

ANNUAL REVIEW**1 January 2020 – 31 December 2020****Cooma Road Quarry**

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SITE DETAILS

Name of operation	Cooma Road Quarry
Name of operator	Holcim (Australia) Pty Ltd
Development consent / project approval #	SSD 5109
Name of holder of development consent / project approval	Holcim (Australia) Pty Ltd
Annual review start date	1 January 2020
Annual review end date	31 December 2020
I, ADAM BERTRAM, certify that this audit report is a true and accurate record of the compliance status of the COOMA ROAD QUARRY for the period of 1 JANUARY 2020 – 31 DECEMBER 2020 and that I am authorised to make this statement on behalf of HOLCIM (AUSTRALIA) PTY LTD. Note. a) <i>The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i> b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</i>	
Name of authorised reporting officer	Adam Bertram
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Revision 1 Document Date	27/05/2021

1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2020 reporting period for the Cooma Road Quarry is provided in **Table 1**. **Table 3** details the non-compliances at the Cooma Road Quarry identified within the 2020 reporting period, with the compliance status key provided in **Table 2**.

Table 1: Statement of Commitments

Were all conditions of the relevant approval(s) complied with?	
SSD 5109	NO - see Table 3 for further details.
EPL 1453	YES

Table 2: DPIE Compliance Status Key

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: - potential for serious environmental consequences, but is unlikely to occur; or - potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: - potential for moderate environmental consequences, but is unlikely to occur; or - potential for low environmental consequences, but is likely to occur
Admin NC	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 3: Non-Compliances of SSD 5109 for 2020

Relevant approval	Condition	Condition Description	Compliance Status	Section Addressed in Annual Review/Comment									
SSD 5109	Air Quality Criteria	Schedule 3 Condition 14 – Air Quality Criteria		Low Risk Non-Compliance	Section 6.3 Air Quality Missed monitoring events in 2020 from the PM ₁₀ and TSP monitoring program due to a change in environmental monitoring contractor and severe regional bushfires. Sampling event at DDG4 in November 2020 due to vandalism of monitoring equipment.								
		<table><tr><th>Pollutant</th><th>Averaging Period</th><th>^d Criterion</th></tr><tr><td>Total Suspended particulate (TSP)</td><td>Annual</td><td>^a90 µm/m³</td></tr><tr><td>Particulate matter < 10 µm (PM₁₀)</td><td>Annual</td><td>^a 30 µm/m³</td></tr></table>	Pollutant			Averaging Period	^d Criterion	Total Suspended particulate (TSP)	Annual	^a 90 µm/m ³	Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µm/m ³
		Pollutant	Averaging Period			^d Criterion							
		Total Suspended particulate (TSP)	Annual			^a 90 µm/m ³							
		Particulate matter < 10 µm (PM ₁₀)	Annual			^a 30 µm/m ³							
		<table><tr><th>Pollutant</th><th>Averaging Period</th><th>^d Criterion</th></tr><tr><td>Particulate matter < 10 µm (PM₁₀)</td><td>24 hour</td><td>^a 50 µm/m³</td></tr></table>	Pollutant			Averaging Period	^d Criterion	Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µm/m ³			
		Pollutant	Averaging Period			^d Criterion							
		Particulate matter < 10 µm (PM ₁₀)	24 hour			^a 50 µm/m ³							
		<table><tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr><tr><td>^c Deposited dust</td><td>Annual</td><td>^b2 g/m²/month</td><td>^a 4 g/m²/month</td></tr></table>	Pollutant			Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level	^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month	
		Pollutant	Averaging Period			Maximum increase in deposited dust level	Maximum total deposited dust level						
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month										
Notes to Tables 4-6:													
^a Total impact (ie incremental increase in concentrations due to the development plus background concentrations due to all other sources);													
^b Incremental impact (ie incremental increase in concentration due to the development on its own);													
^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia AS/NZS 3850:10.1.2003 – Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method													
^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.													

Relevant approval	Condition	Condition Description	Compliance Status	Section Addressed in Annual Review/Comment
SSD 5109	Water Management	Schedule 3 Condition 20 – Groundwater Monitoring Program The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with the EPA and DoI – Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval within 6 months of the date of this consent. This plan must include a: 3. Groundwater Monitoring Program that includes: • baseline data of groundwater levels surrounding the development; • groundwater assessment criteria based upon analysis of baseline data for groundwater, including trigger levels for investigation of any potentially adverse groundwater impacts; and • a program to monitor and/or validate the impacts of the development on groundwater resources;	Low Risk Non-Compliance	Section 7 Groundwater monitoring program was not implemented in 2020 due to being in its planning and assessment phase and difficulty in sourcing contractors due to COVID 19. A total of four bores were installed in early 2021 and quarterly groundwater monitoring will commence in June 2021.
SSD 5109	Rehabilitation Management Plan	Schedule 3 Condition 24 – Rehabilitation Management Plan The Applicant must prepare a Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must: (c) describe the short, medium and long term measures that would be implemented to: • manage remnant vegetation and habitat on site; • ensure compliance with the rehabilitation objectives and progressive • rehabilitation obligations in this consent; (d) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, including triggering remedial action (if necessary); (e) include a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:	Administrative Non-Compliance	Section 5.3 and Section 8 Nest box monitoring was not undertaken in this Annual Review period. Planning for the installation of 51 nest boxes commenced in 2020, with this including the construction and design of these nest boxes. Top quality marine wood was used in the manufacturing of these nest boxes and the sourcing of this wood took longer than expected. However, the installation did not commence until 2021, outside of the report period, making it non-compliant. This has been clarified in the May 2021 resubmission.

Relevant approval	Condition	Condition Description	Compliance Status	Section Addressed in Annual Review/Comment
		- ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent; - enhancing the quality of remnant vegetation and fauna habitat; - establishing vegetation screening to minimise the visual impacts of the site on surrounding receivers; - restoring native endemic vegetation and fauna habitat within the rehabilitation area; - maximising the salvage of environmental resources within the approved disturbance area – including tree hollows, vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area; - collecting and propagating seed; - minimising the impacts on native fauna on site; - controlling weeds and feral pests; - controlling erosion; - controlling access; and - bushfire management; (f) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;		

2 INTRODUCTION

Holcim (Australia) Pty Ltd (Holcim) operates the Cooma Road Quarry, a hard rock quarry located on Old Cooma Road in the Queanbeyan Local Government Area. The site operates under Development Consent (SSD 5109) approved by the New South Wales (NSW) Department of Planning & Infrastructure (now Department of Planning, Industry & Environment [DPIE]) on 27 September 2013.

The site also operates in accordance with the Environmental Protection Licence (EPL) No. 1453 issued by the NSW Environment Protection Authority (EPA). A regional locality figure and aerial view of the site are outlined in **Figure 1** and **Figure 2** below.



Figure 1: Locality Map (Umwelt 2014)



Figure 2: Aerial view of the Cooma Road Quarry, located on Old Cooma Road, Queanbeyan

In accordance with Schedule 5 Condition 9 of the modified Development Consent the site is required to prepare an Annual Review of the site in accordance with the conditions provided in **Table 4**.

Table 4: Annual Review Requirements

Condition	Section addressed in Annual Review
By the end of March each year, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:	
a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;	Section 4 and 6
b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the: - relevant statutory requirements, limits or performance measures/criteria; - the monitoring results of previous years; and - the relevant predictions in the EIS.	Section 6, 7 and 9.3
c) identify any noncompliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 1
d) identify any trends in the monitoring data over the life of the development	Section 6 and 7
e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6
f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	Section 12

This Annual Review has also been prepared in accordance with the *Annual Review Guideline: Post-approval requirements for State significance mining developments* (October 2015). This report documents the environmental performance of the quarry from 1 January to 31 December 2020.

2.1 Name and Contact Details

The key contact details for the site are outlined below:

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3 APPROVALS

The site operates under the following approvals listed in **Table 5**.

Table 5: Approvals for the Cooma Road Quarry Operations

Approval	Regulatory Authority
Development Consent SSD 5109	Department of Planning, Industry & Environment
EPL No. 1453	Environment Protection Authority
Water Approval No. 40WA413082	NSW Department of Industry - Water

Holcim holds **EPL 1453** which covers its activities at the Cooma Road Quarry. **Table 6** outlines these licensing limits. The EPL was varied by the EPA on 17 April 2018 enabling the site to receive **Virgin Excavated Natural Material (VENM)** to match Development Consent Modification approved in 2016. The second Modification of Development Consent SSD 5109 was approved on the 30 April 2019 by DPIE.

Table 6: EPL Fee-Based Activity at the Cooma Road Quarry

Fee Based Activity	Scale
Crushing, grinding or separating	>500,000 T – 2,000,000 T processed
Land-based extractive activity	>500,000 T – 2,000,000T extracted, processed or stored

4 OPERATIONS SUMMARY

4.1 Exploration

No exploration occurred at the Cooma Road Quarry in the 2020 reporting period.

4.2 Land Preparation

No land preparation activities occurred at the Cooma Road Quarry in the 2020 reporting period.

4.3 Construction Activities

No construction activities occurred at the Cooma Road Quarry in the 2020 reporting period.

4.4 Quarry Operations

Development activities undertaken at the Cooma Road Quarry in 2020 included:

- Stripping of topsoil and overburden within the existing extraction limit boundary;
- Drill, Blast, Load and Haul Activities;
- Crushing, screening and stockpiling of product;
- Overburden removal and replacement in the southwest overburden dump;
- Maintenance of rehabilitation undertaken on the overburden dump in the south-western disturbance area; and
- Increasing the size of the Granite Pit.

All activities took place in accordance with the approved operating hours being 6am to 6pm, Monday to Saturday. These 6am-6pm timeframes applied to all operational activities where no crushing, screening or vehicle movements occurred after 6pm and before 6am.

Operating hours relating to Cooma Road are outlined in **Table 7**.

Table 7: Cooma Road Operating Hours

<i>Activity</i>	<i>Operating Hours</i>		
	<i>Monday - Friday</i>	<i>Saturday</i>	<i>Sunday and Public Holidays</i>
<i>Primary Crushing, Truck Departures</i>	6 am – 6 pm	6 am – 6 pm	None
<i>Construction Operations</i>	7 am – 6 pm	8 am – 1 pm	
<i>Return Truck Movements</i>	6 am – 8 pm	6 am – 8 pm	
<i>Other Operations</i>	6 am – 10 pm	6 am – 10 pm	

Table 8 includes a summary of the operations undertaken during the reporting period against the Development Consent conditions regarding product transported from the Cooma Road Quarry, with the site well below the consent criteria.

Table 8: Total Product Distributed (Cooma Road Quarry)

Material	Approval Limit (Tonnes)	2018 Reporting Period (Tonnes)	2019 Reporting Period (Tonnes)	2020 Reporting Period (Tonnes)
Product Distributed - Total	1,500,000	735,978	803,272	1,105,376

4.5 Next Reporting Period

Development activities proposed to be carried out at the Cooma Road Quarry in the 2021 reporting period include:

- Stripping of topsoil and overburden within the existing extraction limit boundary (In both the Granite and Dacite Pits);
- Drill, blast, load and haul activities;
- Crushing, screening and stockpiling of product;
- Overburden removal and placement in the south-west overburden dump; and
- Maintenance of rehabilitation in the south-western disturbance area.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 Actions from 2019 Annual Review – DPIE Actions

Correspondence from DPIE was received 25 May 2020 in an email accepting the 2019 Annual Review. DPIE had no further comments at that time.

5.2 Actions from 2019 Annual Review – Holcim Proposed Actions

Table 9 outlines an update on the proposed Holcim actions from the previous 2019 Annual Review.

Table 9: Status Update on Proposed Holcim Actions

Improvement Measure and Activities	Works Undertaken	Section
Approval of the <i>Rehabilitation Management Plan</i> . The <i>Rehabilitation Management Plan</i> was submitted to DPIE, NOW and Council in 2019 but has not yet been approved. Holcim to follow up as required to get <i>Rehabilitation Management Plan</i> approved.	The updated Rehabilitation Management Plan was approved in 2020.	Section 8
Progressive Rehabilitation. The site will continue to progressively rehabilitate available areas.	No rehabilitation work performed in 2020.	Section 8
Maintenance of rehabilitation. Continued maintenance of rehabilitation in the completed overburden dump in the south-western disturbance area including weed control as well as nest box monitoring.	Existing rehabilitation, including the overburden dump, was maintained during the report period.	Section 8
Depositional Dust Gauge Review. A review of the current location for DDG 1 and DDG 4 will be undertaken during the next reporting period to determine if this gauge should be relocated to a more suitable position.	No activities were performed to contribute to this proposed action. Gauge review to occur in 2021.	Section 6
Groundwater monitoring. Completion of groundwater monitoring.	Planning activities around groundwater monitoring and establishment of ground water monitoring criteria was initiated in the reporting period in conjunction with consultation with DPIE. A ground water assessment was started in 2020. Preparation activities for drilling started in 2020 for commencement in 2021. Ground water monitoring will commence in 2021.	Section 9
Weed spraying will continue at site during the next Annual Review period. Implementation of the <i>Rehabilitation Management Plan</i> .	Weed spraying continued to occur in 2020. The Rehabilitation Management Plan (2020) was implemented. Management measures and controls were implemented including ongoing feral animal inspections, habitat reinstatement, and erosion and sediment control.	Section 6.6

Holcim will initiate a round of monitoring to assess the effectiveness of the 51 nest boxes that have previously been installed around the quarry. Holcim will continue to salvage fallen timber and boulders to promote increased habitat complexity in the rehabilitation areas.	Planning for the fixture of 51 nest boxes commenced in 2020, however the installation of these began in March 2021. Nest box monitoring to assess their effectiveness will commence after this 2020 reporting period.	Section 6.6
Rehabilitation monitoring to be completed in 2020 as per the <i>Rehabilitation Management Plan</i> .	Rehabilitation monitoring was undertaken in 2020. Rehabilitation and ecological assessments were also undertaken in 2020 by an external consultant.	Section 8

5.3 Actions for this 2020 Annual Review

Table 10 addresses the sections in this Annual Review which have been revised upon request from DPIE.

Table 10: Required actions from DPIE for this Annual Review (2020)

Summary of DPIE Requirement	Action DPIE Query	Section Addressed and Updated
<u>Water Management</u> The date of approval and implementation of the Water Management Plan are clarified.	Update the Annual Review to reflect the date the Department approved the Cooma Road WMP. Or provide a copy of the Department's approval of the WMP from the third quarter of 2020.	<u>Section 7</u> The approval date of the WMP has been corrected to 12 August 2019.
	Update the Annual Review to clearly state whether groundwater monitoring commenced in the reporting period, in accordance with the WMP.	<u>Section 1</u> This section remains the same as it accurately reflects the status of the WMP at Cooma Road Quarry in this report period. DPIE's advice on the WMP is included.
	Provide the Department's advice on the WMP.	<u>Section 5.2, including Table 9</u> Amended to reflect the general consultation process Holcim undertook with DPIE regarding water management at Cooma Road. This section is synthesised with the entire report to include a summary of how the WMP was not implemented at Cooma Road during the reporting period.
		<u>Section 7.5</u> Groundwater monitoring summary for the report period clarified, including whether the Groundwater Monitoring Program or Groundwater Assessment was undertaken.
<u>Biodiversity</u> Further clarification is provided on the	Please update the Annual Review to clarify whether nest box monitoring was undertaken in the 2020	<u>Section 1</u> A non-compliance is added to Table 3 regarding Schedule 3 Condition 24 (Rehabilitation Management Plan) of

implementation of the Rehabilitation Management Plan, including the nest box monitoring program	reporting period in accordance with the RMP.	the Development Consent. This is consistent with Section 6.6.3.
		<u>Section 5.2, including Table 9</u> Amended to clarify the status of nest box monitoring in the reporting period.

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

Meteorological monitoring was undertaken at Cooma Road Quarry using a weather station on the Project site. The site uses results from this weather station to inform daily operational activities, and to control potential impacts around noise and air quality. Results from this meteorological monitoring station for the report period are summarised in **Table 11**.

Table 11: 2020 Rainfall Observed at Cooma Road Quarry

Monthly Rainfall (mm)												Total 2020
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
29	89	93	68	18.5	45	23	62	39	124	97	32	719.5

6.2 Noise

6.2.1 EIS Predictions

The 2012 EIS stated that *'Modelling results indicate that under worst case operational and meteorological conditions, with the implementation of the noise management measures outlined above, the Project is predicted to result in an exceedance of the PSNLs at one privately owned residence located to the south east of the Project area (N67) of up to 4dB during the day time period. If the secondary crushing plant were to be operated during the evening under worst case meteorological conditions, this same residence could be expected to experience exceedances of up to 3dB during the evening period. Holcim is however committed not to operate the secondary crushing plant under such conditions, namely gradient winds from the north east, thereby avoiding this potential impact.'*

6.2.2 Approved Criteria

The site has undertaken quarterly noise monitoring throughout 2019 in accordance with the Noise Management Plan. The Approved noise criteria from the Development Consent (Schedule 3 Condition 4) are provided in **Table 12**.

Table 12: Cooma Road Quarry Noise Criteria (SSD 5109)

Receiver	Morning Shoulder 6 – 7 am	Day 7 am – 6 pm	Evening 6 – 10 pm
	LAeq (15 min)	LAeq (15 min)	LAeq (15 min)
N1, N7, N8, N56, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other receivers between N9 and N71 inclusive	36	38	35
All other receivers	35	35	35

Notes:

- To locate the receivers referred in Table 1 refer to Appendix 5 of the Development Consent.
- After the first review on any EPL granted for this development under Section 78 of the POEO Act, nothing in this approval prevents the EPA from imposing stricter noise limits on the quarrying operations on site under the EPL.

Appendix 9 of the Development Consent sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria. However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner/s to generate higher noise levels, and the Applicant has advised the Department in writing of these terms of this agreement.

6.2.3 Key Environmental Performance

Attended noise monitoring was undertaken quarterly at the Cooma Road Quarry by Muller Acoustic Consulting on the following dates:

- 5 and 6 February 2020;
- 22, 23, and 24 April 2020;
- 16 and 17 September 2020; and
- 9, 10, and 11 November 2020.

The compliance assessments for each monitoring location (N3, N8, N38, N60 and N67) are presented in **Appendix 1** and summarised in **Table 13**.

Cooma Road Quarry was not operational in the evening period of the duration of 2020 and therefore satisfied the minimum noise criterion of 35dBA. Non-quarry contributors to the noise survey results included birds, dogs, traffic and roadworks.

Table 13: Cooma Road Quarry Noise Results 2020

Assessment Period	Receiver No.	Quarrying Noise Criteria	Q1 Feb-20		Q2 Apr-20		Q3 Sep-20		Q4 Nov-20	
		LAeq _(15min)	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance
Morning Shoulder	N3	35	<30	✓	<35	✓	<35	✓	<35	✓
	N8	40	<35	✓	<35	✓	<40	✓	<35	✓
	N38	36	<35	✓	<35	✓	<36	✓	<35	✓
	N60	36	<35	✓	<36	✓	<36	✓	<35	✓
	N67	36	<35	✓	35	✓	<35	✓	<35	✓
Daytime	N3	35	<30	✓	<35	✓	<35	✓	<35	✓
	N8	44	<35	✓	<35	✓	<40	✓	<35	✓
	N38	38	<35	✓	<35	✓	<38	✓	<35	✓
	N60	38	<35	✓	<35	✓	<38	✓	<35	✓
	N67	41	<35	✓	<35	✓	<35	✓	34	✓
Evening	N3	35	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓
	N8	39	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓
	N38	35	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓
	N60	35	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓
	N67	35	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓	Quarry Not Operating	✓

Note: Monday to Saturday: Morning shoulder 6am to 7am; Day 7am to 6pm; Evening 6pm to 10pm. On Sunday's and Public Holidays: Day 8am to 6pm; Evening 6pm to 10pm.

All monitoring results for quarterly noise assessments have been undertaken in accordance with the conditions of consent. All results met the criteria of the Development Consent and have been attached as **Appendix 1** to this report.

Long-term Trends:

Noise monitoring results were consistent with previous years and continued to meet the Development Consent criteria. The site continues to effectively manage noise.

6.2.4 Management Measures

Management measures relating to noise are outlined within the Cooma Road Quarry Noise Management Plan. These include:

- Defined operating hours;
- Work restrictions during the early morning shoulder period;
- Monitoring for noise and meteorological conditions;
- Broadband reversing beepers;
- Training of staff and contractors; and
- Controlled blasting activities.

6.2.5 Proposed Improvements

There are no proposed improvements to noise management.

6.3 Air Quality

6.3.1 EIS Predictions

A comprehensive Air Quality assessment was undertaken for the Project by Sinclair Knight Merz (SKM) for the 2012 EIS. The results of the predictive air quality modelling have identified that the Project will comply with the relevant air quality criteria at all nearby sensitive receiver locations under worst case operating conditions.

6.3.2 Approved Criteria

Depositional dust monitoring conducted at Cooma Road Quarry is compared with the monitoring criteria stipulated in Schedule 3, Condition 14 of SSD 5109 and reproduced in **Table 14**.

Table 14: Depositional Dust Criteria

Table 6: Long-term impact assessment criteria for Deposited Dust (from Development Consent)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 4-6:

- ^a Total impact (i.e., incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- ^b Incremental impact (i.e., incremental increase in concentration due to the development on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia AS/NZS 3850:10.1.2003 – Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.

The site installed a **High Volume Sampling Unit (HVAS)** in late 2016 to monitor PM₁₀ in accordance with the criteria stipulated in Schedule 3, Condition 14 of SSD 5109 and listed in **Table 15**. HVAS air quality monitoring at the site has been undertaken throughout 2020.

Table 15: TSP and PM₁₀ Dust Criteria

Table 4: Long-term impact assessment criteria for Particulate Matter (from Development Consent)

Pollutant	Averaging Period	^d Criterion
Total Suspended particulate (TSP)	Annual	^a 90 µm/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µm/m ³

Table 5: Short-term impact assessment criteria for Particulate Matter (from Development Consent)

Pollutant	Averaging Period	^d Criterion
Particulate matter < 10 µm(PM ₁₀)	24 hour	^a 50 µm/m ³

6.3.3 Key Environmental Performance

The principle source of air pollution at the quarry is in the form of airborne dust, which arises from activities such as quarrying, vehicle movements and crushing. To minimise dust emissions associated with vehicle movements, Holcim continued to dampen haul roads and utilise the quarry's wheel wash facility.

6.3.3.1 Depositional Dust Monitoring

Depositional dust monitoring was undertaken at five depositional dust gauges at Cooma Road Quarry in 2020. Results for this monitoring are provided in **Table 16**.

Table 16: 2020 Dust Monitoring (Depositional Dust)

Date	Insoluble Solids (g/m ² /month)				
	DDG1	DDG2	DDG3	DDG4	DDG5
January 3, 2020	4.1	1.7	1.6	1	4.6
February 6, 2020	14.4*	8.2*	6.7*	8.2*	8.4*
March 5, 2020	6.2	2.8	2.2	11.2	2.4
April 6, 2020	2.3*	2.4*	1.6*	8.6*	1.3*
May 6, 2020	4.5	1.4	2.4	0.2	0.3
June 4, 2020	0.5	1.7	0.8	0.9	0.3
July 2, 2020	2.9	0.9	1.5	1.1	1.3
August 3, 2020	4.3	1.6	0.7	1.1	0.2
September 3, 2020	2.6	1.8	0.6	0.6	0.9
October 1, 2020	2.7	2.2	1.2	1.1	1.1
November 2, 2020	4.4	1.5	2.1	NS	1.3
December 3, 2020	4.1	3.1	1.6	1.3	2.8

Annual Average (including contaminated samples)	4.4	2.4	1.9	3.2	2.1
Minimum	0.5	0.9	0.6	0.2	0.2
Maximum	14.4	8.2	6.7	11.2	8.4
Annual Average excluding invalid samples caused by contamination or faulty equipment.	3.6	1.9	1.5	2.1	1.5

* indicates contaminated sample or sample impacted by faulty equipment. NS stands for "No Sample".

For the 2020 reporting period, all Annual Averages excluding invalid samples caused by contamination or faulty equipment were compliant with the consent criteria. The annual averages including contaminated samples for all monitoring locations except for DDG1 were also below the criteria level.

Results from all dust gauges were impacted by the local Canberra bushfires for February and are thus excluded from the annual average calculated by excluding invalid samples in **Table 16**. All gauges were noted as equipped incorrectly for April. DDG4 recorded no sample for November due to missing sampling equipment suspected to be the result of vandalism.

A review of the locations of DDG 1 and DDG4 began in 2020 to determine whether the gauges should be relocated to reduce dust results impacted by contamination such as bird droppings or insects.

A summary of depositional dust trends between 2017 and 2020 are outlined in **Table 17**.

Table 17: Depositional Dust Trends

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results (Contamination Removed) (g/m²/month)			
		2020	2019	2018	2017
DDG1	Insoluble Solids Reporting Period Average	3.6	4.9	3.8	3.1
	Max. Insoluble Solids	6.2	7.7	5.4	3.7
	Min. Insoluble Solids	0.5	2.8	1.9	2.1
DDG2	Insoluble Solids Reporting Period Average	1.9	2.2	1.7	1.8
	Max. Insoluble Solids	8.2	4.1	3.0	2.6
	Min. Insoluble Solids	0.9	1	0.7	0.9
DDG3	Insoluble Solids Reporting Period Average	1.9	2.1	1.5	0.8
	Max. Insoluble Solids	6.7	5	3.9	1.6
	Min. Insoluble Solids	0.6	0.3	0.5	0.4
DDG4	Insoluble Solids Reporting Period Average	2.1	3.6	4.2	2.1
	Max. Insoluble Solids	11.2	7.1	13.1	4.3
	Min. Insoluble Solids	0.2	1.7	0.3	0.8

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results (Contamination Removed) (g/m ² /month)			
		2020	2019	2018	2017
DDG5	Insoluble Solids Reporting Period Average	1.5	2.0	2.2	2.0
	Max. Insoluble Solids	8.4	4.1	6.1	3.8
	Min. Insoluble Solids	0.2	0.6	0.5	0.7

6.3.3.2 PM₁₀ Monitoring

Monitoring of PM₁₀ was undertaken at the quarry for the first full year in 2017 after the HVAS was installed in late 2016. Results for 2020 PM₁₀ monitoring are provided in **Table 18**.

Table 18: 2020 Dust Monitoring (PM₁₀)

Sample Date	PM ₁₀ (µg/m ³)	TSP (calculated)	PM ₁₀ Compliance Status
February 6, 2020	* 218	-	Exceeds 24hr Criterion. Significant amount of regional bushfire smoke.
February 25, 2020	10.3	24.7	Within Criteria
March 2, 2020	18.8	45.1	Within Criteria
March 8, 2020	35.1	84.2	Within Criteria
March 14, 2020	8.5	20.5	Within Criteria
March 20, 2020	27.5	66.0	Within Criteria
March 26, 2020	6.6	15.8	Within Criteria
April 1, 2020	7.1	17.0	Within Criteria
April 7, 2020	12.7	30.5	Within Criteria
April 13, 2020	29.4	70.6	Within Criteria
April 19, 2020	12.1	29.0	Within Criteria
April 25, 2020	6.3	15.1	Within Criteria
May 1, 2020	2.8	6.7	Within Criteria
May 7, 2020	3.2	7.7	Within Criteria
May 13, 2020	12.5	30.0	Within Criteria
May 19, 2020	5.0	12.0	Within Criteria
May 25, 2020	3.7	8.9	Within Criteria

May 31, 2020	6.3	15.1	Within Criteria
June 4, 2020	14.3	34.3	Within Criteria
June 12, 2020	20.2	48.5	Within Criteria
June 18, 2020	10.5	25.2	Within Criteria
June 24, 2020	6.8	16.3	Within Criteria
June 30, 2020	5.1	12.2	Within Criteria
July 6, 2020	7.8	18.7	Within Criteria
July 12, 2020	4.4	10.6	Within Criteria
July 18, 2020	11.1	26.6	Within Criteria
July 24, 2020	13.2	31.7	Within Criteria
July 30, 2020	6.0	14.4	Within Criteria
August 5, 2020	8.9	21.4	Within Criteria
August 11, 2020	5.8	13.9	Within Criteria
August 17, 2020	4.5	10.8	Within Criteria
August 23, 2020	3.7	8.9	Within Criteria
August 29, 2020	14.0	33.6	Within Criteria
September 4, 2020	21.8	52.3	Within Criteria
September 10, 2020	6.8	16.3	Within Criteria
September 16, 2020	21.8	52.3	Within Criteria
September 22, 2020	20.4	49.0	Within Criteria
September 28, 2020	6.3	15.1	Within Criteria
October 4, 2020	15.8	37.9	Within Criteria
October 10, 2020	6.8	16.3	Within Criteria
October 16, 2020	9.6	23.0	Within Criteria
October 22, 2020	17.2	41.3	Within Criteria
October 28, 2020	4.8	11.5	Within Criteria
November 3, 2020	15.5	37.2	Within Criteria
November 9, 2020	10.3	24.7	Within Criteria
November 15, 2020	13.5	32.4	Within Criteria

November 21, 2020	23.2	55.7	Within Criteria
November 27, 2020	25.9	62.2	Within Criteria
December 3, 2020	13.0	31.2	Within Criteria
December 9, 2020	21.4	51.4	Within Criteria
December 15, 2020	8.8	21.1	Within Criteria
December 21, 2020	12.0	28.8	Within Criteria
December 27, 2020	16.5	39.6	Within Criteria

53 sampling events for PM₁₀ were recorded in this 2020 report period. Several sampling events were missed in the first two months of 2020, with no valid results recorded in January, due to a transfer of environmental monitoring between contractors. Cooma Road exceeded the short term (24 hour) PM₁₀ criterion of 50 µg/m³ once for this period with a result of 218.0 µg/m³ recorded on 6 of February. This exceedance can be attributed to extreme bushfires the local region during January and February 2020. We have noted it as an exceedance, however other factors significantly contributed to the dust levels.

TSP is also included in this report in **Table 18** as per the requirements of the Development Consent. These results have been calculated rather than directly measured through the monitoring program at Cooma Road, using a conversion factor per the Cooma Road Air Quality Management Plan and consistent with the region. There are no long-term records to compare these results.

The 2020 annual average for PM₁₀ was 12.2 µg/m³, compared to 10.7 µg/m³ for 2019. A summary of average, minimum and maximum results from 2020 compared to results from previous years are outlined in **Table 19**.

Table 19: PM₁₀ Monitoring Trends

Monitoring Summary for Annual Review Period	Monitoring Results 2020 Period (µg/m ³)	Monitoring Results 2019 Period (µg/m ³)	Monitoring Results 2018 Period (µg/m ³)	Monitoring Results 2017 Period (µg/m ³)
PM ₁₀ Average	12.2	10.7	13.1	10.97
Max. PM ₁₀	35.1	37	80.3	35.9
Min. PM ₁₀	2.8	1.8	1	1.2

6.3.3.3 Long term Trends:

Depositional Dust

Holcim has monitored depositional dust on a monthly basis at five locations within the Cooma Road Quarry project area since 2001. Dust deposition data from the site shows that annual average dust deposition levels have remained below the Development Consent criteria of 4 g/m²/month. Depositional dust results for 2020 had a larger range than previous years, with higher maximum insoluble solids levels and lower minimum insoluble solids levels compared to 2017-2019. Monitoring results for 2020 remain consistent with long-term dust trends at Cooma Road Quarry.

PM₁₀

PM₁₀ results for 2020 are mostly consistent with previous years. There were two exceedances in the 24-hour criteria in 2019 and one in 2020. This 2020 exceedance was noted to be likely impacted by regional bushfires at the time of sampling. This reporting period has seen an increase in the annual

average, maximum, and minimum compared to previous years. Long-term monitoring results have been consistently below the consent criteria.

6.3.3.4 Comparison to EIS Predictions:

The results for annual average for depositional dust and PM₁₀ were within the predicted limits of the EIS predictions.

There was one occasion where the site was above the PM₁₀ short term criteria (6 February 2020). This was above the EIS predictions.

6.3.4 Management Measures

Mitigation measures relating to air quality are outlined within the Cooma Road Quarry *Air Quality Management Plan* (2019). The plan outlines the control measures implemented by Cooma Road Quarry to minimise the potential air quality impacts on the local community, including:

- Inspections;
- Defined operating hours;
- Application of water for dust suppression;
- Enclosure of plants and transfer points;
- Monitoring for air quality and meteorological conditions; and
- Training of staff and contractors.

6.3.5 Proposed Improvements

A review of the current dust gauge locations will be undertaken in 2021 to decrease the potential for contamination of air quality monitoring results.

6.4 Blasting

6.4.1 EIS Predictions

The 2012 EIS found that air blast and ground vibration levels would comply with relevant vibration and air blast criteria at all sensitive residential receivers through ongoing management of blast design and size.

6.4.2 Approved Criteria

According to both EPL 1453 and SSD 5109, the overpressure level from blasting operations must not exceed 115 dB (L) for more than 5% of the total number of blasts, at any residences or nearby receiver, and must not exceed 120 dB (L) at any time.

Ground vibration must not exceed 5 mm/s for 5% of the total number of blasts over a period of 12 months and must not exceed 10 mm/s at the nearby receiver.

6.4.3 Key Environmental Performance

Table 20 outlines the blast monitoring results at the Cooma Road Quarry during the Annual Review period.

Table 20: 2020 Blast Monitoring Results

Date	Heffernans House		Jerrabomberra		Compliance Status
	Overpressure (dBL)	Vibration (mm/s)	Overpressure (dBL)	Vibration (mm/s)	
15/01/2020	100.2	3	89.9	0.77	Compliant
24/01/2020	107.7	1.35	97.7	1.46	Compliant
4/02/2020	86.1	2.6	91.6	0.4	Compliant
14/02/2020	96.5	1.23	DNT	DNT	Compliant
21/02/2020	86.1	1.3	DNT	DNT	Compliant
28/02/2020	106.4	0.92	DNT	DNT	Compliant
17/03/2020	103	0.45	86.1	0.56	Compliant
30/03/2020	109.9	2.3	97.8	1.23	Compliant
7/04/2020	98.4	0.4	103	0.27	Compliant
17/04/2020	110	0.33	112.7	0.41	Compliant
6/05/2020	101.8	2.15	104.6	0.66	Compliant
19/05/2020	100.8	1.1	86.1	0.66	Compliant
29/05/2020	104.6	1.32	101.9	0.69	Compliant
2/06/2020	114.7	0.87	92.4	0.97	Compliant
16/06/2020	106.4	0.59	95.1	0.89	Compliant
23/06/2020	109	2.64	97.1	0.77	Compliant
7/07/2020	94.6	0.63	97.1	0.76	Compliant
21/07/2020	103	0.33	102	0.35	Compliant
28/07/2020	113.9	1.16	98.7	0.58	Compliant
29/07/2020	108.6	0.86	97.2	0.33	Compliant
19/08/2020	109	0.35	101.5	0.61	Compliant
28/09/2020	104.2	0.72	110	0.32	Compliant
1/09/2020	114.2	1.69	110	0.35	Compliant
16/09/2020	110.2	0.34	95.3	0.48	Compliant
19/09/2020	112.6	0.54	111.3	0.34	Compliant
13/10/2020	107.3	0.43	95.6	0.83	Compliant

3/11/2020	DNT	DNT	90.5	0.59	Compliant
13/11/2020	110	1	88.2	0.62	Compliant
27/11/2020	DNT	DNT	65.3	0.38	Compliant

DNT – Did not trigger

In summary:

- There were 29 blasts during 2020; and
- All blasts were compliant with the overpressure and vibration criteria.

Holcim alerts the nearest sensitive receivers within 24 hours of a proposed blast. This process is managed by the weighbridge staff who send a text message to the tenants the day before a planned blast is undertaken.

Long-term Trends:

Blasting levels from 2016 to 2020 measured at Heffernans House are compared in **Table 21**. In 2016 there was a non-compliance relating to a blast result of 119.8 dB. Zero non-compliances for blasting occurred in the subsequent years including this report period.

Table 21: Long-term Blasting Trends

Year	Heffernans House				
	Number of Blasts	Max. Overpressure (dBL)	Average Overpressure (dBL)	Max Vibration (mm/s)	Average Vibration (mm/s)
2016	9	119.8	102.6	1.98	0.88
2017	32	113.5	101.4	4.34	0.75
2018	16	113.5	102.8	3.55	0.98
2019	25	114.7	102.5	4.00	1.12
2020	29	114.7	104.8	3.0	1.1

Comparison to EIS Predictions:

The results for blasting in 2020 were within the predicted limits of the EIS.

6.4.4 Management Measures

Management measures relating to blasting are outlined within the Cooma Road Quarry *Blast Management Plan*. The *Blast Management Plan* provides a mechanism for assessing blast monitoring results against the relevant blast impact assessment criteria and outlines the control measures implemented as part of the continued operations of the quarry to minimise the potential for blast related impacts in the local community.

6.4.5 Proposed Improvements

Blast monitoring will continue in 2021 and all blasts will be reported in the Annual Review.

6.5 Traffic Management

6.5.1 EIS Predictions

The 2012 EIS predicted the increased traffic associated with the Project on the local road network to be satisfactory. On the wider network, the increase in traffic as a result of the Project was predicted to comprise a very small proportion of total traffic and be dispersed over a number of routes, resulting in relatively small increase in the overall traffic levels on these roads and intersections.

The Project was not predicted to have a negative impact on road safety.

The road upgrades were predicted to assist in managing/addressing future road safety issues associated with the overall future traffic growth on the road network, including the relatively small increase in traffic volumes due to the Project.

6.5.2 Approved Criteria

According to Schedule 2, Condition 13 of SSD 5109, for the life of the development, the Applicant must ensure that:

- No more than an average of 48 truck movements per hour occur collectively to and from the site on any day; and
- No more than 30 laden trucks per hour are dispatched from the site.

6.5.3 Key Environmental Performance

Holcim recorded daily truck movements and volumes transported throughout 2020. The site maintained compliance with the conditions for truck movements throughout 2020. A copy of the truck movements and transported quarry product recorded throughout 2020 are outlined in **Table 22**. A total of 1,105,376 tonnes of product was transported on and offsite.

Table 22: Transport Tonnages 2020

Month	Transport Tonnages	Truck Movements
January	59,230.57	2060
February	112,892.80	4135
March	118,906.04	4186
April	109,093.80	4075
May	110,293.20	3989
June	89,544.62	3124
July	55,553.59	2085
August	63,974.30	2406
September	101,043.16	3720
October	59,297.39	2054
November	112,756.77	4372
December	112,790.06	4372
Total	1,105,376.30	40,578

6.5.4 Management Measures

Traffic and transport impacts are managed in accordance with the specific management measures and controls within the Cooma Road Quarry Transport Management Plan.

6.5.5 Proposed Improvements

Truck movements will continue to be monitored and recorded in the oncoming reporting period to ensure that they remain within the approved criteria.

6.6 Biodiversity

6.6.1 EIS Predictions

Consideration of the proposal under Section 5A of the *Environment Planning and Assessment Act 1979* (EPBC Act) determined there was unlikely to be any significant impacts to species or communities listed in NSW.

The Project is also considered unlikely to result in a significant impact on EPBC Act listed species and communities, or on migratory species.

6.6.2 Approved Criteria

There are no specific criteria associated with biodiversity management for the site. The approved quarrying plan has been designed to include a number of biodiversity impact mitigation factors and rehabilitation design factors.

6.6.3 Key Environmental Performance

There was no additional clearing in the 2020 reporting period which limited the site's impacts to biodiversity. The February 2020 bushfires in the local area also had limited impacts on the success of Cooma Road's biodiversity and rehabilitation outcomes.

Weed spraying continued in 2020. Maintenance of trees planted in 2017 continued in this reporting period. Holcim continued to collect boulders and fallen timber to promote increased habitat complexity in the site rehabilitation areas.

No nest box monitoring occurred in 2020. Holcim commenced planning the installation of 51 nest boxes in this report period. Marine wood was selected to be the primary material composing the nest boxes. Holcim experienced challenges sourcing this material within the target timeframe. It was anticipated that the nest boxes would be installed within 2020, however due to the high-quality design and materials of the nest boxes their installation was delayed until outside of 2020. The installation of the nest boxes began in March 2021.

6.6.4 Management Measures

The ongoing management of the ecological values of the Project area are required to be conducted in accordance with the Cooma Road Quarry *Rehabilitation Management Plan*. The plan outlines the control measures to be implemented as part of the continued operations at the Cooma Road Quarry. This includes minimising the potential impacts on biodiversity as a result of quarrying activities as well as risks associated with unsuccessful post-quarrying rehabilitation.

6.6.5 Proposed Improvements

During the 2021 reporting period Holcim will continue to manage weed species on the site.

Holcim will assess the need to carry out feral animal control and implement a program if required, however there have been no feral animal sightings to date.

Holcim will continue to salvage fallen timber and boulders to promote increased habitat complexity in the rehabilitation areas. In this report period Cooma Road Quarry planned to begin monitoring 51 nest boxes in 2021 to assess their effectiveness as per the *Rehabilitation Management Plan*. However due to the insufficient supply of marine wood during 2020, the monitoring program outlined in the RMP will be undertaken from the time of the installation of the new nest boxes.

It is proposed that an area of 0.5ha will be cleared in 2021.

6.7 Heritage (Aboriginal Archaeology and Historic Heritage)

6.7.1 EIS Predictions

6.7.1.1 Aboriginal Archaeology

The 2012 EIS and associated due diligence assessment found that due to the highly disturbed nature of the Project Area, the potential for subsurface Aboriginal artefacts in modified areas would be extremely low. No previously recorded sites were identified within the proposed disturbance area.

One isolated artefact, a silcrete broken flake (identified as Cooma Quarry 2), was located on the spur crest adjacent to the proposed infrastructure area. Holcim has committed that the Project will not impact on this site.

6.7.1.2 Historic Heritage

The known locally listed Moses Morley Kiln is the only heritage item/site to be identified within the Project Area.

The Historic Heritage Assessment conducted as part of the 2012 EIS determined the Project would not physically impact on the kiln and it would be very unlikely to impact on the identified heritage significance of the site.

The EIS did identify the potential for indirect impacts as the result of vibration associated with blasting and construction. Holcim implemented additional management measures for construction and blasting operations.

No other potential heritage items/sites were identified within the Project Area.

6.7.2 Approved Criteria

There are no specific criteria associated with heritage relating to the project. The process for managing any unexpected heritage items is outlined in the *Heritage Management Plan*.

6.7.3 Key Environmental Performance

There were no issues relating to Aboriginal and historic heritage during the reporting period.

Monitoring of Heritage infrastructure was undertaken in 2020 by Holcim with this involving taking before and after photos at the time of the blast. No significant observations were observed from base surveys conducted in 2014.

6.7.4 Management Measures

Heritage impacts will continue to be monitored in accordance with the *Heritage Management Plan*.

6.7.5 Proposed Improvements

As there have been no Aboriginal heritage items located to date, no improvements to management measures are proposed.

6.8 Summary of Environmental Performance

A summary of the performance of environmental management measures and sampling results for 2020 are detailed in **Table 23**.

Table 23: Environmental Performance at Cooma Road Quarry in 2020

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Noise	EIS predictions are all below development consent criteria.	Quarter 1- 4 monitoring has met the Development Consent Criteria.	Consistently meets criteria.	None Required.
Blasting	EIS predictions are all below development consent criteria.	Below criteria.	Below criteria from 2017 to 2020.	None required.
Air Quality	EIS predictions are all below development consent criteria.	Dust deposition results are within criteria of EPL, EIS and Development Consent. The site was above the PM ₁₀ short term impact assessment criteria for one monitoring events in February 2020. Some sampling events in January and February 2020 were missed. These exceedances and ability to conduct sampling were considerably impacted by regional bushfires and the transition between monitoring contractors.	Dust deposition was consistent with EIS and previous Annual Reviews. PM ₁₀ data was generally consistent with the previous period.	A review of the current location for DDG1 will be undertaken during 2021 to determine if this gauge should be relocated to a more suitable position to reduce frequency of contamination. If determined as suitable, liaise with the EPA and DPIE about moving DDG1 to a more suitable location.
Traffic Management	EIS predictions are all below development consent criteria.	Met the Development Consent Criteria.	Consistently meets criteria.	None required.
Water Management	EIS predictions are all below development consent criteria.	No discharge. Groundwater has not been assessed during this reporting period.	Surface water generally meets criteria. There were no discharge events during 2020. Groundwater has not been verified during this reporting	See Section 7.5 for details about proposed groundwater monitoring.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
			period as no monitoring was undertaken.	
Biodiversity	It is unlikely there will be any significant impacts to species or communities listed in NSW.	No additional impacts - no clearing, only some grass slashing. Planning for new nest boxes commenced, but no nest boxes were installed in 2020.	Biodiversity monitoring has been consistent with the <i>Rehabilitation Management Plan</i> , with the exception of nest box monitoring.	Implement the <i>Rehabilitation Management Plan (2020)</i> .
Heritage	No predictions.	No impacts to Aboriginal Cultural Heritage or European Heritage.	Continued to be no impacts.	None Required.

7 WATER MANAGEMENT

Water management at the Cooma Road Quarry is undertaken in accordance with the *Water Management Plan*. The 2014 *Water Management Plan* (Umwelt) (WMP) was updated and significantly altered in July 2019. The updated WMP was approved by DPIE 12 August 2019.

7.1 EIS Predictions

Section 5.3 of the EIS (2012) assessed impacts to local water systems. The Project is expected to have a negligible impact on annual flow volumes in Barracks Creek compared to the currently approved impacts. The Project will not impact on annual flow volumes within Jerrabomberra Creek. The Project is primarily located within the boundary of the existing water management system. The construction and operation of the Project will be consistent with the existing *Water Management Plan* and associated erosion and sediment controls. Therefore, it is considered that there will be negligible impact on water quality in downstream surface water systems. As such it is considered that the Project will result in no changes to the currently approved impacts.

Given both rock types (granite and dacite) quarried at the Cooma Road Quarry are relatively stable with respect to groundwater quality, there is no concern regarding the potential for the quarried material to affect groundwater quality.

7.2 Approved Criteria

Holcim are required to monitor surface water quality during discharge events at the Cooma Road Quarry licensed discharge point (LDP), in accordance with the requirements of EPL 1453 (provided in **Table 24**). These criteria only apply to water quality results when the site is discharging.

Table 24: Water Quality Criteria for the Cooma Road Quarry (EPL 1453) POINT 1

Pollutant	Units of Measure	100 percentile concentration limit
Oil and Grease	milligrams per litre	10
pH	pH	6.5-8.5
Total Suspended solids	milligrams per litre	50

7.3 Water Usage and Storage

Water storages utilised at the Cooma Road Quarry include:

- Extractive Area Sump;
- Granite Hole;
- Pump Dam;
- Sediment Interception Pond (SIP); and
- Discharge Pond

During this reporting period water has been used for use in crushing and screening and watering of haul roads. Water usage has continued to be recorded during this reporting period.

7.4 Surface Water Results

Holcim monitors surface water quality in Barracks Creek monthly.

All water monitoring results listed in **Table 25** are recorded from monitoring undertaken within the creek line, with there being no direct discharge to Barracks Creek in 2020.

Table 25: 2020 Water Monitoring Results (Barracks Creek)

Sample Date	Total Suspended Solids (mg/L)	pH	Oil and Grease	
			mg/L	Visual Inspection
January 3, 2020	3	8	1	Visible
February 6, 2020	5	7.9	1	Visible
March 5, 2020	440	7.57	10	Visible
April 6, 2020	5	8.04	10	Visible
May 6, 2020	1	7.17	10	Not Visible
June 4, 2020	2	7.82	5	Not Visible
July 2, 2020	1	7.21	5	Not Visible
August 3, 2020	5	8.23	5	Not Visible
September 3, 2020	5	7.16	5	Not Visible
October 1, 2020	5	8.07	5	Not Visible
November 2, 2020	160	7.82	5	Not Visible
December 3, 2020	5	7.64	5	Not Visible
Average	53.08	7.72	5.58	Visible (4), Not Visible (8)

The 2020 surface water monitoring results did not approach the criteria within Condition L2.4 of the EPL relating to Barracks Creek. These results demonstrate compliance even while monitoring was not required due to zero discharge events occurring during this reporting period. TSS results were elevated in November 2020 due to the site receiving 160mm of water in a rainfall event in this period.

Long-term Trends:

A comparison of data between 2016 and 2020 indicated that results for pH, total oil and grease and suspended solids are generally within the EPL criteria. Previous exceedances included one result in 2016 and one result in 2017 for pH. The 2020 report period records a TSS average which is greater than previous annual averages. The pH results have been neutral to slightly alkaline. Oil and grease and TSS recorded low readings between 2016 and 2019, however these increased notably in 2020 due to a few elevated results which were likely to be impacted by heavy rainfall events.

There was no discharge events in 2016-2020, therefore the EPL criteria is not relevant.

Table 26: Long-term Water Monitoring Barracks Creek

Year	pH Average	Oil and Grease Average (mg/L)	TSS Average (mg/L)
2016	7.4	<1	2.5
2017	7.5	<1	2.6
2018	7.5	<1	4.75
2019	7.5	<1	5.0
2020	7.7	5.58	53.08

Comparison to EIS Predictions:

There was no evidence of any detrimental impact from the Quarry on surface water. This is consistent with the EIS predictions.

7.5 Groundwater

There was no groundwater monitoring completed at the Cooma Road Quarry in 2020 nor in 2019. Holcim notes in a letter from the DPIE on 14 May 2018 that groundwater monitoring is required by Holcim at Cooma Road. Groundwater monitoring is required in accordance with the WMP.

A groundwater assessment by Coffey Geotechnics (2012) concluded that the operation of Cooma Road Quarry is not considered to have a significant impact on the regional groundwater resources, as:

- The quarry site is in a tight rock formation where no meaningful groundwater extractions can be attained;
- Quarrying activities do not impact on a viable aquifer;
- The volume of groundwater affected by the Cooma Road Quarry is limited to the exposed water table in the granite pit;
- Interaction of the granite pit with regional groundwater is very limited; and
- The maximum extraction depth will not be increased.

Cooma Road Quarry has committed to the following to establish a regular groundwater monitoring system:

- Drilling of MB01 and MB02 bores;
- Casing and installation of piezometer;
- Obtain quarterly land access to bores with neighbors for access to GW400534 and GW 416130 for monitoring;
- Add groundwater monitoring to contractors quarterly environmental monitoring program;
- Update the Water Management Plan accordingly; and
- Engage consultant over the 24 months to set trigger values based quarterly level monitoring.

The Cooma Road *Water Management Plan* was revised in 2019 and outlines a groundwater monitoring program for quarterly groundwater depth and quality at four monitoring bores to be drilled. Groundwater assessment monitoring occurred in this report period to establish criteria for the *Water Management Plan*. Groundwater trigger levels are to be set after 24 months of monitoring and a routine groundwater monitoring program will be implemented by 2022.

In summary, Cooma Road has commenced works to create a groundwater monitoring program by undertaking a groundwater assessment. Groundwater monitoring as per the WMP was not undertaken in 2020, which is a non-compliance with the Development Consent. Groundwater monitoring was not undertaken due to being in the planning and assessment phase, as well as the difficulty sourcing contractors during COVID 19 restrictions. Groundwater monitoring will commence in future reporting periods in accordance with the WMP.

A total of four bores were installed in early 2021. Quarterly groundwater monitoring will commence in June 2021.

7.6 Water Take

Table 27 outlines the water take at the Cooma Road Quarry in 2020. The water take was within the limits of the water access licence requirement.

Table 27: 2020 Water Take

Water Licence Number	Entitlement	Water Usage During 2020	Water Usage During 2019	Water Usage During 2018	Water Usage During 2017
40SL27690	98 ML	36ML	70ML	60ML	48ML

8 REHABILITATION AND LANDSCAPE MANAGEMENT

The site is required to undertake biodiversity and rehabilitation in accordance with the requirements in Table 28.

Table 28: Rehabilitation Requirements for Cooma Road Quarry (SSD 5109)

Rehabilitation Objectives

22. The Applicant must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the EIS and Appendix 7, and comply with the objectives in Table 7.

Rehabilitation Objectives

Feature	Objectives
Site (as a whole)	Safe, stable and non-polluting
Surface Infrastructure	To be decommissioned and removed (unless otherwise agreed with the Secretary)
Benched Quarry Walls	Landscaped and revegetated utilising native tree and understory species, ensuring that the tree canopy is restored and integrated with the surrounding canopy to minimise visual impacts
Quarry Pit Floors	Landscaped and revegetated utilising native flora species, above the anticipated final void water level
Other land affected by the development	Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: - Native endemic species: ad - A landform consistent with Appendix 7 and the surrounding environment
Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with the closure of the development

Note: Revegetation of existing and proposed industrial areas is not required

Progressive Rehabilitation

23. The Applicant must rehabilitation the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready to final rehabilitation.

Rehabilitation and biodiversity management strategies, procedures, controls and monitoring programs at the Cooma Road Quarry are undertaken in accordance with the *Rehabilitation Management Plan* (2019). The *Rehabilitation Management Plan* is available on the Holcim Community Link website.

8.1 Rehabilitation Performance during the Reporting Period

There was no rehabilitation undertaken during 2020. Existing rehabilitation areas continue to be inspected and maintained. See **Table 29** for details of rehabilitation performance.

Table 29: Rehabilitation Performance in 2020

Guideline Requirement	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	No rehabilitation completed. Inspections were completed of the rehabilitation area. Rehabilitation monitoring was conducted on two occasions in 2020.
Agreed post-rehabilitation land use	The final rehabilitation at the Cooma Road Quarry will consist of a woodland/grassland revegetation mix.
Key rehabilitation performance indicators	See Section 4 of the <i>Rehabilitation Management Plan</i> .
Renovation or removal of buildings	No renovation or removal of buildings occurred in 2020, and none are proposed in 2021.
Any other Rehabilitation Taken including: • Exploration activities; • Infrastructure; • Dams; and • The installation or maintenance of fences, bunds and any other works.	No rehabilitation completed in 2020 relating to exploration, infrastructure, or dams.
Any rehabilitation areas which have received formal sign off from the Resources Regulator	No rehabilitation has received signoff.
Variations to activities undertaken to those proposed (including why there were variations and whether the Resources Regulator was notified)	Rehabilitation activities were undertaken as per the 2020 <i>Rehabilitation Management Plan</i> .
Outcomes of trials, research projects and other initiatives.	In 2019 Holcim had a 30% success rate for alpine tree planting from 2018. This low success rate was attributed to low rainfall. Inspections of the trial area occurred in 2020, however no additional alpine trees were planted.
Key issues that may affect successful rehabilitation	There are several potential issues that can affect rehabilitation including availability of material, seed stock, climatic events, and rehabilitation methodology. Dry conditions have impacted growth and success of rehabilitation.

8.2 Summary of Current Rehabilitation and Performance

A summary of the rehabilitation and disturbance status of Cooma Road Quarry is outlined in **Table 30** and **Figure 3**.

Table 30: Rehabilitation and Disturbance Status

Quarry Area Type	2018 (ha)	2019 (ha)	2020 (ha)	Proposed for 2021 (ha)
A. Total Quarry Footprint ¹	0	0	0	0
B. Total Active Disturbance ²	71.5	71.5	71.5	71.5
C. Land Being Prepared for Rehabilitation ³	0	0	0	0.5
D. Land Under Active Rehabilitation ⁴	7.6	7.6	7.6	7.6
E. Completed Rehabilitation ⁵	0	0	0	0

1 Total disturbance and rehabilitation.

2 Total disturbance within the Project Approval boundary

3 Rehabilitation that is being shaped in a phase of decommissioning, landform establishment and growth medium development.

4 rehabilitation under a phase of ecosystem and land use establishment or ecosystem and land use sustainability

5 This refers to rehabilitation that has been signed off from the DRG.

At the end of 2020 there was approximately 71.5 Ha of active disturbance and 7.6 Ha of active rehabilitation. There was no further disturbance or rehabilitation preparation activities done in 2020 which was primarily due to meteorological conditions including lack of rainfall. Cooma Road Quarry is proposing to prepare 0.5 ha for rehabilitation for the next reporting period. Continuous rehabilitation maintenance will be maintained into 2021.

Holcim engaged with an external contractor to conduct rehabilitation monitoring on two occasions in 2020. Four monitoring plots were established in Winter 2020. On this occasion, 28 species of birds were observed, including one threatened species (Scarlet Robin) utilizing habitat features in a cleared paddock. Monitoring in Spring found Hoary Sunray populations to be intact. It was found that R3 was the best progressed rehabilitation area, with native species diversity and exotic weed cover approaching the levels of retained vegetation areas on the project area.

8.3 Actions for the Next Reporting Period

The DPIE 2015 *Annual Review Guidelines* require the Annual Review to outline the rehabilitation actions proposed during the next reporting period. These actions are detailed in **Table 31**.

Table 31: Rehabilitation and Closure Actions for the 2021 Reporting Period

Requirement	Site Comment
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders	0.5 ha to be prepared for rehabilitation in 2021.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period	Inspections of the alpine tree trials will continue in 2021. No other trials are proposed.
Summary of rehabilitation activities proposed for next report period	The maintenance of existing and new rehabilitation will continue in 2021. Rehabilitation monitoring is to continue into 2021 in order to meet Condition 24 of Schedule 3 of the Development Consent.

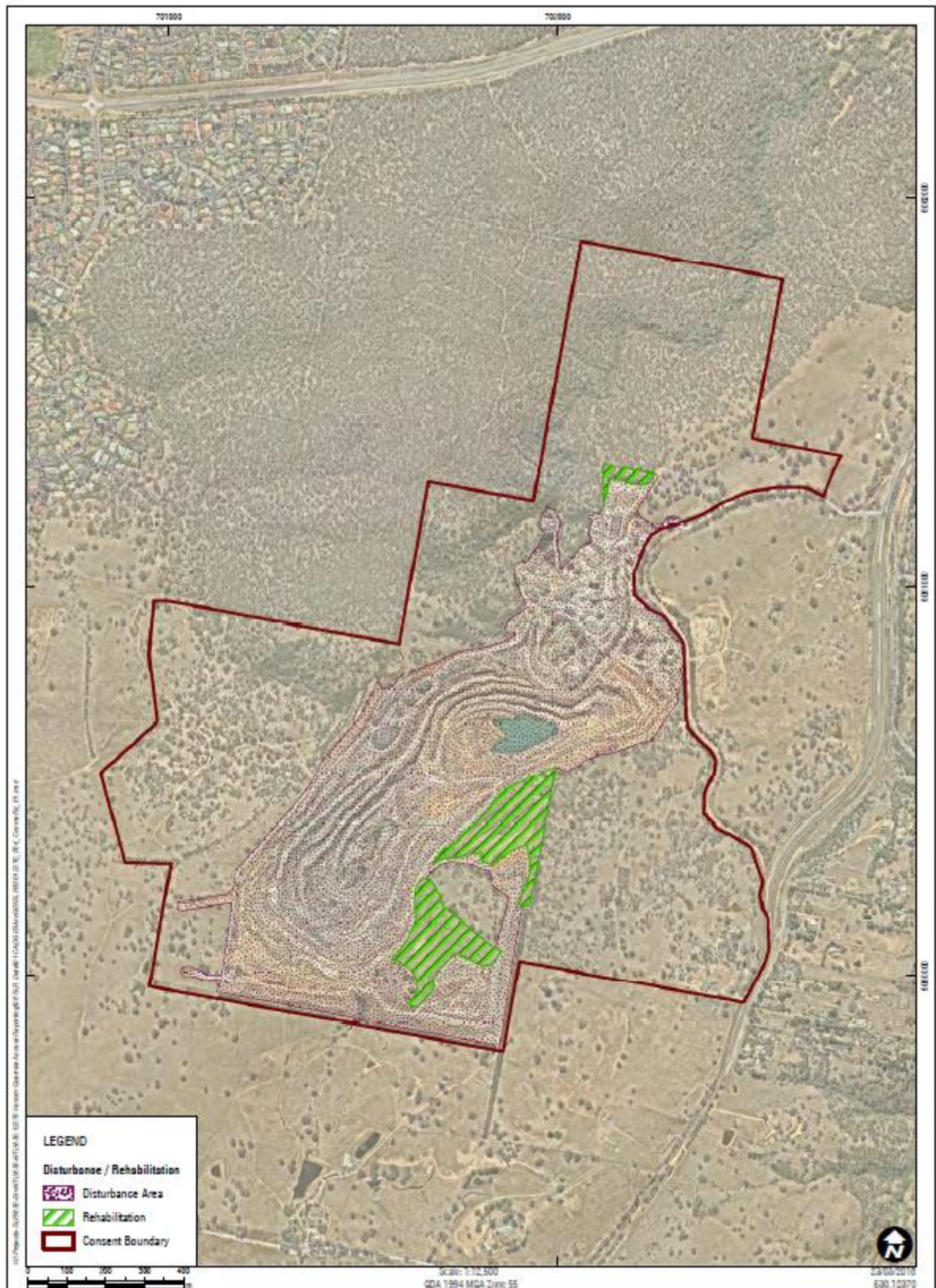


Figure 3: Current Disturbance and Rehabilitation

9 WASTE MANAGEMENT

The waste streams at Cooma Road Quarry are categorised as:

- General waste
- Recyclables such as cardboard and paper
- Scrap steel
- Oils, greases, and filters.

There are three 2m³ general waste bins and one 1.5m³ recycling bin on site which are serviced weekly by contractors. Waste oil, grease, and associated filters are disposed of in a 44-gallon drum which is inspected monthly.

During the 2019 Annual Review period Cooma Road Quarry became an accredited Smart Waste organisation. Cooma Road Quarry continues to demonstrate a commitment to improving the efficiency of their waste streams.

Cooma Road Quarry receives and processes waste concrete as per Schedule 2 Condition 14 of the Development Consent. This condition limits the intake of recycled concrete up to 10,000 tonnes per calendar year. The site is compliant with this condition due to receiving and processing 7,735.5 tonnes of recycled concrete in 2020.

10 COMMUNITY

10.1 Community Engagement Activities

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities in accordance with Schedule 5 Condition 6 of the Development Consent:

- Maintenance of a website (containing publicly available documents);
- A telephone number, email and postal address (on the website) for community complaints and feedback;
- A copy of the Complaints Register is maintained on the company website; and
- All documents and items displayed on the website are regularly updated by Holcim staff.

Schedule 5 Condition 6 also requires the establishment and operation of a Community Consultative Committee (CCC) for Cooma Road Quarry. The Cooma Road Quarry CCC was established in May 2014.

One CCC meeting was held in the reporting period on 15th June 2020. In addition, a 2019-2020 Annual Report has been created by the CCC and made available on the Holcim Cooma Road webpage during this reporting period.

Past community engagement activities have included open days, attendance at resident's association meetings and provision of materials for local projects. Whilst there were no community engagement days held in the reporting period, residents or groups are welcome to contact the Quarry to arrange tours.

In addition to the CCC, Holcim prepared a Community Engagement Plan in 2016 to establish two-way communication with the community. Holcim understands that an integral part of ensuring the continuing success of the quarry operations is the fostering of positive community relations through effective two-way communications and through the promotion of a positive public image.

The Cooma Road Quarry has an extensive program for engagement with the local Ngambri Land Council including employment of indigenous workers for maintenance and housekeeping activities, assistance in the start-up of a local native nursery and guidance on the establishment of a construction materials haulage company utilising indigenous workers.

10.2 Community Contributions

There were no specific community contributions in 2020.

10.3 Complaints

A complaint register is updated and published on the Holcim website quarterly. There was one community complaint received in 2020. The complaint was received 8 of December 2020 and concerned traffic.

All publicly listed information including this 2020 complaints register, incidents and contacts for locals in the community is available at <http://www.holcim.com.au/cooma-road.html>. Holcim continue to operate a Community contact line (02 6297 2211).

11 INDEPENDENT AUDIT

The most recent Independent Environmental Audit (IEA) was undertaken by Pitt & Sherry (Operations) Pty Ltd on behalf of Holcim in December 2017 as required in accordance with Schedule 5, Condition 10 of the Development Consent (SSD_5109) – MOD 1 for the quarry. This was the second IEA, with the previous IEA completed in 2014.

No IEA was undertaken in this report period. Holcim requested an extension for this IEA and the IEA began in February 2021, with the auditors approved by DPIE.

12 INCIDENTS AND NON-COMPLIANCE

Incidents and non-compliances at Cooma Road Quarry in 2020 are summarised in **Table 32**.

Table 32: Incidents and Non-Compliance at the Cooma Road Quarry During 2020

Date	Incident/Non-Compliance	Action/Comment
Overall period	DDG1 above criteria	DDG1 which was just over the Development Consent criteria of 4g/m ² /month. The location of DDG1 will be reviewed in 2020 as some results contained contamination for bird dropping or insects.
6 February 2020	Above Short Term PM ₁₀ Criteria	The site was above the PM ₁₀ short term impact assessment criteria for one monitoring event on 6 February 2020. This has been recorded as an exceedance, but the site was not a big factor.
Throughout the period	No groundwater monitoring	No groundwater monitoring was completed in 2020, with this being a requirement of the <i>Water Management Plan</i> (see Section 7). This was identified as an improvement action in the 2019 Annual Review. Groundwater monitoring is to be completed in 2021, with planning for the program beginning in the 2020 report period.
Throughout the period	No nest box monitoring	No nest box monitoring was conducted during 2020, despite it being a requirement of the RMP. The installation of 51 nest boxes could not be completed in 2020 due to the unforeseen difficulty in sourcing high-quality materials required for the construction of the boxes, including marine wood. Installation of these nest boxes commenced in 2021.

13 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Proposed improvement actions for 2021 are noted in **Table 33**.

Table 33: Improvement Actions for 2021

Improvement Measure	Activities	Timeframe
Progressive Rehabilitation	The site will continue to progressively rehabilitate available areas.	2021.
Maintenance of rehabilitation	Continued maintenance of rehabilitation in the completed overburden dump in the south-western disturbance area including weed control as well as nest box monitoring.	Ongoing.
Depositional Dust Gauge Review	A review of the current location for DDG 1 and DDG 4 will be undertaken during the next reporting period to determine if this gauge should be relocated to a more suitable position.	2020-2021.
Groundwater monitoring	Completion of groundwater monitoring.	Monitoring commencing across 2021 and 2022.
Biodiversity	Weed spraying will continue at site during the next Annual Review period. Implementation of the <i>Rehabilitation Management Plan</i> .	Annually.
Biodiversity	Installation of new nest boxes.	2021.

14 APPENDICES

APPENDIX 1

COOMA ROAD QUARRY QUARTERLY NOISE MONITORING REPORTS 2020

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 1 Ending March 2020.



Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 1 Ending March 2020

Prepared for: Holcim (Australia) Pty Ltd

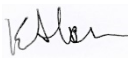
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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending March 2020 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using Svantek Type 1, 971 noise analysers from Wednesday 5 February 2020 to Thursday 6 February 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15\text{min})$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

FIGURE 1

LOCALITY PLAN

REF: MAC180611-03

0 350m



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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
05/02/2020	06:36	57	38	35	WD: E	Birds 36-57
	(Morning				WS: Calm	Distant Traffic 33-38
	Shoulder)				Rain: Nil	Urban Hum <30
						Dogs 33-44
						Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						<30
05/02/2020	11:46	57	41	31	WD: SE	Aircraft 34-57
	(Day)				WS: 1.0m/s	Distant Traffic <30
					Rain: Nil	Urban Hum <30
						Birds 35-42
						Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						<30
05/02/2020	18:48	62	46	37	WD: NE	Wind 30-54
	(Evening)				WS: 2.5m/s	Birds 30-42
					Rain: Nil	Aircraft 39-62
						Distant Traffic <30
						Urban Hum <30
Cooma Road Quarry L _A eq(15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
06/02/2020	06:18				WD: S	Traffic 39-69
	(Morning	69	53	45	WS: 0.5m/s	Birds 43-57
	Shoulder)				Rain: Nil	Dogs 48-56 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	11:00				WD: NE	Traffic 40-79
	(Day)	79	54	39	WS: 0.5m/s	Birds 44-61
					Rain: Nil	Aircraft 43-52 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	20:09				WD: E	Birds 38-74
	(Evening)	74	57	40	WS: 1.0m/s	Traffic 32-58
					Rain: Nil	Dogs 48-74 Wind 35-52
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
06/02/2020	06:37				WD: SW	Traffic 36-81
	(Morning	81	56	46	WS: 0.5m/s	Birds 35-55
	Shoulder)				Rain: Nil	Quarry Not Audible
	Cooma Road Quarry L _{Aeq} (15min) Contribution					<35
05/02/2020	10:41				WD: NE	Traffic 37-66
	(Day)	66	49	39	WS: 0.5m/s	Dogs 42-54
					Rain: Nil	Birds 35-57
						Quarry Not Audible
	Cooma Road Quarry L _{Aeq} (15min) Contribution					<35
05/02/2020	19:50				WD: NE	Traffic 32-77
	(Evening)	77	52	38	WS: 1.0m/s	Wind 35-44
					Rain: Nil	Birds 38-46
						Quarry Not Operating
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
06/02/2020	06:00				WD: S	Traffic 36-59
	(Morning	86	63	42	WS: 0.5m/s	Vehicles Entering/Exiting Quarry 40-86
	Shoulder)				Rain: Nil	Birds 38-52 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	11:20				WD: E	Traffic 38-55
	(Day)	84	65	42	WS: 1.0m/s	Vehicles Entering/Exiting Quarry 40-84
					Rain: Nil	Birds <35 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	20:31				WD: SE	Traffic 30-64
	(Evening)	71	50	39	WS: 1.5m/s	Vehicles Entering Quarry 40-71
					Rain: Nil	Wind 33-47
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
05/02/2020	06:00				WD: SE	Distant Traffic 30-39
	(Morning	54	38	35	WS: <0.5m/s	Birds 35-54
	Shoulder)				Rain: Nil	Insects <30
						Quarry Vehicle 34-37
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	10:13				WD: N	Birds 34-41
	(Day)	57	38	31	WS: 0.5m/s	Aircraft 36-57
					Rain: Nil	Distant Traffic 31-37
						Quarry Site Alarms 34-37
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
05/02/2020	19:25				WD: NE	Wind 30-51
	(Evening)	63	42	36	WS: 2.0m/s	Birds 35-38
					Rain: Nil	Distant Traffic 30-35
						Aircraft 38-63
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was inaudible during all three measurements conducted at location N3. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

It is noted that the quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included birds, dogs barking, wind in trees, urban hum, distant traffic and aircraft noise.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was inaudible during short breaks in traffic for all three measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB LAeq(15min). Extraneous noise sources audible during the survey included wind in trees, birds, traffic, aircraft noise and dogs barking.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was inaudible during short breaks in traffic for all three measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included wind in trees, traffic, dogs barking, birds and traffic.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was inaudible during short breaks in traffic for all three measurements conducted at location N60. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

It is noted that the quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included vehicles entering and exiting site, birds, wind in trees and traffic.

5.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the morning shoulder and daytime measurement at N67. Quarry emissions were estimated at <35dBA for morning shoulder and daytime measurements, therefore satisfying relevant noise limits. Audible quarry sources included truck movements, site alarms and rock tipping.

It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min). Extraneous noise sources audible during the survey included birds, insects, aircraft noise, distant traffic and wind in trees.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Wednesday 5 February 2020 to Thursday 6 February 2020 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending March 2020.

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Appendix A - Glossary of Terms

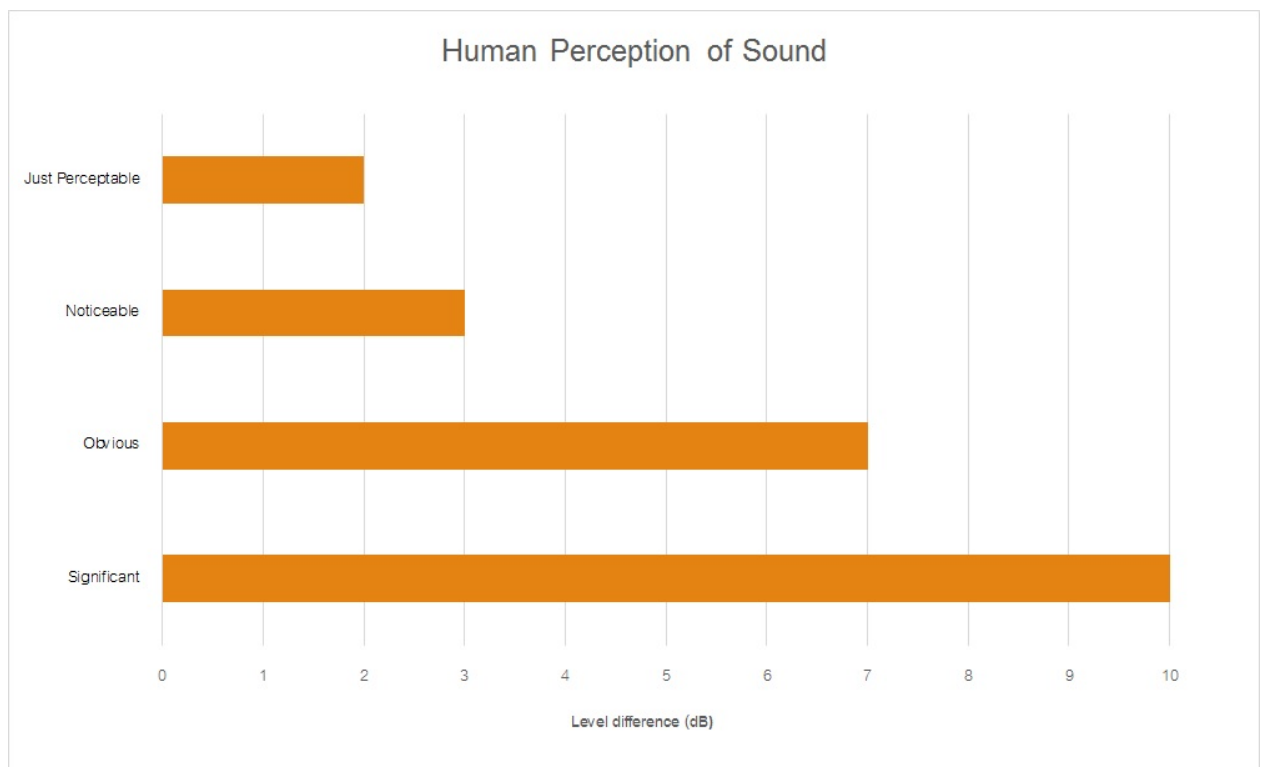
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 2 Ending June 2020.



Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 2 Ending June 2020

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending April 2020 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using Svantek Type 1, 971 noise analysers from Wednesday 22 April 2020 to Friday 24 April 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15min)$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

FIGURE 1

LOCALITY PLAN

REF: MAC180611-03

0 350m



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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
23/04/2020	06:38				WD: N	Birds 48-63
	(Morning	63	48	46	WS: 0.5m/s	Distant traffic 44-56
	Shoulder)				Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
23/04/2020	07:00				WD: N	Distant traffic 44-52
	(Day)	66	48	42	WS: 0.5 m/s	Birds 45-66
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
22/04/2020	18:14				WD: NW	
	(Evening)	50	39	37	WS: 0.1 m/s	Distant traffic 36-49
					Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/04/2020	06:24				WD: W	Traffic 37-67
	(Morning	67	53	48	WS: 0.1 m/s	Birds 38-52
	Shoulder)				Rain: Nil	Aircraft 48-54 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
23/04/2020	08:04				WD: N	Traffic 44-61
	(Day)	61	53	46	WS: 0.5 m/s	Birds 44-53
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
22/04/2020	19:14				WD: NW	Traffic 44-63
	(Evening)	63	48	43	WS: 0.1 m/s	Roadworks 41-44
					Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/04/2020	06:42				WD: W	Birds 46-55
	(Morning	70	56	51	WS: 0.5 m/s	Traffic 44-70
	Shoulder)				Rain: Nil	Roadworks <42 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
23/04/2020	07:44				WD: N	Traffic 46-62
	(Day)	76	55	51	WS: 0.5 m/s	Birds 48-76
					Rain: Nil	Roadworks 52-58 Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
22/04/2020	18:54				WD: NW	Traffic 36-71
	(Evening)	77	53	40	WS: 0.1 m/s	Dogs 68-77
					Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/04/2020	06:05				WD: W	
	(Morning	68	56	46	WS: 0.1 m/s	Traffic 42-68
	Shoulder)				Rain: Nil	Quarry reverse alarms <36
Cooma Road Quarry L _{Aeq} (15min) Contribution						<36
23/04/2020	08:23				WD: N	Traffic 52-72
	(Day)	72	59	47	WS: 0.1 m/s	Roadworks 52-60
					Rain: Nil	Birds <52
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
22/04/2020	19:37				WD: NW	Traffic 38-72
	(Evening)	72	54	33	WS: 0.5 m/s	Local residential noise 41-43
					Rain: Nil	Dogs 36-42
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
23/04/2020	06:04 (Morning Shoulder)	62	43	38	WD: N WS: 0.1 m/s Rain: Nil	Birds 36-46
						Distant traffic 36-40
						Operator 62
						Quarry tipping 34-38 (30 seconds)
						Quarry reverse alarms <36
Cooma Road Quarry L _A eq(15min) Contribution						35
23/04/2020	08:44 (Day)	82	54	38	WD: N WS: 0.5 m/s Rain: Nil	Distant traffic 36-42
						Dogs 42-82
						Birds 42-58
						Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						<35
22/04/2020	20:04 (Evening)	51	30	26	WD: NW WS: 0.1 m/s Rain: Nil	Distant traffic 27-51
						Insects <27
Cooma Road Quarry L _A eq(15min) Contribution						Quarry Not Operating

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was inaudible during all three measurements conducted at location N3. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

It is noted that the quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included birds and distant traffic.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was inaudible during short breaks in traffic for all three measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB LAeq(15min). Extraneous noise sources audible during the survey included birds, aircraft and roadworks.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was inaudible during short breaks in traffic for all three measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria.

The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included birds, roadworks and dogs barking.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all three measurements. Quarry noise was audible during short breaks in traffic during the morning shoulder period. The quarry was inaudible during daytime and evening measurements conducted at location N60. Quarry noise contributions satisfied the relevant morning shoulder and daytime criteria.

It is noted that the quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min). Extraneous noise sources audible during the survey included roadworks, birds, local residential noise and dogs barking.

5.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the morning shoulder measurement at N67. Quarry emissions were estimated at 35dBA for the morning shoulder measurement, therefore satisfying relevant noise limits. Audible quarry sources included truck movements, site alarms and rock tipping. Quarry emissions were inaudible during the daytime period.

It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min). Extraneous noise sources audible during the survey included birds, traffic, dog bark and insects.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Wednesday 22 April 2020 to Friday 24 April 2020 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending June 2020.

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Appendix A - Glossary of Terms

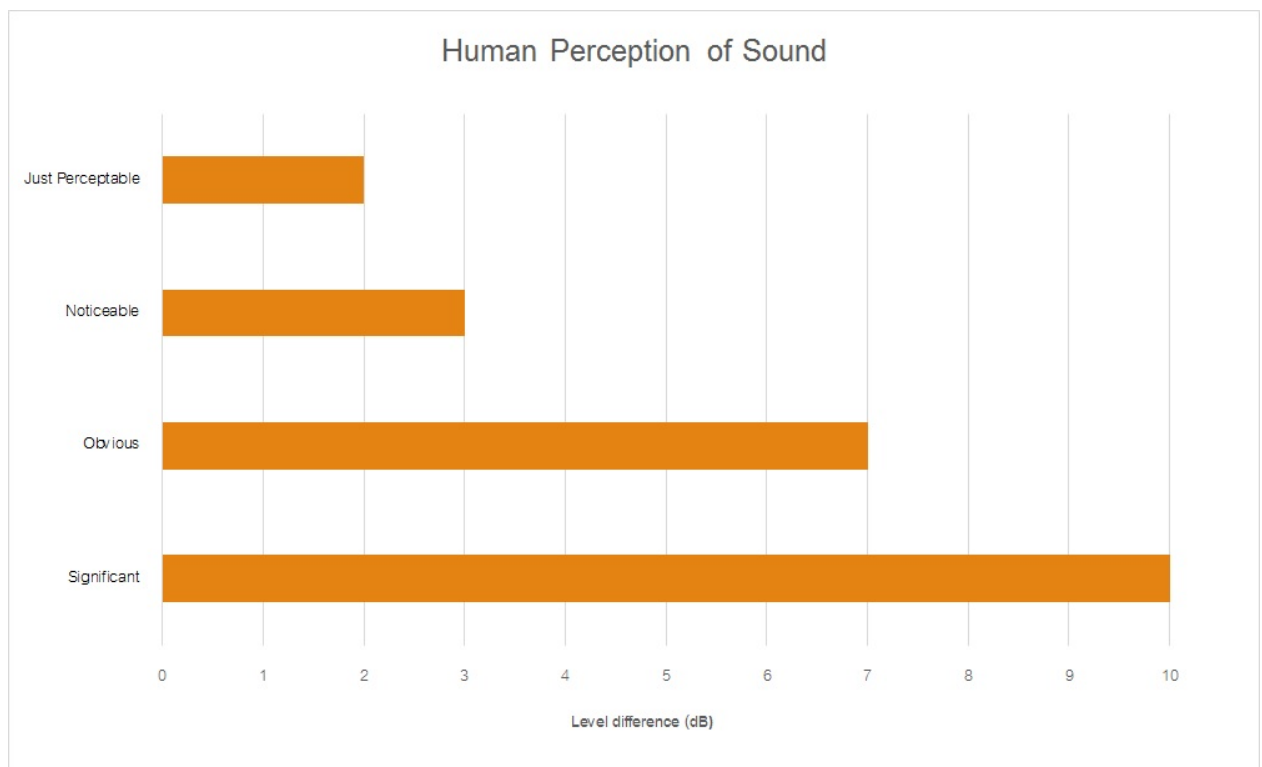
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Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.

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Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 3 Ending September 2020.



Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 3 Ending September 2020

Prepared for: Holcim (Australia) Pty Ltd

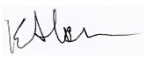
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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending September 2020 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using Svantek Type 1, 971 noise analysers from Wednesday 16 September 2020 to Thursday 17 September 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15\text{min})$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-03
Holcim Cooma Road Quarry

KEY

● Noise Monitoring Locations



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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
16/09/2020	10:23 (Day)	73	45	40	WD: NW	Distant Traffic 38-45
					WS: 2.0m/s	Birds 35-54
					Rain: Nil	Dogs 50-73
						Wind 35-48
						Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
16/09/2020	18:26 (Evening)	57	41	38	WD: NW	Distant Traffic 36-46
					WS: 0.1m/s	Birds 33-41
					Rain: Nil	Operator 57
						Dogs 33-42
						Aircraft 38-39
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating
16/09/2020	06:38 (Morning Shoulder)	66	48	45	WD: NE	Distant Traffic <41-47
					WS: <0.1m/s	Birds 41-66
					Rain: Nil	Construction <40
						Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
16/09/2020	09:35 (Day)	72	54	46	WD: NW	Traffic 43-72
					WS: 1.0m/s	Birds <40-56
					Rain: Nil	Quarry Not Audible
	Cooma Road Quarry L _A eq(15min) Contribution					<40
16/09/2020	20:02 (Evening)	74	53	36	WD: N	Traffic 32-51
					WS: 0.1m/s	Dogs 40-74
					Rain: Nil	Insects <30
	Cooma Road Quarry L _A eq(15min) Contribution					Quarry Not Operating
17/09/2020	06:37 (Morning Shoulder)	72	57	49	WD: W	Traffic 45-72
					WS: 0.1m/s	Birds <42-54
					Rain: Nil	Quarry Vehicles (Enter/Exit)
					<45-51 (4 x 10-15 second durations)	
	Cooma Road Quarry L _A eq(15min) Contribution					<40

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
16/09/2020	09:16 (Day)	71	55	47	WD: N	Traffic 42-68
					WS: 0.5m/s	Birds 37-71
					Rain: Nil	Quarry Not Audible
	Cooma Road Quarry L _A eq(15min) Contribution					<38
16/09/2020	19:43 (Evening)	53	42	36	WD: NW	Traffic 33-53
					WS: 0.1m/s	Birds <30-36
					Rain: Nil	Insects <30
	Cooma Road Quarry L _A eq(15min) Contribution					Quarry Not Operating
17/09/2020	06:20 (Morning Shoulder)	68	53	45	WD: W	Traffic 41-68
					WS: 0.1m/s	Birds 38-51
					Rain: Nil	Quarry Reverse Alarms <36 (Infrequent <5 second durations)
	Cooma Road Quarry L _A eq(15min) Contribution					<36

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
16/09/2020	09:57 (Day)	71	58	44	WD: NW	Traffic 40-71
					WS: 1.0m/s	Birds 37-51
					Rain: Nil	Quarry Vehicles <40
						(<5 minute duration)
Cooma Road Quarry L _A eq(15min) Contribution						<38
16/09/2020	19:23 (Evening)	74	54	37	WD: NW	Traffic 30-74
					WS: 0.1m/s	Birds <30-49
					Rain: Nil	Aircraft 42-56
Cooma Road Quarry L _A eq(15min) Contribution						Quarry Not Operating
17/09/2020	06:00 (Morning Shoulder)	68	53	42	WD: W	Traffic 38-68
						Birds 35-53
					WS: 0.1m/s	Road works 38-42
					Rain: Nil	Quarry Reverse Alarms <38
						(Infrequent <5 second durations)
						Quarry Vehicles <38
						(<7 minute duration)
Cooma Road Quarry L _A eq(15min) Contribution						<36

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
16/09/2020	08:44 (Day)	51	43	41		Traffic 37-51
					WD: NW	Birds <36-48
					WS: 0.5m/s	Road Works <39
					Rain: Nil	Quarry Noise <40
						(Infrequent <5 second durations)
Cooma Road Quarry L _A eq(15min) Contribution						<35
16/09/2020	18:59 (Evening)	51	46	42	WD: NW	Insects 40-51
					WS: 0.1m/s	Distant Traffic <40-44
					Rain: Nil	
					Cooma Road Quarry L _A eq(15min) Contribution	
16/09/2020	06:06 (Morning Shoulder)	68	45	41	WD: N	Distant Traffic 38-50
					WS: 0.1m/s	Birds 35-68
					Rain: Nil	Road Works <39
						Quarry Not Audible
					Cooma Road Quarry L _A eq(15min) Contribution	

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was inaudible during daytime and morning shoulder measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Extraneous noise sources audible during the survey included wind in trees, dogs barking, aircraft, construction, operator noise, birds and distant traffic.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime measurements and occasionally audible during the morning shoulder period. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB LAeq(15min).

Quarry Noise sources audible during the survey included trucks entering and exiting site using the entrance road. Extraneous noise sources audible during the survey included birds, dogs barking and traffic.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime measurements and just audible during the morning shoulder period. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Quarry Noise sources audible during the survey included vehicle reverse alarms. Extraneous noise sources audible during the survey included birds, insects and traffic.

5.4 Discussion of Results - Location N60

Noise levels were dominated by constant traffic on Old Cooma Road during all measurements. Quarry noise was audible during short breaks in traffic during the morning shoulder and daytime periods. Estimated quarry noise contributions satisfied the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Quarry noise sources audible during the survey included quarry vehicles and reverse alarms. Extraneous noise sources audible during the survey included traffic, aircraft and birds.

5.5 Discussion of Results - Location N67

Quarry noise emissions were inaudible during the morning shoulder measurement and just audible during the daytime measurement. Quarry noise contributions satisfied the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min).

Quarry noise sources audible during the survey included general quarry noise. Extraneous noise sources audible during the survey included birds, distant traffic, road works and insects.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Wednesday 16 September 2020 to Thursday 17 September 2020 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending September 2020.

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Appendix A - Glossary of Terms

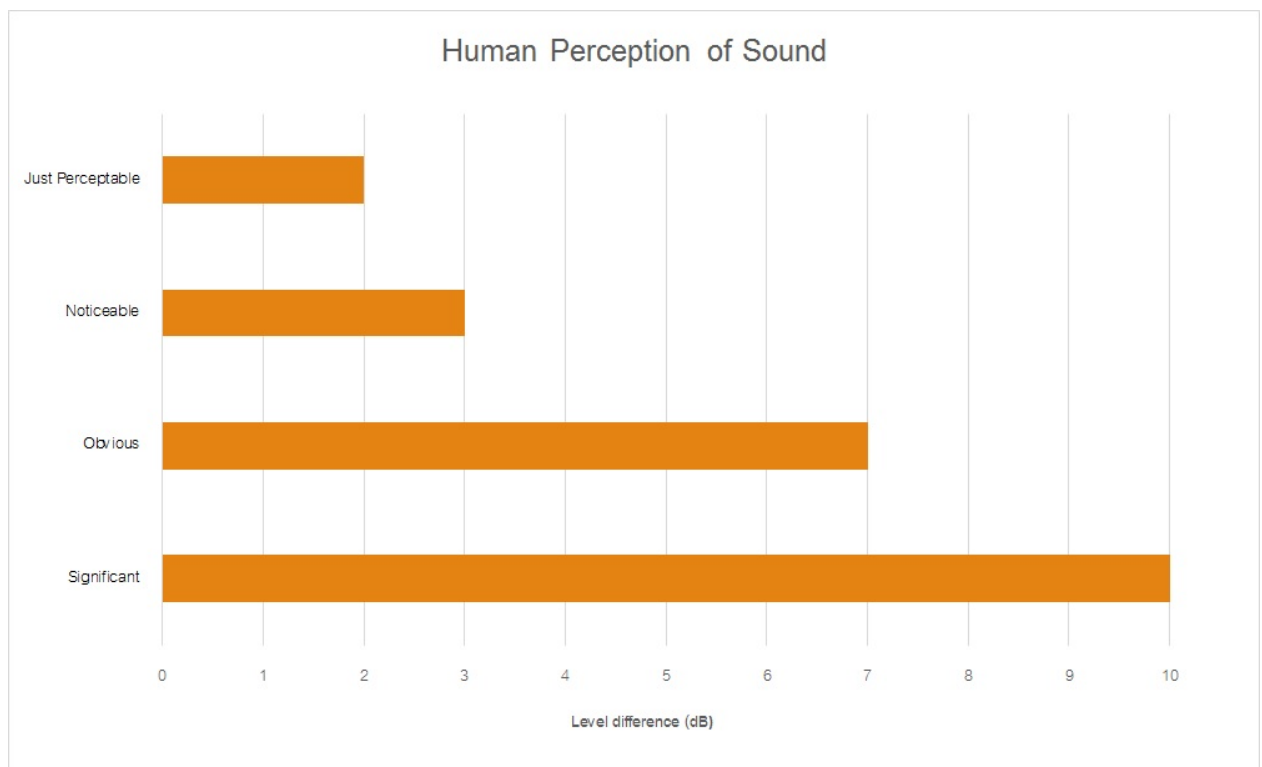
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Cooma Road Quarry, Googong, NSW
Quarter 4 Ending December 2020.



Document Information

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Cooma Road Quarry, Googong, NSW

Quarter 4 Ending December 2020

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Prepared by: Muller Acoustic Consulting Pty Ltd

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending December 2020 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using Svantek Type 1, 971 noise analysers from Monday 9 November 2020 to Wednesday 11 November 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15\text{min})$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-03
Holcim Cooma Road Quarry

KEY

● Noise Monitoring Locations



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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
09/11/2020	17:19 (Day)	64	43	36	WD: E	Traffic 35-44
					WS: 0.5m/s	Birds 35-64
					Rain: Nil	Aircraft 36-48
						Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						<35
09/11/2020	18:01 (Evening)	57	39	34	WD: E	Traffic 36-42
					WS: 0.5m/s	Birds 36-52
					Rain: Nil	Aircraft 42-57
						Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						Quarry Not Operating
10/11/2020	06:07 (Morning Shoulder)	69	44	37	WD: N	Birds 34-69
					WS: 0.1m/s	Traffic 34-38
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _A eq(15min) Contribution						<35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _A max	L _A eq	L _A 90		
09/11/2020	16:53 (Day)	69	52	44	WD: E	Traffic 39-69
					WS: 0.1m/s	Birds 39-56
					Rain: Nil	Quarry Not Audible
	Cooma Road Quarry L _A eq(15min) Contribution				<35	
09/11/2020	18:33 (Evening)	87	60	42	WD: E	Traffic 34-76
					WS: 0.1m/s	Birds 38-77
					Rain: Nil	Local residential noise 42-68
	Dogs 46-87				Quarry Not Audible	
Cooma Road Quarry L _A eq(15min) Contribution		Quarry Not Operating				
11/11/2020	06:38 (Morning Shoulder)	70	55	49	WD: NE	Traffic 48-62
	WS: 0.1m/s				Birds 48-70	
	Rain: Nil				Quarry Not Audible	
Cooma Road Quarry L _A eq(15min) Contribution		<35				

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA					
		L _A max	L _A eq	L _A 90							
09/11/2020	16:35 (Day)	68	50	43	WD: E WS: 0.5m/s Rain: Nil	Traffic 41-68					
						Insects <38					
						Birds 38-44					
						Local residential noise <41					
						Aircraft 38-46					
						Quarry Not Audible					
						Cooma Road Quarry L _A eq(15min) Contribution					
<35											
09/11/2020	18:51 (Evening)	72	47	39	WD: E WS: 0.3m/s Rain: Nil	Traffic 35-58					
						Birds 36-72					
						Dogs 46-60					
						Quarry Not Audible					
						Cooma Road Quarry L _A eq(15min) Contribution					
						Quarry Not Operating					
						11/11/2020	06:19 (Morning Shoulder)	69	51	45	WD: NE WS: 0.1m/s Rain: Nil
Local residential noise <48											
Birds 48-69											
Quarry Not Audible											
Cooma Road Quarry L _A eq(15min) Contribution											
<35											

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
09/11/2020	16:17 (Day)	80	66	47	WD: E	Traffic 37-80
					WS: 0.1m/s	Birds <43
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
09/11/2020	19:33 (Evening)	82	61	38	WD: E	Traffic 28-82
					WS: 0.5m/s	Birds 37-52
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating
11/11/2020	06:01 (Morning Shoulder)	85	66	42	WD: NE	Birds 49-64
					WS: 0.1m/s	Traffic 38-85
					Rain: Nil	Aircraft 42-58
						Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 μPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
09/11/2020	15:52 (Day)	62	40	30	WD: E	Birds 32-62
					WS: 1m/s	Aircraft 32-44
					Rain: Nil	Wind 32-36
						Quarry Mobile Plant 32-35
Cooma Road Quarry L _{Aeq} (15min) Contribution						34
09/11/2020	19:12 (Evening)	59	36	30	WD: E	Traffic 29-36
					WS: 0.1m/s	Birds 32-59
					Rain: Nil	Insects <29
						Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Not Operating
10/11/2020	06:37 (Morning Shoulder)	68	50	37	WD: N	Traffic 36-41
					WS: 0.1m/s	Birds 36-68
					Rain: Nil	Quarry Not Audible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was inaudible during daytime and morning shoulder measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Extraneous noise sources audible during the survey included traffic, aircraft, and birds.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB LAeq(15min).

Extraneous noise sources audible during the survey included traffic, birds, dogs barking and local residential noise.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Extraneous noise sources audible during the survey included insects, traffic, birds, local residential noise, aircraft, and dogs barking.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB LAeq(15min).

Extraneous noise sources audible during the survey included traffic, aircraft, and birds.

5.5 Discussion of Results - Location N67

Quarry noise emissions were inaudible during the morning shoulder measurement and just audible during the daytime measurement. Quarry noise contributions satisfied the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min).

Quarry noise sources audible during the survey included quarry mobile plant. Extraneous noise sources audible during the survey included birds, aircraft, wind in trees and insects.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Monday 9 November 2020 to Wednesday 11 November 2020 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending December 2020.

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Appendix A - Glossary of Terms

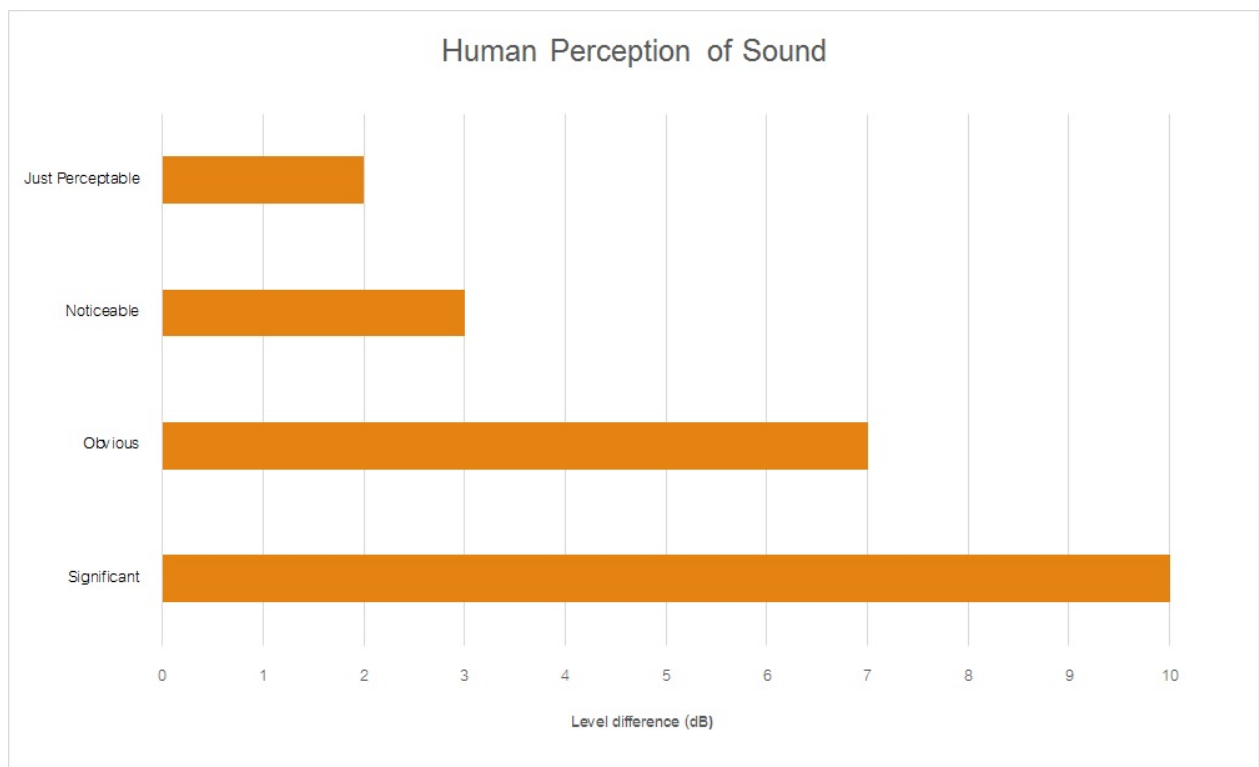
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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