Rain: Nil	Cars passing 57-78 Birds 53 Wind 48-54 Machinery 50-52 Holcim truck 82 Quarry inaudible	Inaudible	38
11-01-23	12:24 (Day)	83.4	60.8	41.1	WD: 315° WS: 1.1 m/s Rain: Nil	Cars/trucks 61-84 Wind 40-46 Birds 43-58 Quarry inaudible	Inaudible	38
10-01-23	20:53 (Evening)	81.4	51.8	42.1	WD: 270° WS: 1.8 m/s Rain: Nil	Vehicle 47-77 Wind 40-46 Fish in creek 42-44 Insects 42-46 Quarry inaudible	Inaudible	35
10-01-23	21:09 (Evening)	81.5	53	41.8	WD: 0° WS: 1.7 m/s Rain: Nil	Wind 43-48 Insects 42-44 Car 52-80 Quarry inaudible	Inaudible	35

4.3 Location NM3

Noise monitoring at location NM3 was completed on Tuesday 10 January 2023 and Wednesday 11 January 2023. The quarry was not audible during any monitored period during the day and evening periods. These results indicate that noise emissions from Teven Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location NM3 are presented in Table 4-3. Noise sources measured included aircrafts, distant road traffic and chirping insects (mostly cicada). Insects were the dominant noise source.

Table 4-3: Noise survey results and observations for Location NM3

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Teven Quarry Contribution (LA1sec) (dBA)	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90				
11-01-23	12:46 (Day)	79.8	56.8	41.3	WD: 315° WS: 1.6 m/s Rain: Nil	Insects 46-62 Wind 47-54 Aircraft 80 Quarry inaudible	Inaudible	37
11-01-23	1:05 (Day)	63.9	50.6	44.7	WD: 315° WS: 3.7 m/s Rain: Nil	Insects 47-54 Wind 44-57 Quarry inaudible	Inaudible	37
10-01-23	21:28 (Evening)	64.4	43.3	41.6	WD: 0° WS: 0.8 m/s Rain: Nil	Insects 39-43 Wind 41-45 Motorway from afar 39-42 Quarry inaudible	Inaudible	35
10-01-23	21:44 (Evening)	87.6	52.7	41.6	WD: 0° WS: 1.7 m/s Rain: Nil	Insects 41-44 Wind 40-44 Motorway traffic from afar 38-43 Sneeze 88 Quarry inaudible	Inaudible	35

4.4 Location NM4

Noise monitoring at location NM4 was completed on Tuesday 10 January 2023 and Wednesday 11 January 2023. The quarry was inaudible during the evening period. During noise monitoring at location NM4 during the day period, the quarry was audible from the production area above the established noise criteria. It should be noted that the monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident. The results and observations taken during the monitoring events at Location NM4 are presented in Table 4-4. Noise sources measured included birds, wind, aircraft, passing trucks, passing cars and insects.

Table 4-4: Noise survey results and observations for Location NM4

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Teven Quarry Contribution (LA1sec) (dBA)	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90				
11-01-23	11:25 (Day)	86.6	58.8	47.6	WD: 315° WS: 1.4 m/s Rain: Nil	Insects (mostly cicadas) 56-67 Wind 46-58 Aircraft 48-50 Truck 59 Quarry audible (production area) 46	46	37
11-01-23	11:41 (Day)	65.9	55.1	47.8	WD: 315° WS: 3.1 m/s Rain: Nil	Insects 56-66 Wind 47-59 Birds 48 Quarry audible (production area) 46	46	37
10-01-23	20:01 (Evening)	73.3	54.3	45.1	WD: 270° WS: 2.4 m/s Rain: Nil	Insects (mostly cicadas) 46-58 Car 52-74 Wind 43-47 Quarry inaudible	Inaudible	35
10-01-23	20:36 (Evening)	64	46.5	44	WD: 270° WS: 3.5 m/s Rain: Nil	Insects (mostly cicadas) 44-57 Wind 46-48 Quarry inaudible	Inaudible	35

4.5 Location NM5

Noise monitoring at location NM5 was completed on Tuesday 10 January 2023 and Wednesday 11 January 2023. The quarry was inaudible during the evening period. These results indicate that noise emissions from Teven Quarry did not contribute to noise nuisance during this time. During noise monitoring at location NM5 during the day period audible quarry noise was observed from the production area. It should be noted that NM5 is a farm shed and not a living residence, so it is unlikely these noise emissions from Teven Quarry contributed to a noise nuisance at this time. The results and observations taken during the monitoring events at Location NM5 are presented in Table 4-5. Noise sources measured included birds, wind, insects, aircraft, passing trucks, and aircraft.

Table 4-5: Noise survey results and observations for Location NM5

Date	Time (hrs)	Descriptor (dBA)			Meteorology	Description and SPL, dBA	Teven Quarry Contribution (LA1sec) (dBA)	LAeq(15min) Criteria
		LAmax	LAeq	LA90				
11-01-23	10:40 (Day)	68.4	47.5	42.5	WD: 315° WS: 3.6 m/s Rain: Nil	Wind 44-52 Insects 44-49 Birds 45 Aircraft 52-60 Quarry audible (production area) 46	46	37
11-01-23	10:56 (Day)	78.7	47.2	40.4	WD: 315° WS: 2.6 m/s Rain: Nil	Wind 43-49 Insects 39-41 Birds 40-42 Aircraft 45-52 Quarry audible (production area) 46	46	37
10-01-23	19:43 (Evening)	69.8	47.4	36.8	WD: 270° WS: 1.2 m/s Rain: Nil	Wind 44-51 Insects 39-60 Birds 35-38 Quarry inaudible	Inaudible	35
10-01-23	20:18 (Evening)	81.6	52	40.2	WD: 270° WS: 0.7 m/s Rain: Nil	Wind 39-51 Insects 40-56 Birds 40-43 Quarry inaudible	Inaudible	35

5. CONCLUSION

This NMA completed by Ramboll at the Holcim Teven Quarry, Teven, NSW as a quarterly requirement of the NMP. Noise monitoring was completed out on Tuesday 10 January 2023 and Wednesday 11 January 2023 at five locations selected as representative to the sensitive receptors at the surroundings to Teven Quarry.

Noise was audible during the day periods at NM4 and NM5. Monitoring at NM4 was completed at the gate of the residence, in direct line-of-site of the quarry. This location will be moved within closer proximity of the resident for subsequent monitoring periods. The quarry was audible at NM5 during the day monitoring period, but it is noted that this receptor is a farm shed rather than a residence. The quarry was not audible at any other location or period during the monitoring campaign.

6. REFERENCES

Holcim Australia (2021) *Teven Quarry, Noise Management Plan*.

Minister for Planning and Environment (2015) 'Development Consent SSD_6422, Teven Quarry Project'.

NSW EPA (2021) Environment Protection Licence number 3293.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority. Available at: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20130127nglg.pdf (Accessed: 25 October 2022).

NSW EPA (2017) *Noise Policy for Industry (NPfI)*. Sydney NSW: NSW Environment Protection Authority. Available at: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf (Accessed: 25 October 2022).

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard. Available at: https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503_SAIG_AS_AS_2626154 (Accessed: 19 January 2023).

Standards Australia (2003) *AS 60942:2003 Electroacoustics - Sound calibrators.* Australian Standard.