



Strength. Performance. Passion

ANNUAL REVIEW

1 January 2018 – 31 December 2018

Cooma Road Quarry

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APPENDICES

Appendix 1 – Cooma Road Quarry Independent Audit Action Plan

Appendix 2 – Cooma Road Quarry Quarterly Noise Monitoring Reports 2018

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 2018
Annual review end date	31 December 2018
<p>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 2018 – 31 DECEMBER 2018 and that I am authorised to make this statement on behalf of HOLCIM (AUSTRALIA) PTY LTD.</p> <p>Note.</p> <p>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></p> <p>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></p>	
Name of authorised reporting officer	Adam Bertram
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Date	27 March 2019

1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2018 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 2018 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	NO- see Table 3 for further details.

Table 2: DPE 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 2018

Relevant approval	Condition	Condition Description	Compliance Status	Section Addressed in Annual Review/Comment																							
SSD 5109	Schedule 3 Condition 14	<p>Table 4: Long-term impact assessment criteria for particulate matter</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Total Suspended particulate (TSP) matter</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> </tbody> </table> <p>Table 5: Short-term impact assessment criteria for particulate matter</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10 µm(PM10)</td> <td>24 hour</td> <td>^a 50 µm/m³</td> </tr> </tbody> </table> <p>Table 6: Long-term impact assessment criteria for Deposited Dust</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>^c Deposited dust</td> <td>Annual</td> <td>^b2 g/m²/month</td> <td>^a 4 g/m²/month</td> </tr> </tbody> </table> <p>Notes to Tables 4-6:</p> <ul style="list-style-type: none"> ^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 concentrations 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. 	Pollutant	Averaging Period	^d Criterion	Total Suspended particulate (TSP) matter	Annual	^a 90 µm/m ³	Particulate matter < 10 µm(PM ₁₀)	Annual	^a 30 µm/m ³	Pollutant	Averaging Period	^d Criterion	Particulate matter < 10 µm(PM10)	24 hour	^a 50 µm/m ³	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	Low	Non – compliance relating to criteria for depositional dust and PM ₁₀ . See Section 6.3 See Section 11
Pollutant	Averaging Period	^d Criterion																									
Total Suspended particulate (TSP) matter	Annual	^a 90 µm/m ³																									
Particulate matter < 10 µm(PM ₁₀)	Annual	^a 30 µm/m ³																									
Pollutant	Averaging Period	^d Criterion																									
Particulate matter < 10 µm(PM10)	24 hour	^a 50 µm/m ³																									
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																								
SSD 5109	Schedule 3, Condition 20	<p><i>Groundwater Monitoring Program</i> that includes:</p> <ul style="list-style-type: none"> baseline data of groundwater levels surrounding the development; groundwater assessment criteria based upon analysis of baseline data for groundwater, including trigger levels for investigating any potentially adverse groundwater impacts; and 	Admin	Non – compliance relating to monitoring See Section 7.5																							

Relevant approval	Condition	Condition Description	Compliance Status	Section Addressed in Annual Review/Comment
		a program to monitor and/or validate the impacts of the development on groundwater resources.		Section 11
SSD 5109	Schedule 3, Condition 20	The Applicant must prepare a Rehabilitation Management Plan for the development to the satisfaction of the Secretary.	Admin	Failure to complete monitoring of rehabilitation (Section 8 of management plan - Ecological and Rehabilitation Monitoring). Section 6.6 and 8.

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 & Environment [DPE]) 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.

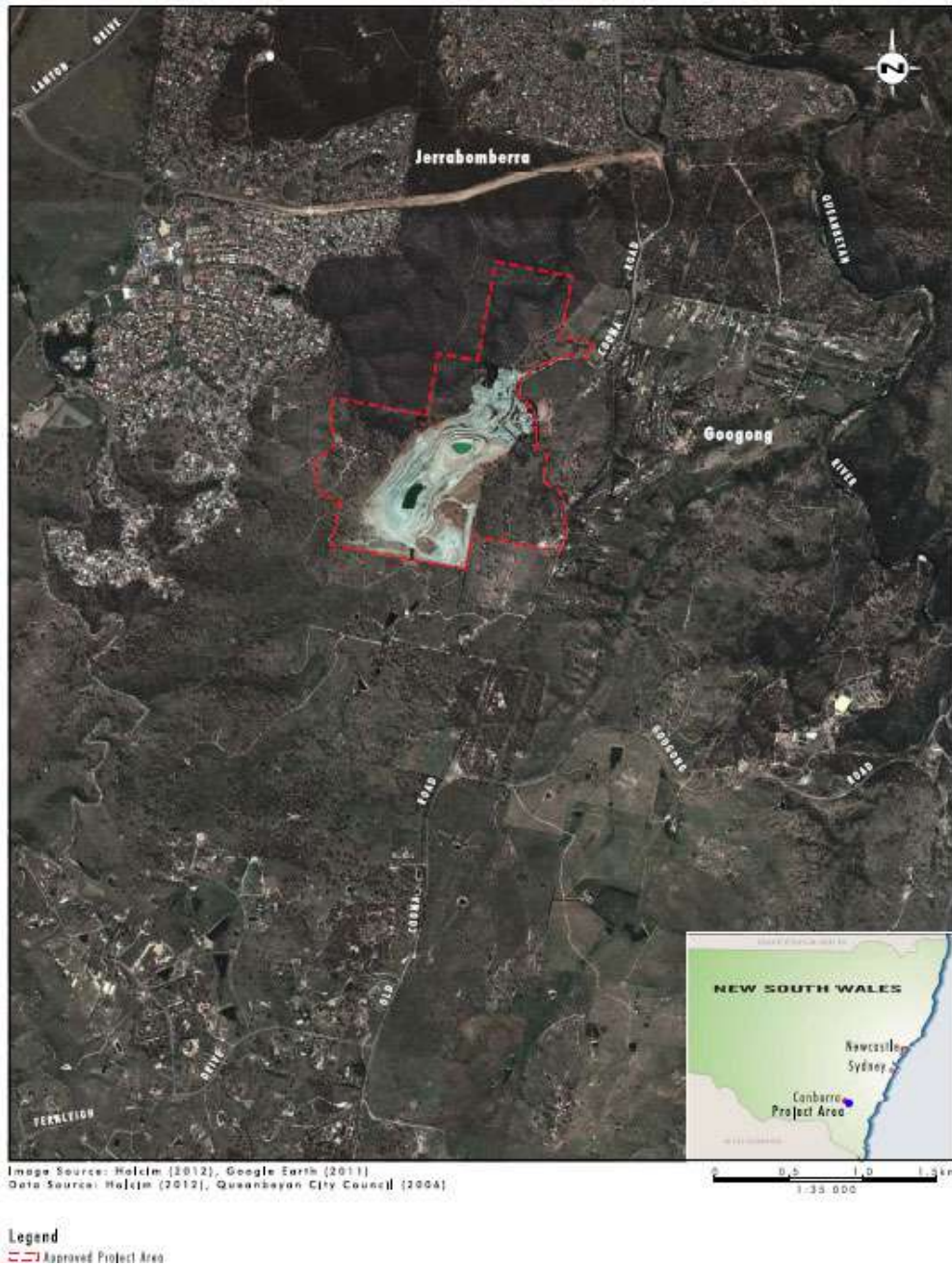


Figure 1: Locality Map (Umwelt 2014)



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: <ul style="list-style-type: none"> - 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 2018.

2.1 Name and Contact Details

The key contact details for the site are outlined below:

Quarry Manager

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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 & 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.

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 2018 reporting period.

4.2 Land Preparation

No land preparation activities occurred at the Cooma Road Quarry in the 2018 reporting period.

4.3 Construction Activities

No construction activities occurred at the Cooma Road Quarry in the 2018 reporting period.

4.4 Quarry Operations

Development activities undertaken at the Cooma Road Quarry in 2018 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; and
- Maintenance of rehabilitation undertaken on the overburden dump in the south-western disturbance area.

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)	2017 Reporting Period (Tonnes)	2018 Reporting Period (Tonnes)
Product Distributed- Total	1,500,000	879,985	735,978

4.5 Next Reporting Period

Development activities proposed to be carried out at the Cooma Road Quarry in the 2019 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
- Continued maintenance of rehabilitation in the completed overburden dump in the south-western disturbance area including weed control as well as nest box monitoring.

No exploration is proposed to be undertaken in the 2019 reporting period. Clearing will be limited to sporadically occurring saplings that have regenerated on currently active benches. Given the young age of these saplings and the area previously being disturbed, ecological pre-clearance surveys will not be required.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Feedback was provided to Holcim from DPE in the Annual Review approval letter on 14 May 2018.

Table 9: Status Update on DPE Actions

Requirement	Compliance Status
<p>The Department notes that no groundwater monitoring has been undertaken to validate the impacts of the project on groundwater resources, as required under the <i>Groundwater Management Plan</i> in accordance with Schedule 3, Condition 20 of the consent. Whilst it's acknowledged that the consent requires you to implement the approved <i>Groundwater Management Plan</i>, failure to undertake groundwater monitoring to assess potential impacts of the project is considered unacceptable. Consequently, the Department requests that within seven days from the date of this letter you follow up with the Department's assessment branch to finalise the approval of the <i>Groundwater Management Plan</i> and subsequent implementation in the timely manner.</p>	<p>Groundwater monitoring has not been completed in 2018. See Section 7.5.</p>

Table 10 outlines an update on the proposed Holcim actions from the previous Annual Review.

Table 10: Status Update on Proposed Holcim Actions

Commitment	Compliance Status
<p>Approval of the Rehabilitation Management Plan - The <i>Rehabilitation Management Plan</i> was submitted to DPI, DoI Water and Council in 2014 but has not yet been approved. Holcim to follow up as required to get <i>Rehabilitation Management Plan</i> approved</p>	<p>This has not yet been approved. Holcim to follow up approval during 2019.</p>
<p>Improving Data Capture PM₁₀ - There is a commitment to improve data capture of the PM₁₀ in 2018.</p>	<p>Full PM₁₀ data capture in 2018.</p>
<p>Depositional Dust Gauge Review - A review of the current location for DDG 4 will be undertaken during the next reporting period to determine if this gauge should be relocated to a more suitable position.</p>	<p>This was not completed in 2018. To be undertaken in 2019. There were still contamination issues in 2018 with DDG4.</p>

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

A meteorological monitoring station has been installed to obtain data in accordance with the requirements of Schedule 3 of Condition 17 of the Development Consent.

Monthly rainfall data has been provided in **Table 11**. The rainfall in 2018 was 449 mm compared to 493 mm.

Table 11: Rainfall Received at the Cooma Road Quarry 2018

Monthly Rainfall (mm)												Total 2018
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
35	49	6	22	13	27	2	77	32	22	70	94	449

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 2018 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	Day 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 located the receivers referred in Table 1 refer to Appendix 5
- 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 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with this 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:

- 6 and 7 March 2018;
- 12 and 13 June 2018;
- 29 and 30 August 2018; and
- 12 and 14 December 2018

The compliance assessments for each monitoring location (N3, N8, N38, N60 and N67) are presented in **Appendix 2** and summarised in **Table 13**.

It is noted that the Cooma Road Quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dBA. Local traffic was the dominant source of noise at this receiver with other non-quarrying sources such as distant traffic, livestock noise and aircraft having been identified throughout the monitoring events.

Table 13: Cooma Road Quarry Noise Results 2018

Assessment Period	Receiver No.	Quarrying Noise Criteria	Q1 March 2018		Q2 June 2018		Q3 August 2018		Q4 December 2018	
		L _{Aeq} (15min)	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance
Morning Shoulder	N3	35	<35	✓	Nil	✓	<35	✓	<35	✓
	N8	40	<35	✓	Nil	✓	<35	✓	<35	✓
	N38	36	<35	✓	Nil	✓	<35	✓	<35	✓
	N60	36	<35	✓	Nil	✓	<35	✓	<35	✓
	N67	36	<35	✓	35	✓	<33	✓	<35	✓
Daytime	N3	35	<35	✓	Nil	✓	<35	✓	<35	✓
	N8	44	<35	✓	Nil	✓	<35	✓	<35	✓
	N38	38	<35	✓	Nil	✓	<35	✓	<35	✓
	N60	38	<35	✓	Nil	✓	<35	✓	<35	✓
	N67	41	38	✓	34	✓	<36	✓	38	✓
Evening	N3	35	<35	✓	Nil	✓	<35	✓	<35	✓
	N8	39	<35	✓	Nil	✓	<35	✓	<35	✓
	N38	35	<35	✓	Nil	✓	<35	✓	<35	✓
	N60	35	<35	✓	Nil	✓	<35	✓	<35	✓
	N67	35	<35	✓	Nil	✓	<35	✓	<35	✓

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 2** to this report.

Longterm Trends:

During 2018 noise was within the Development Consent criteria. Based on the noise results from previous years, the site has continued 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

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 concentrations 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**. Air quality monitoring at the site has been undertaken throughout 2018.

Table 15: TSP and PM₁₀ Dust Criteria

Table 4: Long-term impact assessment criteria for Particulate Matter

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

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 2018. Results for this monitoring are provided in **Table 16**.

Table 16: 2018 Dust Monitoring (Depositional Dust)

Start Date	End Date	DDG1	DDG2	DDG3	DDG4	DDG5
04-01-2018	02-02-2018	4.3	2.2	3.9	3.5	3.7
02-02-2018	02-03-2018	3.4	2.2	1.3	2.3	2.2
02-03-2018	06-04-2018	1.9	0.7	0.9	0.3	1.3
06-04-2018	01-05-2018	4.7	3	2.1	5.7	6.1
01-05-2018	01-06-2018	3.5	1.2	0.7	7.2	1.6
01-06-2018	06-07-2018	3.1	1.1	0.5	13.1	0.6
06-07-2018	03-08-2018	2.9	1.9	0.6	5.1	0.8
03-08-2018	07-09-2018	3.6	1.9	1.4	3	1.4
07-09-2018	05-10-2018	2.1	1	0.5	0.5	0.5
05-10-2018	02-11-2018	5.2	1.2	*NS	2.6	2.5
02-11-2018	07-12-2018	4.9	2.3	1.6	3.9	2.2
07-12-2018	07-01-2018	5.4	2.2	2.7	3.6	3.1
	Annual Average	3.8	1.7	1.5	4.2	2.2
	Min	1.9	0.7	0.5	0.3	0.5
	Max	5.4	3	3.9	13.1	6.1

For the 2018 reporting period, all Annual Average results at the 5 monitoring locations were compliant with the consent criteria, with the exception of DDG4 which was just over the Development Consent criteria of 4g/m²/month.

A review of the current location for DDG 4, and possibly DDG 1, will be undertaken during the next reporting period to determine if these gauges should be relocated to a more suitable position, as the dust levels have likely been affected by contamination eg. Bird droppings and insects.

*It should be noted that there was no sample of DDG3 in November 2018 as the dust gauge had been removed, likely as the result of vandalism. Therefore only 11 samples were included in the DDG3 annual average.

A summary of depositional dust trends between 2016 and 2017 are outlined in **Table 17**.

Table 17: Depositional Dust Trends

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results 2018 Period (Contamination Removed)	Monitoring Results 2017 Period (Contamination Removed)	Monitoring Results 2016 Period (Contamination Removed)
		(g/m ² /month)		
DDG1	Insoluble Solids Reporting Period Average	3.8	3.1	2.9
	Max. Insoluble Solids	5.4	3.7	4.5
	Min. Insoluble Solids	1.9	2.1	1.6
DDG2	Insoluble Solids Reporting Period Average	1.7	1.8	1.2
	Max. Insoluble Solids	3.0	2.6	1.7
	Min. Insoluble Solids	0.7	0.9	0.8
DDG3	Insoluble Solids Reporting Period Average	1.5	0.8	0.9
	Max. Insoluble Solids	3.9	1.6	2.6
	Min. Insoluble Solids	0.5	0.4	0.4
DDG4	Insoluble Solids Reporting Period Average	4.2	2.1	3.8
	Max. Insoluble Solids	13.1	4.3	6.0
	Min. Insoluble Solids	0.3	0.8	2.5
DDG5	Insoluble Solids Reporting Period Average	2.2	2.0	2.8
	Max. Insoluble Solids	6.1	3.8	7.9
	Min. Insoluble Solids	0.5	0.7	0.2

6.3.3.2 PM₁₀ Monitoring

PM₁₀ monitoring continued at site in 2018. 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 2018 PM₁₀ monitoring are provided in **Table 18**.

Table 18: 2018 Dust Monitoring (PM₁₀)

Date	PM ₁₀ Result (ug/m ³)	Sampling Period:	Compliance Status
22-01-2018	31.3	24	Within criteria
29-01-2018	18.1	24	Within criteria
05-02-2018	12.6	24	Within criteria
12-02-2018	11.9	24	Within criteria
19-02-2018	12	24	Within criteria
26-02-2018	9.8	24	Within criteria
05-03-2018	7.8	24	Within criteria
12-03-2018	12.7	24	Within criteria
19-03-2018	18.7	24	Within criteria
26-03-2018	10.6	24	Within criteria
02-04-2018	14.5	24	Within criteria
09-04-2018	22.2	24	Within criteria
16-04-2018	9	24	Within criteria
23-04-2018	19.1	24	Within criteria
30-04-2018	6.3	24	Within criteria
07-05-2018	17.1	24	Within criteria
15-05-2018	10.3	24	Within criteria
21-05-2018	5.8	24	Within criteria
28-05-2018	12.5	24	Within criteria
04-06-2018	3.9	24	Within criteria
11-06-2018	18.4	24	Within criteria
18-06-2018	4.3	24	Within criteria
25-06-2018	14.2	24	Within criteria
02-07-2018	10.7	24	Within criteria
13-07-2018	8	24	Within criteria
16-07-2018	15.8	24	Within criteria
23-07-2018	12.4	24	Within criteria
26-07-2018	4.7	24	Within criteria
30-07-2018	3.3	24	Within criteria
02-08-2018	1	24	Within criteria
06-08-2018	4.8	24	Within criteria
09-08-2018	6	24	Within criteria
16-08-2018	2.6	24	Within criteria
23-08-2018	3.2	24	Within criteria
30-08-2018	24.2	24	Within criteria
06-09-2018	9.6	24	Within criteria
13-09-2018	13.7	24	Within criteria

Date	PM ₁₀ Result (ug/m ³)	Sampling Period:	Compliance Status
20-09-2018	18.6	24	Within criteria
27-09-2018	9.8	24	Within criteria
05-10-2018	7.0	24	Within criteria
12-10-2018	12.5	24	Within criteria
19-10-2018	20.2	24	Within criteria
26-10-2018	5.7	24	Within criteria
15-11-2018	14.3	24	Within criteria
22-11-2018	1	24	Within criteria
01-11-2018	8.2	24	Within criteria
08-11-2018	12.6	24	Within criteria
29-11-2018	3	24	Within criteria
06-12-2018	1	24	Within criteria
13-12-2018	46.3	24	Within criteria
20-12-2018	17.2	24	Within criteria
27-12-2018	80.3	24	Above 24 hour maximum (short term criterion)

The 2018 annual average for PM₁₀ was 13.1 ug/m³, compared to 10.9 ug/m³ for 2017. A summary of average, minimum and maximum results from 2018 compared to 2017 results are outlined in **Table 19**.

There was one occasion in December 2018 where the sample total was above the short term impact assessment criteria for PM₁₀, which is 50 ug/m³.

A summary of PM₁₀ monitoring trends between 2017 and 2018 are outlined in **Table 19**.

Table 19:PM₁₀ Monitoring Trends

Monitoring Summary for Annual Review Period	Monitoring Results 2018 Period (ug/m ³)	Monitoring Results 2017 Period (ug/m ³)
PM ₁₀ Reporting Period Average	13.1	10.97
Max. PM ₁₀	80.3	35.9
Min. PM ₁₀	1	1.2

6.3.3.3 Longterm 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, with the exception of DDG4, which had an annual average of 4.2 g/m²/month. The annual average for DDG 1, 3, 4 and 5 increased during 2018, with there being a small reduction in dust levels at DDG2.

PM₁₀

There are no longterm trends in PM₁₀ monitoring due to the duration of monitoring results. The first year of full monitoring was completed in 2017. There was a small increase to the annual average PM₁₀ levels in 2018 compared to 2017.

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, with the exception of DDG4. However it is noted that there was a vandalised dust depositional gauge (DDG3) on 2 November 2018, with this affecting the annual average.

There was one occasion where the site was above the PM10 short term criteria (27 December 2018). 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*. The plan outlines the control measures implemented as part of the continued operations of the Cooma Road Quarry to minimise the potential air quality impacts on the local community, including:

- Inspections;
- Defined operating hours;
- Monitoring for air quality and meteorological conditions; and
- Training of staff and contractors.

6.3.5 Proposed Improvements

A review of the current location for DDG 4 will be undertaken during the next reporting period to determine if this gauge should be relocated to a more suitable position to reduce the potential contamination of 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: Blast Monitoring Results

Date	Heffernans House		Compliance Status
	Overpressure (dBL)	Vibration (mm/s)	
30-01-2018	105.6	0.43	Compliant
13-02-2018	94.2	0.95	Compliant
06-03-2018	100.2	0.57	Compliant
20-03-2018	92.3	0.84	Compliant
05-04-2018	103.1	0.91	Compliant
03-05-2018	95.8	1.04	Compliant
19-06-2018	92.2	0.47	Compliant
29-06-2018	113.5	0.65	Compliant
06-07-2018	104.7	3.55	Compliant
31-07-2018	103.1	2.36	Compliant
06-08-2018	105.5	1.03	Compliant
14-08-2018	112.2	0.93	Compliant
21-09-2018	107.7	0.43	Compliant
24-10-2018	106.4	0.64	Compliant
05-11-2018	106	0.72	Compliant
30-11-2018	103	0.27	Compliant

In summary:

- There were 16 blasts during 2018; and
- All blasts were within 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.

Longterm Trends:

Blasting levels were compared against the 2016 and 2017 results at the Cooma Road Quarry. In 2016 there was a non - compliance relating to a blast result at Heffernans House (result of 119.8 dB). There were no non – compliances in 2018 regarding blasting. This illustrates improvement in the blasting process.

Table 21: Longterm Blasting Trends

Year	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

Comparison to EIS Predictions:

The results for blasting in 2018 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* also 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 2019 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 2018. The site maintained compliance with the conditions for truck movements throughout 2018. A copy of the truck movements recorded throughout 2018 are outlined in **Table 22**. A total of 735,978 tonnes of product was transported offsite.

Table 22: Transport Tonnages 2019

Month	Transport Tonnages	Truck Movements
January	51947	1939
February	59319	2266
March	64026	2554
April	64950	2269
May	71742	2601
June	56831	1946
July	67940	2362
August	61748	2233
September	63276	2127
October	59268	1981
November	73855	2634
December	41076	1408
Total	735,978	26,320

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 2018 reporting period, therefore there have been no additional impacts to biodiversity.

Green Angle Investments was engaged to undertake the weed spraying in 2018.

There was no additional tree planting in 2018, however trees that were planted during 2017 were maintained. Nest box monitoring was not completed in 2018.

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 2019 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 initiate a round of monitoring to assess the effectiveness of the 55 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.

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 zero. 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 2018 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 2018 are detailed in **Table 23**.

Table 23: Environmental Performance at Cooma Road Quarry in 2018

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 in 2018 and 2017	None required.
Air Quality	EIS predictions are all below development consent criteria.	<p>Dust deposition results are within criteria of EPL, EIS and Development Consent with the exception of DDG4.</p> <p>Due to vandalism no sample was taken of DDG3 during the November 2018 monitoring.</p> <p>The site was above the PM₁₀ short term impact assessment criteria for one monitoring event in December 2018.</p>	<p>Dust deposition was generally consistent with EIS and previous Annual Review with the exception of DDG4.</p> <p>PM₁₀ data was generally consistent with the previous period.</p>	A review of the current location for DDG 4 will be undertaken during 2019 to determine if this gauge should be relocated to a more suitable position to reduce contamination of results. If determined to be required, liaise with the EPA and DPE about moving DDG4 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.	<p>No discharge.</p> <p>Groundwater has not been assessed during this reporting period.</p>	<p>Surface water generally meets criteria. There were no discharges during 2018.</p> <p>Groundwater has not been verified during this reporting period.</p>	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
Biodiversity	It unlikely there will be any significant impacts to species or communities listed in NSW.	No additional impacts - no clearing.	Biodiversity monitoring has not been consistent with the <i>Rehabilitation Management Plan</i> .	Implement the <i>Rehabilitation Management Plan</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*.

7.1 EIS Predictions

Section 5.3 of the EIS (2012) assessed impacts to water. 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**).

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 on a monthly basis.

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 2018.

Table 25: 2018 Water Monitoring Results (Barracks Creek)

Date	Total Suspended Solids (mg/L)	pH	Oil and Grease (mg/L)
04-Jan-2018	<2	7.4	<1
02-Feb-2018	<2	7.9	<1
02-Mar-2018	8	7.3	<1
06-Apr-2018	<2	7.5	<1
03-May-2018	12	7.5	<1
01-Jun-2018	7	7.0	<1
06-Jul-2018	<2	7.6	<1
03-Aug-2018	12	8.0	<1
07-Sep-2018	<2	7.5	<1
05-Oct-2018	3	7.6	<1
02-Nov-2018	3	8.0	<1
07-Dec-2018	<2	7.6	<1

There are discharge criteria within Condition L2.4 of the EPL relating to Barracks Creek, with these outlined in **Table 24**.

These criteria only apply to the site when discharging. Even though there was no discharge during 2018, the monthly samples were below the EPL criteria.

Longterm Trends:

A comparison of data between 2016 and 2018 indicated that results for pH, total oil and grease and suspended solids are generally within the EPL criteria. The only exceptions being one result in 2016 and one result in 2017 for pH. The pH results are generally neutral to slightly alkaline, with oil and grease and suspended solids both recording low readings between 2016 and 2018.

There was no discharge events in 2016- 2018, therefore the EPL criteria is not relevant.

Table 26: Longterm Water Monitoring Barracks Creek

Year	pH Average	Oil and Grease Average	TSS Average
2016	7.4	<1	2.5
2017	7.5	<1	2.6
2018	7.5	<1	4.75

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

Summary of Monitoring

There was no groundwater monitoring completed at the Cooma Road Quarry in 2018. Holcim notes in the letter from the DPE on 14 May 2018 that groundwater monitoring is required by Holcim at Cooma Road Quarry in 2018.

The *Water Management Plan* (2014) outlines the groundwater condition at the site. The Plan states that following a groundwater assessment (Coffey Geotechnics 2012), it was 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.

Holcim is committed to completing groundwater monitoring for depth and parameters in 2019.

7.6 Water Take

Table 27 outlines the water take at the Cooma Road Quarry in 2018. The water take was within the limits of the water access licence requirement.

Table 27: 2018 Water Take

Water Licence Number	Entitlement	Water Usage During 2018	Water Usage During 2017
40SL27690	98 ML	60ML	48ML

The water balance illustrates the total standpipe usage was approximately 43 ML and the total plant usage was 17 ML in 2018.

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: <ul style="list-style-type: none"> - Native endemic species: ad - A landform consistent with Appendix 7 and the surrounding environment
Community	<ul style="list-style-type: none"> • 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*. 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 2018. Existing rehabilitation areas continue to be inspected and maintained. See **Table 29** for details of rehabilitation performance.

Table 29: Rehabilitation Performance in 2018

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.
Agreed post- rehabilitation land use	The final rehabilitation at the Cooma Road Quarry will consist of a woodland/grassland revegetation mix. No change in 2018.
Key rehabilitation performance indicators	See Section 4 of the <i>Rehabilitation Management Plan</i>
Renovation or removal of buildings	No buildings removed in 2018, and none proposed in 2019.
Any other Rehabilitation Taken including: <ul style="list-style-type: none"> • Exploration activities; • Infrastructure; • Dams; and • The installation or maintenance of fences, bunds and any other works. 	No rehabilitation completed in 2018 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 as per the <i>Rehabilitation Management Plan</i> .
Outcomes of trials, research projects and other initiatives	No specific trials.
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.

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	Previous 2017 Annual Review Period (ha)	Current 2018 Annual Review Period (ha)	2019 (next) AEMR Period (ha)
A. Total Quarry Footprint ¹	0	0	0
B. Total Active Disturbance ²	71.5	71.5	71.5
C. Land Being Prepared for Rehabilitation ³	0	0	0
D. Land Under Active Rehabilitation ⁴	7.6	7.6	7.6
E. Completed Rehabilitation ⁵	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 2018 there was approximately 71.5 Ha of active disturbance and 7.6 Ha of active rehabilitation. There is no proposed additional disturbance or rehabilitation in 2019. Rehabilitation maintenance will continue.

8.3 Actions for the Next Reporting Period

The DPE 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 2018 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	No rehabilitation proposed in 2019.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period	No proposed rehabilitation trials.
Summary of rehabilitation activities proposed for next report period	Rehabilitation maintenance will continue in 2019.



Figure 3 Current Disturbance and Rehabilitation

9 COMMUNITY

9.1 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.

A CCC meeting was held on 7 May 2018.

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.

9.2 Community Contributions

There were no specific community contributions in 2018.

9.3 Complaints

A review of the Holcim Safety, Health & Environment (SHE) reporting database (INX) identified two complaints from external stakeholders during the 2018 reporting period.

Complaint 1 – a neighbour complained about blast vibration and noise on 30 November 2018. A review of blasting criteria indicated the blast was within the consent level. Holcim provided this information to the neighbour. Holcim met with the landowner at their house on 10 December 2018.

Complaint 2 – a neighbour complained about blast vibration and noise on 3 October 2018. A review of blasting criteria indicated the blast was within the consent level. Holcim provided this information to the neighbour. Holcim met with the landowner at their house on 10 December 2018.

All publicly listed information including 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).

10 INDEPENDENT AUDIT

The most recent Independent Environmental Audit (IEA) was undertaken by Pitt & Sherry (Operations) Pty Ltd of 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.

The 2017 IEA provided an assessment of the environmental performance of the project by way of compliance with the requirements and conditions of:

- Development Consent (SSD_5109);
- Statement of Commitments;
- EPL No. 1453; and
- Water Approval No. 40WA413082.

A copy of the IEA Action Plan, including an update on proposed actions is attached as **Appendix 1**.

The next IEA is required to be conducted in 2020.

11 INCIDENTS AND NON COMPLIANCE

Incidents and non-compliances at Cooma Road Quarry in 2018 are summarised in **Table 32**.

Table 32: Incidents and Non Compliance at the Cooma Road Quarry During 2018

Date	Incident/Non Compliance	Action/Comment
7 December 2018	Dust Gauge Vandalism	DDG 3 had the funnel broken and appears to be vandalism. The funnel has since been replaced.
2 November 2018	Dust Gauge Vandalism	DDG 3 was missing during the sampling event. The dust gauge was replaced again.
Overall period	DDG4 above criteria	DDG4 which was just over the Development Consent criteria of 4g/m ² /month. The location of DDG4 will be reviewed in 2019 as some results contained contamination for bird dropping/insects.
December 2018	Above Short Term PM ₁₀ Criteria	The site was above the PM ₁₀ short term impact assessment criteria for one monitoring event in December 2018.
Throughout the period	No groundwater monitoring	No groundwater monitoring was completed in 2018, with this being a requirement of the <i>Water Management Plan</i> (see Section 7).
Throughout the period	Implementation of the Rehabilitation Management Plan	Failure to complete monitoring of rehabilitation (Section 8 of management plan - Ecological and Rehabilitation Monitoring).

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Proposed improvement actions for 2019 are noted in **Table 33**.

Table 33: Improvement Actions for 2019

Improvement Measure	Activities	Timeframe
Approval of the <i>Rehabilitation Management Plan</i>	The <i>Rehabilitation Management Plan</i> was submitted to DPI, NOW and Council in 2014 but has not yet been approved. Holcim to follow up as required to get <i>Rehabilitation Management Plan</i> approved	Quarter 2 2019
Progressive Rehabilitation	The site will continue to progressively rehabilitate available areas.	As soon as reasonable practicable after disturbance
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 4 will be undertaken during the next reporting period to determine if this gauge should be relocated to a more suitable position.	Quarter 2 2019.
Groundwater monitoring	Completion of groundwater monitoring	Commencing Quarter 2 2019
Biodiversity	Weed spraying will continue at site during the next Annual Review period. Implementation of the <i>Rehabilitation Management Plan</i> .	Annually

13 APPENDICES

APPENDIX 1

COOMA ROAD QUARRY INDEPENDENT AUDIT ACTION PLAN

Table 1. Development Consent SSD_5109 - MOD 1

Schedule	Condition	Condition Description/Requirement	Compliance	Pittnsherry Comments & Recommendations	Holcim Comments & Response to Recommendations
2	26	<p>The Applicant must pay Council road maintenance contributions of \$0.2911 per tonne for every tonne of quarry product or recycled concrete transported to and from the site in accordance with Council's Section 94 Contributions Plan – No 2 Extractive Industry. Each payment must be:</p> <p>(a) paid to Council at the end of each calendar year; and</p> <p>(b) based on weighbridge records of the quantity of quarry products and recycled concrete transported to and from the site.</p> <p>Note: If the parties are not able to agree on any aspect of the road upgrade and maintenance contributions, either party may refer the matter to the Secretary for resolution.</p>	Not Verified	Documentation confirming compliance with this Condition was not available for review.	<p>Noted. Holcim will continue to pay Council road maintenance contributions in accordance with this Condition.</p> <p>Ongoing.</p>
3	1	<p>The Applicant must keep accurate records of:</p> <p>(a) the amount of quarry products transported from the site (monthly and annually) and publish these records on its website on a quarterly basis; and</p> <p>(b) the quantity, destination and source of all laden truck movements to and from the site (hourly, daily, weekly, monthly and annually).</p>	Observation	<p>(a) Production data is commercially sensitive. Annual production data is provided in the Annual Review (see Schedule 2, Condition 17) to confirm that the quarry's production limits are not exceeded. The data is captured in weighbridge records and in Annual Review documents.</p> <p>(b) Weighbridge records record the quantity, destination of all laden truck movements to and from the site (hourly). This information can be used to determine daily, weekly, monthly and annually dispatches.</p> <p>Observation: AEMR 2016 for the calendar year is signed by NSW Planning and Environment Coordinator on 31 March 2016</p> <p>Recommendation: this typographical error should be corrected.</p>	<p>Noted. Holcim will continue to provide a summary of annual production data in the Annual Review. Detailed data is available on request.</p>
3	6	<p>The Applicant must:</p> <p>(a) implement best management practice to minimise the construction, operational and traffic noise of the development;</p> <p>(b) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply;</p> <p>(c) maintain the effectiveness of any noise attenuation</p>	Not Compliant	<p>(a) The Noise Management Plan (2014) describes best management practice to minimise the construction and operational traffic noise. Earth bunds have been constructed in accordance with the plan. Night/evening work are not undertaken. The 2014 and 2015 Annual Reports stated that no noise monitoring was</p>	<p>Noted. Holcim will continue to undertake attended noise monitoring on a quarterly basis. Holcim will also engage a suitably qualified person to conduct a sound power level testing program to review against sound power level (SWL) for equipment outlined in the EIS.</p>

		<p>on equipment to ensure consistency with the benchmark sound power levels presented in the EIS; and</p> <p>(d) regularly assess the results of noise monitoring to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary.</p>		<p>being undertaken and planned to commence quarterly noise monitoring in 2016.</p> <p>(b) As per (a).</p> <p>(c) The Noise Management Plan (2014) states that “the three-yearly sound power level testing program will commence with the first year of operations following Development Consent”. This has not occurred. Other than noting that there have been no noise-related complaints, it cannot be assessed whether this condition has been met.</p> <p>(d) Attended noise monitoring of operations are being undertaken (see Appendix 9, Condition 3). The AEMR 2016 includes detailed noise report.</p> <p>Conclusion: Noise monitoring data is not available for the entire audit period however it is to be included in the annual report as of 2016.</p>	<p>A comprehensive obligations register will assist with managing these commitments.</p> <p>Responsibility: Both the Planning & Environment team and Quarry Manager</p> <p>Date: Completed - Quarter 2, 2018</p>
3	7	<p>The Applicant must prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with Council and the EPA, and submitted to the Secretary for approval within 6 months of this consent;</p> <p>(b) describe the measures that would be implemented to comply with the:</p> <ul style="list-style-type: none"> • noise criteria in Table 1; • hours of operation in Table 2; and • operating conditions in Condition 7 above; <p>(c) include a monitoring program that:</p> <ul style="list-style-type: none"> • incorporates quarterly (or as otherwise agreed by the Secretary) attended noise monitoring to evaluate the performance of the development against the noise criteria in Table 1; • includes a protocol for determining exceedances of the noise criteria in Table 1; and • assesses the sound power levels of the equipment on site, compares it with the benchmark levels used in the EIS, and evaluates the effectiveness of any attenuation. <p>The Applicant must implement the approved management plan as approved from time to time by the Secretary.</p>	Not Compliant	<p>a) The Noise Management Plan has been prepared and submitted as required.</p> <p>b) and c): The plan includes details of how to address the relevant requirements including attended noise monitoring.</p> <p>Table 2.1 in the Noise Management Plan refers to section 2.1.3 of the plan on addressing condition 7 (a). there is no section 2.1.3 in the plan (2014).</p> <p>The AEMR contains the reports of quarterly noise monitoring in the appendix (December 2016 report by WSP/PB indicating the noise levels are likely to have been within Development Consent conditions).</p> <p>However, implementation of the plan is inadequate in terms of noise monitoring and reporting.</p> <p>Conclusion: Section 6.1 of the plan (2014) refers to quarterly attended noise monitoring however this was not implemented until June 2016. This is now being implemented.</p>	<p>Noted. Holcim will continue to undertake attended noise monitoring on a quarterly basis. Holcim will also engage a suitably qualified person to conduct a sound power level testing program to review against sound power level (SWL) for equipment outlined in the Environmental Impact Statement (EIS). A comprehensive obligations register will assist with managing these commitments.</p> <p>Responsibility: Both the Planning & Environment team and Quarry Manager</p> <p>Date: Completed Quarter 2, 2018</p>

3	9	<p>The Applicant must ensure that the blasting on the site does not cause exceedances of the criteria in Table 3.</p> <p>Table 3: Blasting Criteria</p> <table border="1"> <thead> <tr> <th>Location</th> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Ground vibration (mm/s)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td></td> <td>120</td> <td>10</td> <td>0%</td> </tr> <tr> <td>Any residence on privately-owned land</td> <td>115</td> <td>5</td> <td>5% of the total number of blasts over a period of 12 months</td> </tr> </tbody> </table> <p>However, these criteria do not apply if the Applicant has a written agreement with the relevant owner or infrastructure provider/owner, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance		120	10	0%	Any residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months	Not Compliant	<p>One blast event logged in INX breach of blasting limit on 14/12/16. The Auditor understands that this exceedance is an isolated event.</p> <p>Recommendation: Continue to monitor blasts. If exceedances occur in the future, undertake a review of blasting procedures.</p>	<p>The EPA & DP&E were notified of the exceedance of the 115 dB limit on 14/12/16. The resulting exceedance did not exceed the 120 dB max criteria or the annual limit for blasting.</p> <p>Cooma Road Quarry enters blast monitoring data into a database on a fortnightly basis which is consequently published to the Holcim webpage¹ (as required by the Cooma Road Quarry EPL). Cooma Road Quarry will continue to monitor blasts and enter blast monitoring data on a fortnightly basis. The Holcim Planning & Environment team will continue to work with the Cooma Road Quarry Manager to ensure that exceedances are identified and that appropriate stakeholders are notified as soon as practical.</p> <p>If more than one exceedance occurs in a three month period, a review will be undertaken of the blasting procedure and DP&E (and any other stakeholders) will be provided with the review report.</p> <p>Responsibility: Planning & Environment Team and Quarry Manager</p> <p>Date: Ongoing requirement.</p>
Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance														
	120	10	0%														
Any residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months														
3	20	<p>The Applicant must prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with the EPA and DPI 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:</p> <p>(a) Site Water Balance that includes details of:</p> <ul style="list-style-type: none"> • sources and security of water supply, including contingency planning; • water use on site; and 	Observation	<p>The Water Management Plan has been submitted but approval from the Secretary/Director-General has not been received as at the time of the audit (01 Dec 2017).</p> <p>Recommendation: DPI Water be contacted regarding finalisation of the Water Management Plan.</p>	<p>Holcim will engage a suitably qualified and experienced person/s to assist with the finalisation of the Water Management Plan through consultation with DPI Water.</p> <p>Responsibility: Planning & Environment Team</p> <p>Date: To be resubmitted on 29 March 2019.</p>												

¹ Pollution monitoring data, <http://www.holcim.com.au/en/sustainability/environment/pollution-monitoring-data.html>

		<ul style="list-style-type: none"> • measures that would be implemented to minimise use of clean water and maximise recycling of dirty water on the site; (b) Surface Water Management Plan that includes: <ul style="list-style-type: none"> • baseline data on surface water flows and quality in the watercourses that could be affected by the development; • a detailed description of the surface water management system on site, including the design objectives and performance criteria for the: <ul style="list-style-type: none"> - clean water diversions; - erosion and sediment controls; - water storages (including Maximum Harvestable Rights requirements); and - control of water pollution from areas of the site that have been rehabilitated; • performance criteria, including trigger levels for investigating any potentially adverse surface water quality impacts; • a program to monitor: <ul style="list-style-type: none"> - any surface water discharges; - the effectiveness of the water management system; - surface water flows and quality in local watercourses; and - ecosystem health of local watercourses; (c) Groundwater Monitoring Program that includes: <ul style="list-style-type: none"> • baseline data of groundwater levels surrounding the development; • groundwater assessment criteria based upon analysis of baseline data for groundwater, including trigger levels for investigating any potentially adverse groundwater impacts; and • a program to monitor and/or validate the impacts of the development on groundwater resources; (d) Surface and Ground Water Response Plan that describes the measures and/or procedures that would be implemented to: <ul style="list-style-type: none"> • respond to any exceedences of the surface water and groundwater assessment criteria; and • mitigate and/or offset any adverse impacts on surface water and groundwater resources located within and adjacent to the site. <p>The Applicant must implement the approved management plan as approved from time to time by the Secretary</p>			
3	24	<p>The Applicant must prepare and implement a Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must:</p>	Administrative non-compliance	The Rehabilitation Management Plan has been submitted to DPI, NOW and Council but not yet approved.	Holcim will engage a suitably qualified and experienced person/s to assist with the finalisation of the Rehabilitation Management Plan

		<p>(a) be prepared in consultation with DRE, DPI, DPI Water and Council;</p> <p>(b) be submitted to the Secretary for approval within 12 months of the date of this consent;</p> <p>(c) describe the short, medium and long term measures that would be implemented to:</p> <ul style="list-style-type: none"> • manage remnant vegetation and habitat on site; • ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent; <p>(d) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, including triggering remedial action (if necessary);</p> <p>(e) include a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for:</p> <ul style="list-style-type: none"> • 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; <p>(f) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;</p> <p>(g) include details of who would be responsible for monitoring, reviewing, and implementing the plan;</p> <p>(h) provide details of the conceptual final landform and associated land uses; and</p> <p>(i) provide details of water management requirements and details of the final void in relation to water storage.</p> <p>The Applicant must implement the approved management plan as approved from time to time by the</p>		<p>Observation: Follow up as required to get Rehabilitation Management Plan approved.</p>	<p>through consultation with relevant stakeholders.</p> <p>Responsibility: Planning & Environment Team</p> <p>Date: Not completed in 2018. Quarter 2, 2019.</p>
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		Secretary			
3	30	<p>Prior to importing onto the site any recycled concrete or any other material that may be classified as a waste under the EPA Waste Classification Guidelines 2009 (or its latest version), the Applicant must obtain a 'resource recovery exemption' under the POEO Act and provide evidence of this exemption to the Department.</p> <p>Note: This condition does not apply to routine deliveries to the site.</p>	Not Compliant	<p>Concrete waste (from a concrete batching plant) is processed at the site.</p> <p>A Resource Recovery Exemption for that material has not been obtained.</p> <p>Recommendation: Apply for a Resource Recovery Exemption for the concrete wastes processed at the site.</p>	<p>Holcim will engage a suitably qualified person to assist with the applying for a Resource Recovery Exemption for the concrete waste processed at Cooma Road Quarry.</p> <p>Responsibility: Planning & Environment Team</p> <p>Date: Completed Quarter 2, 2018</p>
3	31	<p>The Applicant must:</p> <p>(a) minimise the waste generated by the development; and</p> <p>(b) ensure that the waste generated by the development is appropriately stored, handled, and disposed of, to the satisfaction of the Secretary.</p>	Not Compliant	<p>No waste stockpile was observed during site inspection. Waste materials are sorted into 3 m³ bins.</p> <p>Waste management service by contractors – waste receipts were inspected – e.g. Remondis 30 June 2017, 31 Aug 2017; Southern Oil (waste oil) on 11 Nov 2017; Southern Oil (waste filter) on 11 Oct 2017.</p> <p>Waste oil is managed in a bunded area. One open waste oil drum for temporary storage was sighted outside the bund. The auditees mentioned that this area is served by an oil/grease separator with hardstand sloping towards a capture drain. However, the area is not protected by any bunds and stormwater or surface water contamination is possible during storm events.</p> <p>Recommendation: It is recommended that this waste oil drum be kept in a drip tray or other suitable mechanism to avoid any leaks affecting stormwater runoff.</p>	<p>Holcim has a comprehensive Environmental Management System (EMS) that addresses environmental risks associated with operational aspects related to quarrying. Chapter 6.11 of the Holcim EMS provides guidelines on the Storage of Liquid Fuels & Chemicals. Holcim's Quarry Manager will review Chapter 6.11 of the Holcim EMS and will hold a toolbox talk for Cooma Road Quarry employees. Environmental hazards will continue to be recorded using Holcim's internal reporting software – INX.</p> <p>Responsibility: Quarry Manager</p> <p>Date: Completed Quarter 1, 2018</p>
5	4	<p>With 3 months of the submission of an:</p> <p>(a) incident report under condition 7 below;</p> <p>(b) Annual Review under condition 9 below;</p> <p>(c) audit report under condition 10 below; and</p> <p>(d) any modifications to this consent,</p> <p>The applicant must review, and if necessary revise, the strategies, plans and programs required under this consent, to the satisfaction of the Secretary.</p>	Not Compliant	<p>The Environmental Management Strategy has not been revised since March 2014, as per the Strategy available on the Holcim website². Annual Review report for 2016 mentions the Modifications to SSD_5109 (page 6).</p> <p>Evidence for review of the Strategy</p>	<p>Develop a Minutes template for recording meetings and/or reviews associated with strategies, plans and programs. Should a revision be required, the strategy, plan and/or program will be updated and submitted to DP&E as well as other relevant stakeholders.</p>

² http://www.holcim.com.au/fileadmin/templates/AU/doc/Community_Link/Cooma_Road/EnvironmentalMgtPlans/EnvironmentalMgtStrategy.pdf

		Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.		following modifications to the consent SSD 5109 as per the August 2016 Modification was not provided to the Auditor. Recommendation: Prepare and save minutes of meetings where documentation Management Reviews and/or procedural document reviews are undertaken.	Responsibility: The Planning & Environment team Date: Completed Quarter 1, 2018
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Table 2. Environment Protection License (EPL) 1453

Condition	Condition Description/Requirement	Compliance	Comments and Recommendations	Holcim Response
01.1	<p>Licensed activities must be carried out in a competent manner. This includes:</p> <p>a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.</p>	Not Compliant	<p>No waste stockpile was observed during site inspection. Waste materials are sorted into 3m³ bins.</p> <p>Waste management service by contractors – waste receipts were inspected – eg Remondis 30 June 2017, 31 Aug 2017; Southern Oil (waste oil) on 11 Nov 2017; Southern Oil (waste filter) on 11 Oct 2017.</p> <p>Waste oil is managed in a bunded area. One open waste oil drum for temporary storage was sighted outside the bund. The auditees mentioned that this area is served by an oil/grease separator with hardstand sloping towards a capture drain. However, the area is not protected by any bunds and stormwater or surface water contamination is possible during storm events.</p> <p>Recommendation: Refer to MCoA Schedule 3 Condition 31 above.</p>	<p>Holcim has a comprehensive Environmental Management System (EMS) that addresses environmental risks associated with operational aspects related to quarrying. Chapter 6.11 of the Holcim EMS provides guidelines on the Storage of Liquid Fuels & Chemicals whilst Chapter 6.13 provides guidelines on Waste Management. Holcim's Quarry Manager will review Chapter 6.11 and 6.13 of the Holcim EMS and will hold a toolbox talk for Cooma Road Quarry employees. Environmental hazards will continue to be recorded using Holcim's internal reporting software – INX.</p> <p>Responsibility: Quarry Manager</p> <p>Date: Completed Quarter 1, 2018</p>
M2.2	<p>The record must include details of the following:</p> <p>a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.</p>	Observation	<p>The required details of complaints, action and status are recorded in the incident report form.</p> <p>The method by which the complaint was made is not clear on the two extracts presented.</p> <p>Recommendation: all required details should be noted on the forms.</p>	<p>Noted. Holcim will continue to record community complaints using Holcim's internal reporting software – INX. Cooma Road Quarry Manager will hold a toolbox talk for Cooma Road Quarry employees explaining the details that must be entered into INX following a community complaint.</p> <p>Responsibility: Quarry Manager</p> <p>Date: Completed Quarter 1, 2018</p>
R1.1	<p>The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:</p> <p>a) a Statement of Compliance; and b) a Monitoring and Complaints Summary.</p> <p>At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.</p>	Not Compliant	<p>The 2017 (1 May 2016 – 30 Apr 2017) Annual Return Form G Statement of Compliance is incomplete. The blasting complaint of March 2017 (as noted in the INX extract) is not noted in the 2017 Annual Return (a similar complaint in 2014 was noted in the 2014 Annual Return).</p> <p>Recommendation: Annual Reports should</p>	<p>Noted. Annual Returns are coordinated by Holcim's Executive Support team. From now on, this team will ensure that the document is reviewed and signed by the Quarry Manager.</p> <p>Responsibility: Executive Support team/Planning & Environment team/Quarry Manager</p>

			be complete and signed off by relevant senior personnel.	Date: Completed Quarter 1, 2018
R1.7	<p>Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:</p> <p>a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.</p>	Administrative Non-Compliance	<p>Annual Returns for 2014, 2015 and 2016 are signed by Director and Secretary.</p> <p>Observation: Annual Return for 2017 is not signed on form H.</p>	<p>Noted. Annual Returns are coordinated by Holcim's Executive Support team. From now on, this team will ensure that the document is reviewed and signed by the Quarry Manager.</p> <p>Responsibility: Executive Support team/Planning & Environment team/Quarry Manager</p> <p>Date: Quarter 1, 2018</p>
R2.2	<p>The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.</p> <p>Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</p>	Not Compliant	<p>There have been no serious environmental harm incidents occurred on site. Any environmental incidents should be included in the Annual Returns; However, Annual Return 2017 (01/5/16 – 30/4/17) form C did not include the one instance of lower than limits pH (6.3 against lower limit of 6.5) as noted on 1 Sept 2016 (AEMR 2016 and Attachment 4.1H Environmental Monitoring Worksheet for 1/9/16 – 15/9/16).</p> <p>Recommendation: Make sure Annual Reports are complete and include all relevant information.</p>	<p>Quarry Manager will be up-skilled to understand notification requirements.</p> <p>Responsibility: Planning & Environment team</p> <p>Date: Completed Quarter 1, 2018</p> <p>Annual Returns are coordinated by Holcim's Executive Support team. From now on, this team will ensure that the document is reviewed and signed by the Quarry Manager.</p> <p>Responsibility: Executive Support team/Planning & Environment team/Quarry Manager</p> <p>Date: Completed Quarter 1, 2018</p>
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	Not Verified	Auditees advised that it is kept in Permit Compliance Folder in the weighbridge office.	<p>Noted. Holcim have a permit compliance folder on-site however this should be audited to check it contains all relevant approvals, licences and/or permits.</p> <p>Responsibility: Quarry Manager</p> <p>Date: Completed Quarter 4, 2018</p>

Table 3. Water Licence 40WA413082

Condition	Condition Description/Requirement	Compliance	Comments and Recommendations	Holcim Response
1	<p>A logbook must be kept and maintained at the authorised work site or on the property for each water supply work authorised by this approval, unless the work is metered and fitted with a data logger.</p> <p>A logbook is a document, electronic or hard copy, that records specific required information.</p> <p>A metered water supply work is a water supply work fitted with a data logger and a meter that complies with Australian standard AS 4747: meters for non-urban water supply.</p>	Not Compliant	<p>Two spreadsheets are maintained for plant water usage and water usage vs rainfall. Such information for past years could not be verified as only 2017 logbooks were available at the audit. The plant water usage spreadsheet for 2017 indicates process water usage and total water usage as per meter reading. Data is available January to November 2017 at the time of this audit.</p> <p>The Water Licence number and other specific details on the logged meter/water source are not noted in the logbooks. Recommendation: update the logbook with required specific details.</p>	<p>Holcim will update the logbook with the required information. The Quarry Manager will continue to log details of water usage as well as additional information required as per logbook update.</p> <p>Responsibility: Planning & Environment Team and Quarry Manager</p> <p>Date: Completed Quarter 4, 2018</p>
2	<p>The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.</p>	Not Compliant	<p>Water metering reading for general use and process water use at plant are noted in the spreadsheet. Only total water usage per month for quarry water usage is available.</p> <p>Recommendation: update the logbook with required specific details.</p>	<p>Holcim will update the logbook with the required information. The Quarry Manager will continue to log details of water usage as well as additional information required as per logbook update.</p> <p>Responsibility: Planning & Environment Team and Quarry Manager</p> <p>Date: Quarter 4, 2018</p>
3	<p>Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.</p> <p>A water meter is a device that measures the volume of water that is extracted over a known period of time. Examples of a water meter may include a mechanical meter, electromagnetic meter, channel meter with mobile phone, or an authorised meter equivalent.</p>	Not Compliant	<p>Logbook entries are per monthly water consumption, not per water extraction. Reading is not recorded every time water is taken.</p> <p>Recommendation: update the logbook with required specific details.</p>	<p>Holcim will update the logbook with the required information. The Quarry Manager will continue to log details of water usage as well as additional information required as per logbook update.</p> <p>Responsibility: Planning & Environment Team and Quarry Manager</p> <p>Date: Completed Quarter 4, 2018</p>
4	<p>Before water is taken through the water supply work authorised by this approval, confirmation must be recorded in the logbook that these conditions do not apply and water may be taken.</p> <p>The method of confirming that water may be taken, such as visual inspection or internet search, must also be recorded in the logbook.</p> <p>If water may be taken, the:</p>	Not Compliant	<p>Date, time and licence or approval number is not recorded in the logbook.</p> <p>Recommendation: Logbooks for WAL 413082 include all required information, including date, time and licence or approval number.</p>	<p>Holcim will update the logbook with the required information. The Quarry Manager will continue to log details of water usage as well as additional information required as per logbook update.</p> <p>Responsibility: Planning & Environment Team and Quarry Manager</p> <p>Date: Completed Quarter 4, 2018</p>

	<p>a. date, and b. time of the confirmation, and c. flow rate or water level at the reference point in the water source must be recorded in the logbook.</p> <p>Visual inspection means to physically inspect the gauge (or reference point) and confirm flow rate or water level by eye. Internet search means to confirm the flow rate or water level at the appropriate gauge by checking the correct website. Cease to take conditions means any condition on this approval, or on the access licence under which water is proposed to be taken, that prohibits the taking of water in a particular circumstance.</p>			
5	<p>Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the minister as soon as practicable. The minister must be notified by: a. email: information@water.nsw.gov.au, or by b. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.</p>	Observation	<p>Recommendation: The water approval related Non- Compliances described in this audit should be reported as per this condition.</p>	<p>Holcim will report the non-compliances identified by this audit to DPI Water. Responsibility: Planning & Environment Team Date: Completed Quarter 1, 2018</p>
8	<p>The following information must be recorded in the logbook for each period of time that water is taken: a. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and b. the access licence number under which the water is taken, and c. the approval number under which the water is taken, and d. the volume of water taken for domestic consumption and/or stock watering. a logbook is a document, electronic or hard copy, that records specific required information.</p>	Not Compliant	<p>The logbook contains monthly total water usage only. It doesn't have date, time, volume of each water draw, access licence number etc. Recommendation: update the logbook with required information.</p>	<p>Holcim will update the logbook with the required information. The Quarry Manager will continue to log details of water usage as well as additional information required as per logbook update. Responsibility: Planning & Environment Team and Quarry Manager Date: Completed Quarter 4, 2018</p>

APPENDIX 2

COOMA ROAD QUARRY QUARTERLY NOISE MONITORING REPORTS 2018

Noise Monitoring Assessment Quarterly

Cooma Road Quarry, Googong, NSW
March 2018.

Document Information

Quarterly Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

March 2018

Prepared for: Holcim (Australia) Pty Ltd



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APPENDIX A - GLOSSARY OF TERMS

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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 during Quarter 1, March 2018 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;
- Conditions of Consent SSD-5109; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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 site.

Table 1 presents the criteria for each of the receivers N1 – N71 as outlined in the Development Consent for quarry operations.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	LAeq(15min)	LAeq(15min)	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/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.

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

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

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

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

N67 is located 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 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out by two MAC staff members using Svanetek Type 1, 971 noise analysers on Tuesday 6 March 2018 and Wednesday 7 March 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-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.

FIGURE 1

LOCALITY PLAN

REF: MAC170437



KEY

● N1 NOISE MONITORING LOCATIONS



Imagery Source: SIO/APS

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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 monitoring assessment 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}		
7/03/2018	06:38	63	46	37	Dir: E Wind Speed: 1.2m/s Rain: Nil	Distant traffic 36-46
	(Morning Shoulder)					Wind in trees <36 Birds 36-59 Aircraft 38-63
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
7/03/2018	07:00	63	44	36	Dir: E Wind Speed: 1.5m/s Rain: Nil	Distant traffic 36-44
	(Day)					Birds 44-63 Wind in trees <44
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
6/03/2018	19:04	65	49	36	Dir: E Wind Speed: 1.5m/s Rain: Nil	Aircraft 48-62
	(Evening)					Wind in trees 38-52 Birds 32-57 Aircraft 42-53
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible

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 monitoring assessment 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}		
7/03/2018	06:40				Dir: SE	Distant traffic 54-57 Local traffic 57-66
	(Morning Shoulder)	67	56	50	Wind Speed: 1m/s Rain: Nil	
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible
6/03/2018	16:26				Dir: E	Distant traffic 48-57 Local traffic/horn 57-105 Wind in trees <57 Birds 42-48
	(Day)	105	73	48	Wind Speed: 0.1m/s Rain: Nil	
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible
6/03/2018	18:10				Dir: NE	Local traffic 58-70 Distant traffic 44-52
	(Evening)	72	54	47	Wind Speed: 0.5m/s Rain: Nil	
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible

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 monitoring assessment 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}		
7/03/2018	06:20				Dir: SE	Distant traffic 40-44 Local traffic 43-65
	(Morning	65	44	37	Wind Speed: 0.1m/s	
	Shoulder)				Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
6/03/2018	16:45				Dir: E	Distant traffic 46-54 Birds 37-45 Aircraft 38-46 Local traffic 48-67
	(Day)	67	52	44	Wind Speed: 0.5m/s	
					Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
6/03/2018	18:28				Dir: NE	Distant traffic 40-42 Wind gust 43-55 Local traffic 53-65
	(Evening)	68	47	39	Wind Speed: 1.5m/s	
					Rain: Nil	
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible

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 monitoring assessment 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}		
7/03/2018	06:00				Dir: SE	
	(Morning Shoulder)	67	57	46	Wind Speed: 0.3m/s Rain: Nil	Traffic 43-62
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible
6/03/2018	17:04				Dir: E	
	(Day)	75	68	57	Wind Speed: 1m/s Rain: Nil	Traffic 43-68
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible
6/03/2018	18:35				Dir: E	
	(Evening)	74	66	54	Wind Speed: 1m/s Rain: Nil	Traffic 43-71
	Cooma Road Quarry L _{Aeq} (15min) Contribution					Quarry Inaudible

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 monitoring assessment are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
7/03/2018	06:00	68	39	33	Dir: SE Wind Speed: 0.5m/s Rain: Nil	Distant traffic 30-40
	(Morning Shoulder)					Wind in trees 28-34 Aircraft 33-41 Local traffic 38-42
Cooma Road Quarry LAeq(15min) Contribution						Quarry Inaudible
6/03/2018	17:26	63	46	41	Dir: E Wind Speed: 1.5m/s Rain: Nil	Wind in trees 41-50
	(Day)					Birds 38-46 Distant traffic <41 Aircraft 46-58
Cooma Road Quarry LAeq(15min) Contribution						Quarry Inaudible
6/03/2018	18:14	73	50	41	Dir: E Wind Speed: 1.5m/s Rain: Nil	Wind in trees 38-47
	(Evening)					Birds 41-61 Distant traffic 38-43 Aircraft 42-66
Cooma Road Quarry LAeq(15min) Contribution						Quarry Inaudible

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 Noise Compliance Assessment

The compliance assessment for each monitoring location N3, N8, N38, N60 and N67 are presented in **Table 7** to **Table 9** for day, evening and morning shoulder assessment periods.

Table 7 Daytime Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	Nil	35	✓
N8	Nil	44	✓
N38	Nil	38	✓
N60	Nil	38	✓
N67	Nil	41	✓

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.

Table 8 Evening Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	Nil	35	✓
N8	Nil	39	✓
N38	Nil	35	✓
N60	Nil	35	✓
N67	Nil	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.

Table 9 Morning Shoulder Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	Nil	35	✓
N8	Nil	40	✓
N38	Nil	36	✓
N60	Nil	36	✓
N67	Nil	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.

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6 Discussion

6.1 Discussion of Results - Location N3

Monitoring on 6 March 2018 and 7 March 2018 identified that Cooma Quarry noise was inaudible on all three occasions at N3, and therefore satisfied the morning shoulder and daytime noise limits of 35dBA. It is noted that the quarry was not operational during the evening period however background measurements were undertaken for completeness and as per the EPL. Extraneous sources audible during the three attended surveys included aircrafts, wind in trees, birds, wind gusts, distant and local traffic.

6.2 Discussion of Results - Location N8

Monitoring results for N8 during Quarter 1, March 2018 were dominated by local traffic that was generally constant during all three attended measurements. Quarry emissions were inaudible on all three occasions, therefore satisfying the relevant morning shoulder criteria of 40dBA and daytime noise limits of 44dBA. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dBA. Extraneous sources measured include wind in trees, birds and distant traffic.

6.3 Discussion of Results - Location N38

Quarry noise was inaudible on all three occasions for the 6 March 2018 and 7 March 2018 survey periods, therefore satisfying the daytime criteria of 38dBA and morning shoulder limit of 36dBA. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dBA. Non-quarrying noise sources included birds, aircraft, wind gusts, distant and local traffic.

6.4 Discussion of Results - Location N60

Quarry noise emissions were inaudible during all three attended noise surveys at N60 during all measurements conducted on 6 March 2018 and 7 March 2018, therefore the relevant morning shoulder limits of 36dBA and daytime noise limits of 38dBA were satisfied at this monitoring location. It is noted that Cooma Quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dBA. Distant and local traffic were the dominant source at this receiver throughout the March 2018 quarter.

6.5 Discussion of Results - Location N67

Quarry noise emissions were inaudible during the attended noise surveys at N67 on 6 March 2018 and 7 March 2018, therefore, satisfying relevant daytime and morning shoulder noise limits. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dBA. Distant traffic was the dominant source at this receiver with other non-quarrying sources including wind in trees, birds and aircraft noise.

7 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 noise monitoring was undertaken on Tuesday 6 March 2018 and Wednesday 7 March 2018 at representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant statutory noise criteria specified in the Conditions of Consent at all assessed residential receivers during Quarter 1, March 2018.

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Appendix A - Glossary of Terms

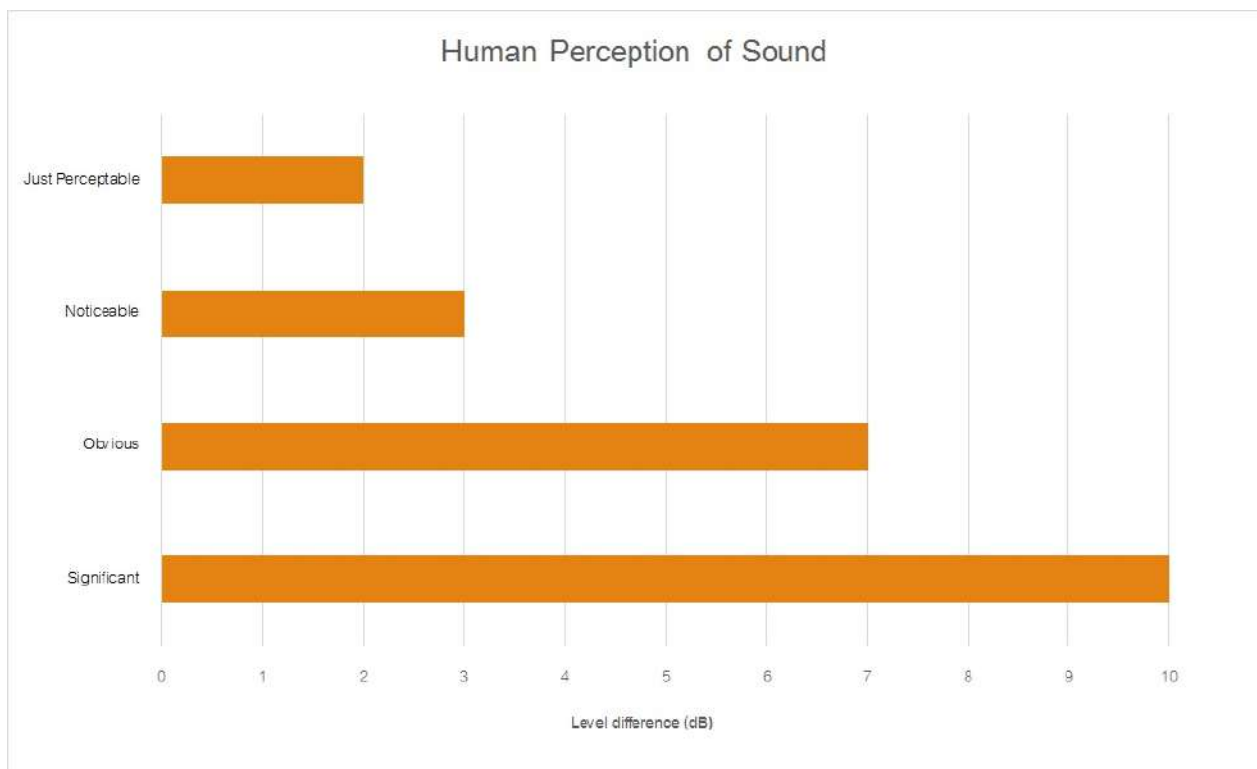
Table A1 provides a number of technical terms have been used in this report.

Table 1A 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 W ₀ 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



Muller Acoustic Consulting Pty Ltd
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Noise Monitoring Assessment Quarterly

Cooma Road Quarry, Googong, NSW
June 2018.



Document Information

Quarterly Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

June 2018

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd

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APPENDIX A - GLOSSARY OF TERMS

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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 during Quarter 2, June 2018 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;
- Conditions of Consent SSD-5109; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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 site.

Table 1 presents the criteria for each of the receivers N1 – N71 as outlined in the Development Consent for quarry operations.

Table 1 Noise Criteria			
Receivers	Morning Shoulder	Day	Evening
	6am – 7am	7am – 6pm	6pm – 10pm
	LAeq(15-min)	LAeq(15-min)	LAeq(15-min)
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/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.

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

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

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

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

N67 is located 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 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out by two MAC staff members using Svantek Type 1, 971 noise analysers on Tuesday 12 June 2018 and Wednesday 13 June 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-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 LAeq(15-min) quarry noise contribution for comparison against the relevant criteria.

KEY

● N1 NOISE MONITORING LOCATIONS

FIGURE 1

LOCALITY PLAN

REF: MAC170437



Imagery Source: SIO/APS

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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 monitoring assessment 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}		
13/06/2018	6:39 (Morning Shoulder)	60	43	40	Dir: W Wind Speed: 1.0m/s Rain: Nil	Urban Hum 35 – 41
						Distant Dog 39 – 40
						Birds 42 – 60 Aircraft Noise 39 – 41
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
13/06/2018	7:00 (Day)	60	44	39	Dir: W Wind Speed: 0.1m/s Rain: Nil	Aircraft 45 – 60
						Birds 48 – 56
						Urban Hum 38 – 43
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
12/06/2018	18:41 (Evening)	62	45	42	Dir: NW Wind Speed: 1.2m/s Rain: Nil	Aircraft 46 – 62
						Urban Hum 42 – 46
						Wind in Trees 36 – 52
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible

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 monitoring assessment 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}		
13/06/2018	06:06				Dir: W	
	(Morning Shoulder)	68	53	44	Wind Speed: 0.5m/s Rain: Nil	Traffic 44 – 68
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
13/06/2018	7:25				Dir: W	Traffic 48 – 79
	(Day)	79	57	52	Wind Speed: 0.5m/s Rain: Nil	Birds 50 – 61
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
12/06/2018	19:09				Dir: NW	Traffic 44 – 77
	(Evening)	77	55	44	Wind Speed: 1.5m/s Rain: Nil	Aircraft Noise 38 – 44 Wind Noise 38 – 42
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible

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 monitoring assessment 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}		
13/06/2018	6:26				Dir: NW	
	(Morning Shoulder)	68	56	49	Wind Speed: 0.5m/s Rain: Nil	Traffic 42 – 68
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
13/06/2018	7:43				Dir: NW	Traffic 48 – 79
	(Day)	79	56	52	Wind Speed: 0.5m/s Rain: Nil	Birds 50 – 61 Aircraft 54 – 59
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible
12/06/2018	19:01				Dir: W	Traffic 46 – 74
	(Evening)	75	54	46	Wind Speed: 2.0m/s Rain: Nil	Aircraft 52 – 54
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible

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 monitoring assessment 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}		
13/06/2018	6:45				Dir: NW	
	(Morning Shoulder)	76	66	51	Wind Speed: 1.0m/s Rain: Nil	Traffic 45 – 76 Birds 60 – 72
	Cooma Road Quarry L _{Aeq} (15-min) Contribution					Quarry Inaudible
13/06/2018	7:00				Dir: NW	Traffic 42 – 75
	(Day)	75	66	52	Wind Speed: 1m/s Rain: Nil	Aircraft 52 – 58 Birds 51 – 69
	Cooma Road Quarry L _{Aeq} (15-min) Contribution					Quarry Inaudible
12/06/2018	18:42				Dir: W	Traffic 46 – 69
	(Evening)	69	58	45	Wind Speed: 2.1m/s Rain: Nil	Dog Barking 48 – 50 Wind Gusts 40 – 53
	Cooma Road Quarry L _{Aeq} (15-min) Contribution					Quarry Inaudible

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 monitoring assessment are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67						
Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/06/2018	6:10	45	36	33	Dir: NW Wind Speed: 1.5m/s Rain: Nil	Traffic 31 – 36
	(Morning					Quarry Operations 35 – 40
	Shoulder)					Aircraft 33 – 39
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Wind Turbulence 39 – 45
						35
13/06/2018	7:22	58	40	37	Dir: NW Wind Speed: 1.2m/s Rain: Nil	Birds 34 – 58
	(Day)					Traffic 36 – 38
						Quarry operations 32 – 35
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Aircraft 37 - 44
						34
12/06/2018	18:17	60	38	34	Dir: NW Wind Speed: 2.2m/s Rain: Nil	Traffic 34 – 35
	(Evening)					Wind Turbulence 36 – 54
						Aircraft 34 – 49
Cooma Road Quarry L _{Aeq} (15-min) Contribution						Quarry Inaudible

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 Noise Compliance Assessment

The compliance assessment for each monitoring location N3, N8, N38, N60 and N67 are presented in **Table 8** to **Table 7** for day, evening and morning shoulder assessment periods.

Table 7 Morning Shoulder Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15-min)	dB, LAeq(15-min)	
N3	Nil	35	✓
N8	Nil	40	✓
N38	Nil	36	✓
N60	Nil	36	✓
N67	35	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.

Table 8 Daytime Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15-min)	dB, LAeq(15-min)	
N3	Nil	35	✓
N8	Nil	44	✓
N38	Nil	38	✓
N60	Nil	38	✓
N67	34	41	✓

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.

Table 9 Evening Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15-min)	dB, LAeq(15-min)	
N3	Nil	35	✓
N8	Nil	39	✓
N38	Nil	35	✓
N60	Nil	35	✓
N67	Nil	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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6 Discussion

6.1 Discussion of Results - Location N3

Monitoring on 12 June 2018 and 13 June 2018 identified that Cooma Quarry noise was inaudible on all three occasions at N3, and therefore satisfied the morning shoulder and daytime noise limits of 35dBA LAeq(15-min). It is noted that the quarry was not operational during the evening period however background measurements were undertaken for completeness and as per the EPL. Extraneous sources audible during the three attended surveys included aircraft, wind in trees, birds, wind gusts, distant and local traffic and general urban hum.

6.2 Discussion of Results - Location N8

Monitoring results for N8 conducted on 12 June 2018 and 13 June 2018 were dominated by traffic noise that was generally constant during all three attended measurements. Quarry emissions were inaudible on all three occasions, therefore satisfying the relevant morning shoulder criteria of 40dBA LAeq(15-min) and daytime noise limits of 44dBA LAeq(15-min). The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dBA LAeq(15-min). Extraneous sources measured include wind in trees, birds and traffic noise.

6.3 Discussion of Results - Location N38

Quarry noise was inaudible on all three occasions during the Quarter 2 noise survey, therefore satisfying the daytime criteria of 38dBA LAeq(15-min) and morning shoulder limit of 36dBA LAeq(15-min). The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dBA LAeq(15-min). Non-quarrying noise sources included birds, aircraft, wind gusts and traffic noise.

6.4 Discussion of Results - Location N60

Quarry noise emissions were inaudible during all three attended noise surveys at N60 during all measurements conducted on 12 June 2018 and 13 June 2018, therefore the relevant morning shoulder limits of 36dBA LAeq(15-min) and daytime noise limits of 38dBA LAeq(15-min) were satisfied at this monitoring location. It is noted that Cooma Quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dBA LAeq(15-min). Traffic noise was the dominant source at this receiver throughout Quarter 2.

6.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the morning shoulder and daytime attended noise surveys at N67 on 13 June 2018, however satisfied the relevant daytime and morning shoulder noise limits. Audible noise sources from the quarry included Haul truck engine noise and reverse alarms. It is noted that the quarry was not operational during the evening period measurement undertaken on 12 June 2018, therefore satisfying the evening noise limit of 35dBA LAeq(15-min). Wind turbulence and distant traffic were the dominant sources at this receiver with other non-quarrying sources including wind in trees, birds and aircraft noise.

7 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 noise monitoring was undertaken on 12 June 2018 and 13 June 2018 at representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry comply with relevant noise criteria specified in the Conditions of Consent at all assessed residential receivers during Quarter 2, June 2018.

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Appendix A - Glossary of Terms

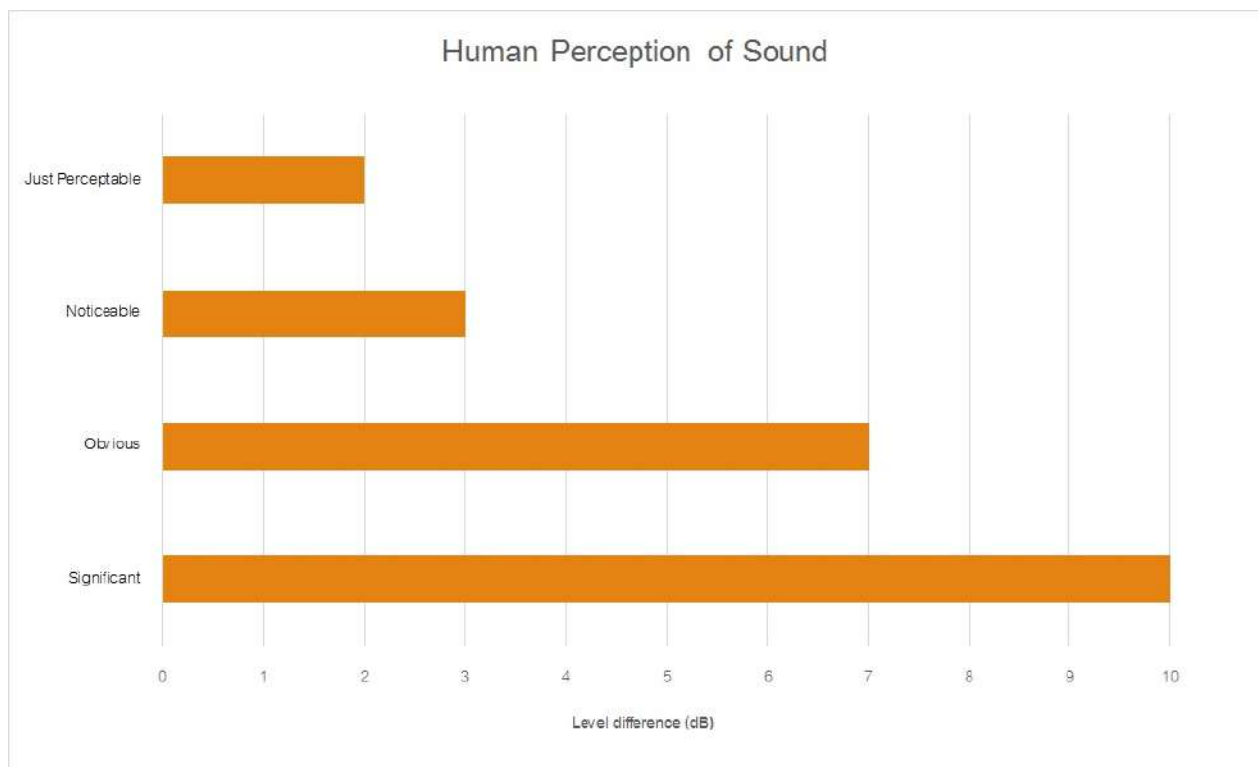
Table A1 provides a number of technical terms have been used in this report.

Table 1A 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 W ₀ 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 3 Ending September 2018.



Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 3 Ending September 2018

Prepared for: Holcim (Australia) Pty Ltd

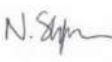

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APPENDIX A - GLOSSARY OF TERMS

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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 2018 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 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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 Road. 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 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out by two MAC staff members using Svantek Type 1, 971 noise analysers on Wednesday 29 August 2018 and Thursday 30 August 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004- 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



KEY

 NOISE MONITORING LOCATIONS



Imagery Source: SKIARS

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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}		
30/08/2018	06:30	68	48	43	Dir: S Wind Speed: 0.1m/s Rain: Nil	Birds 44-68
	(Morning					Distant traffic 42-46
	Shoulder)					Aircraft 42-51 Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
29/08/2018	15:59	68	40	35	Dir: W Wind Speed: 2m/s Rain: Nil	Aircraft 40-46
	(Day)					Birds 35-37 Wind 32-33 Traffic 35-37
						Dog bark 35-36 Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
29/08/2018	18:01	65	43	38	Dir: W Wind Speed: 2m/s Rain: Nil	Aircraft 46-49
	(Evening)					Traffic 38-40 Wind in trees 34-35
						Dog bark 37-40 Quarry Inaudible
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**.

Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
30/08/2018	06:00 (Morning Shoulder)	73	55	44	Dir: S Wind Speed: 0.1m/s Rain: Nil	Traffic 43-56						
						Local traffic 55-72						
						Birds <46						
						Rooster 45-50						
						Quarry Inaudible						
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35						
29/08/2018	16:41 (Day)	87	60	46	Dir: SW Wind Speed: 2m/s Rain: Nil	Traffic 50-56						
						Birds 35-38						
						Local traffic 69-85						
						Quarry Inaudible						
						Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
29/08/2018	18:42 (Evening)	72	51	44	Dir: W Wind Speed: 1m/s Rain: Nil	Traffic 47-48						
						Local traffic 57-68						
						Quarry Inaudible						
						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.

4.3 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 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
30/08/2018	06:00				Dir: S	
	(Morning Shoulder)	62	48	39	Wind Speed: 0.5m/s Rain: Nil	Traffic 45-56 Quarry Inaudible
	Cooma Road Quarry L _{Aeq} (15min) Contribution					
29/08/2018	17:03				Dir: SW	Traffic 50-56
	(Day)	69	53	48	Wind Speed: 2m/s Rain: Nil	Birds 56-61 Local traffic 60-68 Aircraft 40-45 Quarry Inaudible
	Cooma Road Quarry L _{Aeq} (15min) Contribution					
29/08/2018	19:04				Dir: W	Traffic 48-56
	(Evening)	67	52	46	Wind Speed: 1m/s Rain: Nil	Local traffic 48-60 Aircraft 40-42 Quarry Inaudible
	Cooma Road Quarry L _{Aeq} (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.

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}		
30/08/2018	06:21				Dir: S	Traffic 52-68
	(Morning	74	62	51	Wind Speed: 0.5m/s	Birds 38-45
	Shoulder)				Rain: Nil	Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
29/08/2018	16:43				Dir: W	Birds 53-58
	(Day)	78	69	57	Wind Speed: 2m/s	Traffic 64-73
					Rain: Nil	Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
29/08/2018	18:20				Dir: W	Traffic 52-73
	(Evening)	76	68	58	Wind Speed: 0.5m/s	Birds <52
					Rain: Nil	Quarry Inaudible
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**.

Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
30/08/2018	06:45				Dir: S	Birds 40-45
	(Morning	69	46	42	Wind Speed: 0.5m/s	Traffic 40-44
	Shoulder)				Rain: Nil	Dozer <33
Cooma Road Quarry L _{Aeq} (15min) Contribution						<33
29/08/2018	17:04 (Day)	68	45	36	Dir: W	Traffic <34-36
					Wind Speed: 2m/s	Birds 34-66
					Rain: Nil	Haul trucks <34
						Dozers <36
						Aircraft 38-52
Cooma Road Quarry L _{Aeq} (15min) Contribution						<36
29/08/2018	18:00 (Evening)	55	41	35	Dir: W	Birds 36-46
					Wind Speed: 1m/s	Traffic 34-38
					Rain: Nil	Aircraft 38-54
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 Noise Compliance Assessment

The compliance assessment for each monitoring location N3, N8, N38, N60 and N67 are presented in **Table 7** to **Table 9** for day, evening and morning shoulder assessment periods.

Table 7 Daytime Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	44	✓
N38	<35	38	✓
N60	<35	38	✓
N67	<36	41	✓

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.

Table 8 Evening Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	39	✓
N38	<35	35	✓
N60	<35	35	✓
N67	<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.

Table 9 Morning Shoulder Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	40	✓
N38	<35	36	✓
N60	<35	36	✓
N67	<33	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.

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6 Discussion

6.1 Discussion of Results - Location N3

Quarry noise was inaudible during all three measurements. Estimated quarry contributions were <35dBA and therefore satisfied the morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period however background measurements were undertaken for completeness and as per the EPL. Extraneous sources audible during the three attended surveys included birds, traffic, aircraft, wind and dog bark.

6.2 Discussion of Results - Location N8

Noise levels were dominated by local traffic that was generally constant during all three attended measurements. Quarry emissions were inaudible during all three measurements. Estimated quarry contributions were <35dBA therefore satisfying 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 sources measured include traffic, birds and a rooster.

6.3 Discussion of Results - Location N38

Quarry noise was inaudible during all three measurements. Estimated quarry contributions were <35dBA therefore satisfying the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria. Non-quarrying noise sources included traffic, birds and aircraft.

6.4 Discussion of Results - Location N60

Quarry noise emissions were inaudible during all three measurements. Estimated quarry contributions were <35dBA, therefore satisfying the relevant morning shoulder and daytime criteria. It is noted that Cooma Quarry was not operational during the evening period, therefore satisfying the evening noise criteria. Distant and local traffic were the dominant source at this receiver for the Quarterly period ending September 2018.

6.5 Discussion of Results - Location N67

Quarry noise emissions were audible during two of the three attended noise measurements at N67 on 29 August 2018 and 30 August 2018. Quarry emissions were measured at between <33dBA and <36dBA therefore, satisfying relevant daytime and morning shoulder noise limits. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min). Distant traffic was the dominant source at this receiver with other non-quarrying sources including birds, aircraft and wind.

7 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 noise monitoring was undertaken on Wednesday 29 August 2018 and Thursday 30 August 2018 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 2018.

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Appendix A - Glossary of Terms

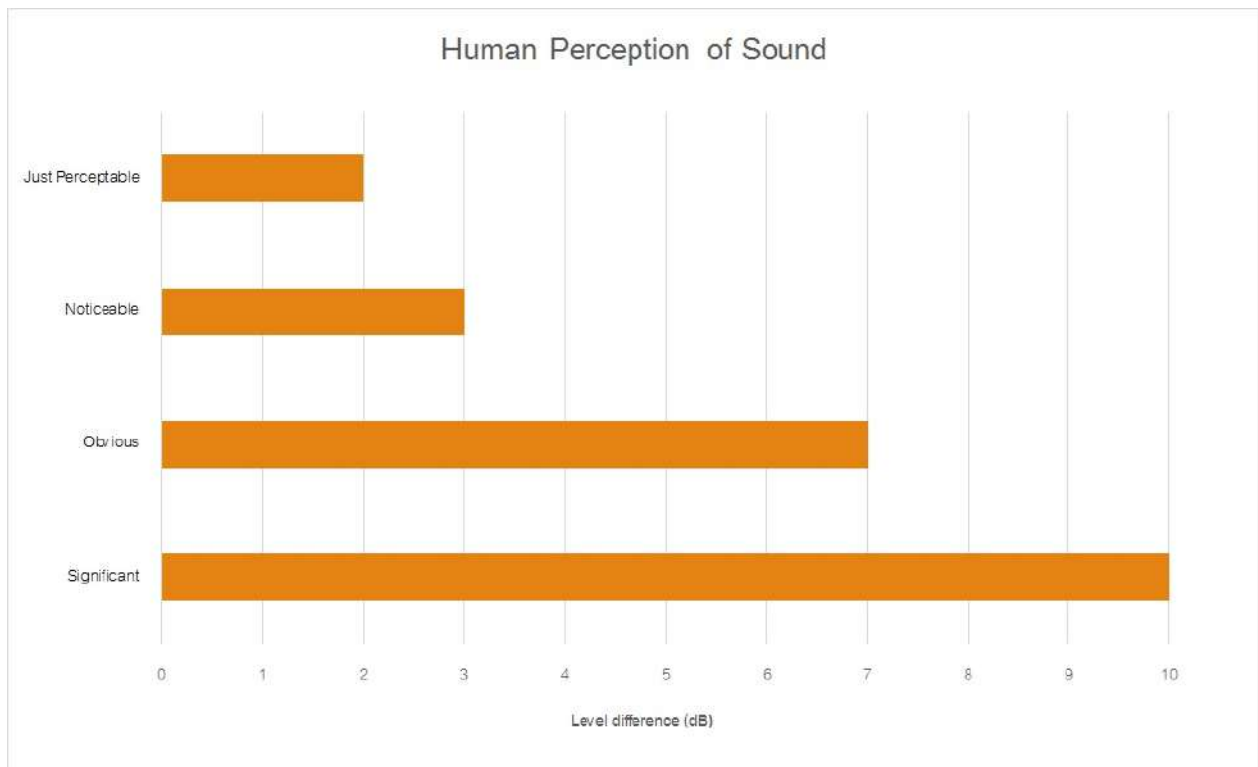
Table A1 provides a number of technical terms have been used in this report.

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 W ₀ 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 4 Ending December 2018.

Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 4 Ending December 2018

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APPENDIX A - GLOSSARY OF TERMS

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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 2018 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 Road. 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 12 November 2018 to Wednesday 14 November 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-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



KEY

 NOISE MONITORING LOCATIONS



Imagery Source: SKIARS

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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}		
13/11/2018	06:00 (Morning Shoulder)	68	42	35	WD: NW WS: 0.1m/s Rain: Nil	Traffic Hum 34-38
						Birds 38-68
						Dogs 35-36
						Aircraft 39-43
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	16:19 (Day)	59	39	31	WD: NE WS: 1.4m/s Rain: Nil	Traffic Hum 35-40
						Birds 40-59
						Aircraft 44-46
						Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	19:26 (Evening)	61	40	35	WD: NW WS: 0.1m/s Rain: Nil	Traffic 30-39
						Dogs 36-38
						Birds 40-61
						Quarry Inaudible
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 _{Amax}	L _{Aeq}	L _{A90}		
13/11/2018	06:26	68	54	49	WD: N	Traffic 50-68
	(Morning				WS: 0.2m/s	Birds 47-53
	Shoulder)				Rain: Nil	Aircraft 40-56
						Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	16:45	67	54	47	WD: NE	Traffic 48-67
	(Day)				WS: 1.0m/s	Birds 44-49
					Rain: Nil	Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	19:01	75	54	42	WD: NW	Traffic 50-75
	(Evening)				WS: 0.2m/s	Dogs 35-42
					Rain: Nil	Birds 37-40
						Quarry Inaudible
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.

4.3 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}		
13/11/2018	06:44	76	55	48	WD: NE	Traffic 50-76
	(Morning				WS: 0.2m/s	Aircraft 40-50
	Shoulder)				Rain: Nil	Aircraft 50-55
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	17:02	81	58	49	WD: NW	Traffic 50-81
	(Day)				WS: 0.4m/s	Domestic noise 55-58
					Rain: Nil	Birds 40-53
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	18:43	68	50	45	WD: NW	Traffic 48-68
	(Evening)				WS: 0.1m/s	Dogs 30-40
					Rain: Nil	Aircraft 40-47
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.

4.4 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**.

Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
14/11/2018	06:24	86	61	50	WD: NW	Birds 35-60
	(Morning				WS: 1.8m/s	Traffic 45-86
	Shoulder)				Rain: Nil	Dogs Barking 40-54 Quarry Operations 30-33
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	17:20	67	58	50	WD: NW	Traffic 55-67
	(Day)				WS: 1.0m/s	Distant Dog 40-42
					Rain: Nil	Birds 40-50 Quarry Inaudible
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	18:24	72	58	44	WD: NW	Traffic 40-72
	(Evening)				WS: 0.8m/s	Birds 40-54
					Rain: Nil	Aircraft 40-50 Quarry Inaudible
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 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
14/11/2018	06:00	60	39	33	WD: NW	Birds 35-56
	(Morning				WS: 1.8m/s	Distant Traffic 30-35
	Shoulder)				Rain: Nil	Livestock 30-39
						Quarry Operations 30-35
Cooma Road Quarry L _{Aeq} (15min) Contribution						<35
12/11/2018	17:41	60	39	35	WD: NW	Wind in trees 35-38
	(Day)				WS: 1.9m/s	Aircraft 48-55
					Rain: Nil	Quarry operations 35-42
Cooma Road Quarry L _{Aeq} (15min) Contribution						38
12/11/2018	18:02	54	37	31	WD: NW	Aircraft 35-40
	(Evening)				WS: 1.5m/s	Leaves on trees 36-42
					Rain: Nil	Birds 31-54
Cooma Road Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
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 Noise Compliance Assessment

The compliance assessment for each monitoring location N3, N8, N38, N60 and N67 are presented in **Table 7** to **Table 9** for day, evening and morning shoulder assessment periods.

Table 7 Daytime Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	44	✓
N38	<35	38	✓
N60	<35	38	✓
N67	38	41	✓

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.

Table 8 Evening Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	39	✓
N38	<35	35	✓
N60	<35	35	✓
N67	<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.

Table 9 Morning Shoulder Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB, LAeq(15min)	dB, LAeq(15min)	
N3	<35	35	✓
N8	<35	40	✓
N38	<35	36	✓
N60	<35	36	✓
N67	<35	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.

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6 Discussion

6.1 Discussion of Results - Location N3

Quarry noise was inaudible during all three measurements. Estimated quarry contributions were <35dBA and therefore satisfied the morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period however background measurements were undertaken for completeness and as per the EPL. Extraneous sources audible during the three attended surveys included birds, traffic, aircraft, wind and dogs barking.

6.2 Discussion of Results - Location N8

Noise levels were dominated by local traffic that was generally constant during all three attended measurements. Quarry emissions were inaudible during all three measurements. Estimated quarry contributions were <35dBA, therefore satisfying 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 sources noted during the measurements include traffic, birds and dogs barking.

6.3 Discussion of Results - Location N38

Quarry noise was inaudible during all three measurements. Estimated quarry contributions were <35dBA, therefore satisfying the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria. Non-quarrying noise sources included traffic, birds, dogs barking and aircraft.

6.4 Discussion of Results - Location N60

Quarry noise emissions were audible during the morning shoulder and inaudible during the daytime. Estimated quarry contributions were <35dBA for both measurements therefore satisfying 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 criteria. Distant and local traffic was the dominant source at this receiver for all measurements.

6.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the daytime and morning shoulder measurements at N67 during the December Quarter for 2018. Quarry emissions were estimated at <35dBA for the morning shoulder and 38dBA for the daytime, therefore, satisfying relevant morning shoulder and daytime noise limits. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB LAeq(15min). Distant traffic, livestock noise and aircraft travelling overhead were the dominant noise sources at this receiver during the survey.

7 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 noise monitoring was undertaken between Monday 12 November 2018 and Wednesday 14 November 2018 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 2018.

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Appendix A - Glossary of Terms

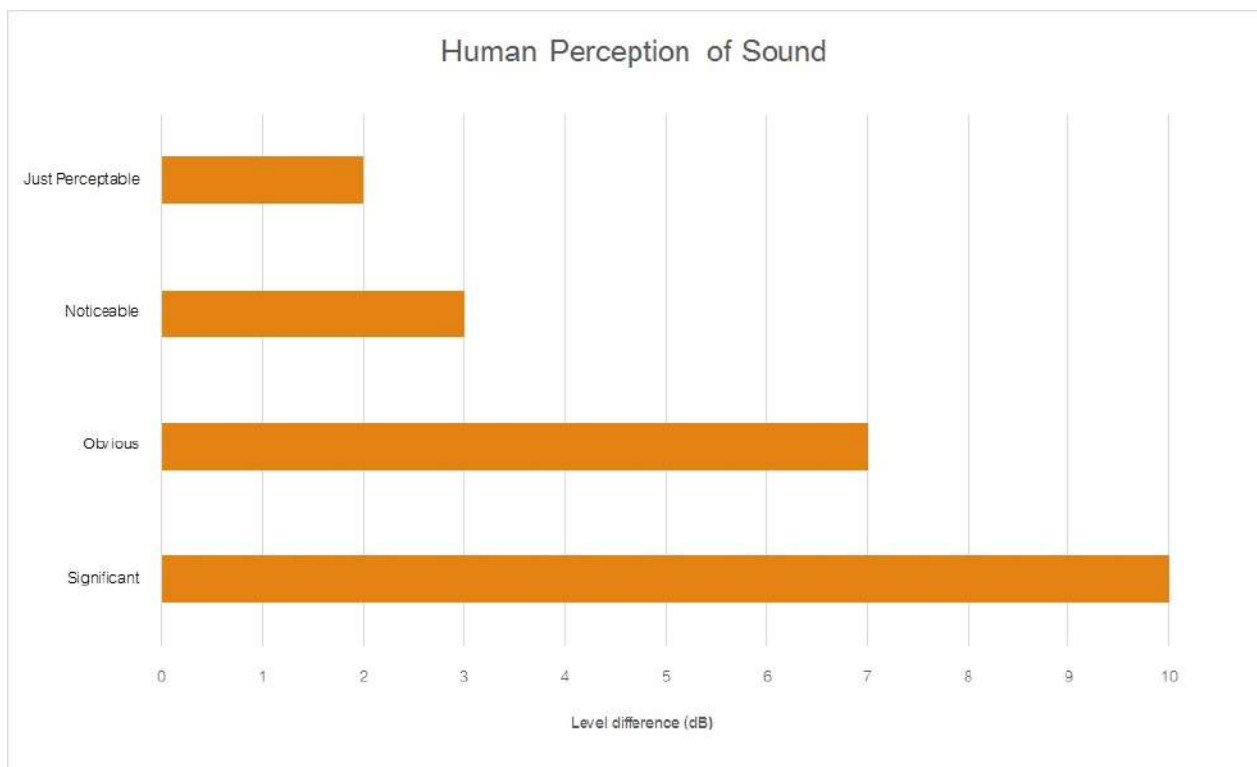
Table A1 provides a number of technical terms have been used in this report.

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 W ₀ 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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