

Strength. Performance. Passion



ANNUAL REVIEW

1 January 2021 – 31 December 2021

Teven Quarry

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APPENDICES

Appendix 1 – Noise Monitoring Reports (MAC)

Appendix 2 – Surface Water Quality Results

Appendix 3 – IEA Action Plan

SITE DETAILS

Name of operation	Teven Quarry
Name of operator	Holcim (Australia) Pty Ltd
Development consent / project approval #	SSD 6422
Name of holder of development consent / project approval	Holcim (Australia) Pty Ltd
Annual review start date	1 January 2021
Annual review end date	31 December 2021
<p>I, Matt Kelly, certify that this audit report is a true and accurate record of the compliance status of the TEVEN QUARRY for the period of 1 JANUARY 2021 - 31 DECEMBER 2021 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	Matt Kelly
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Date	31/03/2022

1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2020 reporting period for Teven Quarry is provided in **Table 1**. **Table 3** details the non-compliances of SSD 6422 identified within the 2021 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 6422	NO – See Table 3
EPL 3293	NO – See Table 3

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: 2021 Summary of Non-Compliances for SSD 6422

Relevant Approval	Condition	Condition Description	Status	Relevant Section of the Annual Review/ Issue																								
SSD 6422	Schedule 3 Condition 11	<p>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.</p> <p><i>Table 4: Air quality criteria</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>Annual</td> <td>a,d 30 µg/m³</td> </tr> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>24 hour</td> <td>b 50 µg/m³</td> </tr> <tr> <td>Total suspended particulates (TSP)</td> <td>Annual</td> <td>a,d 90 µg/m³</td> </tr> <tr> <td>^c Deposited dust</td> <td>Annual</td> <td>b 2 g/m²/month a,d 4 g/m²/month</td> </tr> </tbody> </table>	Pollutant	Averaging Period	Criterion	Particulate matter < 10 µm (PM ₁₀)	Annual	a,d 30 µg/m ³	Particulate matter < 10 µm (PM ₁₀)	24 hour	b 50 µg/m ³	Total suspended particulates (TSP)	Annual	a,d 90 µg/m ³	^c Deposited dust	Annual	b 2 g/m ² /month a,d 4 g/m ² /month	Low Risk Non-Compliant	<p>Section 6.3 Air Quality</p> <p>Exceedance of short term PM₁₀ criteria on 12 August 2021.</p> <p>Non-compliance for no data collected for PM10 monitoring in the first two weeks of January 2021. This missed data collection was due to incorrect equipment installation by contractors.</p>									
Pollutant	Averaging Period	Criterion																										
Particulate matter < 10 µm (PM ₁₀)	Annual	a,d 30 µg/m ³																										
Particulate matter < 10 µm (PM ₁₀)	24 hour	b 50 µg/m ³																										
Total suspended particulates (TSP)	Annual	a,d 90 µg/m ³																										
^c Deposited dust	Annual	b 2 g/m ² /month a,d 4 g/m ² /month																										
EPL 3293	L2.4	<p>Water and/or Land Concentration Limits – Surface Water Discharge Quality</p> <p>POINT 1</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>50 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>3DGM concentration limit</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Oil and Grease</td> <td>Visible</td> <td></td> <td></td> <td></td> <td>nil</td> </tr> <tr> <td>pH</td> <td>pH</td> <td></td> <td></td> <td></td> <td>6.5-8.5</td> </tr> <tr> <td>Total suspended solids</td> <td>milligrams per litre</td> <td></td> <td></td> <td></td> <td>50</td> </tr> </tbody> </table>	Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit	Oil and Grease	Visible				nil	pH	pH				6.5-8.5	Total suspended solids	milligrams per litre				50	Low Risk Non-Compliant	<p>Section 7 Water Management</p> <p>An exceedance with a result of pH 9 from LPD001 occurred on 3 March 2021. Rainfall did not exceed 82.5 mm in the five-day period leading up to the exceedance.</p>
Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit																							
Oil and Grease	Visible				nil																							
pH	pH				6.5-8.5																							
Total suspended solids	milligrams per litre				50																							

Relevant Approval	Condition	Condition Description	Status	Relevant Section of the Annual Review/ Issue											
SSD 6422 EPL3293	Schedule 3 Condition 7 L5.2	<p>The Applicant shall ensure that blasting on site does not cause any exceedance of the criteria in Table 3.</p> <p><i>Table 3: Blasting criteria</i></p> <table border="1"> <thead> <tr> <th>Receiver</th> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Ground vibration (mm/s)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Any residence on privately-owned land</td> <td>120</td> <td>10</td> <td>0%</td> </tr> <tr> <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 to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	Any residence on privately-owned land	120	10	0%	115	5	5% of the total number of blasts over a period of 12 months	Low Risk Non-Compliant	<p>Section 6.4 Blasting</p> <p>A blast on 21 September 2021 exceeded the overpressure limit of 115dB. The blast was recorded to be 2.5 dB over the criteria of 115db (there were a total of 10 blasts in the reporting period).</p> <p>Holcim reported and investigated the exceedance.</p>
Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance												
Any residence on privately-owned land	120	10	0%												
	115	5	5% of the total number of blasts over a period of 12 months												

2 INTRODUCTION

Holcim (Australia) Pty Ltd (Holcim) operates Teven Quarry, a hard rock quarry located on Stokers Lane in the Ballina Shire Local Government Area (refer to **Figures 1 and 2**). The site operates under Development Consent (SSD 6422 as modified) approved by then New South Wales (NSW) Department of Planning and Environment (DPE) on 15 July 2015.

The site also operates in accordance with Environment Protection Licence (EPL) No. 3293 issued by the NSW Environmental Protection Authority (EPA).

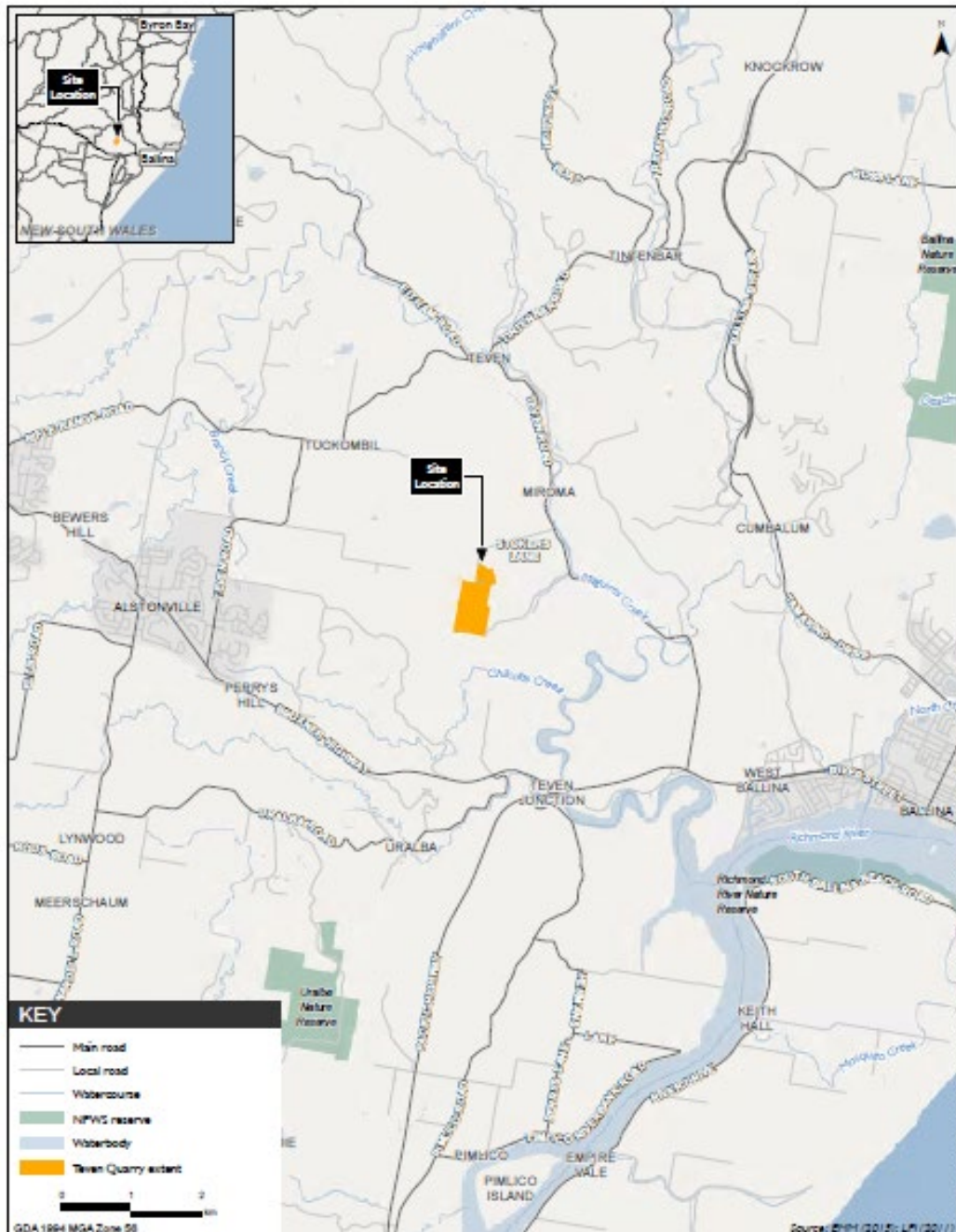


Figure 1: Regional Locality (Source EMM: 2016)



Figure 2: Aerial view of the Teven Quarry, located on Stokers Lane, Teven

In accordance with Schedule 5, Condition 4 of the modified Development Consent the site is required to undertake 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 10.3
c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 1 and 11
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 13

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 site from 1 January 2021 to 31 December 2021.

2.1 Contact Details

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3 APPROVALS

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

Table 5: Approvals for Teven Quarry Operations

Approval	Regulatory Authority
SSD 6422	NSW DPE
EPL No. 3293	NSW EPA

On 14 April 2021 Holcim received a Notice for Variation of EPL 3293. This variation removed the Sediment Basin and Stormwater Pollution Reduction Program (PRP) from EPL 3293, closing out requirements of the PRP.

4 OPERATIONS SUMMARY

For 2021, Teven Quarry transitioned from Queensland and NSW/ACT management to being managed by the Holcim NSW/ACT division. The project Quarry Manager position was filled by Matt Kelly in this report period.

4.1 Exploration

There was no exploration undertaken within the Annual Review period.

4.2 Land Preparation

There was no clearing undertaken during the Annual Review period.

4.3 Construction Activities

There were some minor upgrades done to the existing processing plant in the Annual Review period.

4.4 Quarry Operations

Operational activities undertaken at Teven Quarry in 2021 included:

- Stripping of topsoil and overburden within the existing approved extraction limit boundary;
- Drill, blast, load and haul activities; and
- Crushing, screening and stockpiling of product.

A list of the permissible operating hours under Schedule 3 Condition 1 is outlined below.

Table 6: Operating Hours

Activity	Permissible Hours
Extraction operations Processing operations Overburden management	7 am to 6 pm Monday to Friday; 7 am to 4 pm Saturday; and At no time on Sundays or public holidays.
Blasting	10 am to 3 pm Monday to Friday; and At no time on Sundays or public holidays.
Loading and dispatch Stockpile management Maintenance of plant and equipment	7 am to 10 pm Monday to Friday; 7 am to 4 pm Saturdays; and At no time on Sundays or public holidays.

All activities took place within the approved operating hours in 2021.

Table 7 includes a summary of the operations undertaken during the reporting period against the Development Consent conditions regarding product transported from Teven Quarry.

Table 7: Total Annual Product Distributed (Holcim Teven Quarry)

Material	Approval Limit (Tonnes)	2018 (Tonnes)	2019 (Tonnes)	2020 (Tonnes)	2021 (Tonnes)	Proposed 2022
Product Distributed - Total	500,000	372,640	458,679	292,701	299,713	320,000

4.5 Next Reporting Period

Development activities proposed to be carried out at Teven Quarry in 2022, include:

- Stripping of topsoil and overburden within the existing approved extraction limit boundary;
- Drill, blast, load and haul activities; and
- Continuation of crushing, screening and stockpiling of product.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 Actions from 2020 Annual Review – DPE Actions

Holcim submitted the 2020 Annual Review to DPE by 31 March 2021.

Holcim received a letter from DPE on 21 May 2021 confirming DPE’s receipt and review of the Annual Review. DPE’s comments as well as the actions Holcim have taken to address these and improve compliance are outlined in **Table 8**.

Table 8: DPE Actions from Previous Annual Review

Improvement Actions from Previous Annual Review	Works Undertaken
The report identifies 3 incidents that required notification to the Department throughout the reporting period (2 PM10 exceedances and 1 noise monitoring exceedance at NM4). While a noise exceedance notification was self-reported for May 2020, the remaining notifications were not provided. Schedule 5, Condition 7 requires notification to the Department within 7 days for all reportable incidents.	Holcim continues to maintain an exceedance and non-compliance reporting system to predict and detect incidents. Holcim will continue to report incidents as outlined in the Management Plans and as required by the Consent.
As required by Schedule 5 Condition 11 of the approval, the Proponent shall make the complaints register, updated monthly, available on the proponent’s website. The complaint register is up to date but should demonstrate it is updated monthly. If no complaints were received in the month, a statement that ‘no complaints were received’ should be made.	Holcim has maintained a complaints register in 2021. The publicly available complaints register outlines when no complaints have been made within the file names.

5.2 Actions from 2020 Annual Review - Holcim Proposed Actions for 2021

Table 9 provides an update on the proposed actions from Holcim staff.

Table 9: Update on Holcim Proposed Actions for 2021

Improvement Measure	Activities	2021 Actions
Management Plans	Management Plans to be revised and submitted for approval to DPE in 2022.	Management Plans have been submitted to DPE for approval.
PM ₁₀	Continue the improvement of the air quality monitoring program through ensuring the reliability of internal processes and transparency through the presentation of monitoring data in the Holcim environmental monitoring portal. Maintain a HVAS monitoring program which meets Development Consent requirements. Manage dust control measures to reduce short term non-compliances.	Continued management of air quality and associated monitoring program.
Depositional dust	Liaise with the EPA and DPE about moving DDG1 and DDG2 to a more suitable location, where there is less likelihood of contamination. Continue to monitor instances of contamination.	Correspondence with EPA and DPE continued from 2020 into 2021.
Biodiversity	Weed spraying will continue at site during the next Annual Review period.	Continuation of spot spraying.
Water sampling	Complete all weekly pH sampling during the Annual Review period. Complete water sampling for at least the parameters pH, Total Suspended Solids, and Oil	Surface water quality monitoring was undertaken in line with the Water Management Plan.

	and grease.	
Groundwater Assessment	<p><u>Condition 3, Schedule 19</u></p> <p><i>In the event that groundwater in excess of negligible quantities is intersected during extraction activities, the Applicant shall undertake a hydrogeological investigation, in consultation with NOW, to the satisfaction of the Secretary.</i></p> <p><i>The investigation must report on groundwater sources, levels, yield and quality; identify any risks to groundwater users or groundwater dependent ecosystems and propose recommended management measures. The Applicant must implement reasonable and feasible management measures to the satisfaction of the Secretary.</i></p> <p>Holcim will continue to monitor the quarry void for groundwater seepage to ensure that groundwater quantities remain negligible.</p>	Groundwater seepage was negligible in the quarry void in the report period.

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

Teven Quarry has meteorological monitoring stations on site to monitor meteorological conditions and adjust operations accordingly as per the Development Consent. The site station at the site office collects data hourly at a minimum. Data collected from the on-site meteorological station was referred to when planning activities on site and when analysing environmental monitoring results.

Due to the continuous nature of weather data retrieved from the site station, this report uses 2021 weather data collected from the Bureau of Meteorology's Ballina Airport station to provide a summary for the period. These meteorological results are presented in **Table 9**.

Table 9: Meteorological Monitoring Results 2021 (Ballina Airport AWS, station 058198)

Month	Total Rainfall (mm)	Minimum Temperature (°C)	Maximum Temperature (°C)
January	118.4	19.6	34.4
February	329.2	20.2	34.5
March	432.8	19.0	32.0
April	249.6	14.6	32.6
May	46.6	12.3	25.1
June	52.2	9.3	24.5
July	100.2	9.2	24.5
August	27.0	9.7	25.6
September	52.0	11.5	28.2
October	150.0	15.3	29.0
November	102.8	17.0	31.7
December	365.2	18.9	32.2
Annual TOTAL	2026.05		

6.2 Noise

6.2.1 EIS Predictions

The 2014 EIS found that the Project was not predicted to exceed the project specific noise levels at any privately owned residences surrounding the Project Area, with the exception of Receiver 9. Receiver 9 has since been purchased by Holcim.

Road traffic noise levels were predicted to increase at some receivers whilst decreasing at others, with the criteria proposed in the EIS predicted to be met.

6.2.2 Approved Criteria

In accordance with Schedule 3, Condition 5(c) of SSD 6422, *'the Applicant shall: carry out noise monitoring (at least every 3 months) to determine whether the development is complying with the relevant conditions of this consent.'*

Approved noise criteria from the Development Consent are outlined in **Table 10**.

Table 10: Noise Criteria for Teven Quarry (SSD 6422)

Receiver	Day dB(A) (L _{Aeq(15 min)})	Evening dB(A) (L _{Aeq(15 min)})
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other residences	37	35

Note: Receiver locations are shown on the figure in Appendix 4.

6.2.3 Key Environmental Performance

Quarterly noise monitoring was undertaken 2021 in accordance with the requirements of the Schedule 3, Condition 4. Monitoring was completed by Muller Acoustic Consulting (MAC) on the following dates:

- 24 March 2021;
- 19 May 2021;
- 21 July 2021; and
- 7 October 2021.

Noise results at all locations were within the approved performance criteria as shown in **Table 11**.

Copies of the quarterly noise monitoring reports for 2021 are attached as **Appendix 1**.

Table 11: Noise Compliance Assessment for Teven Quarry

Assessment Period	Receiver No.	Monitoring Location	Quarrying Noise Criteria	Q1 Mar-21		Q2 May-21		Q3 Jul-21		Q4 Oct-21	
			L _{Aeq} (15min)	Quarry Noise Contribution (L _{Aeq} (15min))	Compliance	Quarry Noise Contribution (L _{Aeq} (15min))	Compliance	Quarry Noise Contribution (L _{Aeq} (15min))	Compliance	Quarry Noise Contribution (L _{Aeq} (15min))	Compliance
Day	R2	N3/NM3	37	<36	✓	<30	✓	<30	✓	<30	✓
	R3/R4	N2/NM2	38	<37	✓	<33	✓	<30	✓	<35	✓
	R7	N1/NM1	37	<35	✓	<30	✓	<30	✓	<30	✓
	R10	N4/NM4	37	37	✓	37	✓	37	✓	37	✓
	R14	NM5	37	<35	✓	35	✓	<30	✓	<30	✓
Evening	R2	N3/NM3	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R3/R4	N2/NM2	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R7	N1/NM1	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R10	N4/NM4	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R14	NM5	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓

Note: Monday to Saturday; Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Long-term Trends:

2021 is the fourth year of complete noise monitoring as per the Project Approval. The site was compliant in 2017, 2018, and 2021. In both 2019 and 2020 an exceedance occurred at receiver N4 in quarter 2. These exceedances had different causes, with the 2019 exceedance being caused by changes in loading quantities at the plant at the time of monitoring while the 2020 exceedance was caused by a significant decrease in the size of quarry stockpiles functioning as a noise barrier between the site and receiver N4. A noise investigation assessment was carried out after the 2020 exceedance.

Comparison to EIS Predictions:

At the time of monitoring one exceedance occurred outside of the predicted limits of the EIS in 2021.

6.2.4 Management Measures

Noise impacts are managed in accordance with the specific management strategies, procedures, controls and monitoring programs within the Teven Quarry Noise Management Plan. The site will ensure that stockpiles are kept at a level to reduce noise from operations.

6.2.5 Proposed Improvements

There are no proposed improvements relating to noise.

6.3 Air Quality

6.3.1 EIS Predictions

The 2014 EIS predicted that the change in air quality impacts due to the Project when compared to existing approved operations was predicted to be negligible, with the results for all scenarios predicted to be very similar.

The Project is predicted to comply with the relevant air quality criteria at all nearby sensitive receiver locations under worst case operating conditions, with the exception of 24-hour average PM₁₀ concentrations at two nearby sensitive receiver locations - Receiver 9 and Receiver 6. This exceedance is due to the combined effect of Teven Quarry activities and maximum background levels. Receiver 9 has since been purchased by Holcim. If, on any day, the background levels were average rather than at maximum levels, then no property would be predicted to experience 24-hour average PM₁₀ concentrations above the criteria.

6.3.2 Approved Criteria

Air Quality monitoring conducted at Teven Quarry is compared with the monitoring criteria stipulated in Schedule 3, Condition 11 of SSD 6422 and reproduced in **Table 12**.

Table 12: Air Quality Monitoring Criteria (SSD 6422)

<i>Table 4: Air quality criteria</i>			
Pollutant	Averaging Period	Criterion	
Particulate matter < 10 µm (PM ₁₀)	Annual	a,d 30 µg/m ³	
Particulate matter < 10 µm (PM ₁₀)	24 hour	b 50 µg/m ³	
Total suspended particulates (TSP)	Annual	a,d 90 µg/m ³	
^c Deposited dust	Annual	b 2 g/m ² /month	a,d 4 g/m ² /month

Notes for Table 4:

- Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).
- Incremental impact (ie incremental increase in concentrations due to the development on its own, with zero allowable exceedances of the criteria over the life of the development).
- Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.
- Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, or any other activity agreed to by the Secretary.
- "Reasonable and feasible avoidance and mitigation measures" includes, but is not limited to, the operational requirements in conditions 12 and 13 to develop and implement a air quality management system that ensures operational responses to the risks of exceedance of the criteria.

6.3.3 Key Environmental Performance

6.3.3.1 PM₁₀ Monitoring

Condition 11, Schedule 3 (PM₁₀)

In 2021 dust monitoring was undertaken using a High Volume Air Sampler (HVAS) to monitor particulate matter (PM₁₀). PM₁₀ monitoring results for 2021 are provided in **Table 13**. A conversion factor outlined in the Air Quality Management Plan was used to calculate from the actual monitoring result to derived TSP result.

Table 13: 2021 Dust Monitoring (PM₁₀) at Teven Quarry

Sample Date	TSP (µg/m³)	HVAS PM₁₀ (µg/m³)	24-hour PM₁₀ Criterion
	Calculated Result	Actual Result	
2 January 2021	NS	NS	Invalidated Sample - sampling error during HVAS commissioning
8 January 2021	NS	NS	Invalidated Sample - sampling error during HVAS commissioning

Sample Date	TSP ($\mu\text{g}/\text{m}^3$)	HVAS PM ₁₀ ($\mu\text{g}/\text{m}^3$)	24-hour PM ₁₀ Criterion
	Calculated Result	Actual Result	
14 January 2021	43.4	18.1	Compliant
20 January 2021	47.3	19.7	Compliant
26 January 2021	25.4	10.6	Compliant
1 February 2021	40.8	17.0	Compliant
7 February 2021	40.1	16.7	Compliant
13 February 2021	39.8	16.6	Compliant
19 February 2021	49.9	20.8	Compliant
25 February 2021	60.7	25.3	Compliant
3 March 2021	68.2	28.4	Compliant
9 March 2021	25.0	10.4	Compliant
15 March 2021	22.1	9.2	Compliant
21 March 2021	19.7	8.2	Compliant
27 March 2021	34.6	14.4	Compliant
2 April 2021	40.3	16.8	Compliant
8 April 2021	7.4	3.1	Compliant
14 April 2021	38.2	15.9	Compliant
20 April 2021	25.0	10.4	Compliant
26 April 2021	27.4	11.4	Compliant
2 May 2021	30.5	12.7	Compliant
8 May 2021	1.7	0.7	Compliant
14 May 2021	18.7	7.8	Compliant
20 May 2021	24.7	10.3	Compliant
26 May 2021	26.2	10.9	Compliant
1 June 2021	29.8	12.4	Compliant
7 June 2021	33.8	14.1	Compliant
13 June 2021	21.1	8.8	Compliant
19 June 2021	28.3	11.8	Compliant
25 June 2021	9.6	4.0	Compliant
1 July 2021	108.0	45.0	Compliant
7 July 2021	19.7	8.2	Compliant
13 July 2021	4.6	1.9	Compliant
19 July 2021	28.8	12.0	Compliant
25 July 2021	33.8	14.1	Compliant
31 July 2021	19.2	8.0	Compliant
6 August 2021	34.3	14.3	Compliant
12 August 2021	140.9	58.7	Non-compliant with PM10 24-hour Criteria
18 August 2021	30.7	12.8	Compliant
24 August 2021	18.5	7.7	Compliant
30 August 2021	45.6	19.0	Compliant
5 September 2021	24.2	10.1	Compliant
11 September 2021	39.1	16.3	Compliant
17 September 2021	16.6	6.9	Compliant
23 September 2021	21.6	9.0	Compliant
29 September 2021	7.0	2.9	Compliant

Sample Date	TSP ($\mu\text{g}/\text{m}^3$)	HVAS PM ₁₀ ($\mu\text{g}/\text{m}^3$)	24-hour PM ₁₀ Criterion
	Calculated Result	Actual Result	
5 October 2021	44.9	18.7	Compliant
5 October 2021	41.0	17.1	Compliant
11 October 2021	26.2	10.9	Compliant
17 October 2021	10.1	4.2	Compliant
23 October 2021	41.5	17.3	Compliant
29 October 2021	33.4	13.9	Compliant
4 November 2021	31.9	13.3	Compliant
10 November 2021	29.3	12.2	Compliant
16 November 2021	61.7	25.7	Compliant
22 November 2021	19.0	7.9	Compliant
28 November 2021	40.6	16.9	Compliant
4 December 2021	21.8	9.1	Compliant
16 December 2021	5.3	2.2	Compliant
Minimum	1.7	0.7	
Maximum	140.9	58.7	
Average	33.5	13.9	
Result	Compliant	Compliant	

There were 59 sampling events for PM₁₀ and TSP in 2021. The first two samples in 2021 were invalidated due to the incorrect installation of HVAS equipment at commissioning. This is a non-compliance as the full PM₁₀ schedule was not completed. However, it should be noted that this was due to equipment failure and out of the control of Holcim.

The PM₁₀ 2021 average was 13.9 $\mu\text{g}/\text{m}^3$. This is below the annual criteria and compliant with the Development Consent. This 2021 average is greater than the 2020 average of 10.4 $\mu\text{g}/\text{m}^3$. The PM₁₀ annual average for 2021 was significantly less than for 2019 and 2018, at 32.4 $\mu\text{g}/\text{m}^3$ and 28.6 $\mu\text{g}/\text{m}^3$, respectively.

There was one exceedance in the PM₁₀ 24-hour criteria. This result of 58.7 $\mu\text{g}/\text{m}^3$ occurred on 12 August 2021.

The annual average for derived TSP was 33.5 $\mu\text{g}/\text{m}^3$ which is below the annual criteria of 90 $\mu\text{g}/\text{m}^3$ and meets conditions of the Development Consent.

6.3.3.2 Depositional Dust Monitoring

Condition 11, Schedule 3 (Dust Deposition)

Depositional dust continued to be monitored at three depositional dust gauges at Teven Quarry throughout 2021. Results for this monitoring are provided in **Table 14**.

Table 14: 2021 Dust Monitoring (Depositional Dust)

Sample Period	Insoluble Solids DDG1 ($\text{g}/\text{m}^2/\text{month}$)	Insoluble Solids DDG2 ($\text{g}/\text{m}^2/\text{month}$)	Insoluble Solids DDG3 ($\text{g}/\text{m}^2/\text{month}$)
January	0.9*	1.1	0.2
February	1.2	2.4	1.2
March	0.4	0.4	0.3
April	0.1	0.2	0.6
May	0.5	0.3	2.5
June	0.4	0.3	0.3

Sample Period	Insoluble Solids DDG1 (g/m ² /month)	Insoluble Solids DDG2 (g/m ² /month)	Insoluble Solids DDG3 (g/m ² /month)
July	0.7	0.4	0.7
August	0.4	0.4	1.1
September	1.2	3.7	1.1
October	1.5	1.9	0.9
November	4.8	0.9	1.1
December	0.2	0.2	0.5
Annual Average	1.04	1.02	0.88
Result	Within Criteria	Within Criteria	Within Criteria

Note: Contaminated results are marked with an asterisk (*).

The complete monitoring program was undertaken at Teven in this report period. DDG1, DDG2, and DDG 3 were within the annual average criteria of 4 g/m²/month.

A comparison of depositional dust results (with contamination removed) from 2018 to 2021 is provided in **Table 15**. Contamination of the depositional dust gauges by insects, leaves, bird faeces, and other organic material and its impact on depositional dust monitoring has been noted from 2017 to 2020.

Table 15: Comparison of Depositional Dust Data (with contamination removed)

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	2018 (g/m ² /month)	2019 (g/m ² /month)	2020 (g/m ² /month)	2021 (g/m ² /month)
DDG1	Insoluble Solids Reporting Period Average	2.7	1.3	1.97	1.04
	Max. Insoluble Solids	5.0	3.9	5.2	4.8
	Min. Insoluble Solids	0.6	0.1	0.5	0.1
DDG2	Insoluble Solids Reporting Period Average	1.7	2.8	2.85	1.02
	Max. Insoluble Solids	2.1	5.5	2.9	3.7
	Min. Insoluble Solids	1.2	0.6	2.8	0.2
DDG3	Insoluble Solids Reporting Period Average	0.7	1.5	1.41	0.88
	Max. Insoluble Solids	1.6	3.8	0.1	2.5
	Min. Insoluble Solids	0.3	0.1	3.6	0.2

6.3.3.3 Long-term Trends:

Trends analysis for depositional dust in 2021 has found that depositional dust results decreased in 2021 compared to previous years.

The 2021 annual average for PM₁₀ remains below long-term criteria which is consistent with 2017, 2018, 2019, and 2020 results. Results from the reporting period also found fewer numbers of exceedance in PM₁₀ 24 hour criteria.

6.3.3.4 Comparison to EIS Predictions:

The Project is predicted to comply with the relevant air quality criteria at all nearby sensitive receiver locations under worst case operating conditions, with the exception of 24-hour average PM₁₀ concentrations at two nearby sensitive receiver locations - Receiver 9 and Receiver 6. Predictions suggest that 24-hour average PM₁₀ levels may exceed the criteria of 50µg/m³ up to one day per year

at these two receivers by between 1 and 7 $\mu\text{g}/\text{m}^3$. This short-term criteria prediction in the EIS was demonstrated by one exceedance for PM₁₀ for all of 2021.

Key historical contributions to PM₁₀ exceedances are bushfires and nearby agricultural activity such as cutting of cane and slashing. Previous laboratory analysis indicates outside dust sources are the major contributor to dust levels at DDG1 and DDG2.

6.3.4 Management Measures

Teven Quarry is committed to implementing reasonable and feasible avoidance and mitigation measures and to continue to investigate ways to minimise any air quality impacts from the quarry. Air quality management measures implemented at Teven Quarry are detailed in the *Air Quality Management Plan* (2016).

6.3.5 Proposed Improvements

Holcim is committed to improving air quality management at Teven Quarry. There are no proposed improvement measures for 2022. Teven will continue to implement the site's Management Plans.

6.4 Blasting

6.4.1 EIS Predictions

The 2014 EIS found that the Project can 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

Blasting was undertaken at Teven Quarry throughout 2021 in accordance with the conditions of the Development Consent and EPL No. 3293. The criteria for blasting at the site are detailed in **Table 17**.

Table 16: Blast Monitoring Criteria from EPL 3293 for Teven Quarry

<p>L4 Blasting</p> <p>L4.1 Blasting operations at the premises may only take place between 09:00 to 15:00 Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).</p> <p>L4.2 The airblast overpressure level from blasting operations in or on the premises must not exceed:</p> <p>a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and b) 120 dB (Lin Peak) at any time.</p> <p>At any point within 1 metre of any affected residential property or other sensitive noise location.</p> <p>L4.3 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:</p> <p>a) 5 mm/s for more than 5% of the total number of blasts carried out on the premises during each</p>
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In accordance with Condition 1, Schedule 3 of the Development Consent, blasting is to be undertaken between 10am and 3pm Monday to Friday, with no blasting to occur on Sundays or public holidays.

6.4.3 Key Environmental Performance

Results of blasting undertaken in 2021 are shown in **Table 18**.

The blast on 21 September 2021 exceeded the overpressure limit of 115dB. This is a non-compliance with L4.2 of the EPL and Consent Condition 7 of Schedule 3. The blast was recorded to be 2.5 dB over the criteria of 115db (there were a total of 10 blasts in the reporting period). At the time Holcim investigated the cause of the exceedance however this was inconclusive. This exceedance was reported to DPE and EPA. The Blast Management Plan was updated in 2021 in response to this exceedance. Through the Blast Management Plan, Holcim has relocated the "Site Entrance Stokers Lane" monitoring location to another, more suitable location.

Other than the above exceedance all other results were within the EPL 3293 and Development Consent criteria for 2021.

Table 17: 2021 Blast Monitoring Results

Location	Description	Upper Limit Criteria	Date									
			9/02/2021	17/02/2021	4/05/2021	11/05/2021	22/06/2021	26/07/2021	23/08/2021	21/09/2021	26/10/2021	29/11/2021
Residence on Wellers Rd	Over Pressure - dB (Lin Peak)	120	108	103	112	103.3	108.4	108.1	DNT	109.4	100.5	105.2
	Ground Vibration - (mm/s)	10	1.26	3.64	1.39	3.36	1.23	3	DNT	4.1	3.26	2.34
Site Entrance, Stokers Lane	Over Pressure - dB (Lin Peak)	120	DNT	113	113.6	96	110.5	111	110.3	117.5	109.1	110.2
	Ground Vibration - (mm/s)	10	DNT	1.47	0.75	1.44	4.99	1.56	0.95	1.35	1.06	0.13

DNT – Did Not Trigger

Long-term Trends:

From 2015 – 2021 the blasting levels have been within the Development Consent and EPL criteria. Long term blast results are provided in **Table 18**. These show long-term consistency for overpressure results. There has been a notable increase in the vibration results for 2021 compared to previous years.

Table 18: Teven Quarry Long-term Blasting Trends

Year	Number of Blasts	No. of blasts below vibration or overpressure trigger level	Max. Overpressure (dBL)	Average Overpressure (dBL)	Max Vibration (mm/s)	Average Vibration (mm/s)
2015	14	10	113.1	109.3	0.66	0.44
2016	12	7	112.1	109.6	0.45	0.37
2017	15	8	114.0	106.9	0.5	0.33
2018	12	11	114.1	112.4	0.05	0.05
2019	11	11	NT	NT	NT	NT
2020	12	7	109.3	106.2	1.9	0.9
2021	10	0	117.50	108.28	4.99	2.07

Comparison to EIS Predictions:

The 2021 results for blasting were within the limits of the EIS predictions, with the EIS predicting blasts to be below criteria.

6.4.4 Management Measures

Blast emission related impacts (vibration and air blast) are managed in accordance with the specific measures within the Teven Quarry Blast Management Plan (2021).

6.4.5 Proposed Improvements

No further improvements to blast management are proposed for 2021.

6.5 Traffic Management

6.5.1 EIS Predictions

The 2014 EIS assessment of traffic impacts associated with the Project found that impacts on the road network and principle intersections would be satisfactory and there was no requirement to upgrade the roads or intersections surrounding the site once minor improvements to Route 1 were undertaken.

A review of road safety conducted as part of the EIS recommended prioritising the use of Route 1 for product transport and recommended a number of minor improvements to Route 1 to improve the safety for night time haulage, including centre line marking, reflectors and maintenance of existing guard rails at locations along Route 1. Holcim has implemented these recommendations.

6.5.2 Approved Criteria

According to Development Consent SSD 6422 the site is required to monitor transport in accordance with the following requirements:

Schedule 2, Condition 9: The Applicant will not dispatch more than 73 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.

Schedule 3, Condition 23: The Applicant shall keep accurate records of all laden truck movements to and from the site (hourly, daily, weekly, monthly and annually) and publish a summary of records on its website every 6 months.

6.5.3 Key Environmental Performance

Teven Quarry undertook monitoring of truck movements on a daily basis throughout 2021 to ensure compliance with movements and volume requirements discussed above. A copy of these monitoring results has been included in **Table 19**.

Table 19: Average Truck Movements for 2021

Month	Total Truck Movements	Active days	Average Truck Movement per active day
January	837	16	52
February	1250	24	52
March	1282	27	47
April	1206	20	49
May	1689	21	64
June	1425	21	56
July	1213	22	44
August	1233	22	46
September	1698	22	64
October	1219	20	48
November	1424	22	54
December	1130	16	58

Long term Trends:

Review of truck transport data for Teven Quarry since 2015 indicates average daily truck movements have not exceeded the maximum of 73 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.

The annual average for truck movements per active day in 2021 was similar to the averages for 2018 and 2019 report periods with respective averages of 53 and 54 truck movements. The 2020 report period decreased to an average of 45 truck movements per active day. The annual average truck movements per active day in the 2021 report period equalled 53.

This is consistent with the EIS predictions.

6.5.4 Management Measures

Traffic and transport impacts are managed in accordance with the specific management strategies, procedures, controls and monitoring programs within the Teven Quarry Transport Management Plan (April 2021). The Teven Quarry Transport Management Plan (April 2021) was approved by DPE on 20/05/2021.

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. No additional improvement measures outside those outlined in the 2021 Transport Management Plan are proposed to be implemented in 2021.

6.6 Biodiversity

6.6.1 EIS Predictions

The 2014 EIS found the Project is unlikely to result in a significant change to the existing noise, dust and water runoff impacts of Teven Quarry, therefore it is considered that any indirect impacts to ecology that occur will be minor and will be consistent with the existing approved impacts. The results of the impact assessments under the Environmental Planning and Assessment Act (EP&A Act) and the Environment Protection and Biodiversity Conservation Act (EPBC Act) conclude that the indirect impacts of the Project are unlikely to have a significant impact on any threatened flora or fauna species, migratory fauna species, endangered population or threatened ecological communities listed under the Threatened Species Conservation Act (TSC Act) and/or the EPBC Act.

6.6.2 Approved Criteria

There are no specific criteria associated with biodiversity management for the site.

6.6.3 Key Environmental Performance

Teven Quarry conducted some grass stripping in 2021. No additional clearing occurred in the report period. This has had a limited impact on biodiversity. Weed management continued across the project area in 2021.

No feral animal management occurred in the report period.

6.6.4 Management Measures

Teven Quarry implement biodiversity management measures from its updated Biodiversity and Rehabilitation Management Plan. The main procedures include:

- Weed management;
- Habitat reinstatement;
- Pre-clearance permit process; and
Bushfire management.

6.6.5 Proposed Improvements

Weed spraying will continue at site during the next Annual Review period.

There are no additional proposed improvements for the next reporting period.

6.7 Heritage (Aboriginal Archaeology and Historic Heritage)

6.7.1 EIS Predictions

6.7.1.1 Aboriginal Archaeology

No known Aboriginal cultural heritage sites occur within or in close proximity to the Teven Quarry Project Area. Given the terrain and history of extensive clearing, grazing and quarrying, the area is considered to have low archaeological potential.

No known items or places of Aboriginal heritage significance are located in or within 50 metres of the Project Area. As such, the potential for impacts on items of Aboriginal cultural heritage is limited to indirect impacts such as from blasting or runoff.

6.7.1.2 Historic Heritage

No known items of historic heritage significance occur within the Teven Quarry Project Area.

No historic heritage sites were found to be located within or in close proximity to the Project Area. The closest heritage item was located approximately three kilometres to the south east in Alstonville, a sufficient distance to not experience or be impacted by indirect impacts associated with the Project.

6.7.2 Approved Criteria

There are no specific criteria associated with heritage relating to the quarry.

6.7.3 Key Environmental Performance

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

6.7.4 Management Measures

If during the course of operations, Holcim becomes aware of any previously unknown Aboriginal archaeological material, all works likely to affect the material or site will cease immediately and Office of Environment and Heritage (OEH), relevant Aboriginal stakeholders and a suitably qualified archaeologist will be consulted to determine an appropriate course of action prior to the commencement of work at the site.

6.7.5 Proposed Improvements

As there have been no 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 2021 are detailed in **Table 20**.

Table 20: Environmental Performance at Teven Quarry in 2021

Aspect	Approval Criteria / EIS Prediction	Performance during 2021 reporting period	Trend / key management implications	Implemented / proposed management actions
Meteorological	Development Consent.	Within criteria. Continuous meteorological data collected from site station.	Meteorological data collected at the site. Inspections done on the site station for maintenance.	None required.
Noise	EIS predictions are all below Development Consent criteria.	Within criteria.	Noise monitoring results consistently met criteria.	None required.
Blasting	EIS predictions are all below Development Consent criteria.	Non-compliance for overpressure on one occasion in 2021. All other results were compliant.	2021 averages were mostly consistent with long-term trends.	Update of the Blast Management Plan has been undertaken in 2021.
Air Quality	EIS predictions are all below Development Consent criteria.	The PM ₁₀ 24-hour criteria of 50 µg/m ³ was exceeded on one occasion, on 12 August 2021. PM ₁₀ data could not be collected in the first two weeks of January 2021 due to equipment failure. All other air quality results were compliant.	PM ₁₀ is consistent with long term data. Depositional dust monitoring continued in 2021.	Teven will continue to undertake management measures in line with the Air Quality Management Plan.
Traffic Management	EIS predictions are all below Development Consent criteria.	Within criteria.	Consistently meets criteria.	None required.
Biodiversity	No proposed impacts. No Development Consent criteria.	As per criteria. No issues identified.	No long-term negative trends.	None required. Teven will continue to implement the Biodiversity and Rehabilitation Management Plan.
Heritage	No proposed impacts. No Development Consent criteria.	As per criteria. No issues identified.	No issues have been identified in recent years.	None required.

7 WATER MANAGEMENT

7.1 EIS Predictions

7.1.1 Surface Water

The 2014 EIS stated the Project will not result in any changes to the quarry water management system or associated water management measures. The only potential changes in surface water impacts as a result of the Project are associated with the change in water demands e.g. requirement to use more water for dust suppression or processing.

7.1.2 Groundwater

The results of the hydrogeological assessment conducted during preparation of the 2014 EIS indicate that the local and regional groundwater table is located below the current and proposed elevation of the Teven Quarry pit floor. The quarry has been extracted to its maximum depth of 4mAHD without any evidence of groundwater inflows. For this reason, the assessment concludes that the Project will have a negligible impact on groundwater levels, groundwater quality, groundwater receptors, groundwater dependent ecosystems and groundwater users in the local area.

7.2 Approved Criteria

Holcim are required to monitor water quality from discharge events at the Teven Quarry licenced discharge points, in accordance with the requirements of EPL 3293 (provided in **Table 21** and **Table 22**).

Table 21: Water Monitoring Criteria (Teven Quarry EPL 3293) – LDP001

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
pH	pH				6.5-8.5
Total suspended solids	milligrams per litre				50

Table 22: Discharge Sampling Measurement Requirements (Teven Quarry EPL 3293)

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per litre	Special Frequency 1	Visual Inspection
pH	pH	Special Frequency 1	No method specified
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

In addition to these requirements, the site has been requested by the NSW DPE to undertake an assessment based on the condition below:

Schedule 19 Condition 3

In the event that groundwater in excess of negligible quantities is intersected during extraction activities, the Applicant shall undertake a hydrogeological investigation, in consultation with NOW, to the satisfaction of the Secretary.

The investigation must report on groundwater sources, levels, yield and quality; identify any risks to groundwater users or groundwater dependent ecosystems and propose recommended management measures. The Applicant must implement reasonable and feasible management measures to the satisfaction of the Secretary.

Teven Quarry is currently operating above the groundwater table. No groundwater seepage into the quarry void has been recorded. The quarry will continue to visually monitor the void for groundwater seepage and a detailed assessment will be undertaken in accordance with Schedule 19 Condition 3 of the Development Consent should groundwater in excess of negligible quantities be intercepted.

7.3 Water Usage and Storage

Clean upstream catchment runoff is diverted away from the quarry and conveyed to the cane field drains which flow to Maguire’s Creek and Emigrant Creek. Runoff from disturbed areas within the quarry operations are managed within the water management system, with this outlined in the Water Management Plan.

The Teven Quarry water management system has two dams/storages, the Main Dam and the Pit Dam. Runoff within the quarry pit is managed in the primary siltation storage (Pit Dam), from which surplus water is pumped to the main silt retention storage (Main Dam) at the northern end of the quarry. The quarry water management system is designed to maximise sedimentation of pit runoff on site, prior to reuse on site or discharge via the licensed discharge point.

7.4 Surface Water Results

Table 23 summarises the water quality results during discharge events at LDP001. A copy of the full data is included in **Appendix 2**.

Table 23: Summary of Water Quality Data at Teven Quarry – 2021

Location/ Frequency	Lower Limit	Upper Limit	Unit	Description	2021 Average	2021 Minimum	2021 Maximum	2020 Average
Wet Weather Discharge - Special Frequency 1	6.5	8.5	pH	pH	7.6	7.0	9.0	6.9
		50	mg/L	Suspended Solids	4.6	0.0	42.0	1.4
		10	mg/L	Total Oil & Grease	0.0	0.0	0.0	0

There was an exceedance in pH criteria at the site on 3 March 2021. The water discharging from site was slightly alkaline. There was 55.3 mm received at the site in the preceding 5 days before this discharge according to the site weather station. This exceedance was reported to the EPA. This is a non-compliance with the EPL criteria.

All other discharges were compliant with the EPL criteria.

Monitoring data at LDP001 in 2021 generally met the EPL criteria. This is consistent with EIS predictions.

7.5 Groundwater Results

Groundwater monitoring was not undertaken during the 2021 reporting period. As per Schedule 19 Condition 3 of the Development Consent, in the event that groundwater in excess of negligible quantities is intersected during extraction activities, Holcim will undertake a hydrogeological investigation, in consultation with Department of Industry Water, to the satisfaction of the Secretary.

There are no groundwater trends or comparison to EIS predictions.

7.6 Water Take

There has been no groundwater take during the Annual Review period.

Pumping of 1332 kL of surface water from the sump was undertaken in the 2019 the report period.

7.7 Water Management – Pollution Reduction Program

A Pollution Reduction Program (PRP) was prepared by EMM Consulting, dated 31 January 2019, in order to improve sediment basin management and stormwater management at Teven Quarry.

7.7.1 Basis for PRP

On 7 June 2018, the EPA undertook an inspection of Teven Quarry and observed turbid water in the drainage line between the Main Dam and the current licensed discharge point (LDP 2). The EPA noted concern that water was being discharged from the Site when less than the five-day rainfall event has occurred and that, based on the presence of turbid water, there may be disturbed areas of the Site not draining to a sediment basin.

The EPA also noted concern that:

- Site personnel present at the time of inspection were not aware of the requirement to monitor discharges in accordance with EPL conditions; and
- The Teven Quarry *Water Management Plan* did not adequately reflect EPL conditions in relation to the correct monitoring location of the LDP, and that sampling was being undertaken in the cane drain adjacent to and downstream of the Site which does not accurately reflect the quality of water leaving the Site.

Subsequently the EPA varied EPL 3293 through addition of a PRP as Clause U1, which is reproduced below:

U1 Report – Review the current sediment basin management and stormwater management.

U1.1 The licensee is to review the current sediment basin management and stormwater management of the premise to ensure that:

- 1. All disturbed areas on the quarry including run-off from access roads flows to a settlement basin.*
- 2. The quarry has capacity to capture the five-day rain event.*
- 3. Monitoring occurs for all discharge less than the five-day rain event of 82.5mm.*

A report is to be submitted to the EPA by the 3 September 2018 detailing the review the current sediment basin management and stormwater management.

7.7.2 Improvements Completed

The following recommendations were outlined in the PRP were completed in recent years:

- All Management Plans were updated in accordance with collaboration with DPE and EPA by the 2020 report period.
- Review/audit of all existing bunding of various forms/construction around Catchment C5 should be undertaken to confirm that containment measures are continuous and effective at preventing offsite discharge. If necessary, improvement or enhancement of existing controls should then be undertaken.
- It is noted that bunding is considered to form an effective sediment control for this area, and with no prior evidence or history of uncontrolled discharge from the Site (including from recent rainfall in 2018 that was well in excess of the five-day rainfall event) a formal sediment basin is not considered necessary to manage the risk of discharge in this location.

- At the time of inspection in October 2018 low flows in the Main Drainage Channel were observed to be conveyed within the voids in the rock rip rap lining and left the Site beneath the concrete block that forms the intended discharge weir. This created a situation where it was not possible to obtain consistency in sampling location. On this basis a preliminary recommendation was made that concrete lining of the channel at its downstream end was undertaken to effectively lift the invert of the channel up and match into the top of the concrete block weir, so that the full range of flow rates would be conveyed over the weir.
- These works were undertaken in early December 2018 and appear effective in producing a consistent sampling point at the LDP and in restricting seepage behind the block weir. No further improvements are considered necessary at this location.
- Several improvements to water monitoring procedures and record keeping are recommended for capture in an updated version of the WMP (refer Section 7), including:

Further investigation of the source and potential remedial measures to address seepage and resulting continuous discharge below the Main Dam could also be contemplated if it is considered desirable to reduce EPL compliance costs. It is noted that more frequent water quality monitoring is currently required than would otherwise be needed if the seepage was able to be stopped.

On 14 April 2021 Holcim received a Notice of Variation of EPL3293 from EPA. This letter acknowledged the EPA's receipt of the EMM 2019 report titled, "Holcim Teven Quarry – Review of Current Sediment Basin Management and Stormwater Management" which was submitted in response to the PRP.

The April 2021 Notice of Variation removed PRP U1.1 from EPL 3293.

In this Annual Review period, Holcim continued its revision of the Water Management Plan to improve water management measures at Teven Quarry. The Water Management Plan was updated and submitted for approval in 2021.

7.7.3 Proposed Improvements

Holcim will continue to implement the Water Management Plan.

8 REHABILITATION AND LANDSCAPE MANAGEMENT

8.1 Rehabilitation Performance during the Reporting Period

The site is required to undertake biodiversity and rehabilitation in accordance with the requirements in Table 25.

Table 24: Biodiversity and Rehabilitation Requirements for Teven Quarry (SSD 6422)

<p>27. The Applicant shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and the conceptual final landform in Appendix 2, and must comply with the objectives in Table 5.</p> <p><i>Table 5: Biodiversity and Rehabilitation objectives</i></p> <table border="1"> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Site (as a whole)</td> <td> <ul style="list-style-type: none"> • Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and designed to minimise the visual impacts of the development when viewed from surrounding land • Restored with native, endemic vegetation </td> </tr> <tr> <td>Surface Infrastructure</td> <td> <ul style="list-style-type: none"> • Decommissioned and removed, unless the Secretary agrees otherwise </td> </tr> <tr> <td>Quarry Benches</td> <td> <ul style="list-style-type: none"> • Landscaped and vegetated using native tree and understorey species </td> </tr> <tr> <td>Quarry Pit Floor</td> <td> <ul style="list-style-type: none"> • Landscaped and revegetated using native tree and understorey species, above the final anticipated void water level </td> </tr> </tbody> </table>		Feature	Objective	Site (as a whole)	<ul style="list-style-type: none"> • Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and designed to minimise the visual impacts of the development when viewed from surrounding land • Restored with native, endemic vegetation 	Surface Infrastructure	<ul style="list-style-type: none"> • Decommissioned and removed, unless the Secretary agrees otherwise 	Quarry Benches	<ul style="list-style-type: none"> • Landscaped and vegetated using native tree and understorey species 	Quarry Pit Floor	<ul style="list-style-type: none"> • Landscaped and revegetated using native tree and understorey species, above the final anticipated void water level
Feature	Objective										
Site (as a whole)	<ul style="list-style-type: none"> • Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and designed to minimise the visual impacts of the development when viewed from surrounding land • Restored with native, endemic vegetation 										
Surface Infrastructure	<ul style="list-style-type: none"> • Decommissioned and removed, unless the Secretary agrees otherwise 										
Quarry Benches	<ul style="list-style-type: none"> • Landscaped and vegetated using native tree and understorey species 										
Quarry Pit Floor	<ul style="list-style-type: none"> • Landscaped and revegetated using native tree and understorey species, above the final anticipated void water level 										
<p>Progressive Rehabilitation</p> <p>28. The Applicant shall rehabilitate 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 for final rehabilitation.</p> <p><i>Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.</i></p>											

No rehabilitation was completed in 2021 at the site.

A summary of rehabilitation at the Teven Quarry is outlined in Table 26.

Table 25: Rehabilitation Performance in 2021

Guideline Requirement	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	There was no rehabilitation completed during the 2021 Annual Review period. Operations continued within the existing quarry footprint.
Agreed post-rehabilitation land use	In accordance with the <i>Biodiversity and Rehabilitation Management Plan</i> , vegetation communities will consist of: <ul style="list-style-type: none"> • Mixed Eucalyptus Forest; • Brushbox Forest; and • Subtropical Rainforest.
Key rehabilitation performance indicators	Key rehabilitation indicators are outlined within Section 7 of the Biodiversity and Rehabilitation Management Plan.
Renovation or removal of buildings	No building removal during the Annual Review period.
Any other Rehabilitation taken including: <ul style="list-style-type: none"> • Exploration activities; • Infrastructure; • Dams; and • the installation or maintenance of fences, 	There was no rehabilitation completed during the 2021 Annual Review period.

Guideline Requirement	Site Comment
bunds and any other works.	
Any rehabilitation areas which have received formal sign off from DRG	No rehabilitation received signoff during the 2021 Annual Review period.
Variations to activities undertaken to those proposed (including why there were variations and whether DRG was notified).	No rehabilitation was completed during the 2021 Annual Review period.
Outcomes of trials, research projects and other initiatives	Biobanking was conducted as part of the 2023-2024 greater rehabilitation campaign
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.

Monitoring has commenced on existing rehabilitation in 2021 and will continue in accordance with the Biodiversity and Management Plan.

On 8 June 2021 DPE visited Teven for an inspection rehabilitation. No further actions were required.

Holcim recalculated the Rehabilitation Bond in 2021. Holcim received a response to this from DPE on 25 November 2021, which confirmed DPE's satisfaction with the calculation.

8.2 Summary of Current Rehabilitation and Performance

A summary of the rehabilitation and disturbance status of Teven Quarry is outlined in **Table 27**. Current rehabilitation and disturbance are shown on **Figure 3**.

Table 26: Rehabilitation and Disturbance Status

Quarry Area Type	2018 Annual Review Period (ha)	2019 Annual Review Period (ha)	2020 Annual Review Period (ha)	2021 Annual Review Period (ha)	Next 2022 Annual Review Period (ha)
	Actual				Forecast
A. Total Quarry Footprint ₁	17.1	17.1	17.1	17.1	17.1
B. Total Active Disturbance ₂	17.1	17.1	17.1	17.1	17.1
C. Land Being Prepared for Rehabilitation ₃	0	0	0	0	0
D. Land Under Active Rehabilitation ₄	0	0	0	0	0
E. Completed Rehabilitation ₅	0	0	0	0	0

1 Total disturbance and rehabilitation.

2 Total disturbance within the Project Approval boundary

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

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

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

At the end of 2021 there was approximately 17.1 Ha of active disturbance. There is no active rehabilitation at Teven Quarry, and none proposed in 2022.



Figure 3: Teven Quarry Rehabilitation and Disturbance

There has been no change to rehabilitation or disturbance in the report period, hence this figure hasn't been updated.

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 28**.

Table 27: Rehabilitation and Closure Actions for the 2022 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.	Progressive rehabilitation will be established once areas become available for rehabilitation.
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.	Non-active benches will be assessed for rehabilitation preparation in 2022. Teven will identify any further actions to perform progressive rehabilitation.

9 WASTE MANAGEMENT

9.1 Waste Streams

Waste streams produced at Teven Quarry are categorised as:

- Waste oil, filters, grease cartridges;
- Scrap metal;
- Tyres;
- Office paper and general rubbish;
- Silt (from aggregate washing); and
- Waste water from amenities and office.

9.2 Waste Management

All waste generated by Teven Quarry is managed by way of Council collection services, via licensed waste contractors or onsite treatment. No on-site disposal of general waste occurs. Teven Quarry is committed to reducing, reusing and recycling wastes prior to disposal.

Key components of waste management are:

- All waste oil is collected and stored in containers within a covered and bunded area and is removed from the site by an appropriately licensed contractor as required;
- All oil filters are separately stored and returned to the manufacturer for reuse by appropriately licensed contractor;
- Scrap metal is deposited into a dedicated skip bin for periodic collection and recycling (approximately every three months) by an appropriately licenced contractor;
- Diesel fuel is stored within a self-bunded, above-ground tank and all refuelling is undertaken on a hardstand area which drains to an oil/water separator (refer waste oil disposal);
- Silt is captured in on-site silt control structures and is periodically removed and placed/stored in the product stockpile area or overburden materials for use;
- All waste tyres are removed by the supplier of replacement tyres;
- All paper/cardboard (1 x 3m³ bin) and general waste (2 x 3m³ bin) originating from the office and amenities buildings, as well as packaging from routine equipment is placed in the appropriate skips for collection by Council or a licensed contractor for disposal/ recycling at an appropriate waste management facility every month; and
- Wastewater from amenities is treated and disposed of via an on-site septic tank with absorption trenches/pump out.

10 COMMUNITY

10.1 Community Engagement Activities

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities:

- 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.

10.2 Complaints

A copy of the complaints register, as well as all publicly listed information including contacts for locals in the community is publicly available on the Teven Quarry webpage in accordance with the Development Consent requirements (<https://www.holcim.com.au/about-us/community-link/teven-quarry-teven-ballina-nsw>).

There were no complaints in 2017, three complaints in 2018, one complaint in 2019, three complaints in 2020 and three complaints in 2021.

Of these three complaints for the reporting period, one was submitted 22/06/21 as a blast complaint following a notification to one resident mistakenly listing the blast as “today” rather than “tomorrow”. Two traffic related complaints from one complainant were received on 05/05/21. One complaint was regarding trucks allegedly speeding down Teven Road and using jake (engine) brakes outside the complainant’s house. The second complaint alleged truck movements on Teven Road resulted in cracks to the complainant’s verandah.

All three complaints for 2021 have been closed out.

11 INDEPENDENT AUDIT

The site undertook an Independent Environmental Audit (IEA) in late 2019 in accordance with the requirements of Schedule 5, Condition 9 of the Development Consent. The IEA Action Plan was sent to DPE in 2020 and Teven continues to work to the actions outlined in this plan. The IEA Action Plan is presented in Appendix 3.

The next IEA is due in 2022.

12 INCIDENTS AND NON-COMPLIANCE

Table 28 summarises the incidents and non-compliances at Teven in 2021.

Table 28: Summary of Incidents and Non-Compliances

Date	Incident/Non-Compliance	Action
January 2021	<p>Schedule 3 Condition 11 – SSD 6422 – Air Quality Monitoring Criteria No sample could be collected for PM10 in the first two weeks of January 2021. These invalidated samples are dated 2 and 8 January 2021.</p>	Holcim will continue to verify monitoring results and report on non-compliances.
3 March 2021	<p>L2.4 Water and/or Land Concentration Limits – Surface Water Discharge Quality There was an exceedance (9) of pH EPL criteria (8.5) from LPD001 at the site on 3 March 2021. Rainfall did not exceed 82.5 mm in the five-day period leading up to the exceedance.</p>	Holcim reported this exceedance to the EPA. This pH exceedance was not consistent with previous monitoring results and therefore no further actions were determined to be required.
12 August 2021	<p>Schedule 3 Condition 11 – SSD 6422 – Air Quality Monitoring Criteria A result of 58.7 µg/m³ on 12 August 2021 exceeded the PM₁₀ 24-hour criteria of 50 µg/m³.</p>	Breaches and exceedances to be closely monitored and reported as soon as the site is aware.
21 September 2021	<p>Schedule 3 Condition 7 SSD 6422 and L5.2 of EPL3293 - Blasting A blast on 21 September 2021 exceeded the overpressure limit of 115dB. The blast was recorded to be 2.5 dB over the criteria of 115db (there were a total of 10 blasts in the reporting period).</p>	Holcim reported the exceedance and investigated the cause of the exceedance however the investigation was inconclusive. The Blast Management Plan was updated in 2021 in response to this exceedance. Through the Blast Management Plan, Holcim has relocated the “Site Entrance Stokers Lane” monitoring location to another, more suitable location.

13 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Holcim staff will undertake the following works and improvement measures and projects at Teven Quarry in 2022 to ensure compliance with the Development Consent and EPL 3293, and to ensure that effective environmental management controls are in place and operating in accordance with the requirements of the Development Consent. **Table 29** outlines proposed actions for 2022.

Table 29: Improvement Actions for 2022

Improvement Measure	Activities
PM ₁₀	Continue the improvement of the air quality monitoring program through ensuring the reliability of internal processes and transparency through the presentation of monitoring data in the Holcim environmental monitoring portal. Maintain a HVAS monitoring program which meets Development Consent requirements. Manage dust control measures to reduce short term non-compliances.
Biodiversity	Weed spraying will continue at site during the next Annual Review period.
Water sampling	Complete water sampling for at least the parameters pH, Total Suspended Solids, and Oil and grease.
Groundwater Assessment	<p><u>Condition 3, Schedule 19</u></p> <p><i>In the event that groundwater in excess of negligible quantities is intersected during extraction activities, the Applicant shall undertake a hydrogeological investigation, in consultation with NOW, to the satisfaction of the Secretary.</i></p> <p><i>The investigation must report on groundwater sources, levels, yield and quality; identify any risks to groundwater users or groundwater dependent ecosystems and propose recommended management measures. The Applicant must implement reasonable and feasible management measures to the satisfaction of the Secretary.</i></p> <p>Holcim will continue to monitor the quarry void for groundwater seepage to ensure that groundwater quantities remain negligible.</p>

APPENDIX 1
QUARTERLY NOISE RESULTS

Noise Monitoring Assessment

Teven Quarry, Teven, NSW
Quarter 1 Ending March 2021.

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 1 Ending March 2021

Prepared for: Holcim (Australia) Pty Ltd

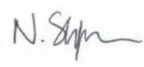

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MAC180611-06RP11	Final	31 March 2021	Nicholas Shipman		Rod Linnett	

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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 the quarterly period ending March 2021 for Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan (NMP) and in general accordance with relevant conditions outlined in the Development Consent (ref: SSD 6422) at five representative monitoring locations. This assessment has been undertaken during Quarter 1, ending March 2021 and forms part of the 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;
- NSW Environment Protection Authority (EPA), Environmental Protection Licence (EPL 3293);
- NSW Department of Planning and Environment, Development Consent (SSD 6422), 2015;
- Teven Quarry Noise Management Plan Revision 1, 4 May 2016 (EMM); 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 of the Teven Quarry Development Consent (2015), outlines the applicable noise criteria for residential receivers surrounding the quarry site.

Table 1 reproduces relevant criteria for each of the receivers as outlined in the quarry's Development Consent.

Table 1 Noise Criteria		
Location ¹	Quarry Operations	
	Period: Day	Period: Evening
	7am – 6pm dB LAeq(15min)	6pm – 10pm dB LAeq(15min)
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other receivers	37	35

Note 1: Receiver locations are shown in Figure 1.

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3 Methodology

3.1 Locality

The quarry is located in Teven, NSW approximately 7km west of Ballina, NSW. Receivers in the locality surrounding the quarry are primarily rural residential. The surroundings of the quarry are primarily rural. The monitoring locations with respect to the quarry 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 in accordance with the NMP. The selected monitoring locations are presented in **Table 2** along with the noise sensitive receivers they represent.

Table 2 Monitoring Locations (MGA56 Coordinates)			
Location	Nearest Receiver	Easting, m	Northing, m
NM1	R7	546737	6809918
NM2	R3/R4	548892	6810285
NM3	R2	547781	6808991
NM4	R10	547576	6810379
NM5	R14	548100	6810792

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 NPI. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 24 March 2021. Acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

As per the Noise Management Plan, two daytime measurements were conducted at each monitoring location. It is noted that the quarry was not operating during the evening period, however two measurements were conducted at each monitoring location as per the requirements of the EPL.

Measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to determine the $L_{Aeq}(15min)$ noise contribution for comparison against the relevant criteria. Where the quarry was inaudible, the contribution is estimated to be at least 10dB below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-06
Holcim Teven Quarry

KEY

● Noise Monitoring Locations



4 Results

4.1 Assessment Results - Location NM1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/03/2021	07:26 (Day)	70	54	39	WD: W WS: 0.1m/s Rain: Nil	Birds 37-70
						Insects 37-53
						Traffic 37-65
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<35
24/03/2021	07:41 (Day)	63	54	37	WD: W WS: 0.1m/s Rain: Nil	Insects 49-56
						Birds 36-54
						Traffic 32-63
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<35
24/03/2021	18:08 (Evening)	86	58	41	WD: NW WS: 0.4m/s Rain: Nil	Insects 38-46
						Birds 38-44
						Traffic <38
						Dog bark 38-86
						Local residential noise 38-54
						Wind <42
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
24/03/2021	18:23 (Evening)	66	52	44	WD: NW WS: 0.3m/s Rain: Nil	Wind 38-44
						Insects 42-48
						Birds <44
						Traffic 41-66
						Aircraft 41-52
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location NM2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/03/2021	08:09 (Day)	88	66	41	WD: W WS: 0.1m/s Rain: Nil	Traffic 43-88
						Birds 41-57
						Aircraft 41-48
						Holcim processing 33-37
						Local residential noise 43-59
Teven Quarry L _{Aeq} (15min) Contribution						Insects 38-46
						<37
24/03/2021	08:24 (Day)	88	66	40	WD: W WS: 0.1m/s Rain: Nil	Traffic 38-88
						Birds 40-61
						Insects <40
						Local residential noise 46-56
						Dogs 42-45
Teven Quarry L _{Aeq} (15min) Contribution						Aircraft 38-40
						Quarry Inaudible
						<35
24/03/2021	18:50 (Evening)	93	63	47	WD: NW WS: 0.2m/s Rain: Nil	Insects 45-48
						Traffic 45-93
						Birds 45-49
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
24/03/2021	19:05 (Evening)	87	60	45	WD: NW WS: 0.2m/s Rain: Nil	Insects 46-52
						Traffic 46-87
						Birds 46-67
						Aircraft 46-53
Teven Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
						Quarry not operational

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 NM3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM3 are presented in **Table 5**.

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/03/2021	08:44 (Day)	62	43	38	WD: W	Birds 36-62
					WS: 0.1m/s	Insects 36-45
					Rain: Nil	Holcim processing 32-36
						Holcim FEL 32-36
Teven Quarry L _{Aeq} (15min) Contribution						<36
24/03/2021	08:59 (Day)	61	40	34	WD: W	Holcim processing 32-36
					WS: 0.1m/s	Insects 36-42
					Rain: Nil	Birds 40-61
Teven Quarry L _{Aeq} (15min) Contribution						<36
24/03/2021	19:27 (Evening)	65	60	55	WD: NW	Insects 48-65
					WS: 0.1m/s	Traffic <48
					Rain: Nil	Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
24/03/2021	19:42 (Evening)	65	62	60	WD: NW	Insects 46-65
					WS: 0.1m/s	Quarry Inaudible
					Rain: Nil	
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location NM4												
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
24/03/2021	09:23 (Day)	77	53	41	WD: W WS: 0.1m/s Rain: Nil	Holcim FEL 36-50						
						Holcim processing 35-37						
						Insects <38						
						Birds 39-46						
						Traffic 38-77						
Teven Quarry L _{Aeq} (15min) Contribution						Local residential noise <38						
						37						
24/03/2021	09:38 (Day)	78	59	41	WD: W WS: 0.1m/s Rain: Nil	Local residential noise <37						
						Holcim processing 34-41						
						Insects 37-42						
						Birds 37-45						
						Traffic 37-78						
Teven Quarry L _{Aeq} (15min) Contribution						37						
24/03/2021	20:05 (Evening)	54	51	50	WD: NW WS: 0.1m/s Rain: Nil	Insects 49-52						
						Traffic <49						
						Birds 49-54						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
24/03/2021	20:20 (Evening)	60	50	49	WD: NW WS: 0.1m/s Rain: Nil	Insects 49-52						
						Birds 49-60						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
												Quarry not operational

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 NM5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM5 are presented in **Table 7**.

Date	Time (hrs)	Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
24/03/2021	10:11 (Day)	60	41	34	WD: W	Birds 36-44
					WS: 0.1m/s	Insects 31-36
					Rain: Nil	Holcim processing 31-36
						Aircraft 38-60
Teven Quarry L _{Aeq} (15min) Contribution						<35
24/03/2021	10:26 (Day)	57	40	35	WD: W	Birds 36-48
					WS: 1m/s	Insects 36-40
					Rain: Nil	Holcim processing 32-36
						Wind 36-57
Teven Quarry L _{Aeq} (15min) Contribution						<35
24/03/2021	20:41 (Evening)	55	50	48	WD: NW	Insects 47-55
					WS: 0.1m/s	Traffic <47
					Rain: Nil	Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
24/03/2021	20:56 (Evening)	53	49	47	WD: NW	Insects 47-52
					WS: 0.1m/s	Traffic <47
					Rain: Nil	Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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

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5 Discussion

5.1 Discussion of Results - Location NM1

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 24 March 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included birds, insects, traffic, dogs barking, local residential noise, wind in trees and aircraft.

5.2 Discussion of Results - Location NM2

Quarry noise emissions were audible during one of the daytime measurements conducted on Wednesday 24 March 2021. Quarry noise contributions were measured at <37dBA and therefore satisfied the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included the processing plant. Non quarry noise sources observed during the measurements included traffic, birds, aircraft, local residential noise, insects, and dogs barking.

5.3 Discussion of Results - Location NM3

Quarry noise emissions were audible during the daytime noise measurements conducted on Wednesday 24 March 2021. Quarry noise contributions were estimated at <36dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included front end loader and the processing plant. Non quarry noise sources observed during the measurements included birds, insects, and traffic.

5.4 Discussion of Results - Location NM4

Quarry noise emissions were audible during the daytime noise measurements conducted on Wednesday 24 March 2021. Quarry noise contributions were estimated at 37dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included front end loader and the processing plant. Non quarry noise sources included birds, aircraft, traffic, and insects.

5.5 Discussion of Results - Location NM5

Quarry noise emissions were audible during the daytime measurements conducted on Wednesday 24 March 2021. Quarry noise contributions were estimated at <35dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included the processing plant. Non-quarrying sources included insects, birds, traffic, wind in trees, and aircraft.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for the relevant surrounding residential receivers during Quarter 1, ending March 2021.

Attended noise measurements were undertaken on Wednesday 24 March 2021 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry complied with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

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Appendix A - Glossary of Terms

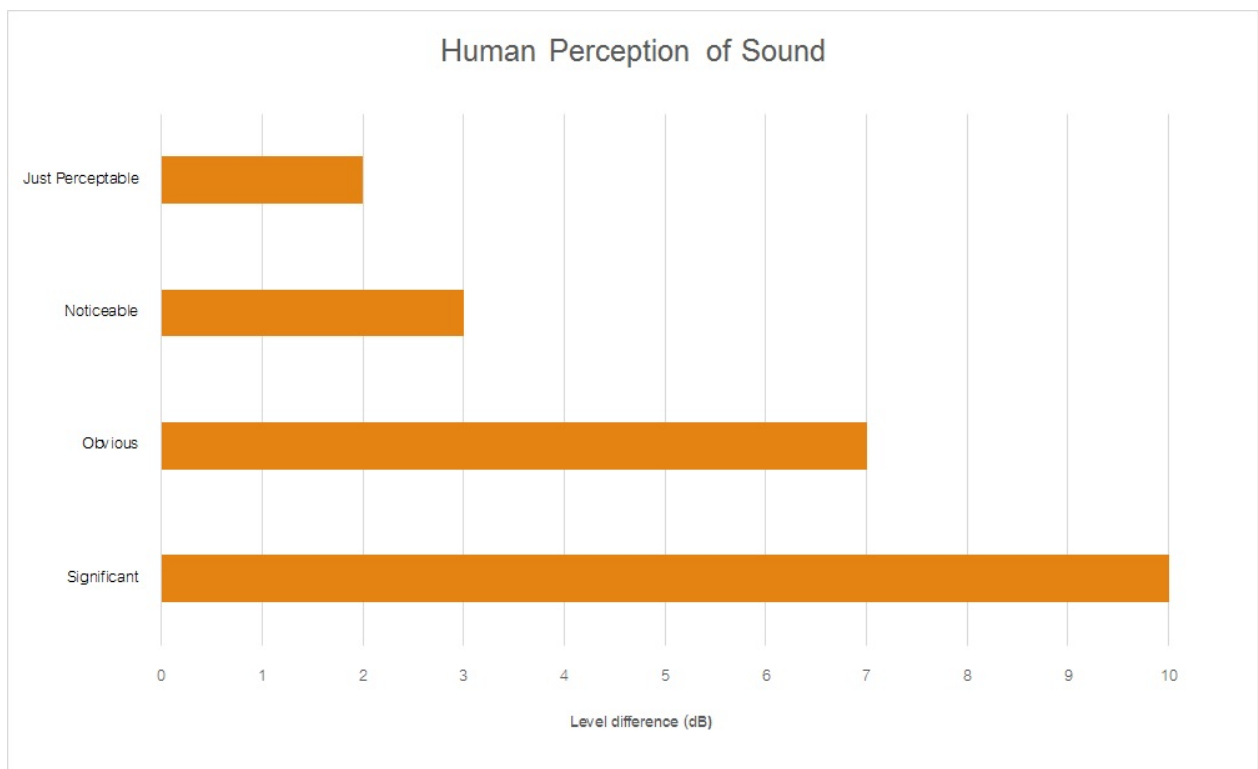
Table A1 provides a number of technical terms have been used in this report.

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

Teven Quarry, Teven, NSW
Quarter 2 Ending June 2021.

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 2 Ending June 2021

Prepared for: Holcim (Australia) Pty Ltd

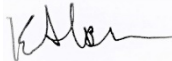

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APPENDIX A - GLOSSARY OF TERMS

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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 the quarterly period ending June 2021 for Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan (NMP) and in general accordance with relevant conditions outlined in the Development Consent (ref: SSD 6422) at five representative monitoring locations. This assessment has been undertaken during Quarter 2, ending June 2021 and forms part of the 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;
- NSW Environment Protection Authority (EPA), Environmental Protection Licence (EPL 3293);
- NSW Department of Planning and Environment, Development Consent (SSD 6422), 2015;
- Teven Quarry Noise Management Plan Revision 1, 4 May 2016 (EMM); 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 of the Teven Quarry Development Consent (2015), outlines the applicable noise criteria for residential receivers surrounding the quarry site.

Table 1 reproduces relevant criteria for each of the receivers as outlined in the quarry's Development Consent.

Table 1 Noise Criteria		
Location ¹	Quarry Operations	
	Period: Day	Period: Evening
	7am – 6pm dB LAeq(15min)	6pm – 10pm dB LAeq(15min)
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other receivers	37	35

Note 1: Receiver locations are shown in Figure 1.

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3 Methodology

3.1 Locality

The quarry is located in Teven, NSW approximately 7km west of Ballina, NSW. Receivers in the locality surrounding the quarry are primarily rural residential. The surroundings of the quarry are primarily rural. The monitoring locations with respect to the quarry 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 in accordance with the NMP. The selected monitoring locations are presented in **Table 2** along with the noise sensitive receivers they represent.

Table 2 Monitoring Locations (MGA56 Coordinates)			
Location	Nearest Receiver	Easting, m	Northing, m
NM1	R7	546737	6809918
NM2	R3/R4	548892	6810285
NM3	R2	547781	6808991
NM4	R10	547576	6810379
NM5	R14	548100	6810792

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 NPI. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 19 May 2021. Acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

As per the Noise Management Plan, two daytime measurements were conducted at each monitoring location. It is noted that the quarry was not operating during the evening period, however two measurements were conducted at each monitoring location as per the requirements of the EPL.

Measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to determine the $L_{Aeq}(15min)$ noise contribution for comparison against the relevant criteria. Where the quarry was inaudible, the contribution is estimated to be at least 10dB below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-06
Holcim Teven Quarry

KEY

● Noise Monitoring Locations



4 Results

4.1 Assessment Results - Location NM1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
19/05/2021	11:45 (Day)	53	37	33	WD: SE WS: 1.0m/s Rain: Nil	Traffic 31-35
						Birds 28-53
						Aircraft 30-48
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
19/05/2021	12:00 (Day)	52	36	32	WD: SE WS: 1.0m/s Rain: Nil	Traffic 30-35
						Birds 27-52
						Residential Noise 32-39
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
19/05/2021	18:14 (Evening)	63	40	33	WD: SE WS: <0.5m/s Rain: Nil	Traffic 30-63
						Insects 32-45
						Dogs <32
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
19/05/2021	18:29 (Evening)	52	37	29	WD: SE WS: <0.5m/s Rain: Nil	Traffic 25-39
						Insects 28-36
						Dogs 25-30
						Aircraft 30-52
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location NM2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
19/05/2021	13:05 (Day)	85	65	39	WD: SW WS: 1.0m/s Rain: Nil	Traffic 33-85
						Birds 33-46
						Aircraft 35-56
						Wind 36-40
						Quarry - Reverse Alarms <33 (Infrequent 3 second durations)
Teven Quarry L _{Aeq} (15min) Contribution						<33
19/05/2021	13:20 (Day)	88	65	38	WD: SW WS: 1.0m/s Rain: Nil	Traffic 31-88
						Birds 31-54
						Wind 34-40
						Aircraft 35-40
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
19/05/2021	19:34 (Evening)	88	66	37	WD: S WS: <0.5m/s Rain: Nil	Traffic 32-88
						Insects 35-44
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
19/05/2021	19:49 (Evening)	85	60	37	WD: S WS: <0.5m/s Rain: Nil	Traffic 31-85
						Insects 34-41
						People 31-40
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location NM3												
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
19/05/2021	12:30 (Day)	79	56	31	WD: SE WS: 1.0m/s Rain: Nil	Traffic 29-36						
						Birds 26-41						
						Aircraft 30-79						
						Wind 26-34						
						Insects 29-41						
Teven Quarry L _{Aeq} (15min) Contribution						<30						
19/05/2021	12:45 (Day)	54	44	32	WD: SE WS: 1.0m/s Rain: Nil	Traffic 30-35						
						Insects 30-49						
						Birds 27-54						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						<30
19/05/2021	18:59 (Evening)	60	47	42	WD: SE WS: <0.5m/s Rain: Nil	Insects 37-47						
						Traffic 34-40						
						Aircraft 34-60						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
19/05/2021	19:14 (Evening)	52	45	41	WD: S WS: 0.1m/s Rain: Nil	Insects 36-52						
						Traffic 33-43						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location NM4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
19/05/2021	13:55 (Day)	73	58	45	WD: S WS: 0.5m/s Rain: Nil	Traffic 40-73
						Trucks Idling 52-60
						Agricultural Noise <39
						Quarry FEL <35-47 (6-8 Minute total duration)
						Quarry Processing <35-44 (10-15 minute duration)
Quarry Trucks <35-39 (Infrequent 20 second durations)						
Teven Quarry L _{Aeq} (15min) Contribution						37 ¹
19/05/2021	14:10 (Day)	74	55	44	WD: S WS: 0.5m/s Rain: Nil	Traffic 38-74
						Trucks Idling 52-56
						Agricultural Noise <37-40
						Quarry FEL <34-45 (6-9 minute total duration)
						Quarry Processing <34-43 (10-15 minute duration)
Quarry Trucks <34-38 (Infrequent 20 second durations)						
Teven Quarry L _{Aeq} (15min) Contribution						37 ¹
19/05/2021	20:43 (Evening)	47	39	37	WD: S WS: 0.1m/s Rain: Nil	Insects 36-47
						Traffic 33-46
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
19/05/2021	20:58 (Evening)	72	46	37	WD: S WS: 0.1m/s Rain: Nil	Insects 31-43
						Traffic 34-72
						Aircraft 34-45
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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.

Note 1: Contribution calculated at 108 Stockers Lane.

4.5 Assessment Results - Location NM5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location NM5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
19/05/2021	14:30 (Day)	52	43	38	WD: S WS: 0.5m/s Rain: Nil	Traffic 30-52
						Insects 30-35
						Agricultural Noise 35-47
						Birds 30-44
Quarry Processing <34-38 (8-12 minute total duration)						
Quarry FEL <31-39 (2-4 minute total duration)						
Teven Quarry L _{Aeq} (15min) Contribution						35
19/05/2021	14:45 (Day)	56	43	37	WD: S WS: 0.5m/s Rain: Nil	Traffic 30-56
						Insects 30-35
						Agricultural Noise 35-45
						Birds 30-40
Quarry Processing <34-37 (8-12 minute total duration)						
Quarry FEL <31-38 (2-4 minute total duration)						
Teven Quarry L _{Aeq} (15min) Contribution						35
19/05/2021	20:09 (Evening)	60	42	37	WD: S WS: 0.1m/s Rain: Nil	Traffic 32-60
						Insects 35-44
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
19/05/2021	20:24 (Evening)	42	37	35	WD: S WS: 0.1m/s Rain: Nil	Traffic 30-39
						Insects 33-42
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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

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5 Discussion

5.1 Discussion of Results - Location NM1

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 19 May 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included birds, insects, traffic, dogs barking, local residential noise and aircraft.

5.2 Discussion of Results - Location NM2

Quarry noise emissions were just audible occasionally during one of the daytime measurements conducted on Wednesday 19 May 2021. Quarry noise contributions were measured at <33dBA and <30dBA and therefore satisfied the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included the vehicle reverse alarms. Non quarry noise sources observed during the measurements included traffic, birds, aircraft, wind in trees, insects and people taking.

5.3 Discussion of Results - Location NM3

Quarry noise emissions were inaudible during the daytime noise measurements conducted on Wednesday 19 May 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non Quarry noise sources observed during the measurements included aircraft, wind in tress, birds, insects and traffic.

5.4 Discussion of Results - Location NM4

Quarry noise emissions were audible during the daytime noise measurements conducted on Wednesday 19 May 2021. Quarry noise contributions were estimated at 37dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included front end loader, heavy vehicles, and the processing plant. Non quarry noise sources included trucks idling, birds, agricultural noise, aircraft, traffic and insects.

5.5 Discussion of Results - Location NM5

Quarry noise emissions were audible during the daytime measurements conducted on Wednesday 19 May 2021. Quarry noise contributions were estimated at 35dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included front end loader and the processing plant. Non-quarrying sources included insects, agricultural noise, birds, traffic, wind in trees and aircraft.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for the relevant surrounding residential receivers during Quarter 2, ending June 2021.

Attended noise measurements were undertaken on Wednesday 19 May 2021 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry complied with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

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Appendix A - Glossary of Terms

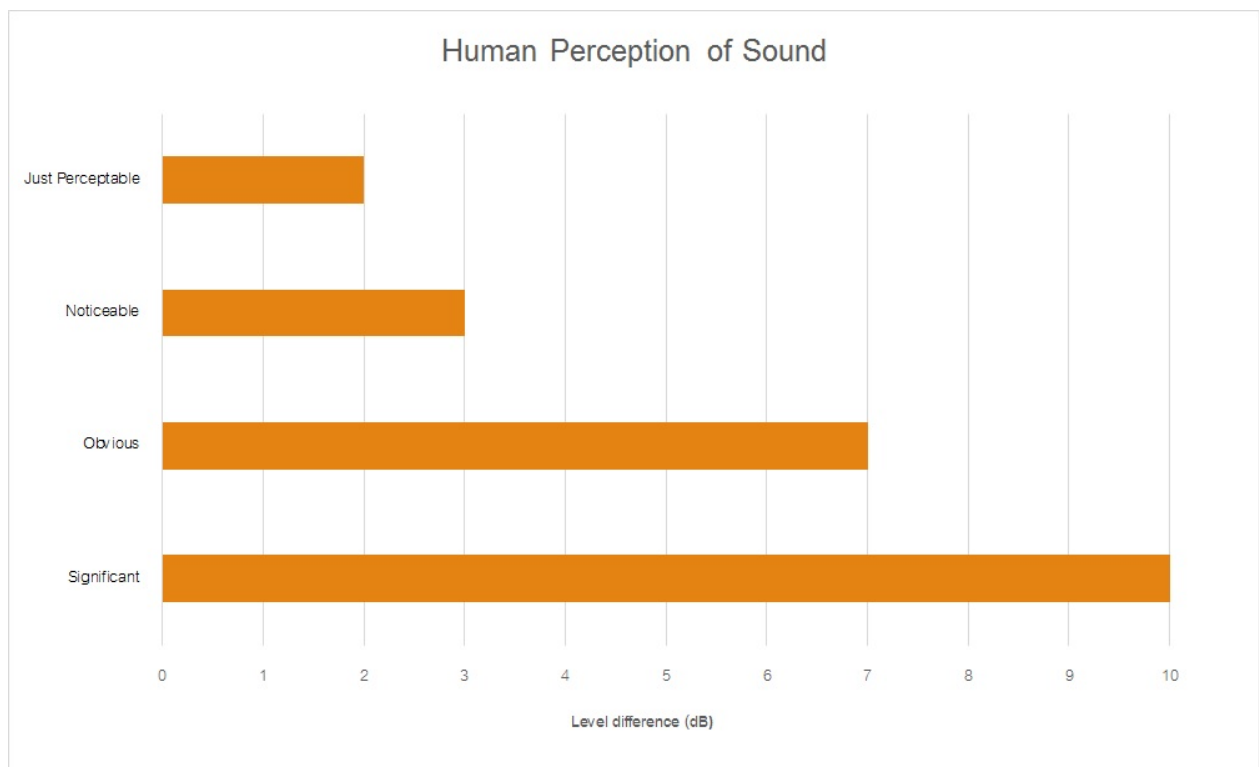
Table A1 provides a number of technical terms have been used in this report.

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

Teven Quarry, Teven, NSW
Quarter 3 Ending September 2021.

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 3 Ending September 2021

Prepared for: Holcim (Australia) Pty Ltd

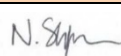

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APPENDIX A - GLOSSARY OF TERMS

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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 the quarterly period ending September 2021 for Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan (NMP) and in general accordance with relevant conditions outlined in the Development Consent (ref: SSD 6422) at five representative monitoring locations. This assessment has been undertaken during Quarter 3, ending September 2021 and forms part of the 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;
- NSW Environment Protection Authority (EPA), Environmental Protection Licence (EPL 3293);
- NSW Department of Planning and Environment, Development Consent (SSD 6422), 2015;
- Teven Quarry Noise Management Plan Revision 1, 4 May 2016 (EMM); 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 of the Teven Quarry Development Consent (2015), outlines the applicable noise criteria for residential receivers surrounding the quarry site.

Table 1 reproduces relevant criteria for each of the receivers as outlined in the quarry's Development Consent.

Table 1 Noise Criteria		
Location ¹	Quarry Operations	
	Period: Day	Period: Evening
	7am – 6pm dB LAeq(15min)	6pm – 10pm dB LAeq(15min)
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other receivers	37	35

Note 1: Receiver locations are shown in Figure 1.

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3 Methodology

3.1 Locality

The quarry is located in Teven, NSW approximately 7km west of Ballina, NSW. Receivers in the locality surrounding the quarry are primarily rural residential. The surroundings of the quarry are primarily rural. The monitoring locations with respect to the quarry 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 in accordance with the NMP. The selected monitoring locations are presented in **Table 2** along with the noise sensitive receivers they represent.

Table 2 Monitoring Locations (MGA56 Coordinates)			
Location	Nearest Receiver	Easting, m	Northing, m
NM1	R7	546737	6809918
NM2	R3/R4	548892	6810285
NM3	R2	547781	6808991
NM4	R10	547576	6810379
NM5	R14	548100	6810792

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 NPI. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Tuesday 20 July 2021 and Wednesday 21 July 2021. Acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

As per the Noise Management Plan, two daytime measurements were conducted at each monitoring location. It is noted that the quarry was not operating during the evening period, however two measurements were conducted at each monitoring location as per the requirements of the EPL.

Measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to determine the $L_{Aeq}(15min)$ noise contribution for comparison against the relevant criteria. Where the quarry was inaudible, the contribution is estimated to be at least 10dB below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-06
Holcim Teven Quarry

KEY

● Noise Monitoring Locations



4 Results

4.1 Assessment Results - Location NM1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
21/07/2021	08:28	75	49	38	WD: W WS: 0.8m/s Rain: Nil	Birds 34-62
	(Day)					Wind in trees 34-44
						Traffic 34-75
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
21/07/2021	08:43	76	49	40	WD: W WS: 0.8m/s Rain: Nil	Birds 36-48
	(Day)					Wind in trees 36-52
						Traffic 36-76
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
20/07/2021	18:32	64	41	27	WD: W WS: 0.4m/s Rain: Nil	Traffic 26-64
	(Evening)					Wind in trees 26-34
						Birds 26-40
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
20/07/2021	18:47	61	38	26	WD: W WS: 0.5m/s Rain: Nil	Traffic 26-61
	(Evening)					Insects 24-30
						Wind in trees 24-32
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location NM2												
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L _{Amax}	L _{Aeq}	L _{A90}								
21/07/2021	09:10 (Day)	86	65	46	WD: W WS: 2m/s Rain: Nil	Wind in trees 42-48						
						Dog bark 42-58						
						Traffic 42-86						
						Birds 42-68						
						Aircraft 39-62						
Teven Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible						
						<30						
21/07/2021	09:25 (Day)	85	66	47	WD: W WS: 2.5m/s Rain: Nil	Wind in trees 44-58						
						Birds 44-72						
						Traffic 44-85						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						<30
						<30						
20/07/2021	19:15 (Evening)	88	60	34	WD: W WS: 1.2m/s Rain: Nil	Wind in trees 32-46						
						Traffic 32-88						
						Birds 32-38						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
20/07/2021	19:30 (Evening)	50	39	33	WD: W WS: 1.2m/s Rain: Nil	Wind in trees 30-50						
						Insects <30						
						Quarry Inaudible						
						Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
												Quarry not operational

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 NM3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location NM3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
21/07/2021	09:47 (Day)	58	41	37	WD: W	Wind in trees 36-55
					WS: 1.2m/s	Birds 36-56
					Rain: Nil	Aircraft 36-58
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
21/07/2021	10:02 (Day)	57	41	37	WD: W	Wind in trees 35-46
					WS: 1m/s	Birds 35-57
					Rain: Nil	Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
20/07/2021	19:51 (Evening)	70	46	28	WD: W	Operator 55-57
					WS: 0.4m/s	Traffic 28-48
					Rain: Nil	Aircraft 54-70
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
20/07/2021	20:06 (Evening)	47	28	27	WD: W	Traffic 27-47
					WS: 0.3m/s	Insects 26-29
					Rain: Nil	Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location NM4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
21/07/2021	10:25 (Day)	83	59	45	WD: W WS: 2m/s Rain: Nil	Wind in trees 44-56
						Traffic 44-83
						Birds 44-52
						Holcim Crushing <37-41 (constant)
						Holcim FEL 37-41 (20 seconds)
Teven Quarry L _{Aeq} (15min) Contribution						37 ¹
21/07/2021	10:40 (Day)	81	60	46	WD: W WS: 2m/s Rain: Nil	Wind in trees 41-58
						Birds 41-55
						Traffic 41-81
						Holcim Tipping 36-46 (5 seconds)
						Holcim Crushing <37-41 (constant)
Teven Quarry L _{Aeq} (15min) Contribution						37 ¹
20/07/2021	20:29 (Evening)	41	33	29	WD: W WS: 0.3m/s Rain: Nil	Insects <26
						Traffic 26-29
						Birds 26-41
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
20/07/2021	20:44 (Evening)	43	31	26	WD: W WS: 0.4m/s Rain: Nil	Birds 27-43
						Insects <27
						Traffic 26-32
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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.

Note 1: Contribution calculated at 108 Stockers Lane.

4.5 Assessment Results - Location NM5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM5 are presented in **Table 7**.

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
21/07/2021	11:06 (Day)	83	59	45	WD: W	Wind in trees 41-56
					WS: 2m/s	Birds 41-57
					Rain: Nil	Traffic 41-83
						Aircraft 41-47
Teven Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
						<30
21/07/2021	11:21 (Day)	86	59	44	WD: W	Wind in trees 41-56
					WS: 2m/s	Birds 41-53
					Rain: Nil	Traffic 41-86
						Aircraft 41-60
Teven Quarry L _{Aeq} (15min) Contribution						Quarry Inaudible
						<30
20/07/2021	21:04 (Evening)	77	47	29	WD: W	Wind in trees 26-42
					WS: 0.4m/s	Insects 26-30
					Rain: Nil	Traffic 26-77
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
20/07/2021	21:19 (Evening)	81	50	26	WD: W	Traffic 23-81
					WS: 0.4m/s	Insects 23-26
					Rain: Nil	Wind in trees 23-32
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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

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5 Discussion

5.1 Discussion of Results - Location NM1

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 21 July 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included birds, wind in trees, traffic and insects.

5.2 Discussion of Results - Location NM2

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 21 July 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included wind in trees, dog barking, traffic, birds and aircraft.

5.3 Discussion of Results - Location NM3

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 21 July 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included wind in trees, birds, aircraft, operator noise and traffic.

5.4 Discussion of Results - Location NM4

Quarry noise emissions were audible during the daytime noise measurements conducted on Wednesday 21 July 2021. Quarry noise contributions were estimated at 37dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included front end loader, heavy vehicles tipping, and the processing plant. Non quarry noise sources included wind in trees, traffic, birds and insects.

5.5 Discussion of Results - Location NM5

Quarry noise emissions were inaudible during the daytime measurements conducted on Wednesday 21 July 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included wind in trees, birds, traffic, aircraft and insects.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for the relevant surrounding residential receivers during Quarter 3, ending September 2021.

Attended noise measurements were undertaken on Tuesday 20 July 2021 and Wednesday 21 July 2021 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry complied with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

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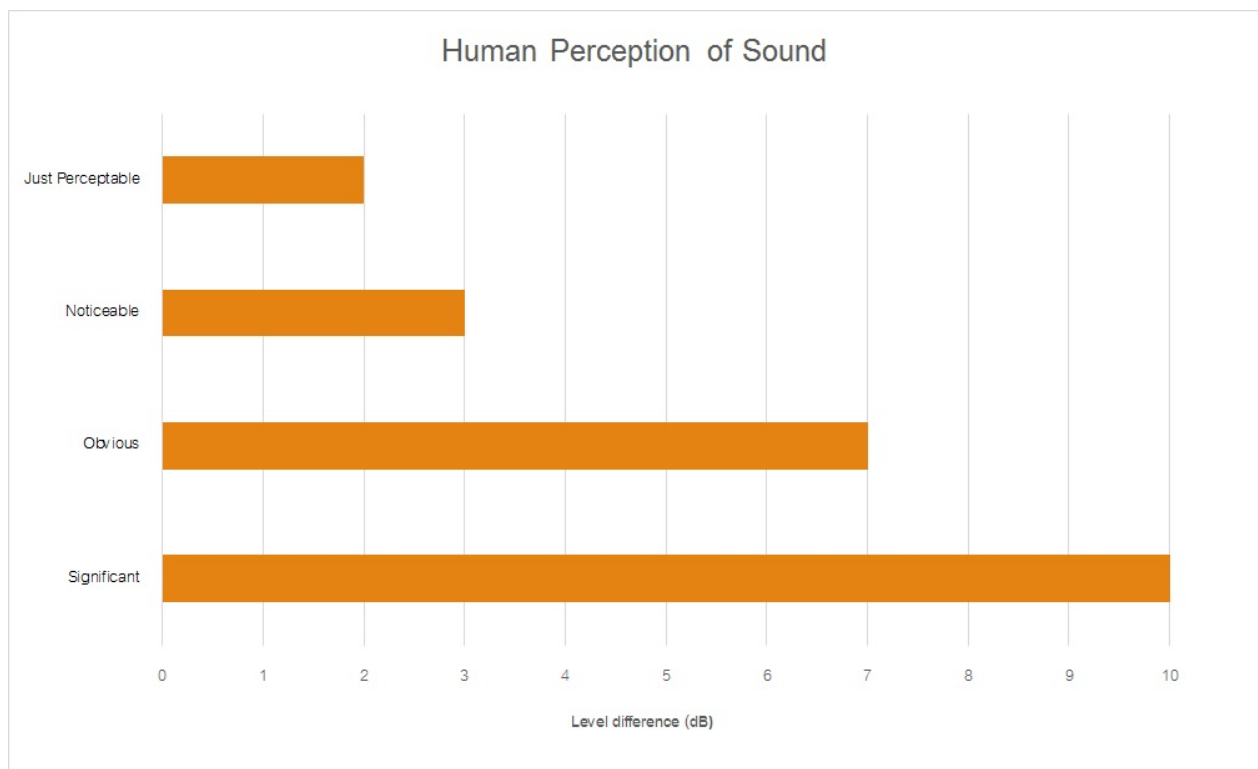
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dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
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LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound 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.
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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

Teven Quarry, Teven, NSW
Quarter 4 Ending December 2021.

Document Information

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Teven Quarry, Teven, NSW

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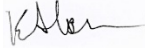

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APPENDIX A - GLOSSARY OF TERMS

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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 the quarterly period ending December 2021 for Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan (NMP) and in general accordance with relevant conditions outlined in the Development Consent (ref: SSD 6422) at five representative monitoring locations. This assessment has been undertaken during Quarter 4, ending December 2021 and forms part of the 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;
- NSW Environment Protection Authority (EPA), Environmental Protection Licence (EPL 3293);
- NSW Department of Planning and Environment, Development Consent (SSD 6422), 2015;
- Teven Quarry Noise Management Plan Revision 1, 4 May 2016 (EMM); 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 of the Teven Quarry Development Consent (2015), outlines the applicable noise criteria for residential receivers surrounding the quarry site.

Table 1 reproduces relevant criteria for each of the receivers as outlined in the quarry's Development Consent.

Table 1 Noise Criteria		
Location ¹	Quarry Operations	
	Period: Day	Period: Evening
	7am – 6pm dB LAeq(15min)	6pm – 10pm dB LAeq(15min)
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other receivers	37	35

Note 1: Receiver locations are shown in Figure 1.

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3 Methodology

3.1 Locality

The quarry is located in Teven, NSW approximately 7km west of Ballina, NSW. Receivers in the locality surrounding the quarry are primarily rural residential. The surroundings of the quarry are primarily rural. The monitoring locations with respect to the quarry 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 in accordance with the NMP. The selected monitoring locations are presented in **Table 2** along with the noise sensitive receivers they represent.

Table 2 Monitoring Locations (MGA56 Coordinates)			
Location	Nearest Receiver	Easting, m	Northing, m
NM1	R7	546737	6809918
NM2	R3/R4	548892	6810285
NM3	R2	547781	6808991
NM4	R10	547576	6810379
NM5	R14	548100	6810792

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 NPI. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 6 October 2021 and Thursday 7 October 2021. Acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

As per the Noise Management Plan, two daytime measurements were conducted at each monitoring location. It is noted that the quarry was not operating during the evening period, however two measurements were conducted at each monitoring location as per the requirements of the EPL.

Measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to determine the $L_{Aeq}(15min)$ noise contribution for comparison against the relevant criteria. Where the quarry was inaudible, the contribution is estimated to be at least 10dB below the ambient noise level.



FIGURE 1
Site Locality
MAC180611-06
Holcim Teven Quarry

KEY

● Noise Monitoring Locations



4 Results

4.1 Assessment Results - Location NM1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
07/10/2021	07:20 (Day)	67	45	30	WD: N WS: 0.1m/s Rain: Nil	Birds 28-46
						Traffic 28-67
						Agricultural Noise 28-44
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
07/10/2021	07:35 (Day)	72	48	31	WD: N WS: 0.3m/s Rain: Nil	Birds 28-52
						Traffic 28-72
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
06/10/2021	18:11 (Evening)	59	40	33	WD: E WS: 1.0m/s Rain: Nil	Wind 34-46
						Birds 34-59
						Traffic <34
						Insects <34
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
06/10/2021	18:26 (Evening)	56	37	32	WD: E WS: 1.0m/s Rain: Nil	Insects <31
						Wind 31-44
						Birds 30-56
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM2 are presented in **Table 4**.

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
07/10/2021	08:04 (Day)	89	67	39	WD: N WS: 0.3m/s Rain: Nil	Birds 36-52
						Traffic 36-89
						Wind <37
						Holcim Processing <36 (30 seconds)
Teven Quarry L _{Aeq} (15min) Contribution						<35
07/10/2021	08:19 (Day)	86	66	38	WD: N WS: 0.4m/s Rain: Nil	Traffic 35-86
						Birds 35-51
						Quarry Inaudible
						Teven Quarry L _{Aeq} (15min) Contribution
06/10/2021	18:53 (Evening)	81	55	37	WD: E WS: 0.4m/s Rain: Nil	Residential Noise <36
						Birds 34-52
						Traffic 34-81
						Insects <34
						Wind <34
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
06/10/2021	19:08 (Evening)	85	60	45	WD: E WS: <0.1m/s Rain: Nil	Traffic 42-85
						Insects <42
						Birds 42-48
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location NM3						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
07/10/2021	08:46 (Day)	60	40	31	WD: N WS: 0.4m/s Rain: Nil	Birds 28-50
						Agricultural Noise 28-60
						Distant Traffic 28-36
						Insects <28
Teven Quarry L _{Aeq} (15min) Contribution						<30
07/10/2021	09:01 (Day)	65	46	36	WD: N WS: 0.4m/s Rain: Nil	Birds 30-50
						Agricultural Noise 30-65
						Distant Traffic 30-34
						Insects <30
Teven Quarry L _{Aeq} (15min) Contribution						<30
06/10/2021	19:29 (Evening)	65	42	36	WD: E WS: 0.3m/s Rain: Nil	Insects 34-35
						Distant Traffic 34-42
						Birds 34-65
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
06/10/2021	19:44 (Evening)	50	41	36	WD: E WS: 0.2m/s Rain: Nil	Insects 34-35
						Distant Traffic 34-40
						Agricultural Noise 42-50
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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 NM4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location NM4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
07/10/2021	09:23 (Day)	80	57	43	WD: N	Birds 39-46
					WS: 0.2m/s	Traffic 39-80
					Rain: Nil	Aircraft 39-62
						Holcim Processing 39-41 (Constant)
Teven Quarry L _{Aeq} (15min) Contribution						36 ¹
07/10/2021	09:38 (Day)	78	56	43	WD: N	Birds 39-54
					WS: 0.3m/s	Traffic 39-78
					Rain: Nil	Holcim Processing 39-43
						(Constant)
Teven Quarry L _{Aeq} (15min) Contribution						37 ¹
06/10/2021	20:06 (Evening)	54	39	36	WD: E	Insects <34
					WS: 0.1m/s	Agricultural Noise 34-54
					Rain: Nil	Distant Traffic 34-44
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
06/10/2021	20:21 (Evening)	47	39	37	WD: E	Insects <35
					WS: 0.1m/s	Agricultural Noise 35-47
					Rain: Nil	Distant Traffic 35-44
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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.

Note 1: Contribution calculated at 108 Stockers Lane.

4.5 Assessment Results - Location NM5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location NM5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location NM5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
07/10/2021	10:04 (Day)	66	41	30	WD: N WS: 0.2m/s Rain: Nil	Birds 28-66
						Distant Traffic 28-38
						Agricultural Noise 28-36
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
07/10/2021	10:19 (Day)	65	46	33	WD: N WS: 0.2m/s Rain: Nil	Agricultural Noise 28-65
						Birds 28-56
						Aircraft 28-54
						Distant Traffic 30-34
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						<30
06/10/2021	20:39 (Evening)	48	40	38	WD: E WS: 0.1m/s Rain: Nil	Agricultural Noise 35-45
						Distant Traffic 35-48
						Insects <35
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational
06/10/2021	20:54 (Evening)	45	37	36	WD: E WS: 0.1m/s Rain: Nil	Traffic 34-45
						Insects 34-36
						Quarry Inaudible
Teven Quarry L _{Aeq} (15min) Contribution						Quarry not operational

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

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5 Discussion

5.1 Discussion of Results - Location NM1

Quarry noise emissions were inaudible during the daytime measurements conducted on Thursday 7 October 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included birds, wind in trees, traffic, agricultural noise and insects.

5.2 Discussion of Results - Location NM2

Quarry noise emissions were just audible for a short period during the daytime measurements conducted on Thursday 7 October 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included the processing plant. Non quarry noise sources observed during the measurements included wind in trees, traffic, birds, insects and residential noise.

5.3 Discussion of Results - Location NM3

Quarry noise emissions were inaudible during the daytime measurements conducted on Thursday 7 October 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included birds, insects, agricultural noise and traffic.

5.4 Discussion of Results - Location NM4

Quarry noise emissions were audible during the daytime noise measurements conducted on Thursday 7 October 2021. Quarry noise contributions were estimated at 36dBA and 37dBA for both measurements and therefore satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Quarry noise sources observed during the measurements included the processing plant. Non quarry noise sources included aircraft, agricultural noise, traffic, birds and insects.

5.5 Discussion of Results - Location NM5

Quarry noise emissions were inaudible during the daytime measurements conducted on Thursday 7 October 2021. Quarry noise contributions were estimated to satisfy the daytime noise limits. The quarry was not operational during the evening period which satisfied the relevant evening noise limits, however background measurements were completed as per the requirements of the EPL.

Non quarry noise sources observed during the measurements included agricultural noise, birds, traffic, aircraft and insects.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for the relevant surrounding residential receivers during Quarter 4, ending December 2021.

Attended noise measurements were undertaken on Wednesday 6 October 2021 and Thursday 7 October 2021 at five representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry complied with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

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Appendix A - Glossary of Terms

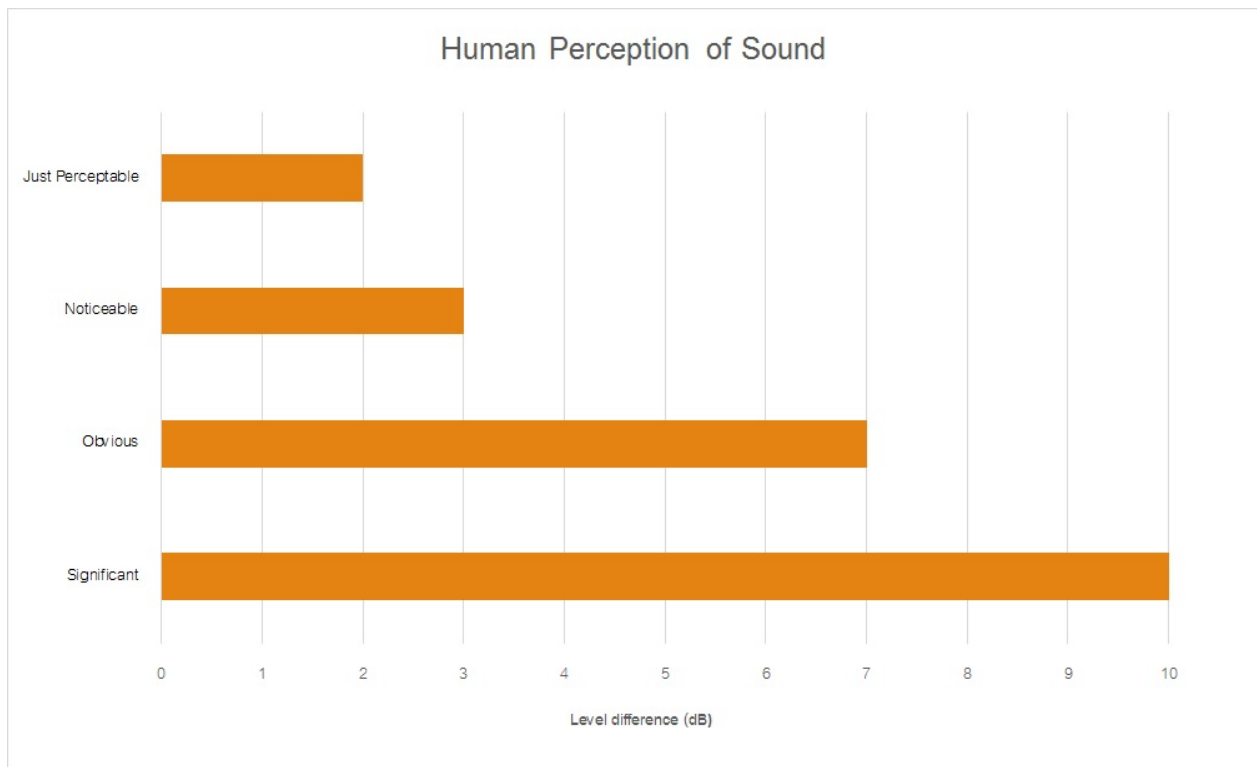
Table A1 provides a number of technical terms have been used in this report.

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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APPENDIX 2
SURFACE WATER QUALITY RESULTS

LDP1			
Date	pH	Suspended Solids (mg/L)	Oil and Grease (mg/L)
14/01/2021	7.62	1	0
15/01/2021	7.65	6	0
15/01/2021	7.76	1	0
18/01/2021	7.74	1	0
20/01/2021	7.7	2	0
20/01/2021	7.68	1	0
21/01/2021	7.86	1	0
18/02/2021	7.64	2	0
18/02/2021	7.58	1	0
25/02/2021	7.27	1	0
26/02/2021	7.28	1	0
03/03/2021	9	1	0
04/03/2021	7.45	6	0
15/03/2021	7.32	5	0
16/03/2021	7.35	3	0
18/03/2021	7.61	2	0
18/03/2021	7.27	2	0
19/03/2021	7.28	1	0
22/03/2021	7.26	23	0
06/04/2021	7.7	1	0
07/04/2021	7.02	6	0
08/04/2021	7.74	1	0
09/04/2021	7.05	15	0
12/04/2021	7.11	1	0
13/04/2021	7.14	1	0
14/04/2021	7.36	1	0
15/04/2021	7.37	1	0
03/05/2021	7.87	1	0
04/05/2021	7.57	1	0
05/05/2021	7.55	1	0
06/05/2021	7.52	13	0
01/07/2021	7.5	4	0
02/07/2021	8	9	0
05/07/2021	7.5	1	0
07/07/2021	8	5	0
08/07/2021	7.5	15	0
09/07/2021	7.5	1	0
13/07/2021	7.5	2	0
14/07/2021	8	42	0
01/10/2021	7.5	0	0
Pit Dam			
11/01/2021	8.06	4	0
Dam LOP2			
11/01/2021	7.86	8	0

APPENDIX 3
INDEPENDENT ENVIRONMENTAL
AUDIT ACTION PLAN (2019)

Holcim (Australia) Pty Ltd - Teven Quarry Project - Independent Environmental Compliance Audit – Action Plan – April 2020

Condition	Observation	Holcim comments in relation to observation	Audit Reference	Auditors Recommended Action	Holcim comments	Status	Person Responsible	To be completed before
Summary of Non - Compliances - SSD- 6422								
Condition 18 (b), Schedule 2	A copy of the 2018 Division of Resources and Energy (DRE) Standard form was provided but it was not included in the Annual Review.		Corrective action 01	Provide a copy of the DRE standard form in the Annual Review	2020 annual review to include this form.	Accepted	SS/GS	Completed
Condition 4, Schedule 3	The Annual Review summarises the noise monitoring results from Muller Acoustic Consultants which indicate compliance with the relevant criteria. While the monitoring locations appear to surround the quarry, providing a reasonable indication of the noise levels, there is nothing linking the monitoring locations with all the receivers in Table 2 of the consent. Table 6-1 of the Noise Management Plan justifies the noise monitoring locations in relation to the receivers but there is no mention of R13, R15, R16, R17, R18 or R20. The monitoring locations in the Quarterly Noise Monitoring Assessment are similar but not the same as those identified in the Noise Management Plan but there is no justification or link provided to all the receivers in Table 2. The Quarterly Noise Monitoring Assessment concludes that the noise criteria was achieved at all assessed residential receivers, however, because not all receivers mentioned in Table 2 were assessed, it is difficult to confirm if noise levels complied at all these receivers. It does appear the monitoring is comprehensive, with the exception of R13, with an observed linkage between the results and the receivers in Table 2.	Regarding the review comments around the receivers R13-R18 and R20 as per Table 2 of the Consent. The noise monitoring location align reasonably well with those in the NMP. The receivers R13-18 and R20 are more distant than measurement location N5 and hence, compliance is implied at these if levels are compliant at N5	Corrective action 02	Confirm in the Quarterly Noise Monitoring Assessments, the noise criteria at all receivers in Table 2 was achieved. And/or update the Noise Management Plan to confirm the noise monitoring locations are representative of all the receivers in Table 2.	Finding to be communicated to Muller Acoustic Consultants regarding noise monitoring report. Noise monitoring will also changed from 30 minutes 4 times per year to 1.5 hours 1 time per year for next round. Muller to review monitoring locations to ensure the noise monitoring locations are representative of all the receivers in Table 2. for next round.	Accepted	SS/GS	December 2020.
Condition 10(d), Schedule 3	The Blast Management Plan describes the control measures, monitoring program and protocol for investigating complaints. However it does not include a community notification procedure. It also appears the Blast Management Plan was not submitted to the Secretary within 6 months of the consent but this is considered to be outside the audit period. The Blasting Checklist indicates the mitigation measures are implemented	One page fact sheet has been previously provided to local residents. There is a Blast sign on the front gate.	Corrective action 03	Include community notification procedures for the blasting schedule in the Blast Management Plan.	SLR to update Plan. New requirement to be added to plan: if a community member complains regarding blasting or requested to be notified ('sensitive receivers'), the community member will be notified 24 hours prior to any blast for a period of 12 months, unless they request to extend.	Accepted	SS	December 2020.
Condition 11, Schedule 3	According to the Annual Review, the PM10 annual average was below the annual average criteria but the PM10 24 hour criteria was exceeded on 5 occasions during 2018 (11 August, 6 September, 6 November, 10 November and 4 December). The results ranged from 58µg/m3 to 68µg/m3 compared against a criteria of 50 µg/m3. The Annual Review explains there was an issue with the sampling methodology which has since been rectified. The depositional dust results in the Annual Review also indicate some exceedances of the approval criteria, however, it explains	It is noted that no exceedance / non-compliance of the approval limits occurred. It is noted that the approval limits only apply to residential location. It is noted that the high dust levels were not detected at dust sensitive residential locations. The high results were as a result of surround agricultural land use. The high levels were proactively reported to DPIE. DPIE visited the site on the 9.03.2020. It was agreed that the Air Quality management Plan will be	Corrective action 04	Review the dust monitoring program to ensure it provides representative results that can be used to confirm compliance with the relevant criteria and update the Air Quality Management Plan accordingly.	If a incident is detected (i.e a dust result above air quality criteria in the Development Consent at any residence on privately-owned land.) this will be reported to DPIE within 7 days. It is noted that Holcim proactively notified the local residents regarding the recent high levels detected in the surrounding agricultural locations. Holcim will continue to notified the landowners as required as soon as practicable.	Accepted	SS /ES /GS	December 2020.

Condition	Observation	Holcim comments in relation to observation	Audit Reference	Auditors Recommended Action	Holcim comments	Status	Person Responsible	To be completed before
	the exceedances were due to sugar farming operations that surround the monitoring locations. Holcim are in discussion with DPIE and EPA regarding the relocation of the dust deposition gauges.	updated.			Holcim will update the site's air quality management plan to only undertake dust deposition monitoring at sensitive receptors in the event of a complaint. Proactive due diligence monitoring will continue on site at a non dust sensitive receptors for internal business management purpose. It is noted that the timeframe will be dependant on the departments approval of the revised management plan.			
Condition 15, Schedule 3	The Annual Review reported a non-compliance with this condition due to a faulty weather station. However, a meteorological station was observed, which Holcim advised was installed by VGT. Although considered a non-compliance, the issue has since been addressed.	Ramboll fixed the weather station in Feb 2020.	Corrective action 05	Regularly maintain and monitor the weather station to ensure it is working.	The weather station will be upgraded to 3G capabilities to allow data to be remotely downloaded	No further action	ES	Closed
Condition 20, Schedule 3	The Water Management Plan includes a water balance, management system and monitoring program, however, it does not include: <ul style="list-style-type: none"> • Evidence the author was approved by the Secretary • Approved within 6 months • Detailed baseline data • Erosion and sediment controls Although it appears the Water Management Plan was not submitted to the Secretary within 6 months of the consent this is considered to be outside the audit period. In relation to erosion and sediment controls, the basin management is discussed but there are no other erosion and sediment controls mentioned. Controls on site and the Annual Review indicate the water management and monitoring is implemented and effective.		Corrective action 06	Update the Water Management Plan to include all the information required by Condition 20, Schedule 3. <ul style="list-style-type: none"> • Detailed baseline data • Erosion and sediment controls 	Liaise with SLR regarding finding. SLR to include all the information required by Condition 20, Schedule 3. <ul style="list-style-type: none"> • Detailed baseline data • Erosion and sediment controls The water management plan figure will also be updated to reflect the updated EPL location description Copy to be uploaded on the Holcim website after the approval.	Accepted	SS	December 2020.
Condition 23, Schedule 3	The delivery dockets show the date and time trucks arrive and leave the site. Monthly truck movements are included in the Annual Review. A summary is also on the website for 2016 and 2017 but it does not appear to be updated every 6 months.	It is noted that the truck movement are included in the 2017, 2018 & 2019 annual review report. 2019 report to be uploaded shortly pending review and approval by DPIE	Corrective action 07	Publish a summary of truck movements on the website every 6 months.	Site to add requirement to site planner Site to upload data directly every 6 months from July 2020 Site to upload hisotrical 6 monthly data for the last 3 years	Accepted	GS	July 2020
Condition 30, Schedule 3	Holcim was not able to provide any evidence a bond had been lodged with the Department. Holcim was also not able to confirm when the Biodiversity and Rehabilitation Management Plan (EMM 2016) was approved, however, as it was prepared in		Corrective action 08	Lodge a Conservation and Rehabilitation Bond with the Department, in accordance with	Working with Surveyor, Ecologist and Consultant for the Biodiversity Calculation.	Accepted	SS / ES	June 2021

Condition	Observation	Holcim comments in relation to observation	Audit Reference	Auditors Recommended Action	Holcim comments	Status	Person Responsible	To be completed before
	2016, it is assumed the Plan has been approved for more than 6 months, so the bond is required.			Condition 30, Schedule 3.				
Condition 31, Schedule 3	Holcim was not able to provide any evidence the Conservation and Rehabilitation Bond had been reviewed following the previous Independent Environmental Audit.		Corrective action 09	Review the Conservation and Rehabilitation Bond following the Independent Environmental Audit.	See Corrective action 08	Accepted	See Corrective action 08	See Corrective action 08
Condition 33, Schedule 3	Ballina Shire Council have indicated there is not a current Approval to Operate the on site sewage treatment and disposal system. Holcim advised the system has been in place since they started operating the quarry. Waste segregation was observed on site, with waste chemicals and oils stored appropriately under cover and bunded. Waste invoices indicate waste is handled and disposed appropriately. Waste management is discussed in the Annual Review		Corrective action 10	Obtain confirmation from EPA and Council indicating they are satisfied with the on site sewage treatment and disposal system.	Liaise with council to lodge an application to obtain the relevant approvals as required. Council's OSSM Officers note that they can assist the owner / operator in ensuring the OSSM is operating correctly to obtain the relevant approvals and required servicing reports.	Accepted	Victoria Musgrove	June 2021
Condition 1, Schedule 4	Exceedances of the air quality criteria were recorded but Holcim advised landowners were not notified. It was claimed that the air quality exceedances were not due to Holcim activities but there is nothing in the condition indicating it is only quarry related exceedance that are to be notified.	It is noted that no exceedance / non-compliance of the approval limits occurred. It is noted that the approval limits only apply to residential location. It is noted that the high dust levels were not detected at dust sensitive residential locations. The high results were as a result of surround agricultural land use. The high levels were proactively reported to DPIE. DPIE visited the site on the 9.03.2020. It was agreed that the Air Quality management Plan will be updated.	Corrective action 11	Notify affected landowners when monitoring results indicate an exceedance of the relevant criteria with justification why the exceedance was not associated with Holcim activities, if applicable.	It is noted that Holcim proactively notified the local residents regarding the recent high levels detected in the surrounding agricultural locations. Holcim will continue to notified the landowners as required as soon as practicable. Holcim will update the site's air quality management plan to only undertake dust deposition monitoring at sensitive receptors in the event of a complaint. Proactive due diligence monitoring will continue on site at a non dust sensitive receptors for internal business management purpose. It is noted that the timeframe will be dependant on the departments approval of the revised management plan.	Ongoing	See Corrective action 04	See Corrective action 04
Condition 2, Schedule 5	The management plans all provide: <input type="checkbox"/> Baseline data (except the Water Management Plan) <input type="checkbox"/> A description of the relevant statutory requirements, performance measures/criteria and indicators <input type="checkbox"/> Management measures Monitoring program <input type="checkbox"/> Protocols for managing and reporting on incidents, complaints, non-compliances and exceedances <input type="checkbox"/> Review and improvement protocol None of the plans included a contingency plan to manage unpredicted impacts.		Corrective action 12	Update the management plans required under the consent to include a contingency plan to manage unpredicted impacts.	Environmental Management Strategy included contingency plans.	No further action required	-	-
Condition 3, Schedule 5	5 Exceedances of the air quality criteria were recorded but Holcim	It is noted that no exceedance / non-compliance of the approval limits	Corrective action 13	Notify the Secretary, in accordance with	If a incident is detected (i.e a dust result above air quality criteria in the	Ongoing	See Corrective	See Corrective

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	advised that the Secretary was not notified. It was claimed that the air quality exceedances were not due to Holcim activities but there is nothing in the condition indicating it is only quarry related exceedance that are to be notified.	occurred. It is noted that the approval limits only apply to residential location. It is noted that the high dust levels were not detected at dust sensitive residential locations. The high results were as a result of surround agricultural land use. The high levels were proactively reported to DPIE. DPIE visited the site on the 9.03.2020. It was agreed that the Air Quality management Plan will be updated.		Condition 3, Schedule 5, when monitoring results indicate an exceedance of the relevant criteria and, when relevant, document justification why the exceedance was not associated with Holcim activities.	Development Consent at any residence on privately-owned land.) this will be reported to DPIE within 7 days. It is noted that Holcim proactively notified the local residents regarding the recent high levels detected in the surrounding agricultural locations. Holcim will continue to notified the landowners as required as soon as practicable. Holcim will update the site's air quality management plan to only undertake dust deposition monitoring at sensitive receptors in the event of a complaint. Proactive due diligence monitoring will continue on site at a non dust sensitive receptors for internal business management purpose. It is noted that the timeframe will be dependant on the departments approval of the revised management plan.		action 04	action 04
Condition 5, Schedule 5	Holcim was not able to provide any evidence there had been a review of the strategies, plans and programs required under this consent, following any of the triggers.	SLR was engaged in Q3 2019 to review and update the site management plans. Site has been awaiting the findings of the independent audit , before finalising the review and update of the management plans	Corrective action 14	Review the strategies, plans and programs following the annual review, incident report, audit report or modification and maintain evidence of the reviews.	SLR was engaged in Q3 2019 to review and update the site management plans. Site has been awaiting the findings of the independent audit, before finalising the review and update of the management plans. This will be completed once the department acceptance the findings of the independent audit.	Accepted	SS /ES /GS	December 2020.
Condition 7, Schedule 5	The Annual Review identifies two Incidents/Non compliances. Holcim advised that the Secretary was not notified other than inclusion in the Annual Review.	Duplicate finding. This is in relation to dust monitoring (corrective action 4 & 13) and weather station (corrective actions 5)	Corrective action 15	Notify the Secretary and any other relevant agencies of any incident, within 7 days of the date of the incident, in accordance with Condition 7, Schedule 5.	<u>Dust monitoring</u> If a incident is detected (i.e a dust result above air quality criteria in the Development Consent at any residence on privately-owned land.) this will be reported to DPIE within 7 days. It is noted that Holcim proactively notified the local residents regarding the recent high levels detected in the surrounding agricultural locations.	Ongoing	Duplicate finding. This is in relation to dust monitoring (corrective action 4 & 13) and weather station (corrective	Duplicate finding. This is in relation to dust monitoring (corrective action 4 & 13) and weather station

Condition	Observation	Holcim comments in relation to observation	Audit Reference	Auditors Recommended Action	Holcim comments	Status	Person Responsible	To be completed before
					<p>Holcim will continue to notified the landowners as required as soon as practicable.</p> <p>Holcim will update the site's air quality management plan to only undertake dust deposition monitoring at sensitive receptors in the event of a complaint. Proactive due diligence monitoring will continue on site at a non dust sensitive receptors for internal business management purpose.</p> <p>It is noted that the timeframe will be dependant on the departments approval of the revised management plan.</p> <p><u>Weather Station</u> The weather station will be upgraded to 3G capabilities to allow data to be remotely downloaded</p>		actions 5)	(corrective actions 5)
Condition 8, Schedule 5	<p>Truck movement data, complaints register and Annual Reviews are provided on the website, however the most recent truck monitoring data was from 2017, complaints register was 2018 and Annual Review 2017.</p> <p>No noise, dust or water monitoring was on the website at the time of the audit.</p>	<p>Complaint Register is updated and available online.</p> <p>It is noted that the truck movement are included in the 2017, 2018 & 2019 annual review report.</p> <p>2019 report to be uploaded shortly pending review and approval by DPIE.</p> <p>It is noted that the summary of the Monitoring (noise, dust and water) data is now available online.</p>	Corrective action 16	Regularly update the website with the environmental performance of the development, in accordance with Condition 8, Schedule 5.	<p>- Site to add requirement to site planner</p> <p>- Site to upload data directly every 6 months</p>	See corrective actions 07	See corrective actions 07	See corrective actions 07
Condition 9, Schedule 5	The appointment of GHD was endorsed by the Secretary on 12 August 2019. The audit involved consultation with the agencies and assessment of the environmental performance and compliance of the project. It also reviews the adequacy of any strategy/plan/program and recommends actions to improve the environmental performance. The Applicant had not commissioned and paid the full costs of an Independent Environmental Audit by the anniversary date of the consent.	It is noted that the delay was caused due to waiting for the approval from the secretary. The auditor is not able to be engaged until approval is provided	Corrective action 17	When the Independent Environmental Audit is required, commission and pay the full costs of the audit by the anniversary date of the consent.		no further action required		

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Condition 11, Schedule 5	The website contains some of the information required but is missing: <input type="checkbox"/> Statement of commitments <input type="checkbox"/> Comprehensive summary of monitoring results <input type="checkbox"/> An updated complaints register (last updated quarter 1 2018) <input type="checkbox"/> The 2018 and 2019 Annual Review <input type="checkbox"/> The last Independent Environmental Compliance Audit was provided but Holcim response was not..	Complaint Register is updated and available online. It is noted that the truck movement are included in the 2017, 2018 & 2019 annual review report. 2019 report to be uploaded shortly pending review and approval by DPIE. It is noted that the summary of the Monitoring (noise, dust and water) data is now available online.	Corrective action 18	Update the website to include all the information required by Condition 11, Schedule 5.	Holcim to request copy of Statement of Commitments and Response to previous independent audit from DPIE Holcim comment from Corrective actions 7: - Site to add requirement to site planner - Site to upload data directly every 6 months	Accepted	SS / GS	Ongoing
Summary of recommendations - SSD- 6422								
Condition 7, Schedule 2	The survey indicated the quarry floor was above the RL of 4 metres AHD. Holcim reported the datum peg observed was placed on the floor of the quarry during this survey. The quarry floor appeared to be above this datum.		Recommendation 01:	To confirm the floor height, it is recommended that an annual survey is undertaken.	Survey Peg RL 4.20 on floor	no further action required		
Summary of Non - Compliances - EPL - 3293								
M 1.3	Review of the Annual Review indicated the date and monitoring location of the sample but not the time or person who collected the sample.		Corrective action 19	Record all the information required by M1.3 of the EPL, when collecting samples.	Site water monitoring records have location, time, name etc ,started from 5/7/2018. These lab records can be provided at any time	Not accepted - Please see Holcim comments		
M4.2	Records of complaints received during the audit period did not contain: <input type="checkbox"/> Time of the complaint <input type="checkbox"/> The method by which the complaint was made <input type="checkbox"/> Personal details		Corrective action 20	Update complaint handling procedures so all information required by Condition M4.2 is recorded.	It is noted that the auditor reviewed the complaint data available on Holcim's website. It is noted that these details on published on web version. These details are recorded in Holcim INX database and can be provided at any time .	Not accepted - Please see Holcim comments		
M6.1	The Quarterly Noise Monitoring Assessment indicates the noise monitoring was done for a period of 15 minutes, rather than the 1.5 hours required.	Noted that Noise Monitoring was undertaken 4 times a year for 30 mins each.	Corrective action 21	Undertake noise monitoring for 1.5 hours, once a year, in accordance with EPL condition M6.1.	Finding to be communicated to Muller Acoustic Consultants regarding noise monitoring report. Noise monitoring will also changed from 30 minutes 4 times per year to 1.5 hours 1 time per year for next round. Muller to review monitoring locations	Accepted	See corrective actions 2	See corrective actions 2

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					to ensure the noise monitoring locations are representative of all the receivers in Table 2. for next round.			
P1.2	Based on the description and site observations, Holcim has been monitoring at the EPL location. This location differed from the location of the licenced discharge point nominated in the Water Management Plan (WMP) – Figure 3.1 and Section 6.0. The Annual Review reports the EPA have requested additional sampling to be undertaken at the site.	Water Quality Management to be updated to reflect the EPL Location.	Recommendation 02	Clarify with the EPA the monitoring locations and, if necessary, obtain an EPL variation and update the Water Management Plan so they are consistent with the current monitoring requirements	Liaise with SLR regarding finding. SLR to include all the information required by Condition 20, Schedule 3. <ul style="list-style-type: none"> Detailed baseline data Erosion and sediment controls The water management plan figure will also be updated to reflect the updated EPL location description Copy to be uploaded on the Holcim website after the approval.	Accepted	See corrective actions 6	See corrective actions 6
L4.4	The Blasting Checklist has a requirement to place a blast warning sign at the front entrance and notify neighbour of a blast as early as possible, which has been signed, indicating it is done. However, it was not possible to determine if neighbours were given at least 24 hours notice.	One page fact sheet has been previously provided to local residents. There is a Blast sign on the front gate.	Recommendation 03	Update the Blasting Checklist to include reference that all sensitive receivers are to be given at least 24 hours notice.	SLR to update Plan. New requirement to be added to plan: if a community member complains regarding blasting or requested to be notified ('sensitive receivers'), the community member will be notified 24 hours prior to any blast for a period of 12 months, unless they request to extend.	Accepted	See corrective actions 03	See corrective actions 03
O4.1	The Water Management Plan mentions the use and maintenance of diversion drains, however there is no plan showing their location. Diversion drains were observed on site.	It is noted that the condition O4.1 of the EPL requires that 'the licensee must maximise the diversion of run-on waters from lands upslope and around the site whilst land disturbance activities are being undertaken'. This condition of the EPL, does not require the Water Management Plan figure to show the locations of clean water bunds.	Recommendation 04	To clarify the location of diversion drains and erosion control measures, it is recommended a staged sediment and erosion control plan be prepared and included in the Water Management Plan.	Liaise with SLR regarding finding. SLR to include all the information required by Condition 20, Schedule 3. <ul style="list-style-type: none"> Detailed baseline data Erosion and sediment controls The water management plan figure will also be updated to reflect the updated EPL location description Update Water Management Plan figure to show diversion bunds. Copy to be uploaded on the Holcim website after the approval.	Accepted	See corrective actions 06	See corrective actions 06
O 4.4	Holcim reported a marker in the dam indicates the design storage capacity of the Main Dam and the water level is restored to this level within 5 days of rainfall events. However, it was difficult to confirm compliance with this condition with the records available.		Recommendation 05	To confirm the design capacity in the Main Dam is restored within 5 days of rainfall, it is recommended that this is recorded	Marker in Dam indicating level and point at which water discharges. Main dam is not the main rainfall collection dam rather it is a dam for plant and dust control, water also recycled from plant. Top up as required. Capacity in Mgt Plan.	Not accepted - Please see Holcim comments		
Summary of Non - Compliances - Management Plans								
Noise Management Plan	The quarry was not expected to cause significant noise related impacts on sensitive receivers, so other than the placement of	Refer to Corrective action 02 and Corrective action 21	Refer to Corrective	Confirm in the Quarterly Noise Monitoring	Refer to Corrective action 02 and Corrective action 21	Refer to Corrective	Refer to Corrective	Refer to Corrective

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(NMP)	stockpiles along the northern edge of the project and regular maintenance of machinery, minimal noise mitigation practices were observed. The noise monitoring indicates compliance with the relevant criteria but does not assess all the residential receivers. The monitoring is not in accordance with the EPL requirements.		action 02 and Corrective action 21	Assessments, the noise criteria at all receivers in Table 2 was achieved. And/or update the Noise Management Plan to confirm the noise monitoring locations are representative of all the receivers in Table 2		action 02 and Corrective action 21	action 02 and Corrective action 21	action 02 and Corrective action 21
Blast Management Plan (BMP)	Blast monitoring results are reported in the Annual Review and are publically available on the Holcim website. No exceedances were recorded during the 2018 reporting period. Teven Quarry provides verbal notification to neighbouring properties prior to undertaking blasting, with a message left and a follow-up call made if the resident is unable to be reached. While Teven Quarry has indicated verbal notification is provided to neighbouring properties prior to undertaking blasting, the BMP does not provide detail in relation to community notification procedures for the blasting schedule in accordance with Condition 10(d) of Schedule 3 of SSD-6422.	Duplicate finding . See response for Condition 10 (d), Schedule 3 above	Refer to Corrective action 03 and Recommendation 03	Include community notification procedures for the blasting schedule in the Blast Management Plan Update the Blasting Checklist to include reference that all sensitive receivers are to be given at least 24 hours notice.	Refer to Corrective action 03 and Recommendation 03	Refer to Corrective action 03 and Recommendation 03	Refer to Corrective action 03 and Recommendation 03	Refer to Corrective action 03 and Recommendation 03
Air Quality Management Plan (AQMP)	Dust management was observed during the site visit, including an irrigation system on haulage roads and a sprinkler system on conveyor belts. The Annual Review indicates five exceedances of the PM10 24 hour criteria. A number of exceedances were also recorded for the depositional dust at DDG1 and DDG2, however, Holcim report this was due to contamination and have therefore been removed from the annual average. The Annual Review mentions the depositional dust gauges are poorly located and Holcim are in discussions with DPIE and EPA regarding moving them and updating the AQMP accordingly	Refer to Corrective action 04	Refer to Corrective action 04	Review the dust monitoring program to ensure it provides representative results that can be used to confirm compliance with the relevant criteria and update the Air Quality Management Plan accordingly.	Refer to Corrective action 04	Refer to Corrective action 04	Refer to Corrective action 04	Refer to Corrective action 04
Water Management Plan (WMP)	The Water Management Plan includes a water balance, management system and monitoring program, however, it does not include: <ul style="list-style-type: none"> • Evidence the author was approved by the Secretary • Approved within 6 months • Detailed baseline data • Erosion and sediment controls Although it appears the Water Management Plan was not submitted to the Secretary within 6 months of the consent this is considered to be outside the audit period. In relation to erosion and sediment controls, the basin management is discussed but there are no other erosion and sediment controls mentioned. Controls on site and the Annual Review indicate the water management and monitoring is implemented and effective.	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05	Update the Water Management Plan to include all the information required by Condition 20, Schedule 3. <ul style="list-style-type: none"> • Detailed baseline data • Erosion and sediment controls 	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05	Refer to Corrective action 06, 12 and 19 and Recommendation 02, 04 and 05

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Biodiversity and Rehabilitation Management Plan (BRMP)	The 2018 Annual Review indicated that there had not been any rehabilitation at the quarry during the reporting period. However, weed spraying was undertaken. The BRMP appears to provide comprehensive guidance on the rehabilitation to occur but currently the quarry is active, so there is little opportunity for implementation.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.