Strength. Performance. Passion

Holcim

ANNUAL REVIEW
1 January 2019 – 31 December 2019

Teven Quarry

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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 2019
Annual review end date	31 December 2019

I, **GARTH STACEY**, 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 2019- 31 DECEMBER 2019** and that I am authorised to make this statement on behalf of **HOLCIM (AUSTRALIA) PTY LTD**.

Note.

a) *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.*

b) *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).*

Name of authorised reporting officer	Garth Stacey
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Date	30 March 2020

1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2019 reporting period for Teven Quarry is provided in **Table 1. Table 3** details the non-compliances of SSD 6422 identified within the 2019 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
EPL 3293	NO

Table 2: DPIE Compliance Status Key

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

Table 3: Non-Compliances of SSD 6422 for 2019

<table>
<tr><th>Relevant approval</th><th>Condition</th><th>Condition Description</th><th>Status</th><th>Relevant Section of the Annual Review/ Issue</th></tr>
<tr><td>SSD 6422</td><td>Schedule 3, Condition 4</td><td>The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Noise criteria dB(A)
<table><tr><th>Receiver</th><th>Day
dB(A) ($L_{Aeq(15\ min)}$)</th><th>Evening
dB(A) ($L_{Aeq(15\ min)}$)</th></tr><tr><td>R3, R4, R13, R15, R16, R17, R18, R20</td><td>38</td><td>35</td></tr><tr><td>All other residences</td><td>37</td><td>35</td></tr></table>Note: Receiver locations are shown on the figure in Appendix 4.</td><td>Low Risk
Non - Compliant</td><td>Section 6.2 (Noise)

Exceedance of noise criteria</td></tr>
<tr><td>SD 6422</td><td>Schedule 5, Condition 7</td><td>The applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the applicant shall provide the Secretary and any relevant agencies with a details report on the incident, and such further reports as may be requested.</td><td>Admin
Non-Compliant</td><td>Exceedance of noise criteria not reported and a details report not provided within 7 days.
Section 6.2 (Noise)

Incomplete PM_{10} monitoring was not reported to DPIE within 7 days.
Section 6.3 (Air Quality)</td></tr>
<tr><td>SSD 6422</td><td>Schedule 3 Condition 11</td><td>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.
Table 4: Air quality criteria
<table><tr><th>Pollutant</th><th>Averaging Period</th><th colspan="2">Criterion</th></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td colspan="2">[a,d] 30 µg/m^3</td></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td colspan="2">[b] 50 µg/m^3</td></tr><tr><td>Total suspended particulates (TSP)</td><td>Annual</td><td colspan="2">[a,d] 90 µg/m^3</td></tr><tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a,d] 4 g/m^2/month</td></tr></table></td><td>Low Risk
Non - Compliant</td><td>Section 6.3 (Air Quality)

Missed monitoring of DDG1 in November 2019 due to a smashed gauge. This was reported to DPIE.

Exceedances in short term PM_{10}.</td></tr>
</table>

SSD 6422	Schedule 3 Condition 15	For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.	Low Risk Non - Compliant	Issues with monitoring gauge. Gauge fixed February 2020 by the new monitoring contractors. Section 6.1

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) (now Department of Planning, Industry and Environment (DPIE)) 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).

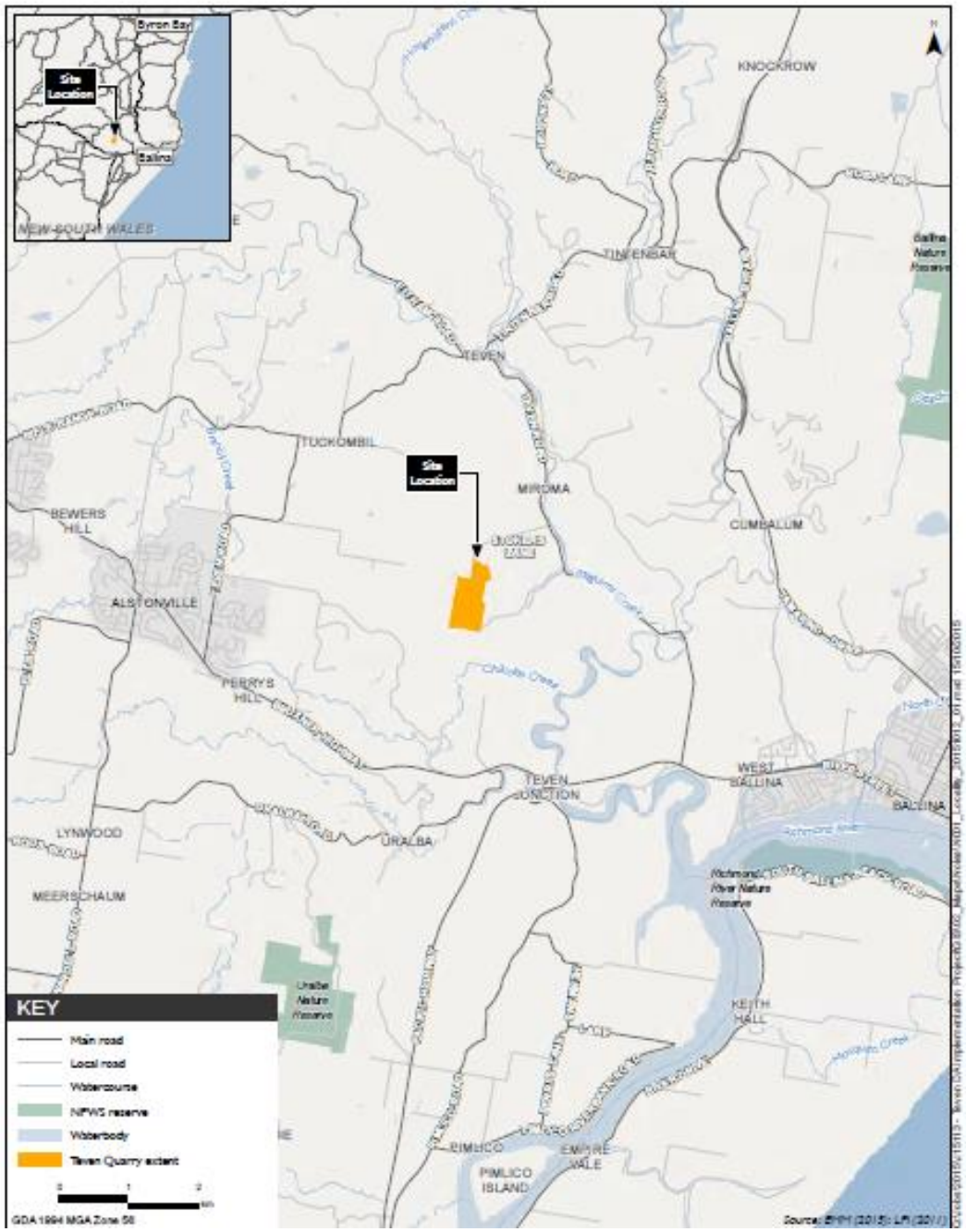


Figure 1: Regional Locality (Source EMM: 2016)

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: - 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 2019 to 31 December 2019.

2.1 Contact Details

Quarry Supervisor
Scott Callander
Mob: 0419 476 067
scott.callander@lafargeholcim.com

Quarry Manager
Garth Stacey
Work: +61 2 6687 8566
Mob: +61 429 790 217
garth.stacey@lafargeholcim.com

QLD Aggregates Manager
Martin Halliday
Work: +61 2 6656 8620
martin.halliday@lafargeholcim.com

Environmental Manager OLD
Evan Smith
Mob: +61 429 790 950
Work: 0732 591 766
Evan.smitt@lafargeholcim.com

Planning & Environment Manager NSW/ACT
Luke Edminson
Holcim (Australia) Pty Ltd
Mob +61 429 790 756
Email: luke.edminson@lafargeholcim.com

Planning and Environment Coordinator NSW/ACT
Shilpa Shashi
Mob: +61 (0)427 859 852
Email: shilpa.shashi@lafargeholcim.com

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 DPIE
EPL No. 3293	NSW EPA

4 OPERATIONS SUMMARY

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

Whilst there was no construction undertaken on-site, there were some upgrades made within existing plant during the Annual Review period.

4.4 Quarry Operations

Operational activities undertaken at Teven Quarry in 2019 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 are 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 2019.

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 Reporting Period (Tonnes)	2019 Reporting Period (Tonnes)	Proposed 2020 Reporting Period (Tonnes)
Product Distributed-Total	500,000	372,640	458,679	250,000

4.5 Next Reporting Period

Development activities proposed to be carried out at Teven Quarry in 2020, 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 2018 Annual Review

The DPIE requested additional information for the 2018 Annual Review in the letter dated 28 May 2019 (see **Table 8**).

Table 8: 2018 Annual Review Additional Information Request - DPIE

Requirement	Compliance Status
Raw truck movement data as an appendix to the report to correlate site compliance between transport rates and hours of operation;	Appendix 4 in 2018 Annual Review. Also included in 2019 Annual Review.
Discussion in sections 6.3.3.1 regarding the PM10 exceedances, and the contaminated dust deposition monitoring samples in section 6.3.3.2 and the actions that Holcim have taken or are taking to address the adaptive management and/or revision of strategies, plans and programs requirements in Schedule 5 Conditions 3 and 5;	Section 6.3 updated in 2018 Annual Review. Dust management covered in 2019 Annual Review.
In Section 5 please include each of the points the Department raised in the 2017 AEMR review in Table 8 along with the actions that Holcim took to address these.	See Section 5.1 in 2018 Annual Review.
Further, the Department notes when reviewing the Report that: • Schedule 5 Condition 7 requires the Secretary to be notified immediately of any incident that breaches or exceeds measures/criteria in the consent. This did not occur for: - 5 PM_{10} exceedances in 2018; • 12 depositional dust samples collected in 2018 that were contaminated All future incidents should be reported to compliance@planning.nsw.gov.au	Noted. Reporting of some breaches and exceedances was not completed in 2019. These are to be closely monitored in 2020 and reported as soon as the site is aware.
5 Condition 5 requires the revision of strategies, plans and programs to be undertaken within 3 months of the submission of an incident report. Please take this letter as notification to review the Air Quality Management Plan by 27 August 2019.	The management plans for the site are currently being reviewed and are to be completed by Q2 2020. The site waited until after the Independent Environmental Audit was completed so all plans could be reviewed.
Schedule 5 Condition 11 requires the quarry website to be up to date with various information relating to the quarry, the complaints register has not been updated since March 2018. It is required to be updated monthly. Please ensure that the complaints register and all other relevant documents such as monitoring data and reports are updated by 18 June 2019.	Noted

5.2 Update on Holcim Proposed Actions from 2018 Annual Review

An update on the proposed activities from Holcim is outlined in the table below:

Table 9: Holcim Proposed Actions

Improvement Measure	Activities Proposed for 2019	Update for 2019 Annual Review
PM_{10}	Improve the PM_{10} sampling and analysis process in 2019 to operate as per the Development Consent requirements. Reduction in short term non compliances.	PM_{10} monitoring was undertaken in 2019; however there were 2 exceedances of short-term criteria in 2019 and 4 occasions of missed monitoring.
Depositional dust	Liaise with the EPA and DPE about moving DDG2 to a more suitable location, where there is less likelihood of contamination.	Still being undertaken. To be finalised in Q2 2020.
Biodiversity	Weed spraying will continue at site during the next Annual Review period.	Continued in 2019 period.
Water sampling	Complete all weekly pH sampling during the Annual Review period. Continue with the expanded monitoring suite.	Continued in 2019 period.
Groundwater Assessment	Condition 3, Schedule 19 *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.* Holcim will continue to monitor the quarry void for groundwater seepage to ensure that groundwater quantities remain negligible.	No groundwater issues noted in 2019.

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

A meteorological monitoring station was installed at Teven Quarry in late 2016 to obtain data in accordance with the requirements of Schedule 3 Condition 15 of the Development Consent. However, throughout 2018 and 2019 there have been numerous issues with the station, therefore data from the Bureau of Meteorology Ballina Airport Weather Station (Station ID 058198) has been used for this Annual Review. Based on the issues with the meteorological station this is a non – compliance with Schedule 3 Condition 15. Teven Quarry has now changed monitoring contractors to improve monitoring consistency. Issues with the Teven Quarry station were fixed in February 2020 by the new contractors.

Monthly rainfall, wind and temperature data for 2019 has been provided in **Table 10.**

Table 10: Weather Observations at Teven Quarry 2019 (Ballina Airport AWS 058198)

Month	Temperature		Rain			Wind
	Min Temp (ºC)	Max Temp (ºC)	Total (mm)	Max Daily (mm)	No. rain days > 1 mm	Max Wind Gust (km/h)
Jan-19	27.6	33.7	2.4	1.2	1	59
Feb-19	24.7	35.2	70.2	25.2	9	76
Mar-19	23.3	33	139.2	37.6	11	55
Apr-19	22.5	28.6	158.8	34.4	15	48
May-19	18.5	26.8	94.0	25.8	15	-
Jun-19	16.7	24	268.2	51.4	14	61
Jul-19	15	24.5	74.8	15.2	8	61
Aug-19	18.4	27.3	52.0	34.8	4	63
Sep-19	19.3	32.1	4.2	1.4	1	-
Oct-19	19.2	32.4	5.0	1.8	2	63
Nov-19	24.6	38	6.2	3.0	2	67
Dec-19	26.6	36.2	96.6	38.0	9	63

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 11**.

Table 11: Noise Criteria for Teven Quarry (SSD 6422)

Table 2: Noise criteria dB(A)

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 2019 in accordance with the requirements of the Schedule 3, Condition 4. Monitoring was completed on the following dates:

- 6 March 2019;
- 17 and 18 June 2019;
- 20 and 21 August 2019; and
- 27 November 2019.

Noise results at all locations were within the approved performance criteria for the site with the exception of N4 during quarter 2 which exceeded the day criteria by 4dBA as shown in **Table 12**. This exceedance was attributed to the processing plant, in particular the screens, as a result of changes to loading quantities at the time of monitoring. This exceedance reported was not reported to DPIE which is a non-compliance with Schedule 5 Condition 7.

Copies of the quarterly noise monitoring reports for 2019 are attached as **Appendix 1**.

Table 12: Noise Compliance Assessment for Teven Quarry (Muller Acoustic Consultants, 2019)

Assessment Period	Receiver No.	Monitoring Location	Quarrying Noise Criteria	Q1 March 2019		Q2 June 2019		Q3 September 2019		Q4 November 2019	
			$LAeq_{(15min)}$	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance
Daytime	R2	N3	37	31	✓	33	✓	33	✓	<30	✓
	R3/R4	N2	38	<28	✓	36	✓	37	✓	<30	✓
	R7	N1	37	<27	✓	<36	✓	<32	✓	<30	✓
	R10	N4	37	<36	✓	**41**	✗	37	✓	36	✓
	R15	N5	38	<30	✓	35	✓	36	✓	<30	✓
Evening	R2	N3	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R3/R4	N2	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R7	N1	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R10	N4	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R14	N5	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.

Longterm Trends:

2019 is the third year of full noise monitoring (four quarters of monitoring). The site was compliant in both 2017 and 2018 with one day exceedance at N4 during quarter 2 of 2019.

Comparison to EIS Predictions:

At the time of monitoring one exceedance occurred outside of the predicted limits of the EIS in 2019.

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.*

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 PM_{10} 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 PM_{10} 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 13**.

Table 13: Air Quality Monitoring Criteria (SSD 6422)

Table 4: Air quality criteria

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 tor Table 4:

a. *Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).*
b. *Incremental impact (ie incremental increase in concentrations due to the development on its own, with zero allowable exceedances of the criteria over the life of the development).*
c. *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.*
d. *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, or any other activity agreed to by the Secretary.*
e. *"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 PM_{10} Monitoring

Condition 11, Schedule 3 (PM_{10})

A Low Volume Air Sampler (LVAS) was installed at Teven Quarry in September 2017 to monitor for particulate matter. PM_{10} monitoring results have been obtained from January to December 2019. These results are provided in **Table 14.**

Table 14: 2019 Dust Monitoring (PM_{10}) at Teven Quarry

Sample Date	LVAS - PM10 * (ug/m3)
07-01-2019	<14
13-01-2019	<14
15-01-2019	**51**
21-01-2019	<14
30-01-2019	<14
05-02-2019	**74**
08-02-2019	33
18-02-2019	30
20-02-2019	32
26-02-2019	31
09-03-2019	41
15-03-2019	<23
21-03-2019	<23
27-03-2019	38
02-04-2019	<23
08-04-2019	<23
14-04-2019	<23
20-04-2019	33
26-04-2019	<14
08-05-2019	<23
14-05-2019	<23
20-05-2019	<23
26-05-2019	<23
01-06-2019	<23
07-06-2019	<23
13-06-2019	28.0
19-06-2019	<23
25-06-2019	<23
01-07-2019	<23
07-07-2019	25.0
13-07-2019	<23
19-07-2019	<23
25-07-2019	<23
31-07-2019	<23
06-08-2019	<24
12-08-2019	28
18-08-2019	<24
24-08-2019	<24
30-08-2019	39
05-09-2019	<23
11-09-2019	<23
17-09-2019	**63**
29-09-2019	<23
05/10/2019	<23
11/10/2019	<23
17/10/2019	<23
23/10/2019	<23
25-10-2019	**57**
31-10-2019	<35
06-11-2019	<35
22-11-2019	**193**
28-11-2019	**123**
04-12-2019	<23
10-12-2019	<23
16-12-2019	34
22-12-2019	36
28-12-2019	<23
Min	**14**
Average	**32.4**
Max	**193**

Note: Where results include a '<' the average has been calculated by removing the < sign.

The PM_{10} annual average for 2019 was 32.4 µg/m^3 which is exceeds the annual criteria of 30 µg/m^3. Significantly high PM_{10} samples were taken on the 17 September, 5 October, 22 November and 28 November are attributed to large bushfires that occurred in the region. Excluding these PM_{10} results the annual average for 2019 was 26.6 µg/m^3 which is compliant with Schedule 3 Condition 11 criteria. However, short term PM_{10} was exceeded on 2 other occasions during 2019 resulting in a non-compliance with Schedule 3 Condition 11.

In summary:

- The PM_{10} annual average for 2019 was 26.6 µg/m^3 compared to 28.6 µg/m^3 in 2018;
- The PM_{10} annual average was below the annual average criteria (30 µg/m^3) which is outlined in Schedule 3 Condition 11 of the Development Consent; and
- The PM_{10} 24 hour criteria of 50 µg/m^3 was exceeded on 6 occasions during 2019. These are highlighted bold in the table above (15 January, 5 February, 17 September, 25 October, 22 November and 28 November).

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 2019. Results for this monitoring are provided in **Table 15**.

As in 2017, contamination of depositional dust gauges by leaves and insects at DDG1 and DDG2 continued to be a problem in 2018. Three of twelve samples at DDG1 and two of the twelve samples at DDG2 had contamination and have therefore been removed from the annual average.

Table 15: 2019 Dust Monitoring (Depositional Dust)

Start Date	Insoluble Solids DDG1 (g/m^2/month)	Insoluble Solids DDG2 (g/m^2/month)	Insoluble Solids DDG3 (g/m^2/month)
08-01-2019	9.2c	4.4	1.1
05-02-2019	0.9	0.7	1
08-03-2019	28.7c	3.4	3.8
05-04-2019	23.6c	0.6	0.1
06-05-2019	3.9	4.2	0.7
03-06-2019	1.2	2.7	3.7
04-07-2019	1.2	2.7	0.7
01-08-2019	1.2	0.6	0.7
26-09-2019	0.7	2.8	0.8
24-10-2019	0.8	5.5	2.2
22-11-2019	NS (Monitor was smashed)	13.9c	0.6
20-12-2019	0.1	59.5c	2.2
Annual Average	**6.5**	**8.4**	**1.5**
Annual Average – contaminated samples removed ***contaminated samples (bird dropping, insects, vegetation)**	**1.3**	**2.8**	**1.5**

Start Date	Insoluble Solids DDG1 (g/m^2/month)	Insoluble Solids DDG2 (g/m^2/month)	Insoluble Solids DDG3 (g/m^2/month)
Result (Year to Date)	**Within Criteria**	**Within Criteria**	**Within Criteria**

There was no sample taken for DDG1 in November 2019 due to a smashed monitor. This is a non - compliance with Schedule 3 Condition 11.

A comparison of 2018 and 2019 depositional dust results (with contamination removed) is provided in **Table 16**.

Table 16: Comparison of Depositional Dust Data (with contamination removed)

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results 2018 Period (g/m^2/month)	Monitoring Results 2019 Period (g/m^2/month)
DDG1	Insoluble Solids Reporting Period Average	2.7	1.3
	Max. Insoluble Solids	5.0	3.9
	Min. Insoluble Solids	0.6	0.1
DDG2	Insoluble Solids Reporting Period Average	1.7	2.8
	Max. Insoluble Solids	2.1	5.5
	Min. Insoluble Solids	1.2	0.6
DDG3	Insoluble Solids Reporting Period Average	0.7	1.5
	Max. Insoluble Solids	1.6	3.8
	Min. Insoluble Solids	0.3	0.1

6.3.3.3 Longterm Trends:

During preparation of the 2016 Annual Review for Teven Quarry it was discovered that Holcim were receiving incorrect dust deposition results from ALS Laboratories. The results received by Holcim were found to be results for the Boral Teven Quarry.

Immediately upon identifying this non-compliance, Holcim commissioned VGT consultants in February 2017 to undertake monthly monitoring in accordance with the *Air Quality Management Plan* to ensure full compliance with this condition.

As such, any trends analysis of depositional dust in 2019 is consistent with monitoring in 2017 and 2018. However, it is difficult to discuss trends for depositional dust considering the number of samples which are discarded from the annual average due to contamination.

The 2019 annual average for PM_{10} remains below longterm criteria which is consistent with 2017 and 2018 trends. Issues with monitoring frequency occurred in 2018.

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 location under worst case operating conditions, with the exception of 24-hour average PM_{10} concentrations at two nearby sensitive receiver locations - Receiver 9 and Receiver 6. Predictions suggest that 24-hour average PM_{10} levels may exceed the criteria of 50µg/m^3 up to one day per year at these two receivers by between 1 and 7µg/m^3. The PM_{10} results for short term criteria were above some of the EIS predictions. Much of this was caused by nearby agricultural activity and bushfires elevating results.

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*.

6.3.5 Proposed Improvements

Holcim is committed to improving the PM_{10} sampling process in 2020 to ensure that sampling is conducted correctly and on the required timetable to ensure operation as per the Development Consent requirements.

Holcim will liaise with the EPA and DPIE in 2020 about moving DDG1 and 2 to a more suitable location, where there is less likelihood of contamination. These dust gauges are affected by agricultural dust including the cutting of cane and slashing the adjacent paddocks. Based on laboratory analysis it indicates that outside dust sources are the bulk contributor to dust levels of DDG1 and 2. The *Air Quality Management Plan* will be updated and resubmitted (proposed Quarter 2 submission 2020) to the DPIE with the revised locations._

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 2019 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 17: Blast Monitoring Criteria from EL 3293 for Teven Quarry

L4	**Blasting**
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).
L4.2	The airblast overpressure level from blasting operations in or on the premises must not exceed: 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. At any point within 1 metre of any affected residential property or other sensitive noise location.
L4.3	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: a) 5 mm/s for more than 5% of the total number of blasts carried out on the premises during each

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 2019 are shown in **Table 18**.

Table 18: 2019 Blast Monitoring Results from Teven Quarry – Monitoring Location: Wellers Road

Date	Time	Vibration – (5.0 mm/sec max)	Overpressure – 115 (dBL max)	Compliance with Approved Criteria
04-02-2019	1.41 pm	NT	NT	Y
19-02-2019	12.00 pm	NT	NT	Y
11-03-2019	12.37 pm	NT	NT	Y
12-04-2019	11.56 am	NT	NT	Y
07-05-2019	12.54 pm	NT	NT	Y
19-06-2019	1.35 pm	NT	NT	Y
02-07-2019	2.10 pm	NT	NT	Y
30-09-2019	11.58 am	NT	NT	Y
12-09-2019	11.00 am	NT	NT	Y
17-10-2019	12.00 pm	NT	NT	Y
19-12-2019	12.15 pm	NT	NT	Y

NT – No Trigger

The results for blasting at the site fell within the expected criteria of the EPL and Development Consent during the whole 2019 reporting period. All blasts were below trigger levels.

Long term Trends:

From 2015 – 2019 the blasting levels have been within the Development Consent and EPL criteria. Long term blast results are provided in **Table 19**.

Table 19: 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

Comparison to EIS Predictions:

The 2019 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.*

6.4.5 Proposed Improvements

The *Blast Management Plan* will be updated in Quarter 2 2020 to include the relevant Blasting Protocol.

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 2019 to ensure compliance with movements and volume requirements discussed above. A copy of these monitoring results has been included in **Table 20**.

Table 20: Average Truck Movements for 2019

Month	Truck movements	Active days	Avg Truck Movement per active day
January	976	18	46
February	1211	20	49
March	1080	21	41
April	693	22	28
May	1978	23	68
June	1310	18	50
July	1952	23	71
August	1975	23	71
September	1840	21	70

Month	Truck movements	Active days	Avg Truck Movement per active day
October	1835	23	67
November	1479	21	56
December	544	15	31
Total	**16,873**	**248**	**54**

The annual average truck movements in 2019 were 54 truck movements per active day, which was a small increase from the average of 53.4 truck movements per active day in 2018.

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. 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.*

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.

The Teven Quarry *Transport Management Plan* will be reviewed and updated in the 2020 reporting period.

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

As there was no additional clearance in 2019, there were no additional impacts to biodiversity. Weed spraying was completed along the internal haul road during the 2018 Annual Review reporting period.

6.6.4 Management Measures

The main biodiversity management includes weed management and managing clearing through the preclearance permit process. There was no clearance at Teven in 2019.

6.6.5 Proposed Improvements

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

The Teven Quarry *Biodiversity and Rehabilitation Management Plan* will be reviewed and updated in the 2020 reporting period, however there are no major changes anticipated.

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 recommencement 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 2019 are detailed in **Table 21**.

Table 21: Environmental Performance at Teven Quarry in 2019

Aspect	Approval Criteria / EIS Prediction	Performance during 2019 reporting period	Trend / key management implications	Implemented / proposed management actions
Meteorological	-	Non-Compliant. Issues with monitoring station	Numerous issues with station in both 2018 and 2019	Monitoring station fixed February 2020.
Noise	EIS predictions are all below Development Consent criteria.	Non-Compliant. Exceedance on the 18 June 2019	Consistently meets criteria. One exceedance during 2019 monitoring.	Implementation of specific management strategies, procedures, controls and monitoring programs within the Teven Quarry *Noise Management Plan*.
Blasting	EIS predictions are all below Development Consent criteria.	Within criteria.	Consistently meets criteria.	None required.
Air Quality	EIS predictions are all below Development Consent criteria.	The PM_{10} 24 hour criteria of 50 µg/m^3 was exceeded on 2 occasions. These include 15 January 2019 and 5 February 2019. Depositional dust monitoring was not undertaken in accordance with development consent criteria. Sampling was not undertaken at DDG1 in November due to a smashed monitor.	Depositional Dust and PM_{10} is consistent with long term data.	Holcim will liaise with the EPA and DPIE in 2020 about moving DDG1 and 2 to a more suitable location, where there is less likelihood of contamination. A new location will be outlined in the revised AQMP.
Traffic Management	EIS predictions are all below Development Consent criteria.	Teven Quarry met the Development Consent Criteria.	Consistently meets criteria.	None required.
Biodiversity	No proposed impacts. No Development Consent criteria.	No issues identified. Minor weed management completed.	No long-term negative trends.	None required.
Heritage	No proposed impacts. No Development Consent criteria.	No issues identified.	No issues identified.	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 22** and **Table 23).**

Table 22: Water Monitoring Criteria (Teven Quarry EPL 3293) – LDP001 and 002

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 23: Discharge Sampling Measurement Requirements (Teven Quarry EPL 3293)

POINT 1,2

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	Visible	Special Frequency 1	Visual Inspection
pH	pH	Special Frequency 1	Probe
TSS	milligrams per litre	Special Frequency 1	Grab sample

In addition to these requirements, the site has been requested by the NSW DPIE 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

A detailed spreadsheet of discharge water quality results is attached as **Appendix 2**. In summary:

- pH and oil and grease levels were sampled weekly from Licenced Discharge Point 2 (Dredge Pond) during the Annual Review period;
- Additional monitoring of TSS at Point 2 was undertaken during discharge events; and
- Sampling of Licenced Discharge Point 1 (Silt Pond) was undertaken during discharge events, with this including pH and TSS.

A summary of the data is outlined in **Table 24**.

Table 24: Summary of Water Quality Data at Teven Quarry – 2019

	Silt Pond Licence Discharge Point 1		Dredge Pond Licence Discharge Point 2		
	TSS (mg/L)	**pH**	**TSS (mg/L)**	**pH**	**Oil and Grease (mg/L)**
Average	5	7.1	5	7.2	Nil
Min	1	6.6	1	6.6	Nil
Max	23	7.6	22	7.7	Nil

All water quality results during discharge events were within the EPL criteria.

Longterm Trends:

pH results from 2017, 2018 and 2019 at Point 2 show that water samples taken at the Teven Quarry Licence Discharge Point have remained within the relevant EPL criteria. There is little variation between results in 2019 and previous monitoring years with an average pH of 7.2 in 2019 (see **Table 25**).

Table 25: 2017 to 2019 pH Trends at Point 2

Year	pH average	pH maximum	pH minimum
2017	7.5	7.8	6.9
2018	7.5	8.4	6.6
2019	7.2	7.7	6.6

This is the first year of regular TSS monitoring, hence additional comparison will be completed in future Annual Reviews.

Comparison to EIS Predictions:

The 2019 surface water results remain consistent with the predictions made in the 2014 EIS.

Compliance:

Discharge monitoring was completed in 2019 in accordance with the EPL requirements.

7.5 Groundwater Results

Groundwater monitoring was not undertaken during the 2019 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 during the report period.

7.7 Water Management – Pollution Reduction Program

A Pollution Reduction Program (PRP) was prepared by EMM Consulting, dated 31 January 2019. This has been included as **Appendix 3** to this report.

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 for 2019

The following recommendations were outlined in the PRP were completed in 2019:

- 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 [Photo 19] 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.

7.7.3 Improvements Proposed for 2020

The finalisation of the WMP updates in be undertaken in Quarter 2 2020.

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 26.**

Table 26: Biodiversity and Rehabilitation Requirements for Teven Quarry (SSD 6422)

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.

Table 5: Biodiversity and Rehabilitation objectives

Feature	***Objective***
Site (as a whole)	• 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	• Decommissioned and removed, unless the Secretary agrees otherwise
Quarry Benches	• Landscaped and vegetated using native tree and understorey species
Quarry Pit Floor	• Landscaped and revegetated using native tree and understorey species, above the final anticipated void water level

Progressive Rehabilitation

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.

Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.

No rehabilitation was completed in 2019 at the site.

A summary of rehabilitation at the Teven Quarry is outlined in **Table 27**.

Table 27: Rehabilitation Performance in 2019

Guideline Requirement	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	There was no rehabilitation completed during the 2019 Annual Review period. Operations continued within the existing quarry footprint.
Agreed post- rehabilitation land use	In accordance with the *Biodiversity and Rehabilitation Management Plan*, vegetation communities will consist of: ● 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: ● Exploration activities; ● Infrastructure; ● Dams; and The installation or maintenance of fences, bunds and any other works.	There was no rehabilitation completed during the 2019 Annual Review period. Rehabilitation bonds will be reviewed in 2020.

Guideline Requirement	Site Comment
Any rehabilitation areas which have received formal sign off from DRG	No rehabilitation received signoff during the 2019 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 2019 Annual Review period.
Outcomes of trials, research projects and other initiatives	No trials were conducted during the 2019 Annual Review period.
Key issues that may affect successful rehabilitation	There are several potential issues that can affect rehabilitation including availability of material, seed stock, climatic events and rehabilitation methodology.

8.2 Summary of Current Rehabilitation and Performance

A summary of the rehabilitation and disturbance status of Teven Quarry is outlined in **Table 28.** Current rehabilitation and disturbance are shown **on Figure 3.**

Table 28: Rehabilitation and Disturbance Status

Quarry Area Type	2017 Annual Review Period (ha)	2018 Annual Review Period (ha)	2019 Annual Review Period (ha)	Next 2020 Annual Review Period (ha)
	Actual			Forecast
A. Total Quarry Footprint[1]	17.1	17.1	17.1	17.1
B. Total Active Disturbance[2]	17.1	17.1	17,1	17.1
C. Land Being Prepared for Rehabilitation[3]	0	0	0	0
D. Land Under Active Rehabilitation[4]	0	0	0	0
E. Completed Rehabilitation[5]	0	0	0	0

1 Total disturbance and rehabilitation.
2 Total disturbance within the Project Approval boundary
3 Rehabilitation that is being shaped in a phase of decommissioning, landform establishment and growth medium development.
4 rehabilitation under a phase of ecosystem and land use establishment or ecosystem and land use sustainability
5 This refers to rehabilitation that has been signed off from the DRG.

At the end of 2019 there was approximately 17.1 Ha of active disturbance. There is no proposed additional disturbance in 2020 at Teven Quarry. There is no active rehabilitation at Teven Quarry, and none proposed in 2020.

Figure 3: Teven Quarry Rehabilitation and Disturbance

8.3 Actions for the Next Reporting Period

The DPIE 2015 Annual Review Guidelines require the Annual Review to outline the rehabilitation actions proposed during the next reporting period. These actions are detailed in **Table 29**.

Table 29: Rehabilitation and Closure Actions for the 2020 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.	A program for 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.	All benches will be active next reporting period and hence there will be no area in need of 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 $3m^3$ bin) and general waste (2 x $3m^3$ 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
- Waste water 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 review of the Holcim Safety, Health & Environment (SHE) reporting database (INX) identified one complaint during the 2019 reporting period. On 31 July 2019 a neighbour contacted Holcim to report trucks using brakes excessively on corner into Stokers Lane. Holcim recorded and investigated the complaint, identifying that it was not Holcim trucks causing the nuisance.

A copy of the register, as well as all publicly listed information including contacts for locals in the community is 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 and one complaint in 2019.

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. A copy of the Audit Action Plan will be sent to DPIE prior to the end of March 2020.

The next IEA is due in 2022.

12 INCIDENTS AND NON-COMPLIANCE

Table 30 summarises the incidents and non - compliances at Teven in 2019.

Table 30: Summary of Incidents and Non Compliances

Date	Incident/Non Compliance	Action
18 June 2019	**Schedule 3 Condition 4 - SSD 6422 – Noise Monitoring Criteria** The daytime $LAeq_{(15min)}$ noise criteria of 37 dBA at monitoring location N4 (receptor R10) was exceeded at the time of quarter 2 monitoring (18 June 2019).	Continuation of monitoring in 2020. Management in accordance with the *Teven Noise Management Plan.*
18 June 2019	**Schedule 5 Condition 7 - SSD 6422 – Incident Reporting** Exceedance of noise criteria on the 18 June 2019 was not reported to DPIE within 7 days. Incomplete PM_{10} monitoring was not reported to DPIE within 7 days.	Breaches and exceedances to be closely monitored and reported as soon as the site is aware.
Throughout the period	**Schedule 3 Condition 11 - SSD 6422 – Dust Monitoring Criteria** Depositional Dust Monitoring • There was no sample taken on the 22 November 2019 at DDG1. This was due to a smashed monitor. PM_{10} Monitoring • The PM_{10} 24 hour criteria of 50 µg/m^3 was exceeded on 2 occasions (15 January and 5 February);	Continuation of monitoring in 2020. Determine if offsite dust sources are responsible for higher readings.
Throughout the period	**Schedule 3 Condition 15 – Meteorological Monitoring** A meteorological monitoring station was installed at Teven Quarry in late 2016 to obtain data in accordance with the requirements of Schedule 3, Condition 15 of the Development Consent. However, there have been numerous issues with the station in 2018 and 2019, therefore data from the Bureau of Meteorology Ballina Airport Weather Station has been used for this Annual Review.	The meteorological station was fixed in February 2020 by the new monitoring contractor.

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 2020 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 31** outlines proposed actions for 2020.

Table 31: Improvement Actions for 2020

Improvement Measure	Activities
Management Plans	Management Plans to be sent to DPIE in Quarter 2 2020
PM_{10}	Improve the PM_{10} sampling and analysis process in 2020 to operate as per the Development Consent requirements. Reduction in short term non compliances.
Depositional dust	Liaise with the EPA and DPIE about moving DDG1 and DDG2 to a more suitable location, where there is less likelihood of contamination.
Biodiversity	Weed spraying will continue at site during the next Annual Review period.
Water sampling	Complete all weekly pH sampling during the Annual Review period. Continue with the expanded monitoring suite.
Groundwater Assessment	Condition 3, Schedule 19 *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.* Holcim will continue to monitor the quarry void for groundwater seepage to ensure that groundwater quantities remain negligible.

APPENDIX 1
QUARTERLY NOISE RESULTS

Noise Monitoring Assessment

Teven Quarry, Teven, NSW
Quarter 1 Ending March 2019.

Prepared for: Holcim (Australia) Pty Ltd
March 2019
MAC180611-06RP3

Muller Acoustic Consulting

Document Information

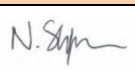
Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 1 Ending March 2019

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC180611-06RP3	Final	18 March 2019	Nicholas Shipman		Rod Linnett	

CONTENTS

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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 Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan 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 quarterly period ending March 2019, 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 Department of Planning and Environment, Development Consent (SSD 6422), 2015; 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	6pm – 10pm
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$
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 include bushland and farming pastures. 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

Location	Nearest Receiver	Easting, m	Northing, m
N1	R7	547017	6810098
N2	R3/R4	548877	6810290
N3	R2	548642	6810801
N4	R10	547729	6810226
N5	R15	547793	6808998

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. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 6 March 2019. 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 ±0.5dBA.

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 although two measurements were conducted at each monitoring location.

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 $LA_{eq(15min)}$ 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

LOCALITY PLAN

REF: MAC180611-06

0 150m

KEY

N1 RECEIVER LOCATION

SITE LOCATION

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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4 Results

4.1 Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
06/03/19	11:01 (Day)	63	42	33	WD: NE WS: 0.5m/s Rain: Nil	Insects 31-33 Birds 43-60 Wind in trees 36-46 Aircraft 36-56 Lawn mowing 46-63 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<23
06/03/19	11:16 (Day)	63	46	37	WD: NE WS: 0.5m/s Rain: Nil	Wind in trees 32-44 Insects 30-33 Aircraft 34-42 Birds 36-50 Lawn mowing 46-63 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<27
06/03/19	18:18 (Evening)	75	51	45	WD: N WS: 2m/s Rain: Nil	Birds 40-51 Wind in trees 40-46 Local traffic 45-75
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
06/03/19	18:34 (Evening)	69	47	40	WD: N WS: 2m/s Rain: Nil	Wind in trees 36-46 Local traffic 42-69 Aircraft 38-52 Birds 38-43 Distant traffic 36-44 Insects <40
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 N2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N2

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
06/03/19	11:49 (Day)	88	65	38	WD: NE WS: 1.5m/s Rain: Nil	Traffic 33-84 Wind in trees 33-37 Birds 32-39 Local residential noise 32-34 Insects <30 Aircraft 34-58 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<28
06/03/19	12:04 (Day)	85	61	37	WD: NE WS: 0.5m/s Rain: Nil	Birds 38-42 Insects <30 Wind in trees 32-35 Traffic 36-85 Local residential noise 38-43 Aircraft 41-51 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<27
06/03/19	19:00 (Evening)	87	60	36	WD: N WS: 2m/s Rain: Nil	Wind in trees 36-48 Traffic 36-87 Birds 41-50
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
06/03/19	19:16 (Evening)	84	57	37	WD: N WS: 2m/s Rain: Nil	Wind in trees 36-44 Birds 36-62 Traffic 36-84 Insects <37
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 N3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
06/03/19	12:29 (Day)	72	50	33	WD: NE WS: 1m/s Rain: Nil	Insects <28 Wind in grass 28-33 Aircraft 31-40 Holcim haul trucks 28-34 Local residential noise 39-70
		Teven Quarry $L_{Aeq(15min)}$ Contribution				31
06/03/19	12:46 (Day)	68	52	34	WD: N WS: 1.5m/s Rain: Nil	Local residential noise 36-70 Wind in grass 36-39 Insects <36 Holcim tipping <31
		Teven Quarry $L_{Aeq(15min)}$ Contribution				<31
06/03/19	19:37 (Evening)	60	46	36	WD: N WS: 1.5m/s Rain: Nil	Wind in trees 40-46 Insects <40 Aircraft 42-58 Traffic 46-48
		Teven Quarry $L_{Aeq(15min)}$ Contribution				Quarry not operational
06/03/19	19:52 (Evening)	53	47	42	WD: N WS: 1m/s Rain: Nil	Aircraft 38-54 Distant traffic 38-44 Wind in grass 40-50 Insects <42
		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 N4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
06/03/19	13:07 (Day)	77	53	35	WD: NE WS: 2m/s Rain: Nil	Local traffic 38-76 Birds 34-38 Wind in trees 36-40 Holcim haul trucks <34 Distant traffic <34
Teven Quarry $L_{Aeq(15min)}$ Contribution						<34
06/03/19	13:23 (Day)	81	57	37	WD: NE WS: 1.5m/s Rain: Nil	Holcim reverse alarms <36 Holcim haul trucks <36 Wind in trees 36-40 Holcim FEL <36 Traffic 36-81 Aircraft 38-52
Teven Quarry $L_{Aeq(15min)}$ Contribution						<36
06/03/19	20:14 (Evening)	53	47	45	WD: N WS: 0.5m/s Rain: Nil	Insects 36-40 Distant traffic 40-42 Aircraft 40-52 Wind in trees 38-44 Birds 46-50
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
06/03/19	20:30 (Evening)	52	45	43	WD: N WS: 0.5m/s Rain: Nil	Insects <33 Traffic 38-42 Aircraft 42-50
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.

4.5 Assessment Results - Location N5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location N5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
06/03/19	13:43 (Day)	87	63	40	WD: NE WS: 1.5m/s Rain: Nil	Traffic 36-78 Birds 36-50 Industrial noise 36-40 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
06/03/19	13:58 (Day)	88	62	40	WD: NE WS: 1.5m/s Rain: Nil	Birds 38-45 Traffic 38-88 Industrial noise 37-42 Aircraft 41-52 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
06/03/19	20:50 (Evening)	74	46	32	WD: N WS: 1m/s Rain: Nil	Traffic 30-74 Insects <30 Aircraft 38-47
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
06/03/19	21:05 (Evening)	68	44	32	WD: N WS: 1m/s Rain: Nil	Insects <30 Distant traffic 30-34 Local traffic 34-65
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 Noise Compliance Assessment

The compliance assessment for each residential receiver (R2, R3/R4, R7, R10 and R15) are presented in **Table 8** and **Table 9** for day and evening assessment periods respectively.

Table 8 Daytime Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	31	37	✓
R3/R4	N2	<28	38	✓
R7	N1	<27	37	✓
R10	N4	<36	37	✓
R15	N5	<30	38	✓

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

Table 9 Evening Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	Quarry Not Operational	35	✓
R3/R4	N2	Quarry Not Operational	35	✓
R7	N1	Quarry Not Operational	35	✓
R10	N4	Quarry Not Operational	35	✓
R15	N5	Quarry Not Operational	35	✓

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

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6 Discussion

6.1 Discussion of Results - Location N1

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Wednesday 6 March 2019, therefore satisfying 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 insects, birds, wind in trees, aircraft pass-by, lawn mowing, local and distant traffic.

6.2 Discussion of Results - Location N2

Quarry emissions were inaudible during the two daytime measurements on Wednesday 6 March 2019, therefore satisfying the relevant daytime and evening 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.

Extraneous sources measured include traffic, wind in trees, birds, local residential noise, insects and aircraft pass-by.

6.3 Discussion of Results - Location N3

Quarry noise emissions were audible during the two daytime measurements conducted on Wednesday 6 March 2019. Holcim haul trucks and tipping were audible during the two daytime measurements with contributions measured at 31dBA, therefore satisfying the daytime criteria.

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-quarrying noise sources observed during the measurements included insects, wind in grass, aircraft pass-by, local residential noise and traffic.

6.4 Discussion of Results - Location N4

Quarry noise emissions were audible during the two daytime measurements conducted on Wednesday 6 March 2019. Holcim haul trucks, reverse alarms and front-end loader were audible during the two daytime measurements with contributions ranging between <34dBA and <36dBA, therefore satisfying the daytime criteria.

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-quarrying sources observed during the measurements included local traffic, birds, wind in trees, distant traffic, insects and aircraft pass-by audible throughout the noise measurements.

6.5 Discussion of Results - Location N5

Quarry noise emissions were inaudible during the two daytime measurements conducted on Wednesday 6 March 2019, therefore satisfying the daytime criteria.

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.

Local traffic was the dominant source audible throughout the survey at this location. Other non-quarrying sources including traffic, birds, industrial noise, insects and aircraft pass-by all audible during the March 2019 monitoring period.

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at the Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for relevant surrounding residential receivers during Quarter 1, period ending March 2019.

Attended noise measurements were undertaken on Wednesday 6 March 2019 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry comply 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.

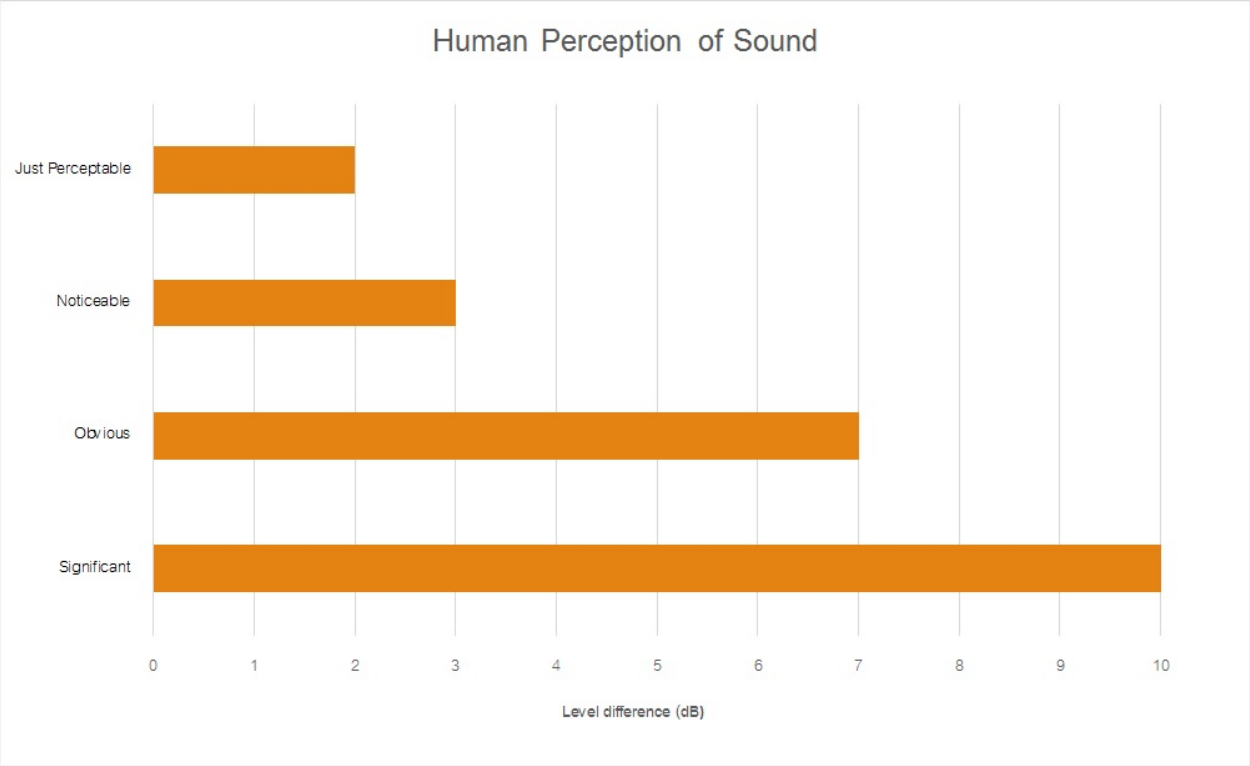
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single 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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

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

Figure A1 – Human Perception of Sound



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting

Noise Monitoring Assessment

Teven Quarry, Teven, NSW
Quarter 2 Ending June 2019.

Prepared for: Holcim (Australia) Pty Ltd
July 2019
MAC180611-06RP4

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 2 Ending June 2019

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
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CONTENTS

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The monitoring has been conducted in accordance with the Teven Noise Management Plan 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 quarterly period ending June 2019, and forms part of the noise monitoring program for the quarry.

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Schedule 3 of the Teven Quarry Development Consent (2015), outlines the applicable noise criteria for residential receivers surrounding the quarry site.

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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 include bushland and farming pastures. 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)

Location	Nearest Receiver	Easting, m	Northing, m
N1	R7	547017	6810098
N2	R3/R4	548877	6810290
N3	R2	548642	6810801
N4	R10	547729	6810226
N5	R15	547793	6808998

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. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Monday 17 June 2019 and Tuesday 18 June 2019. 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 ±0.5dBA.

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 although two measurements were conducted at each monitoring location.

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 $LA_{eq(15min)}$ 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

LOCALITY PLAN

REF: MAC180611-06

0 150m

KEY

N1 RECEIVER LOCATION

SITE LOCATION

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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4 Results

4.1 Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
18/06/2019	08:15 (Day)	84	60	46	WD: NW WS: 2.4m/s Rain: Nil	Wind in Trees 48-54 Passing Traffic 60-84 Birds 50-67 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<36
18/06/2019	08:30 (Day)	69	50	46	WD: NW WS: 2.2m/s Rain: Nil	Wind in Trees 48-54 Birds 50-62 Passing Traffic 50-69 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<36
17/06/2019	21:20 (Evening)	60	41	39	WD: NW WS: 1.2m/s Rain: Nil	Wind in trees 39-60 Distant Traffic 30-40
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
17/06/2019	21:35 (Evening)	56	39	38	WD: NW WS: 1.4m/s Rain: Nil	Wind in trees 38-40 Distant traffic 35-36 Insects 30-38
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 N2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N2

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
18/06/2019	10:15 (Day)	89	69	40	WD: NW WS: 0.3m/s Rain: Nil	Birds 40-52 Passing Traffic 40-89 Quarry Operations 35-38
Teven Quarry $L_{Aeq(15min)}$ Contribution						36
18/06/2019	10:30 (Day)	91	69	39	WD: NW WS: 0.2m/s Rain: Nil	Passing Traffic 58-91 Birds 40-57 Quarry Operations 34-37
Teven Quarry $L_{Aeq(15min)}$ Contribution						35
17/06/2019	19:34 (Evening)	88	64	47	WD: N WS: 0.4m/s Rain: Nil	Frogs 50-55 Traffic 45-88 Aircraft 55-60
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
17/06/2019	19:49 (Evening)	60	49	39	WD: N WS: 0.1m/s Rain: Nil	Frogs 50-55 Traffic 40-60 Aircraft 46-51
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 N3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
18/06/2019	10:54 (Day)	60	36	30	WD: NW WS: 0.2m/s Rain: Nil	Wind in Crops 33-40 Birds 42-45 Quarry Operations 30-36
Teven Quarry $L_{Aeq(15min)}$ Contribution						33
18/06/2019	11:10 (Day)	58	37	30	WD: NW WS: 0.2m/s Rain: Nil	Quarry Operations 30-35 Winds in Crops 35-37 Aircraft 35-38
Teven Quarry $L_{Aeq(15min)}$ Contribution						33
17/06/2019	19:00 (Evening)	71	51	35	WD: N WS: 0.0m/s Rain: Nil	Traffic 34-37 Insects 34-38 Dog Bark 40-50 Aircraft 40-71
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
17/06/2019	19:15 (Evening)	57	38	35	WD: N WS: 0.1m/s Rain: Nil	Traffic 30-37 Insects 32-35 Birds 37-45 Aircraft 40-57
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 N4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
18/06/2019	09:38 (Day)	86	63	46	WD: NW WS: 0.1m/s Rain: Nil	Quarry Fixed Plant 38-46 Passing Traffic 50-86
Teven Quarry $L_{Aeq(15min)}$ Contribution						41
18/06/2019	09:53 (Day)	79	61	46	WD: NW WS: 0.1m/s Rain: Nil	Passing Traffic 44-79 Quarry Fixed Plant 38-47
Teven Quarry $L_{Aeq(15min)}$ Contribution						41
17/06/2019	20:06 (Evening)	68	38	31	WD: N WS: 0.1m/s Rain: Nil	Insects 30-34 Aircraft 40-52 Birds 40-68 Distant Traffic 30-35
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
17/06/2019	20:22 (Evening)	58	37	31	WD: N WS: 0.2m/s Rain: Nil	Insects 30-34 Traffic 29-42 Birds 45-58 Aircraft 40-42
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.

4.5 Assessment Results - Location N5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at location N5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location N5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
18/06/2019	08:57 (Day)	88	64	44	WD: NW WS: 1.5m/s Rain: Nil	Passing Traffic 50-86 Tractor in Field 35-46 Birds 45-56 Quarry Operations 30-40
Teven Quarry $L_{Aeq(15min)}$ Contribution						35
18/06/2019	09:17 (Day)	86	59	43	WD: NW WS: 1.3m/s Rain: Nil	Wind in Trees 40-44 Tractor in Field 37-46 Aircraft 50-68 Birds 50-74 Passing Traffic 70-86 Quarry Operations 31-38
Teven Quarry $L_{Aeq(15min)}$ Contribution						35
17/06/2019	20:39 (Evening)	87	59	35	WD: N WS: 0.4m/s Rain: Nil	Frogs 30-40 Traffic 35-42 Passing Traffic 80-87
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
17/06/2019	20:55 (Evening)	80	52	36	WD: N WS: 0.3m/s Rain: Nil	Passing Traffic 35-80 Wind in Trees 30-34 Insects 30-33 Birds 32-43
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 Noise Compliance Assessment

The compliance assessment for each residential receiver (R2, R3/R4, R7, R10 and R15) are presented in **Table 8** and **Table 9** for day and evening assessment periods respectively.

Table 8 Daytime Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	33	37	✓
R3/R4	N2	36	38	✓
R7	N1	<36	37	✓
R10	N4	41	37	X
R15	N5	35	38	✓

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

Table 9 Evening Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	Quarry Not Operational	35	✓
R3/R4	N2	Quarry Not Operational	35	✓
R7	N1	Quarry Not Operational	35	✓
R10	N4	Quarry Not Operational	35	✓
R15	N5	Quarry Not Operational	35	✓

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

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6 Discussion

6.1 Discussion of Results - Location N1

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Tuesday 18 June 2019, therefore satisfying 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 insects, birds, wind in trees, aircraft pass-by, local and distant traffic.

6.2 Discussion of Results - Location N2

Quarry emissions were audible during the two daytime measurements on Tuesday 18 June 2019 however satisfied the relevant daytime and evening noise limits. Audible noise sources included processing plant and truck movements.

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.

Extraneous sources measured include traffic, wind in trees, birds, local residential noise, insects and aircraft pass-by.

6.3 Discussion of Results - Location N3

Quarry noise emissions were audible during the two daytime measurements conducted on Tuesday 18 June 2019. Processing plant and truck movements were audible during the two daytime measurements with a measured contribution of 33dBA, therefore satisfying the daytime criteria.

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-quarrying noise sources observed during the measurements included insects, wind in crops, aircraft pass-by, local residential noise and traffic.

6.4 Discussion of Results - Location N4

Quarry noise emissions were audible during the two daytime measurements conducted on Tuesday 18 June 2019. Processing plant, in particular screens, were audible during the two daytime measurements with contributions ranging between 38dBA and 47dBA. The overall contribution was quantified as 41dBA at the dwelling at 108 Stokers Lane for both the first and second daytime measurements which is above the applicable daytime criteria of 37dBA.

Following discussion with quarry management, it is noted that changes were recently made to the processing plant and that the plant was being run at half load during the survey. This will allow the screen to shake excessively and material to rattle more on the screens.

It is recommended that the screens be checked for faults and to operate at full load to reduce noise emissions.

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-quarrying sources observed during the measurements included local and distant traffic, birds, wind in trees, insects and aircraft pass-bys.

6.5 Discussion of Results - Location N5

Quarry noise emissions were audible during the two daytime measurements conducted on Tuesday 18 June 2019, however satisfied the daytime criteria of 38dBA with a quarry contribution of 35dBA.

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.

Local traffic was the dominant source audible throughout the survey at this location. Other non-quarrying sources including traffic, birds, industrial noise, insects and aircraft pass-by all audible during the June 2019 monitoring period.

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at the Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for relevant surrounding residential receivers during Quarter 2, period ending June 2019.

Attended noise measurements were undertaken on Monday 17 June 2019 and Tuesday 18 June 2019 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers, with the exception of R3/R4 during the daytime period which had a noise contribution of 41dBA for both the daytime measurements at the location.

Next quarterly assessment will validate any exceedance from the processing plant at R3/R4.

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Appendix A - Glossary of Terms

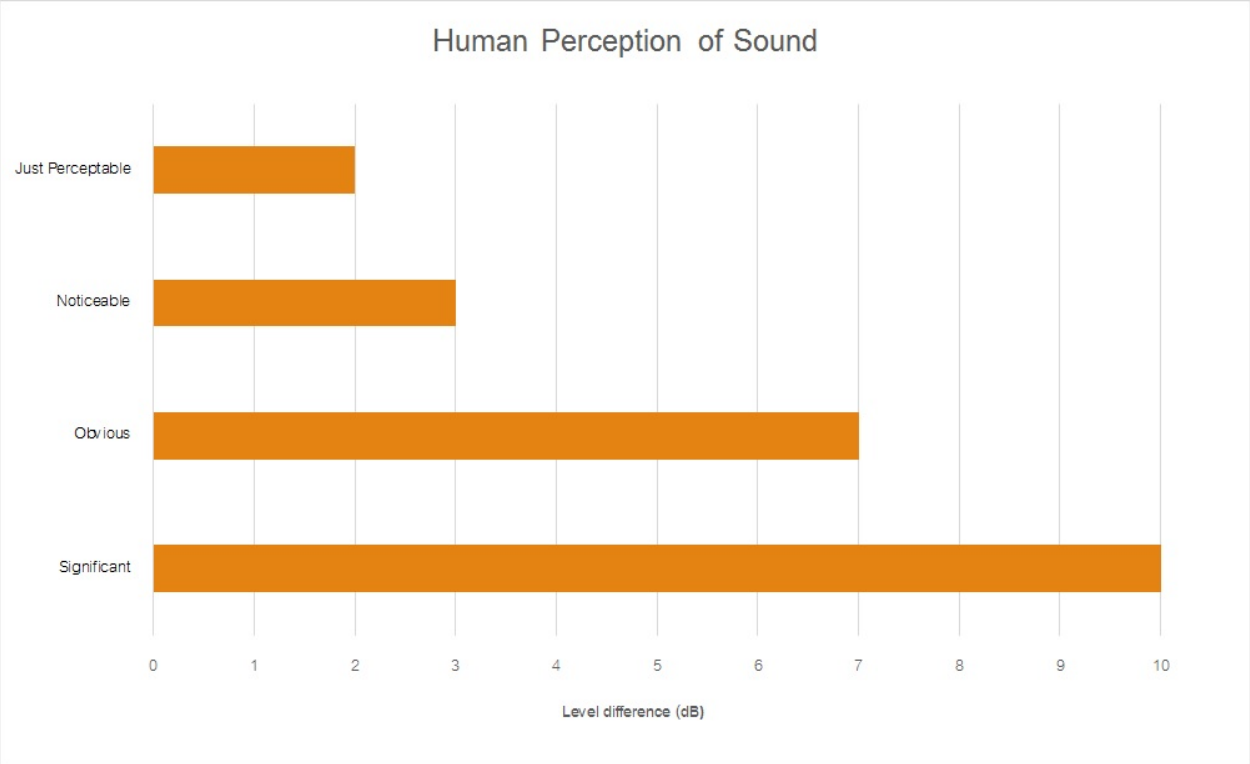
Table A1 provides a number of technical terms have been used in this report.

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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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

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

Figure A1 – Human Perception of Sound



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting

Noise Monitoring Assessment

Teven Quarry, Teven, NSW
Quarter 3 Ending September 2019.

Prepared for: Holcim (Australia) Pty Ltd
August 2019
MAC180611-06RP5

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 3 Ending September 2019

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC180611-06RP5	Final	27 August 2019	Rod Linnett		Oliver Muller	

CONTENTS

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 Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan 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 quarterly period ending September 2019, 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 Department of Planning and Environment, Development Consent (SSD 6422), 2015; 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	6pm – 10pm
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$
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 include bushland and farming pastures. 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)

Location	Nearest Receiver	Easting, m	Northing, m
N1	R7	547017	6810098
N2	R3/R4	548877	6810290
N3	R2	548642	6810801
N4	R10	547729	6810226
N5	R15	547793	6808998

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 August 2019 and Wednesday 21 August 2019. 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 ±0.5dBA.

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 $LA_{eq(15min)}$ 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

LOCALITY PLAN

REF: MAC180611-06

0 150m

KEY

N1 RECEIVER LOCATION

SITE LOCATION

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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4 Results

4.1 Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/08/2019	11:30 (Day)	63	38	30	WD: W WS: 1m/s Rain: Nil	Aircraft 45-58 Birds 37-55 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
21/08/2019	11:45 (Day)	76	42	31	WD: W WS: 1m/s Rain: Nil	Birds 40-55 Operator 55-68 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<32
20/08/2019	18:00 (Evening)	63	35	26	Calm Rain: Nil	Birds 40-45 Resident's car 38-45
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
21/08/2019	18:15 (Evening)	58	33	26	Calm Rain: Nil	Birds 40-50
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 N2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N2

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/08/2019	09:30 (Day)	88	64	37	WD: SW WS: 1.5m/s Rain: Nil	Birds 38-47 Passing Traffic 40-85 Quarry Operations 37-39
	Teven Quarry $L_{Aeq(15min)}$ Contribution					37
21/08/2019	09:45 (Day)	86	65	38	WD: SW WS: 1.5m/s Rain: Nil	Birds 38-47 Passing Traffic 40-85 Quarry Operations 36-38
	Teven Quarry $L_{Aeq(15min)}$ Contribution					37
21/08/2019	19:55 (Evening)	82	55	28	Calm Rain: Nil	Frogs 34-44 Passing Traffic 45-80
	Teven Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operational
21/08/2019	20:11 (Evening)	86	62	28	Calm Rain: Nil	Frogs 34-44 Passing Traffic 45-85
	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 N3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/08/2019	16:23 (Day)	57	37	32	Calm Rain: Nil	Birds 42-45 Quarry Operations 32-36
	Teven Quarry $L_{Aeq(15min)}$ Contribution					33
20/08/2019	16:38 (Day)	75	54	28	Calm Rain: Nil	Quarry Operations 33-38 Aircraft 43-73
	Teven Quarry $L_{Aeq(15min)}$ Contribution					33
20/08/2019	20:32 (Evening)	54	31	26	Calm Rain: Nil	Distant Traffic 30-32 Aircraft 33-40
	Teven Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operational
20/08/2019	20:48 (Evening)	49	29	26	Calm Rain: Nil	Insects/Frogs 26-30
	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 N4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/08/2019	10:05 (Day)	74	56	40	WD: W WS: 1m/s Rain: Nil	Quarry Fixed Plant 38-43 Passing Traffic 50-76 Truck parked (5min) 55-58 Birds 40-49
Teven Quarry $L_{Aeq(15min)}$ Contribution						37
21/08/2019	10:21 (Day)	70	52	39	WD: W WS: 1m/s Rain: Nil	Quarry Fixed Plant 38-43 Passing Traffic 50-70 Birds 40-51
Teven Quarry $L_{Aeq(15min)}$ Contribution						36
20/08/2019	18:41 (Evening)	71	41	30	Calm Rain: Nil	Insects 28-30 Distant Traffic 28-30
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
20/08/2019	18:57 (Evening)	76	41	29	Calm Rain: Nil	Insects 27-29 Distant Traffic 28-30
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.

4.5 Assessment Results - Location N5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location N5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/08/2019	10:41 (Day)	78	56	38	WD: W WS: 1.5m/s Rain: Nil	Passing Traffic 50-75 Tractor in Field 35-46 Resident 43-50 Wind in Trees 40-44 Quarry Operations 34-36
		Teven Quarry $L_{Aeq(15min)}$ Contribution				35
21/08/2019	10:57 (Day)	77	54	40	WD: W WS: 2.5m/s Rain: Nil	Passing Traffic 50-75 Tractor in Field 35-46 Wind in Trees 40-44 Quarry Operations 34-38
		Teven Quarry $L_{Aeq(15min)}$ Contribution				36
20/08/2019	19:20 (Evening)	68	44	26	Calm Rain: Nil	Passing Traffic 40-68 Operator 40-50
		Teven Quarry $L_{Aeq(15min)}$ Contribution				Quarry not operational
20/08/2019	19:36 (Evening)	44	30	26	Calm Rain: Nil	Frogs/Insects 26-30
		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 Noise Compliance Assessment

The compliance assessment for each residential receiver (R2, R3/R4, R7, R10 and R15) are presented in **Table 8** and **Table 9** for day and evening assessment periods respectively.

Table 8 Daytime Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	33	37	✓
R3/R4	N2	37	38	✓
R7	N1	<32	37	✓
R10	N4	37	37	✓
R15	N5	36	38	✓

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

Table 9 Evening Noise Compliance Assessment

Receiver No.	Monitoring Location	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
		dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	
R2	N3	Quarry Not Operational	35	✓
R3/R4	N2	Quarry Not Operational	35	✓
R7	N1	Quarry Not Operational	35	✓
R10	N4	Quarry Not Operational	35	✓
R15	N5	Quarry Not Operational	35	✓

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

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6 Discussion

6.1 Discussion of Results - Location N1

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Wednesday 21 August 2019, therefore satisfying 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 insects, birds and aircraft.

6.2 Discussion of Results - Location N2

Quarry emissions were audible during the two daytime measurements on Wednesday 21 August 2019 however satisfied the relevant daytime and evening noise limits. Audible noise sources included processing plant and road traffic.

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.

Extraneous sources measured include traffic, birds and frogs.

6.3 Discussion of Results - Location N3

Quarry noise emissions were audible during the two daytime measurements conducted on Tuesday 20 August 2019. The Processing plant and pit activities were audible during the two daytime measurements with a measured contribution of 33dBA, therefore satisfying the daytime criteria.

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-quarrying noise sources observed during the measurements included insects, aircraft and distant traffic.

6.4 Discussion of Results - Location N4

Quarry noise emissions were audible during the two daytime measurements conducted on Wednesday 21 August 2019. The Processing plant and truck loading activities were audible during the two daytime measurements with a measured contribution of 37dBA, therefore satisfying the daytime criteria.

The exceedance noted from the previous survey was not observed during this round of measurements. The previous survey (quarter ending June 2019) had noted that the dominant noise was screen noise which was audible but not dominant during the survey. Therefore, the ameliorative measures implemented have successfully reduced noise emissions to a compliant level.

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-quarrying sources observed during the measurements included local and local and distant traffic, birds and frogs/insects.

6.5 Discussion of Results - Location N5

Quarry noise emissions were audible during the two daytime measurements conducted on Wednesday 21 August 2019, however satisfied the daytime criteria of 38dBA with a quarry contribution of 36dBA.

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.

Local traffic was the dominant source audible throughout the survey at this location. Other non-quarrying sources including traffic, birds and insects were audible during the September 2019 monitoring period.

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at the Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for relevant surrounding residential receivers during Quarter 2, period ending September 2019.

Attended noise measurements were undertaken on Tuesday 20 August 2019 and Wednesday 21 August 2019 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

The exceedance noted from the previous survey was not observed during this quarterly survey, demonstrating that ameliorative measures have been successful in reducing noise emissions from the quarry achieveing compliance.

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Appendix A - Glossary of Terms

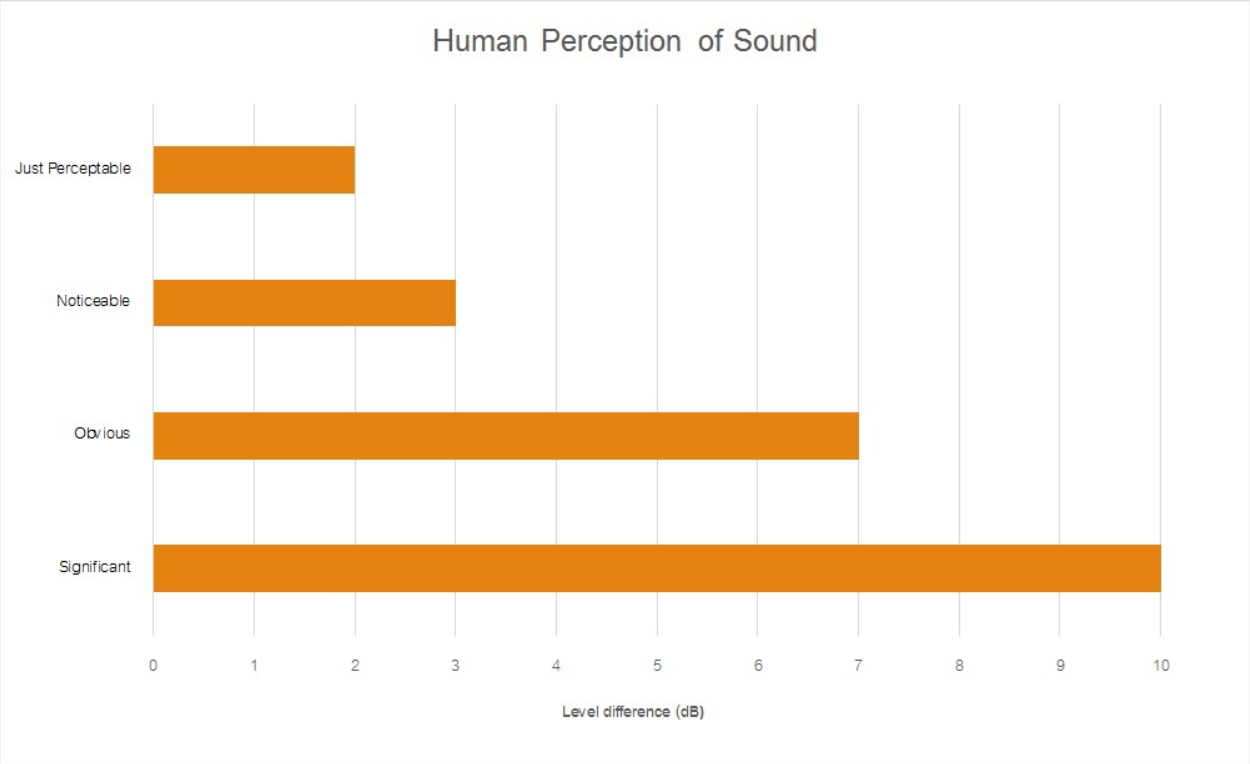
Table A1 provides a number of technical terms have been used in this report.

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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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

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

Figure A1 – Human Perception of Sound



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting

Noise Monitoring Assessment

Teven Quarry, Teven, NSW
Quarter 4 Ending December 2019.

Prepared for: Holcim (Australia) Pty Ltd
December 2019
MAC180611-06RP6

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Teven Quarry, Teven, NSW

Quarter 4 Ending December 2019

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

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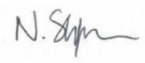
MAC180611-06RP6	Final	11 December 2019	Nicholas Shipman		Oliver Muller	

CONTENTS

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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 Teven Quarry (the 'quarry'), Teven, NSW.

The monitoring has been conducted in accordance with the Teven Noise Management Plan 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 quarterly period ending December 2019, 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 Department of Planning and Environment, Development Consent (SSD 6422), 2015; 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	6pm – 10pm
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$
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 include bushland and farming pastures. 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)

Location	Nearest Receiver	Easting, m	Northing, m
N1	R7	547017	6810098
N2	R3/R4	548877	6810290
N3	R2	548642	6810801
N4	R10	547729	6810226
N5	R15	547793	6808998

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 27 November 2019. 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 ±0.5dBA.

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 $LA_{eq(15min)}$ 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

LOCALITY PLAN

REF: MAC180611-06

0 150m

KEY

N1 RECEIVER LOCATION

SITE LOCATION

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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4 Results

4.1 Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N1 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
27/11/2019	10:43 (Day)	65	54	44	WD: ESE WS: 2.5m/s Rain: Nil	Wind 42-65 Construction works <42 Birds <42 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	10:58 (Day)	76	59	49	WD: ESE WS: 2.5m/s Rain: Nil	Wind 46-60 Traffic 52-76 Construction works <42 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	18:15 (Evening)	69	48	37	WD: SE WS: 2m/s Rain: Nil	Wind 36-46 Traffic 36-69 Birds 36-42 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
27/11/2019	18:30 (Evening)	81	54	35	WD: SE WS: 2m/s Rain: Nil	Insects <34 Traffic 38-81 Wind 34-42 Local residential noise 36-48 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.

4.2 Assessment Results - Location N2

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N2 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N2

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
27/11/2019	11:28 (Day)	85	64	45	WD: E WS: 2m/s Rain: Nil	Traffic 46-84 Birds 42-50 Wind 42-51 Aircraft 44-48 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	11:43 (Day)	83	60	43	WD: E WS: 2m/s Rain: Nil	Traffic 44-82 Birds 38-46 Wind 38-46 Local residential noise 46-51 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	19:03 (Evening)	81	56	33	WD: SE WS: 1m/s Rain: Nil	Insects <35 Birds 36-50 Traffic 35-81 Wind 34-38 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
27/11/2019	19:18 (Evening)	83	57	35	WD: SE WS: 1m/s Rain: Nil	Birds 46-52 Insects <34 Traffic 36-83 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 N3

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N3 are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
27/11/2019	12:09 (Day)	66	50	43	WD: E WS: 2.5m/s Rain: Nil	Wind 38-58 Traffic <36 Aircraft 38-48 Birds 36-66 Quarry Inaudible
		Teven Quarry $L_{Aeq(15min)}$ Contribution				<30
27/11/2019	12:24 (Day)	71	50	42	WD: E WS: 2.5m/s Rain: Nil	Birds 44-46 Wind 44-61 Aircraft 42-48 Insects <42 Quarry Inaudible
		Teven Quarry $L_{Aeq(15min)}$ Contribution				<30
27/11/2019	19:40 (Evening)	51	46	41	WD: S WS: 0.5m/s Rain: Nil	Dog bark 38-41 Traffic 36-40 Insects 36-45 Quarry Inaudible
		Teven Quarry $L_{Aeq(15min)}$ Contribution				Quarry not operational
27/11/2019	19:55 (Evening)	65	47	42	WD: S WS: 1m/s Rain: Nil	Traffic 43-46 Insects 43-45 Birds 43-55 Aircraft 38-61 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 N4

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N4 are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
27/11/2019	12:51 (Day)	93	67	46	WD: ESE WS: 2.5m/s Rain: Nil	Wind 42-52 Quarry 42-44 (5-10sec) Birds <50 Traffic 48-92 Insects <46 Aircraft 46-54
Teven Quarry $L_{Aeq(15min)}$ Contribution						36
27/11/2019	13:06 (Day)	87	62	48	WD: E WS: 2.5m/s Rain: Nil	Traffic 39-84 Quarry 42-44 (5-10sec) Wind 38-54 Birds 38-44 Insects <38
Teven Quarry $L_{Aeq(15min)}$ Contribution						36
27/11/2019	20:18 (Evening)	53	47	45	WD: S WS: 1m/s Rain: Nil	Insects 44-46 Traffic 45-53 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
27/11/2019	20:33 (Evening)	50	44	43	WD: S WS: 1m/s Rain: Nil	Insects 44-45 Traffic <43 Aircraft 38-50 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.

4.5 Assessment Results - Location N5

The monitored noise level contributions and observed meteorological conditions for each day and evening survey period at Location N5 are presented in **Table 7**.

Table 7 Operator-Attended Noise Survey Results – Location N5

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
27/11/2019	13:32 (Day)	87	63	43	WD: SE WS: 2.5m/s Rain: Nil	Traffic 42-84 Wind 36-46 Birds 36-54 Aircraft 42-57 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	13:47 (Day)	81	58	41	WD: SE WS: 2.5m/s Rain: Nil	Traffic 42-81 Wind 38-48 Birds 36-44 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						<30
27/11/2019	20:56 (Evening)	83	55	38	WD: SE WS: 0.5m/s Rain: Nil	Traffic 37-83 Insects 36-38 Quarry Inaudible
Teven Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operational
27/11/2019	21:11 (Evening)	84	58	37	WD: S WS: 0.5m/s Rain: Nil	Traffic 38-83 Insects <38 Local residential noise 38-46 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 N1

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Wednesday 27 November 2019. 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, construction works, birds, traffic and local residential noise.

5.2 Discussion of Results - Location N2

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Wednesday 27 November 2019. 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 traffic, birds, wind in trees, aircraft, local residential noise and insects.

5.3 Discussion of Results - Location N3

Quarry noise emissions were inaudible during the two daytime noise measurements conducted on Wednesday 27 November 2019. 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, traffic, aircraft, birds, dog bark and insects.

5.4 Discussion of Results - Location N4

Quarry noise emissions were audible during the two daytime measurements conducted on Wednesday 27 November 2019. The processing plant and truck loading activities were audible during the two daytime measurements with a measured contribution of 36dBA, therefore satisfying the daytime criteria. 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-quarrying sources observed during the measurements included wind in trees, birds, traffic, insects and aircraft.

5.5 Discussion of Results - Location N5

Quarry noise emissions were inaudible during the two daytime measurements conducted on Wednesday 27 November 2019, therefore satisfying the relevant daytime and evening 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 traffic, wind in trees, birds, aircraft, insects and local residential noise.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd at the Teven Quarry, Teven, NSW. The assessment was completed to determine the quarry's compliance with the relevant criteria outlined in their Development Consent for relevant surrounding residential receivers during Quarter 4, period ending December 2019.

Attended noise measurements were undertaken on Wednesday 27 November 2019 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Teven Quarry comply with relevant noise criteria specified in the Development Consent at all assessed residential receivers.

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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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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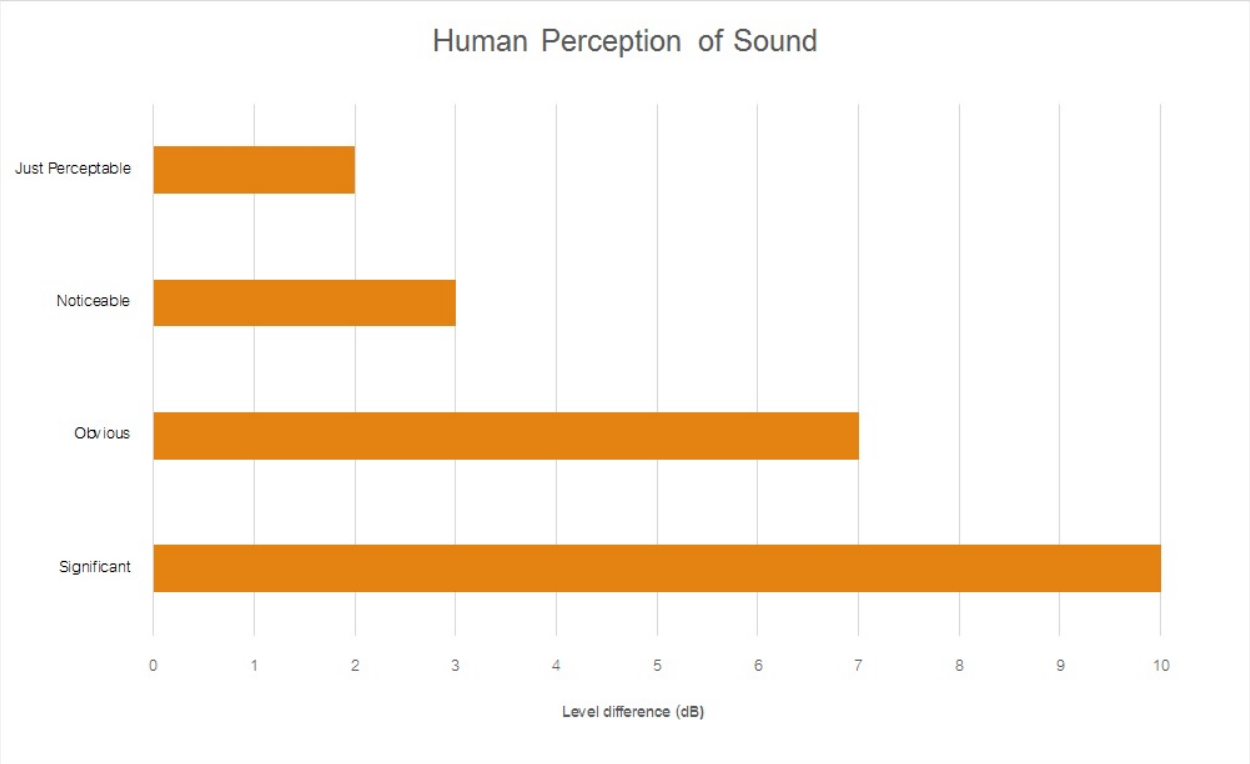
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

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APPENDIX 2

WATER MONITORING SUMMARY - DISCHARGES

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	01-01-2019									No discharge.	N	
	02-01-2019									No discharge.	N	
	03-01-2019									No discharge.	N	
	04-01-2019									No discharge.	N	
	05-01-2019									No discharge.	N	
	06-01-2019									No discharge.	N	
R.S	07-01-2019						7.6	Nil	11.05	No discharge.	N	
	08-01-2019									No discharge.	N	
	09-01-2019									No discharge.	N	0.6
	10-01-2019									No discharge.	N	0.2
	11-01-2019									No discharge.	N	0.2
	12-01-2019									No discharge.	N	
	13-01-2019									No discharge.	N	
R.S	14-01-2019						7.4	Nil	11.07	No discharge.	N	
	15-01-2019									No discharge.	N	
	16-01-2019									No discharge.	N	
	17-01-2019									No discharge.	N	
	18-01-2019									No discharge.	N	
	19-01-2019									No discharge.	N	
	20-01-2019									No discharge.	N	
R.S	21-01-2019						7.7	Nil	11	No discharge.	N	
	22-01-2019									No discharge.	N	
	23-01-2019									No discharge.	N	
	24-01-2019									No discharge.	N	1.2
	25-01-2019									No discharge.	N	0.2
	26-01-2019									No discharge.	N	
	27-01-2019									No discharge.	N	
R.S	28-01-2019									No discharge.	N	
	29-01-2019						7.5	Nil	11.16	No discharge.	N	
	30-01-2019									No discharge.	N	
	31-01-2019									No discharge.	N	
	01-02-2019									No discharge.	N	
	02-02-2019									No discharge.	N	0.2
	03-02-2019									No discharge.	N	0.2
R.S	04-02-2019	0.23	0.53	1	7.4	1	7.3	Nil	2.50	Controled discharge.	N	
R.S	05-02-2019	0.51	1.46	1	7.3	1	7.3	Nil	11.10	Controled discharge.	N	0.4
R.S	06-02-2019	0.49	0.78	1	7.5	1	7.5	Nil	11.30	Controled discharge.	N	0.2
R.S	07-02-2019	0.88	0.8	2	6.8	1	6.9	Nil	11.55	Controled discharge.	N	0.6
	08-02-2019									No discharge.	N	2
	09-02-2019									No discharge.	N	
	10-02-2019									No discharge.	N	0.6
R.S	11-02-2019						7.4	Nil	11.25	No discharge.	N	0.2
	12-02-2019									No discharge.	N	
	13-02-2019									No discharge.	N	
	14-02-2019									No discharge.	N	9.2
	15-02-2019									No discharge.	N	2
	16-02-2019									No discharge.	N	
	17-02-2019									No discharge.	N	1.2
R.S	18-02-2019						7.2	Nil	11.19	No discharge.	N	
	19-02-2019									No discharge.	N	
	20-02-2019									No discharge.	N	

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	21-02-2019									No discharge.	N	0.6
	22-02-2019									No discharge.	N	14
	23-02-2019									No discharge.	N	25.2
	24-02-2019									No discharge.	N	8.4
R.S	25-02-2019						7.4	Nil	11.1	No discharge.	N	3.8
	26-02-2019									No discharge.	N	0.2
	27-02-2019									No discharge.	N	
	28-02-2019									No discharge.	N	1.2
	01-03-2019									No discharge.	N	0.4
	02-03-2019									No discharge.	N	2.8
	03-03-2019									No discharge.	N	6.6
R.S	04-03-2019						7.6	Nil	11.25	No discharge.	N	0.8
	05-03-2019									No discharge.	N	
	06-03-2019									No discharge.	N	
	07-03-2019									No discharge.	N	
	08-03-2019									No discharge.	N	1.8
	09-03-2019									No discharge.	N	0.2
	10-03-2019									No discharge.	N	
R.S	11-03-2019						7.2	Nil	11.3	No discharge.	N	
	12-03-2019									No discharge.	N	
	13-03-2019									No discharge.	N	
	14-03-2019									No discharge.	N	0.2
	15-03-2019									No discharge.	N	0.8
	16-03-2019									No discharge.	N	12.6
	17-03-2019									No discharge.	N	22.6
R.S	18-03-2019						7.3	Nil	11.1	No discharge.	N	20.2
	19-03-2019									No discharge.	N	2.6
	20-03-2019									No discharge.	N	16.4
	21-03-2019									No discharge.	N	
	22-03-2019									No discharge.	N	
	23-03-2019									No discharge.	N	
	24-03-2019									No discharge.	N	
R.S	25-03-2019						7.4	Nil	11.01	No discharge.	N	
	26-03-2019									No discharge.	N	
	27-03-2019									No discharge.	N	37.6
	28-03-2019									No discharge.	N	11.2
	29-03-2019									No discharge.	N	0.6
	30-03-2019									No discharge.	N	1.6
	31-03-2019									No discharge.	N	0.2
R.S	01-04-2019						7.2	Nil	11.08	No discharge.	N	
	02-04-2019									No discharge.	N	7.6
	03-04-2019									No discharge.	N	34.4
	04-04-2019									No discharge.	N	0.6
	05-04-2019									No discharge.	N	
	06-04-2019									No discharge.	N	
	07-04-2019									No discharge.	N	
	08-04-2019						7.1	Nil	11.09	No discharge.	N	
	09-04-2019									No discharge.	N	
	10-04-2019									No discharge.	N	2.4
	11-04-2019									No discharge.	N	12.4
	12-04-2019									No discharge.	N	12

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	13-04-2019									No discharge.	N	3.2
	14-04-2019									No discharge.	N	0.2
	15-04-2019			1	7.2	3	7.4	Nil	11.45	Heavy showers	N	15.2
	16-04-2019			1	7	1	7	Nil	11.35	Heavy showers	N	29.8
	17-04-2019									No discharge.	N	9.4
	18-04-2019									No discharge.	N	4.6
	19-04-2019									No discharge.	N	9
	20-04-2019									No discharge.	N	9.4
	21-04-2019									No discharge.	N	2
	22-04-2019						7.2	Nil	11.2	No discharge.	N	0.2
	23-04-2019									No discharge.	N	0.4
	24-04-2019									No discharge.	N	3
	25-04-2019									No discharge.	N	2.2
	26-04-2019									No discharge.	N	0.2
	27-04-2019									No discharge.	N	0
	28-04-2019									No discharge.	N	0
	29-04-2019									No discharge.	N	0
	30-04-2019									No discharge.	N	1
	01-05-2019						7	Nil	11.25	No discharge.	N	7.2
	02-05-2019									No discharge.	N	2.6
	03-05-2019									No discharge.	N	0
	04-05-2019									No discharge.	N	5.4
	05-05-2019									No discharge.	N	6.6
	06-05-2019			1	7	1	7	Nil	11.15	controlled discharge	N	0.2
	07-05-2019			1	6.59	1	7	Nil	11.12	controlled discharge	N	0
	08-05-2019			1	7.1	1	7.2	Nil	11.18	controlled discharge	N	0
	09-05-2019									No discharge	N	0
	10-05-2019									No discharge	N	0
	11-05-2019									No discharge	N	2.2
	12-05-2019									No discharge	N	0
	13-05-2019						7.1	Nil	11	No discharge	N	6
	14-05-2019									No discharge	N	4
	15-05-2019									No discharge	N	3
	16-05-2019									No discharge	N	1.8
	17-05-2019									No discharge	N	25.8
	18-05-2019									No discharge	N	6.2
	19-05-2019									No discharge	N	3.4
	20-05-2019						7.3	Nil	11.10	No discharge	N	7.4
	21-05-2019									No discharge	N	2
	22-05-2019									No discharge	N	0.2
	23-05-2019									No discharge	N	0
	24-05-2019									No discharge	N	10
	25-05-2019									No discharge	N	0
	26-05-2019									No discharge	N	0
	27-05-2019						6.59	Nil	11.05	No discharge	N	0
	28-05-2019									No discharge	N	0
	29-05-2019									No discharge	N	0
	30-05-2019									No discharge	N	0
	31-05-2019									No discharge	N	0
	01-06-2019									No discharge	N	0
	02-06-2019									No discharge	N	25.8

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	03-06-2019						7.1	Nil	11.00	No discharge	N	0.8
	04-06-2019									No discharge	N	0
	05-06-2019									No discharge	N	0
	06-06-2019									No discharge	N	9.6
	07-06-2019									No discharge	N	0
	08-06-2019									No discharge	N	4.6
	09-06-2019									No discharge	N	9
	10-06-2019									No discharge	N	0
	11-06-2019			1	7.2	1	7.1	Nil	11.15	Discharge	N	0
	12-06-2019			1	7.5	1	7.2	Nil	11.25	Discharge	N	0
	13-06-2019			1	7	1	7.1	Nil	11.10	Discharge	N	0
	14-06-2019			1	7.6	1	7.5	Nil	11.30	Discharge	N	0
	15-06-2019									No Discharge	N	0
	16-06-2019									No Discharge	N	3.4
	17-06-2019						7.5	Nil	11.20	No Discharge	N	10.8
	18-06-2019									No Discharge	N	0
	19-06-2019									No Discharge	N	0
	20-06-2019									No Discharge	N	0
	21-06-2019									No Discharge	N	5.6
	22-06-2019									No Discharge	N	0
	23-06-2019									No Discharge	N	0.4
	24-06-2019			18	6.8	15	6.9	Nil	11.15	Discharge	N	20.4
	25-06-2019			23	6.8	22	7	Nil	11.10	Discharge	N	34.8
	26-06-2019			19	7.1	14	6.9	Nil	11.20	Over 82.5 in 5 day event - Discharge	N	51.4
	27-06-2019			18	7	21	7	Nil	11.15	Discharge - over 82.5 5 day event	N	15.2
	28-06-2019									Discharge - over 82.5 5 day event	N	27.8
	29-06-2019									No Discharge	N	7.2
	30-06-2019									No Discharge	N	13.4
	01-07-2019						7.3	Nil	11.05	No Discharge	N	5.8
	02-07-2019									No Discharge	N	15.2
	03-07-2019						7.2	Nil	11.05	No Discharge	N	0.2
	04-07-2019									No Discharge	N	0.6
	05-07-2019									No Discharge	N	11.8
	06-07-2019									No Discharge	N	1.8
	07-07-2019									No Discharge	N	12.6
	08-07-2019			1	6.8	1	7.1	Nil	11.15	Discharge	N	13.2
	09-07-2019			1	7.1	1	7	Nil	11.2	Discharge	N	0.2
	10-07-2019									No Discharge	N	0
	11-07-2019									No Discharge	N	0.2
	12-07-2019									No Discharge	N	0
	13-07-2019									No Discharge	N	0
	14-07-2019									No Discharge	N	0
	15-07-2019						7.2	Nil	11.2	No Discharge	N	0
	16-07-2019									No Discharge	N	0
	17-07-2019									No Discharge	N	0
	18-07-2019									No Discharge	N	0
	19-07-2019									No Discharge	N	0
	20-07-2019									No Discharge	N	0
	21-07-2019									No Discharge	N	0
	22-07-2019						7.4	Nil	11.05	No Discharge	N	0
	23-07-2019									No Discharge	N	0

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	24-07-2019									No Discharge	N	0
	25-07-2019									No Discharge	N	0.2
	26-07-2019									No Discharge	N	10.2
	27-07-2019									No Discharge	N	0.2
	28-07-2019									No Discharge	N	0
	29-07-2019						7.3	Nil	11.15	No Discharge	N	0
	30-07-2019									No Discharge	N	0
	31-07-2019									No Discharge	N	2.6
	01-08-2019									No Discharge	N	34.8
	02-08-2019									No Discharge	N	4.8
	03-08-2019									No Discharge	N	9.6
	04-08-2019									No Discharge	N	0
	05-08-2019						7.1	Nil	11	No Discharge	N	0
	06-08-2019									No Discharge	N	0
	07-08-2019									No Discharge	N	0
	08-08-2019									No Discharge	N	0
	09-08-2019									No Discharge	N	0
	10-08-2019									No Discharge	N	0
	11-08-2019									No Discharge	N	0
	12-08-2019						7.2	Nil	11.2	No Discharge	N	0
	13-08-2019									No Discharge	N	0
	14-08-2019									No Discharge	N	0
	15-08-2019									No Discharge	N	0
	16-08-2019									No Discharge	N	0
	17-08-2019									No Discharge	N	0
	18-08-2019									No Discharge	N	0
	19-08-2019						6.9	Nil	11.15	No Discharge	N	0
	20-08-2019									No Discharge	N	0
	21-08-2019									No Discharge	N	0
	22-08-2019									No Discharge	N	0
	23-08-2019									No Discharge	N	0
	24-08-2019									No Discharge	N	0
	25-08-2019									No Discharge	N	0
	26-08-2019						7.4	Nil	11	No Discharge	N	0
	27-08-2019									No Discharge	N	0
	28-08-2019									No Discharge	N	0
	29-08-2019									No Discharge	N	0
	30-08-2019									No Discharge	N	0
	31-08-2019									No Discharge		2
	01-09-2019									No Discharge		0
	02-09-2019						7.1	Nil	11.25	No Discharge		0.2
	03-09-2019									No Discharge		0
	04-09-2019									No Discharge		0.2
	05-09-2019									No Discharge		
	06-09-2019									No Discharge		
	07-09-2019									No Discharge		
	08-09-2019									No Discharge		
	09-09-2019						7.3	Nil	8	No Discharge		
	10-09-2019									No Discharge		
	11-09-2019									No Discharge		
	12-09-2019									09-23-2019		

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	13-09-2019									No Discharge		
	14-09-2019									No Discharge		
	15-09-2019									No Discharge		
	16-09-2019						7	Nil	7.3	No Discharge		
	17-09-2019									No Discharge		
	18-09-2019									No Discharge		
	19-09-2019									No Discharge		
	20-09-2019									No Discharge		
	21-09-2019									No Discharge		
	22-09-2019									No Discharge		
	23-09-2019						7.5	Nil	12	No Discharge		
	24-09-2019									No Discharge		
	25-09-2019									No Discharge		
	26-09-2019									No Discharge		
	27-09-2019									No Discharge		
	28-09-2019									No Discharge		
	29-09-2019									No Discharge		
R.S	30-09-2019						7.3	Nil	7.2	No Discharge	N	
	01-10-2019									No Discharge	N	
	02-10-2019									No Discharge	N	
	03-10-2019									No Discharge	N	
	04-10-2019									No Discharge	N	
	05-10-2019									No Discharge	N	
	06-10-2019									No Discharge	N	
	07-10-2019									Public holiday	N	
R.S	08-10-2019						7.2	Nil	8	No Discharge	N	
	09-10-2019									No Discharge	N	
	10-10-2019									No Discharge		1.2
	11-10-2019									No Discharge		0.2
	12-10-2019									No Discharge		1
	13-10-2019									No Discharge		1.8
R.S	14-10-2019						7.4	Nil	10	No Discharge	N	
	15-10-2019									No Discharge	N	
	16-10-2019									No Discharge	N	
	17-10-2019									No Discharge		0.2
	18-10-2019									No Discharge	N	
	19-10-2019									No Discharge	N	
	20-10-2019									No Discharge	N	
R.S	21-10-2019						7.3	Nil	9	No Discharge	N	
	22-10-2019									No Discharge	N	
	23-10-2019									No Discharge	N	
	24-10-2019									No Discharge	N	
	25-10-2019									No Discharge	N	
	26-10-2019									No Discharge	N	
	27-10-2019									No Discharge	N	
R.S	28-10-2019						7.5	Nil	10	No Discharge		0.6
	29-10-2019									No Discharge	N	
	30-10-2019									No Discharge	N	
	31-10-2019									No Discharge	N	
	01-11-2019									No Discharge		
	02-11-2019									No Discharge		

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	03-11-2019									No Discharge		
R.S	04-11-2019						7.6	nil	9	No Discharge		
	05-11-2019									No Discharge		
	06-11-2019									No Discharge		
	07-11-2019									No Discharge		
	08-11-2019									No Discharge		
	09-11-2019									No Discharge		
	10-11-2019									No Discharge		
R.S	11-11-2019						7.3	nil	8	No Discharge		
	12-11-2019									No Discharge		
	13-11-2019									No Discharge		
	14-11-2019									No Discharge		
	15-11-2019									No Discharge		
	16-11-2019									No Discharge		
	17-11-2019									No Discharge		
R.S	18-11-2019						7.5	nil	9	No Discharge		
	19-11-2019									No Discharge		
	20-11-2019									No Discharge		
	21-11-2019									No Discharge		
	22-11-2019									No Discharge		
	23-11-2019									No Discharge		
	24-11-2019									No Discharge		
	25-11-2019									No Discharge		
	26-11-2019									No Discharge		
R.S	27-11-2019						7.4	nil	10	No Discharge		
	28-11-2019									No Discharge		
	29-11-2019									No Discharge		
	30-11-2019									No Discharge		
	01-12-2019									No Discharge		
	02-12-2019						7.3	nil	8	No Discharge		
	03-12-2019									No Discharge		
	04-12-2019									No Discharge		
	05-12-2019									No Discharge		
	06-12-2019									No Discharge		
	07-12-2019									No Discharge		
	08-12-2019									No Discharge		
	09-12-2019						7.4	nil	8	No Discharge		
	10-12-2019									No Discharge		
	11-12-2019									No Discharge		
	12-12-2019									No Discharge		
	13-12-2019									No Discharge		
	14-12-2019									No Discharge		
	15-12-2019									No Discharge		
	16-12-2019						7.3	nil	7	No Discharge		
	17-12-2019									No Discharge		
	18-12-2019									No Discharge		
	19-12-2019									No Discharge		
	20-12-2019									No Discharge		
	21-12-2019									No Discharge		
	22-12-2019									No Discharge		
	23-12-2019									No Discharge		

Teven 2019 water discharge and rain log.

Name	Test Date	NTU PT 1	NTU PT 2	Point 1-TSS	PH - Pt 1	LD Point 2 -TSS	PH Pt-2	Oil & Grease	Time	Teven Water Sampling Comments	Rain fall	Rain mm
	24-12-2019									No Discharge		
	25-12-2019									No Discharge		
	26-12-2019									No Discharge		
	27-12-2019									No Discharge		
	28-12-2019									No Discharge		
	29-12-2019									No Discharge		
	30-12-2019									No Discharge		
	31-12-2019									No Discharge		

APPENDIX 3
POLLUTION REDUCTION PROGRAM

31 January 2019

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065
PO Box 21
St Leonards, NSW, 1590

T +61 2 9493 9500
F +61 2 9493 9599
E info@emmconsulting.com.au

www.emmconsulting.com.au

Victoria Musgrove
Planning Approvals Manager – Queensland
Holcim (Australia) Pty Ltd
18 Little Cribb St
Milton QLD 4064

Re: Holcim Teven Quarry – Review of Current Sediment Basin Management and Stormwater Management

Dear Victoria,

1 Introduction

This report presents the findings of a review of current sediment basin management and stormwater management generally for Holcim's Teven Quarry (herein referred to as the Site). The review is intended to address a Pollution Reduction Program (PRP) that has been recently added to Environment Protection Licence (EPL) 3293 that applies to the Site.

It is understood that Holcim will engage with the Environment Protection Authority (EPA), supported by this report, to close out the PRP. EMM will then update the Water Management Plan (WMP) for the Site, to reflect the outcomes of the review. Recommended updates to the WMP are provided as part of this review.

This report is structured as follows:

- Section 1 outlines the purpose and scope of the report.
- Section 2 describes relevant background to the PRP and issues of concern to the EPA.
- Section 3 summarises the methodology and available data used to inform the review.
- Section 4 describes existing water management infrastructure and practices for the Site.
- Section 5 assesses the performance of existing water management dams and other Site controls.
- Section 6 provides recommendations to review and improve the effectiveness of existing water management practices and measures.
- Section 7 provides recommendations for update of the WMP.

Figure 1 shows a plan of the site including catchment areas and key water management features referred to herein.

2 Background

2.1 EPA inspection and PRP

On 7 June 2018, the EPA undertook an inspection of the Site and observed turbid water in the drainage line between the Main Dam and the current licensed discharge point (LDP). 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 WMP 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.*

This report responds to Clause U1 and the aforementioned concerns raised by the EPA.

2.2 Existing EPL water-related conditions

The current version of EPL 3293 dated 25 July 2018 includes several water-related conditions relevant to the PRP, including:

- *Section 2 – Discharges to Air and Water and Applications to Land*
  - establishes the LDP.
- *Section 3 – Limit Conditions*
  - sets the five-day rainfall depth (82.5 mm); and
  - sets concentration limits on oil/grease, pH and total suspended solids for discharges at the LDP where less than the five-day rainfall depth has occurred.
- *Section 4 – Operating Conditions*

- describes principles for water management and associated process/management related requirements.

- *Section 5 – Monitoring and Recording Conditions*
  - establishes relevant water quality sampling and associated record keeping requirements for monitoring of discharges from the Site.

- *Section 8 – Pollution Studies and Reduction Programs*
  - lists any PRP currently applying to the Site.

3 Methodology and available data

3.1 Site inspection

To inform an understanding of current site conditions and stormwater management practices, site inspection was undertaken on Friday 26 October 2018, between approximately 10:30-14:00. Whilst on site, discussions were held with the Quarry Manager Garth Stacey.

Weather conditions on the day of inspection were warm and sunny. Rainfall at Ballina Airport measured 2.4 mm for the prior 24 hours to 09:00, with zero measured rainfall for the prior 3 days.

3.2 Available data

The following information and data was also used to inform the review:

- the current WMP for the Site (Version 7 dated 6 September 2018);
- water quality monitoring data for the Site, provided by Holcim; and
- various spatial datasets, including aerial imagery and terrain data, held by EMM from previous involvement in preparation of the WMP and various other management plans for the Site.

4 Existing site water management

4.1 Overview

Key elements and context for the existing Site water management system are shown on **Figure 1**, including:

- recent aerial imagery;
- contours generated from LiDAR data;
- primary catchment areas;
- water management dams (Pit Dam and Main Dam);
- internal piped and open drainage systems;
- EPL monitoring location; and
- location of current water monitoring points where sampling is undertaken.

4.2 Catchment areas

Table 1 provides further information for each of the primary catchment areas, including a description of internal drainage and water management practices and associated infrastructure. The referenced photographs are provided in **Attachment A**.

Table **1** Catchment Description

Catchment	Description
C1	• Catchment area of 11.6 ha comprising main quarry area, increasing to 15.3 ha at ultimate development. • Catchment drains to the Pit Dam [Photo 1] located in quarry floor. • Water is pumped out to the Main Dam [Photo 2], with water levels maintained to avoid flooding of the adjacent quarry floor access track.
C2	• Catchment area of 0.9 ha comprising area surrounding Main Dam. • Catchment drains to the Main Dam. • Water extracted from Main Dam via pump to supply processing plant and dust suppression sprinkler system. • Sediment accumulation in the Main Dam is monitored against a red marker block, with desilting undertaken as required. • Main Dam gravity drains via piped [Photo 3] and open [Photo 4] drainage system, discharging to the Main Drainage Channel. • Water quality is currently monitored at the upstream end of the Main Drainage Channel, immediately downstream of the existing pipe outlet [Photo 5]. • Main Drainage Channel receives runoff from the adjacent vegetated/undisturbed area immediately to the west before discharging offsite to the receiving cane drain system [Photo 6] at the LDP [Photo 7]. *Recent improvement works along the Main Drainage Channel are described further in Section 4.3.* • Water quality is also currently monitored at the downstream end of the Main Drainage Channel at the LDP [Photo 7]. • A small, steady discharge of clear water (around 0.5 L/s from visual observation) in the Main Drainage Channel was observed on the day of inspection, which followed a substantially dry period with rainfall well below the 5-day rainfall depth. The source of this continuous discharge was traced to the reach of piped drainage immediately downstream of the Main Dam, and it is considered most likely that seepage through fractures in the rock in which the Main Dam has been excavated is entering the pipe at an unknown location along its length. Site personnel noted that the continuous discharge typically occurs following rainfall that raises the level in the dam, and abates several days after rainfall has stopped.
C3	• Catchment area of 0.8 ha comprising area surrounding Stockpile Area #2 [Photos 8 and 9]. • Stockpile Area #2 is used only for select 'cleaner' product sourced from fresh rock with low fines content. • Catchment is gravel-lined and appears fully contained via bunding with no discharge point, nor evidence of recent discharge. Accumulated runoff is lost via infiltration or evaporation only. *Recent improvement works to bunding surrounding the stockpile area are described further in Section 4.3.*
C4	• Catchment area of 1.0 ha comprising area surrounding processing facilities, primary feed bin, fuel storage and refuelling area, and workshop. • Catchment drains to 2 wedge pits [Photo 10], which provide primary sedimentation. • Water is pumped out of the wedge pits to the Main Dam, with automated pump operation via float switch. • Wedge pits are desilted typically multiple times per day, with removed sediment blended back into suitable product. • Concrete lined drains collect runoff from adjacent processing and workshop areas [Photo 11]. Oil/grease 'snakes' are used to bund off and capture hydrocarbons from these drains in the case of a leakage or spill. Trailer-mounted spill kits are on hand for spill management [Photo 12].
C5	• Catchment area of 2.4 ha comprising area surrounding Stockpile Area #1, the main entrance and driveway, weighbridge, office and laboratory [Photos 13, 14 and 15]. • Catchment is predominantly gravel-lined and appears fully contained via bunding with no clear discharge point, nor evidence of recent discharge. Accumulated runoff is lost via infiltration or evaporation only.

Key observations in relation to the PRP are as follows:

- The Main Dam and the Pit Dam are the primary water management controls for the Site and control the bulk of the disturbed quarry catchment area, comprising Catchments C1, C2 and C4.

- Catchments C3 and C5 do not drain to a sediment basin. Runoff from these disturbed areas is managed by alternative measures, primarily through containment via bunding to prevent discharge of runoff from leaving the Site.

- The continuous discharge that occurs in the Main Drainage Channel over a period of days following even minor rainfall events means that the quarry does not technically capture the five-day rainfall event. Monitoring is however undertaken on a daily basis for all discharges when less than the five-day rainfall event has occurred.

4.3 Recent improvement works

On receipt of initial feedback from the EPA following their inspection of 7 June 2018, various site works were undertaken in the vicinity of Stockpile #2 and the adjacent Main Drainage Channel to further improve erosion and sediment control in this part of the quarry. These works were undertaken in early August 2018 and comprised:

- Stabilisation and formalisation of bunding around Stockpile #2. This work involved reconstruction of selected areas of bunding with compacted earth core and rock rip rap lining, with suitable materials sourced on-site. The final bunding is continuous around the stockpile area and observed to be at least 0.5 m high. [Photo 9 – the bunding can be seen in the background of this photo behind the 4WD]

- Rock lining and construction of check dams along the Main Drainage Channel. This work involved placement of concrete blocks, wrapped in geofabric and embedded into the ground, and placement of rock rip rap to create a series of check dams along the channel. The check dams were observed to be in the order of 0.5 to 1 m deep, with extensive rip rap lining of the lower channel reach approaching the LDP. [Photos 16 and 17]

Ongoing monitoring of erosion and sediment control measures, and improvement where necessary, is also evidenced by observation of the following works also recently constructed in September 2018:

- concrete lining of selected catch drains subject to high velocity flows for erosion control within Catchment C1 [Photo 18]; and

- construction of a diversion bund and cross-drain at a key location across the main access track within Catchment C1, with associated piped drainage to direct sediment laden runoff into the Pit Dam.

5 Performance of water management dams and controls

5.1 Review of water quality monitoring results

Holcim provided water quality monitoring results for the Site for the recent period June to October 2018 which followed the EPA inspection. Over this time, monitoring at the LDP has been supplemented by a second monitoring location at the upstream end of Main Drainage Channel to help assess whether the adjacent Stockpile Area #2 is potentially contributing to any increased turbidity in runoff conveyed within the channel.

Monitoring results are presented in **Figure 2**, which shows that water quality at both sampling points is consistently within the EPL concentration limits, with no exceedances recorded over the monitoring period.

On this basis, it is recommended that Holcim cease monitoring at the Water Monitoring Point #1 and continue to monitor water quality only at the LDP per EPL requirements.

5.2 Assessment of Pit Dam and Main Dam

The Main Dam and the Pit Dam are operated as sediment basins and control the bulk of the disturbed quarry catchment area comprising Catchments C1, C2 and C4. Both dams are understood to have been excavated in hard rock.

The WMP provided a comparison of available dam storage against the 'Guideline Volume' calculated using the methods detailed in *Managing Urban Stormwater: Soils and Construction, Volume 2E – Mines and Quarries* (DECC 2008). This comparison has been updated and is presented in **Table 2**, which shows that current dam volumes are well in excess of the Guideline Volumes.

Table 2 Water Management Dam Volumes

Dam	Settling Volume (m^3)	Sediment Zone (m^3)	Guideline Volume (m^3)	Current Dam Volume (m^3)
Main Dam	1,252	626	1,878	5,125
Pit Dam	7,541	3,771	11,312	37,753
Pit Dam[1]	9,962	4,981	14,943	NA[2]

Notes: 1. Anticipated volumes when the quarry reaches the maximum extraction extent.

2. Dam volume will depend on quarry dimensions which vary with time.

5.3 Operational water requirements and sources

It is understood that all water required for operational needs including processing, wash down and dust suppression is sourced from the Main Dam, which is a reliable source of water that has not required mains top up in recent history.

Rainwater from the office roof is also harvested for non-potable internal uses such as toilet flushing.

Imported water is limited to bottled water for drinking purposes.

In summary, there is no clear need for improvement of any aspect of current operational water management.

6 Recommended improvements

The following recommendations are made to review, and if necessary improve, the effectiveness of existing water management measures, practices and procedures:

- 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 [Photo 19] 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:

  - to ensure discharge sampling occurs at a consistent location at the LDP at all times; and

  - improvement of record keeping to capture additional details (eg. timing of sampling when undertaken, affirmation of oil/grease observations).

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.

7 Recommendations for WMP update

Based on the above, no substantial changes to the WMP are warranted. However, the following updates should be incorporated to reflect current water management practices, recent works undertaken and the key findings and recommendations from the review:

- Update to reflect the **recommended improvements** noted in Section 6, as appropriate.

- Sections and figures of the WMP that refer to **water monitoring locations** should be updated to retain just the single monitoring point at the LDP.

- There is a need to clarify the **water monitoring requirements** in Section 6.3 of the WMP to ensure that all relevant requirements in terms of location, frequency, timing, parameters and protocols to be observed are clear and readily understood.

- Section 5.4 of the WMP infers that monthly **water balance monitoring** and six-monthly **site water balance model updates** will be undertaken, which is understood to be not occurring nor required to effectively manage water use and discharge from the Site. It is recommended that this section is revised to reduce the frequency of monitoring to reflect current practice, and to remove model balance model updates unless a significant change to water management is required.

Updates to the WMP should be undertaken once in-principle agreement on the PRP response is reached with the EPA.

8 Closing

I trust this adequately addresses the EPA's concerns in regards to stormwater management generally, and in particular the specific issues noted along the Main Drainage Channel, but please don't hesitate to call me to discuss should you require any further information or clarification.

Yours sincerely

Nick Bartho
Associates Water Resources Engineer

nbartho@emmconsuting.com.au
P: 0411 100 998

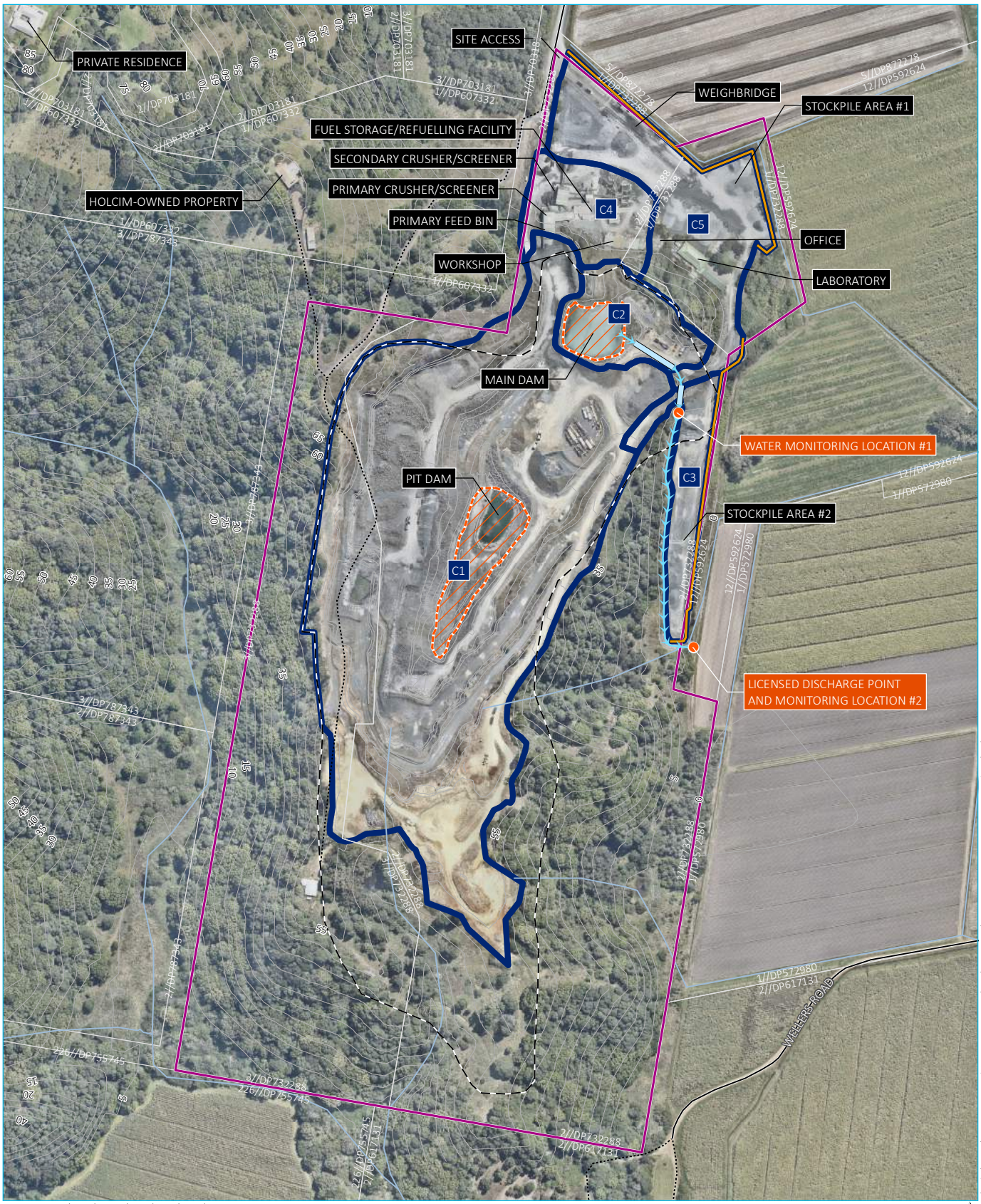
Figures

1 Water management overview

2 Assessment of water quality monitoring data

Attachments

A Photographs



Source: EMM (2018); DFSI (2017); GA (2015)

0 100 200 m

GDA 1994 MGA Zone 56

N

T:\Jobs\2018\H180116 - Holcim Teven Quarry\GIS\02_Maps\G001_WMP_20181105_06.mxd 29/01/2019

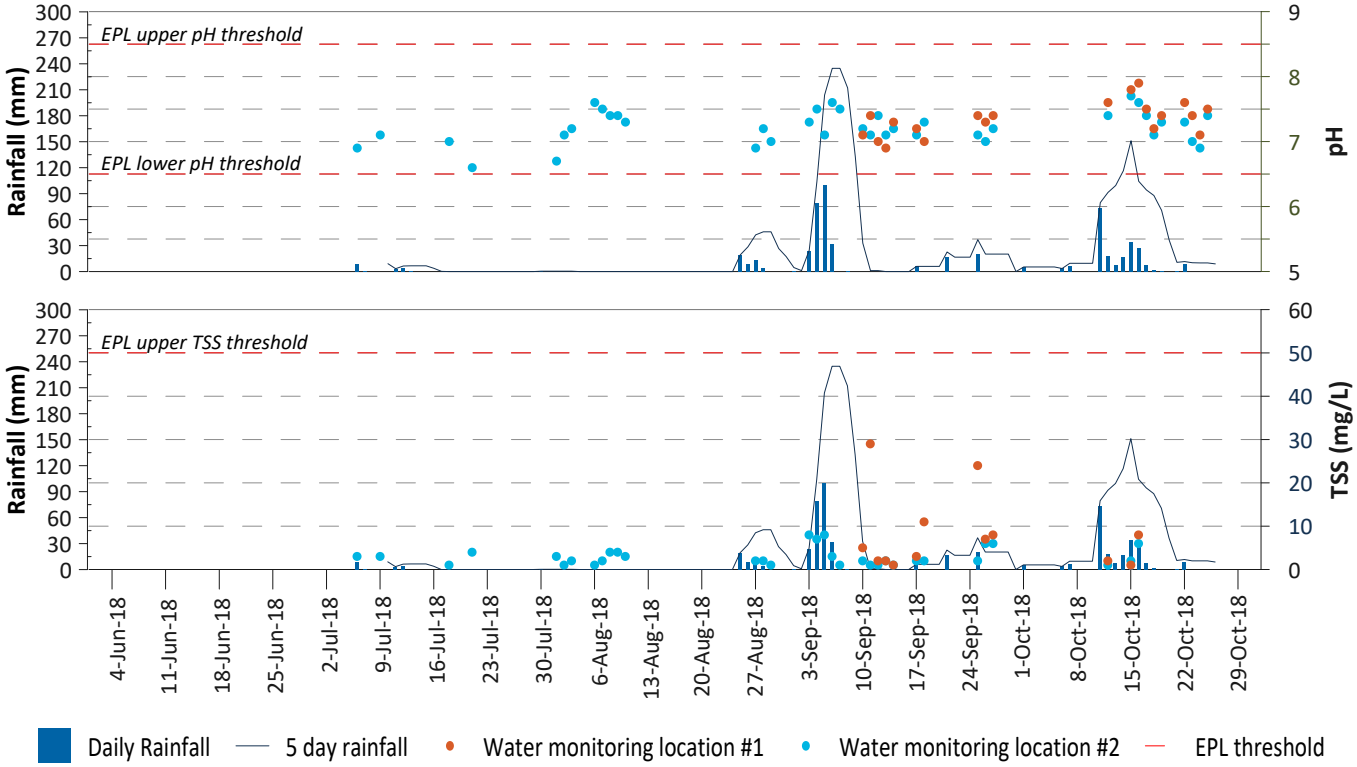
KEY

- Teven Quarry extent
- Approved extraction extent
- Water monitoring point
- Bund
- Open channel
- Pipe
- Final dam location
- Local road
- Vehicular track
- Watercourse/drainage line
- Topographic contour (5 m)
- Cadastral boundary
- Current catchments

Water Management Overview

Teven Quarry
Water Management Review
Figure 1

EMM
creating opportunities



Assessment of water quality monitoring data
Teven Quarry
Water Management Review
Figure 2

Attachment A - Photographs

Photograph 1: Pit Dam – view to south with pump and rising main shown in foreground

Photograph 2: Main Dam – view to north across dam

Photograph 3: pipe outlet from Main Dam

Photograph 4: open channel reach downstream of Main Dam, upstream of access track crossing

Photograph 5: Water Monitoring Location #1 at the upstream end of the Main Drainage Channel

Photograph 6: receiving cane drain system

Photograph 7: concrete block weir located at the LDP at Site boundary, corresponding to Water Monitoring Location #2

Photograph 8: Stockpile Area #2 – view to south. Main Drainage Channel to right of photograph.

Photograph 9: Stockpile Area #2 – view to north. Main Drainage Channel to left of photograph.

Photograph 10: Wedge pits adjacent to main processing facilities and workshop

Photograph 11: Concrete lined drains draining to wedge pits

Photograph 12: Trailer-mounted spill kit located near workshop

Photograph 13: Main entrance driveway, kerb shown to left of photograph which contains and directs runoff towards weighbridge and truck wash area

Photograph 14: Dust suppression sprinkler in operation on main driveway

Photograph 15: Main stockpile area showing ponded runoff and concrete block bunding located along northern site boundary

Photograph 16: Check dam constructed along Main Drainage Channel

Photograph 17: Check dam constructed along Main Drainage Channel

Photograph 18: Concrete lining of catch drains along upper access road

Photograph 19: Concrete lining of Main Drainage Channel immediately upstream of the LDP

APPENDIX 4

TRANSPORT AND PRODUCTION SUMMARY

January 2019

	5000283-ROUGH SHALE	5000284-SOFT SHALE	5000029- SELECT FILL	5000031- OVERBURDEN	5000257-10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000099-DGB 20 R/BASE	5000060-DGS 20 R/BASE	5201128-SIDE & OVERLAY	5000281-NO.1 R/BASE	5000262 NO.2 R/BASE	5000299-40MM R/BASE	5000259-40MM COBBLE	5000024- 63MM BALLAST	QFOX10-10MM AGG	QFOX20- 20MM AGG	QFOXT- 7MM AGG	5000602- QUARRY SAND	5000214-CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Tue																														0.00	0.00	
02 Wed																														0.00	0.00	
03 Thu																														0.00	0.00	
04 Fri																														0.00	0.00	
05 Sat																														0.00	0.00	
06 Sun																														0.00	0.00	
07 Mon							32.55	32.75								34.70		58.10	12.75		32.35	73.00	12.60		127.75	32.05		23	0	448.60	448.60	
08 Tue								9.00		2.95						350.00					65.00				88.75			40	0	515.70	964.30	
09 Wed				94.25			7.35									66.50						32.20			80.50	33.00		25	0	313.80	1278.10	
10 Thu		97.50		7.95												321.10					32.50	64.90			145.45			34	0	669.40	1947.50	
11 Fri		320.85		993.35				9.85		18.80						696.90					65.00	33.00			18.35	32.85		86	0	2188.95	4136.45	
12 Sat																												0	0	0.00	4136.45	
13 Sun																														0.00	4136.45	
14 Mon				1,256.90			1.55			39.20						226.30					96.60	161.70	57.60		348.70	98		86	0	2286.20	6422.65	
15 Tue				355.95			3.30	49.30		55.25						693.55					167.45	143.35	37.75		369.75	63.85		86	0	1939.50	8362.15	
16 Wed				260.30			2.70			12.80						543.10		23.70			32.75	65.80	12.50		281.40	33.15		59	0	1268.20	9630.35	
17 Thu				480.80			3.35	8.80		106.00	5.00					421.75			25.55		45.60	129.90			310.15	65.50		63	0	1602.40	11232.75	
18 Fri				610.20						50.65	2.15					35.90				12.65	174.00	143.15	38.30		150.65	126.15		54	1	1343.80	12576.55	
19 Sat																												0	0	0.00	12576.55	
20 Sun																														0.00	12576.55	
21 Mon				774.85				12.70		56.45								12.90		10.60	244.10	264.60	57.60		306.70	150.15		81	1	1890.65	14467.20	
22 Tue										56.55						123.85					130.30	163.85			249.65	162.60		37	0	886.80	15354.00	
23 Wed							25.90			80.25						32.75	12.60	36.25			130.55	196.35	12.85		78.00	118.35		32	1	723.85	16077.85	
24 Thu				455.70			32.05	98.95		26.00	11.50						10.55	46.50		12.10	128.45	143.75	32.25		202.40	64.50		55	0	1264.70	17342.55	
25 Fri				389.85				39.30		60.00									12.65		65.10	97.40			113.30	64.65		33	0	842.25	18184.80	
26 Sat																												0	0	0.00	18184.80	
27 Sun																														0.00	18184.80	
28 Mon																														0.00	18184.80	
29 Tue										49.75						156.55	40.80		12.00		143.55	359.90	65.80		149.70	118.50		53	2	1096.55	19281.35	
30 Wed				97.70			3.60	8.90								585.85	72.25			4.45	150.45	130.50			246.40	168.70		62	1	1468.80	20750.15	
31 Thu				454.95			50.95	10.05		162.80						195.70				23.65	130.90	130.05			381.20	32.45		67	0	1572.70	22322.85	
Product Totals	0.00	418.35	0.00	6,232.75	0.00	0.00	163.30	279.60	0.00	777.45	18.65	0.00	0.00	0.00	0.00	4,484.50	136.20	177.45	62.95	63.45	1,834.65	2,333.40	327.25	0.00	3,648.80	1,364.10	0.00	976	6	22323	22323	0
Average T/Day	0.00	19.92	0.00	296.80	0.00	0.00	7.78	13.31	0.00	37.02	0.89	0.00	0.00	0.00	0.00	213.55	6.49	8.45	3.00	3.02	87.36	111.11	15.58	0.00	173.75	64.96	0.00	46	Actual Mth average Truck movements			0
																													46			0

Average tonnes/day	1,063 t	Mth Working days	17	Days worked	21	Work days remaining	-4	SAP Sales Budget	13,168 t	Prog. Forecast Mth Total	18,071 t

February 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031- OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000059-DGB 20 R/BASE	5000060-DGS20 R/BASE	5201128-SIDE & OVERLAY	5000261-NO1 R/BASE	5000262 NO2 R/BASE	5000299-40MM R/BASE	5000259-40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123- SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Fri							3.05	22.55		149.70						191.00	2.05			7.00	111.40	242.50	19.75		663.25	118.20		89	2	1530.45	1530.45	
02 Sat																												0	0	0.00	1530.45	
03 Sun																														0.00	1530.45	
04 Mon								9.80		112.45											129.85	97.90	71.05		146.85	52.55		30	2	620.45	2150.90	
05 Tue		96.25								83.60						132.95		580.80	6.05		180.45	149.50	20.20		350.70	135.00		78	1	1735.50	3886.40	
06 Wed		129.75	15.75				126.05	24.90		36.60						35.95	25.35	47.90	11.40		163.95	65.50			134.35	65.75		43	1	883.20	4769.60	
07 Thu			69.00				8.10	66.15		13.70						23.75					98.30	208.50	33.15	68.25	29.50	149.90		38	1	768.30	5537.90	
08 Fri	97.20		138.45				230.10			13.70						153.50	46.10				98.45	65.35	12.80	23.85	148.05	52.45		58	1	1080.00	6617.90	
09 Sat																												0	0	0.00	6617.90	
10 Sun																														0.00	6617.90	
11 Mon								38.10		76.40						105.10	6.10		24.55		109.95	170.30	25.35	54.50	101.75	170.35		42	2	882.45	7500.35	
12 Tue							19.50			54.70						11.35	63.45				65.20	143.55	57.45	219.60	202.55	73.40		54	1	910.75	8411.10	
13 Wed							58.55			91.00						39.60	38.90		7.50		234.90	208.30	50.40	53.10	179.00	155.45		51	3	1116.70	9527.80	
14 Thu							99.05	26.55		71.30							12.75	24.60		25.95	97.80	164.45	12.60	101.05	323.00	65.15		56	0	1024.25	10552.05	
15 Fri			326.50	23.85			10.50	56.85		18.05						15.70				7.55	129.80	269.15	13.00		221.05	58.85		56	2	1150.85	11702.90	
16 Sat																												0	0	0.00	11702.90	
17 Sun																														0.00	11702.90	
18 Mon										122.35										21.80	202.65	131.95		32.95	28.95	103.65		25	0	644.30	12347.20	
19 Tue			128.50	772.40			9.05	64.75		29.35						308.15		12.25	25.05		97.30	181.25	12.75		81.80	72.75		66	2	1795.35	14142.55	
20 Wed				669.20				56.05		129.20						1,308.15		17.95		32.70	176.45	331.45	12.55	164.15	155.70	207.80		116	1	3261.35	17403.90	
21 Thu								109.45		36.70						853.80	12.85	4.65		114.10	272.00	340.95	25.15	32.90	103.50	146.75		78	0	2052.80	19456.70	
22 Fri										79.65						767.05					78.50	65.10	25.65			52.65		45	1	1068.60	20525.30	
23 Sat																												0	0	0.00	20525.30	
24 Sun																														0.00	20525.30	
25 Mon							12.85	100.80		24.05						1,181.60	**9.85**			8.10				215.25	124.80			71	0	1677.30	22202.60	
26 Tue			26.00				12.15	98.20		96.50						863.30	250.00	65.25			97.10	33.00			182.95	32.50		80	2	1756.95	23959.55	
27 Wed				35.95			111.35	138.70		39.80						12.45		766.10		12.85	97.00	104.75	25.75	12.40	143.60	104.50		71	2	1605.20	25564.75	
28 Thu							41.40	50.10		129.25							33.05	649.85	11.85		161.95	240.35	12.50		238.30	150.20		64	1	1718.80	27283.55	
																														0.00	27283.55	
#VALUE!																														0.00	27283.55	
#VALUE!																														0.00	27283.55	
Product Totals	97.20	226.00	704.20	1,501.40	0.00	0.00	741.70	862.95	0.00	1,408.05	0.00	0.00	0.00	0.00	0.00	6,003.40	500.45	2,169.35	86.40	230.05	2,603.00	3,213.80	430.10	978.00	3,559.65	1,967.85	0.00	1211	25	27283.55	27283.55	0
Average T/Day	4.05	9.42	29.34	62.56	0.00	0.00	30.90	35.96	0.00	58.67	0.00	0.00	0.00	0.00	0.00	250.14	20.85	90.39	3.60	9.59	108.46	133.91	17.92	40.75	148.32	81.99	0.00	50	Actual Mth average Truck movements			0
																													49			0

Average tonnes/day	1,137 t	Mth Working days	20	Days worked	24	Work days remaining	-4	SAP Sales Budget	21,885 t	Prog. Forecast Mth Total	22,736 t

March 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031- OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000059-DGB 20 R/BASE	5000060-DGS 20 R/BASE	5201128-SIDE & OVERLAY	5000261-NO.1 R/BASE	5000262 NO.2 R/BASE	5000299- 40MM R/BASE	5000259- 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214-CRUSHER DUST	QFOXM5- MAN SAND	5000123- SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Fri			49.80	599.40				43.10		77.45						113.10		421.00	15.05	12.60	137.60	143.95	24.95		104.40	66.00		71	0	1808.40	1808.40	
02 Sat																												0	0	0.00	1808.40	
03 Sun																														0.00	1808.40	
04 Mon			146.95	761.90						81.30								25.30	12.65		123.20	136.65	25.50		246.45	123.65		81	2	1683.55	3491.95	
05 Tue			12.70				25.55	54.10		73.30						315.05	76.50	25.15		10.50	64.85	196.25	50.70	60.30	159.40	105.50		67	2	1229.85	4721.80	
06 Wed										82.80						401.20	81.90			8.15	97.40	132.25		32.90	279.30	32.55		72	0	1148.45	5870.25	
07 Thu							44.55	6.00		173.75						313.65		9.50			65.25	99.00	12.50	64.40	114.20	65.95		51	0	968.75	6839.00	
08 Fri			12.85				26.45	10.05		13.70								32.05	12.80		98.65	163.35	25.25	32.70	114.60	105.45		32	2	647.90	7486.90	
09 Sat																												0	0	0.00	7486.90	
10 Sun																														0.00	7486.90	
11 Mon								9.85		121.70	37.70					100.10		22.05	3.20		213.65	167.85	45.40	374.30	193.00	64.25		63	1	1353.05	8839.95	
12 Tue			13.20	37.00			12.45	33.05		55.10						898.45	135.15	11.05		10.55	76.15	32.45	38.40	392.85	132.35	163.20		83	0	2041.40	10881.35	
13 Wed			13.10	156.65				42.80		84.00						614.55	33.05				162.10	175.35	25.65		310.45	104.50		80	2	1722.20	12603.55	
14 Thu								23.45		13.70						94.15	162.55			10.25	104.10	163.10	12.40		205.10	150.50		47	1	939.30	13542.85	
15 Fri																47.20				8.20	98.40	164.10	32.50		106.50	65.50		25		522.40	14065.25	
16 Sat																												0	0	0.00	14065.25	
17 Sun																														0.00	14065.25	
18 Mon				24.35				12.00		57.80						79.45				13.35	98.15	209.50	12.80		49.60	169.20		36	2	726.20	14791.45	
19 Tue				57.45						26.55						160.55					97.25	130.25			326.90	99.25	2.80	41	0	901.00	15692.45	
20 Wed								19.95		43.65						94.25	13.05	11.05			111.75	295.95			113.80	172.05		44	1	875.50	16567.95	
21 Thu				73.65						12.25						170.90	3.85				185.30	228.85			327.60	98.65		50	1	1101.05	17669.00	
22 Fri				60.50				48.00		61.95						94.40		552.60			163.95	265.15	12.45		95.60	156.10		59	2	1510.70	19179.70	
23 Sat																												0	0	0.00	19179.70	
24 Sun																														0.00	19179.70	
25 Mon								11.50		25.00						93.25					45.20	64.85			128.30	20.10		22	1	388.20	19567.90	
26 Tue								31.90		63.70											176.50	136.65		65.00	84.00	118.05		34	1	675.80	20243.70	
27 Wed								9.80								48.35					78.90	98.85		27.40	87.95	85.50		19	1	436.75	20680.45	
28 Thu								10.00		24.50						226.75					32.70		12.30	166.45	125.85	19.65		39	1	618.20	21298.65	
29 Fri								41.00		61.25						615.70	84.35		11.95	6.25	65.10	131.10	49.80	71.95	163.75	85.05		64	2	1387.25	22685.90	
30 Sat																												0	0	0.00	22685.90	
31 Sun																														0.00	22685.90	
Product Totals	0.00	0.00	248.60	1,770.90	0.00	0.00	109.00	406.55	0.00	1,153.45	37.70	0.00	0.00	0.00	0.00	4,481.05	590.40	1,109.75	55.65	79.85	2,296.15	3,135.45	380.60	1,288.25	3,469.10	2,070.65	2.80	1080	22	22685.90	22685.90	0
Average T/Day	0.00	0.00	9.56	68.11	0.00	0.00	4.19	15.64	0.00	44.36	1.45	0.00	0.00	0.00	0.00	172.35	22.71	42.68	2.14	3.07	88.31	120.59	14.64	49.55	133.43	79.64	0.11	42	Actual Mth average Truck movements			0
																													41			0

Average tonnes/day	873 t	Mth Working days	21	Days worked	26	Work days remaining	-5	SAP Sales Budget	22,334 t	Prog. Forecast Mth Total	18,323 t

April 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031 - OVERBURDEN	5000257- 10MM ASPH/ALT	5000403- 14MM ASPH/ALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071 -14MM DRAIN	5101087- 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000059-DGB 20 R/BASE	5000060-DGS 20 R/BASE	5201128-SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262 NO.2 R/BASE	5000239-40MM R/BASE	5000259 - 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214 - CRUSHER DUST	QFOXCD	QFOXMS- MAN SAND	5000122- SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	5000031 - OVERBURDEN	
01 Mon			37.95				8.05			32.60										12.05	129.80	130.55			282.00		97.30		33	2	730.30	730.30		
02 Tue								50.90		36.75								78.80			45.10	64.25	32.40	33.00	13.15		20.00		20	1	374.35	1104.65		
03 Wed										34.85											77.35	65.35		13.65			52.55		11	1	243.75	1348.40		
04 Thu			12.00	24.10				72.10		25.90										73.35	98.85	109.25	44.85	12.05	80.45		263.35		41	4	816.25	2164.65		
05 Fri				36.00				35.65		90.15						275.70					189.45	319.25	32.20		136.90		160.60		52	3	1275.90	3440.55		
06 Sat																													0	0	0.00	3440.55		
07 Sun																															0.00	3440.55		
08 Mon			12.65							84.00						47.20					193.55	227.75	12.80	118.45	114.25		181.05		47	1	991.70	4432.25		
09 Tue			196.30				38.60	59.00		87.60						202.80	154.80				82.85	202.05	24.90	73.80	50.35		91.15		53	5	1264.20	5696.45		
10 Wed								52.50		32.70						216.60	171.35				131.10	130.65		40.75	185.75		136.90		43	4	1098.30	6794.75		
11 Thu			12.70					49.65		63.60											97.35	98.50	25.35	41.00	153.90		65.05		30	4	607.10	7401.85		
12 Fri										24.60						11.65		25.10	35.90		98.65	104.40	25.45	32.05	47.50		267.70		31	6	673.00	8074.85		
13 Sat																													0	0	0.00	8074.85		
14 Sun																															0.00	8074.85		
15 Mon			12.55							52.20						388.20		49.60	3.15		136.75	45.25			25.10		124.60		34	3	837.40	8912.25		
16 Tue								22.50		52.35						987.30			24.75		32.45	33.10	90.25		77.80		64.20		49	1	1384.70	10296.95		
17 Wed								45.20		57.55						299.70	25.50		18.15		117.35	77.50			132.20		32.00		46	2	805.15	11102.10		
18 Thu							23.85			101.20						70.95	38.40	24.80	36.95	12.75	97.60	64.65	12.45		195.85		19.90		39	1	699.35	11801.45		
19 Fri																															0.00	11801.45		
20 Sat																													0	0	0.00	11801.45		
21 Sun																															0.00	11801.45		
22 Mon																															0.00	11801.45		
23 Tue			66.30					20.05		171.75								32.95			65.00	65.05	25.70		92.10		104.30		34	2	643.20	12444.65		
24 Wed			11.10					32.60		91.65											118.20	111.00			92.55		32.25		24	1	489.35	12934.00		
25 Thu																															0.00	12934.00		
26 Fri										59.10									32.25		78.10	220.85	25.65		81.65		110.65		22	0	608.25	13542.25		
27 Sat																													0	0	0.00	13542.25		
28 Sun																															0.00	13542.25		
29 Mon										135.30						38.65	50.65		4.20		212.75	250.75			336.80		173.25		46	0	1202.35	14744.60		
30 Tue			35.95					12.30		69.15											213.30	167.70	20.10		154.80		162.50		38	1	835.80	15580.40		
																															0.00	15580.40		
Product Totals	0.00	0.00	397.50	60.10	0.00	301.00	70.50	452.45	0.00	1,303.00	0.00	0.00	0.00	0.00	0.00	2,538.75	440.70	211.25	155.35	98.15	2,215.55	2,487.85	372.10	364.75	2,253.10	0.00	2,159.30	0.00	693	42	15881.40	15580.40	0.00	
Average T/Day	0.00	0.00	17.28	2.61	0.00	0.00	3.07	19.67	0.00	56.65	0.00	0.00	0.00	0.00	0.00	110.38	19.16	9.18	6.75	4.27	96.33	108.17	16.18	15.86	97.96	0.00	93.88	0.00	30	Actual Mth average Truck movements			0.00	
																														28			0.00	

Average tonnes/day	690 t	Mth Working days	19	Days worked	23	Work days remaining	-4	SAP Sales Budget	20,597 t	Prog. Forecast Mth Total	13,119 t

May 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031 - OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000299- 40MM R/BASE	5000259- 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	5000031 - OVERBURDEN	
01 Wed			543.35							45.10											136.10	225.00			80.35	174.70		41	3	**1204.60**	**1204.60**		
02 Thu			2,084.90							207.20						433.15					136.25	105.25			112.75	98.05		110	1	**3177.55**	**4382.15**		
03 Fri			2,041.55							170.15						565.65			10.55		44.80	65.15	51.40		297.05	85.40		130	5	**3331.70**	**7713.85**		
04 Sat																												0	0	**0.00**	**7713.85**		
05 Sun																														**0.00**	**7713.85**		
06 Mon			2,072.40				12.55	19.65		12.55						388.80			3.25		64.75	109.85			37.30	99.30		102	6	**2820.40**	**10534.25**		
07 Tue			1,779.90				12.80			215.25						357.90					117.10	147.85	12.95		180.55	64.40		86	4	**2888.70**	**13422.95**		
08 Wed			1,994.75					19.75		191.25						500.40	19.10	123.20	26.70		192.45	206.75	52.25		161.30	110.90		121	10	**3598.80**	**17021.75**		
09 Thu			1,993.95				12.35			90.55						273.15		144.40	19.30		208.10	162.15	12.85		128.25	236.80		118	11	**3281.85**	**20303.60**		
10 Fri			1,883.90							59.30						81.70	20.30	108.05			111.05	167.35	12.85		209.10	85.60		88	9	**2739.20**	**23042.80**		
11 Sat																												0	0	**0.00**	**23042.80**		
12 Sun																														**0.00**	**23042.80**		
13 Mon			1,795.50							130.30						176.45	11.45				164.35	163.45			89.35	65.30		75	1	**2596.15**	**25638.95**		
14 Tue			1,968.95				25.80									126.10			3.20		65.60	65.65	20.30		100.20	130.10		78	3	**2505.90**	**28144.85**		
15 Wed			2,039.05					58.25		11.55	11.75					160.65					98.30	110.40	32.85		146.45	52.60		88	5	**2721.85**	**30866.70**		
16 Thu			1,416.50					19.80								106.30	65.90		20.00		32.50	65.30	24.95		139.65	65.90		69	4	**1956.80**	**32823.50**		
17 Fri			24.25							40.35								12.45	12.45		12.95	32.40			154.10	52.25		20	5	**341.20**	**33164.70**		
18 Sat																												0	0	**0.00**	**33164.70**		
19 Sun																														**0.00**	**33164.70**		
20 Mon										74.10						162.45					131.40	130.55	12.45		69.35	130.60		37	3	**710.90**	**33875.60**		
21 Tue								25.15		12.45						44.70		37.15	19.85		98.45	97.70	25.25		70.05	52.85		23	4	**483.60**	**34359.20**		
22 Wed			2,393.70				25.70	20.20								19.95	32.25	24.15	20.25		86.20	169.50	25.45		152.25	77.80		93	8	**3047.40**	**37406.60**		
23 Thu			2,356.45				12.30			84.50	7.35					101.20	19.90				135.40	71.45	12.45		438.25	90.90		107	15	**3330.15**	**40736.75**		
24 Fri			2,020.25							52.75						52.55					109.00	131.20			139.50	118.55		80	8	**2623.80**	**43360.55**		
25 Sat			1,174.95													32.40												32	0	**1207.35**	**44567.90**		
26 Sun																														**0.00**	**44567.90**		
27 Mon							12.50	20.00		98.25	45.05					31.70	54.20				207.20	261.55	64.85		76.20	129.85		45	9	**1001.35**	**45569.25**		
28 Tue			2,313.70					44.25		217.10	46.30					148.60	58.45		19.90		162.40	161.40	38.80		218.05	144.55		116	10	**3573.50**	**49142.75**		
29 Wed		32.50	2,466.70					59.20			59.40					103.05	53.20				165.40	129.70	12.75		274.45	131.00		109	10	**3487.35**	**52630.10**		
30 Thu		385.00	1,905.05							104.20	89.50					66.00	116.85		19.50		230.80	188.00	11.50		108.90	169.25		116	7	**3394.55**	**56024.65**		
31 Fri			1,561.50					12.45		97.85	14.85					311.10	55.85		24.60		208.25	182.05		33.25	222.10	176.65		94	2	**2900.50**	**58925.15**		
Product Totals	**0.00**	**417.50**	**37,831.25**	**0.00**	**0.00**	**0.00**	**114.00**	**298.70**	**0.00**	**1,914.75**	**274.20**	**0.00**	**0.00**	**0.00**	**0.00**	**4,243.95**	**507.45**	**449.40**	**199.55**	**0.00**	**2,918.80**	**3,149.65**	**423.90**	**33.25**	**3,605.50**	**2,543.30**	**0.00**	**1978**	**143**	**58925.15**	**58925.15**	**0.00**	
Average T/Day	**0.00**	**15.46**	**1,401.16**	**0.00**	**0.00**	**0.00**	**4.22**	**11.06**	**0.00**	**70.92**	**10.16**	**0.00**	**0.00**	**0.00**	**0.00**	**157.18**	**18.79**	**16.64**	**7.39**	**0.00**	**108.10**	**116.65**	**15.70**	**1.23**	**133.54**	**94.20**	**0.00**	**73**	Actual Mth average Truck movements **68**			**0.00**	

Average tonnes/day	2,182 t	**Mth Working days**	23	**Days worked**	27	**Work days remaining**	-4	**SAP Sales Budget**	23,498 t	**Prog. Forecast Mth Total**	

June 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031- OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522- 300MM ROCK	5000260- 150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000299- 40MM R/BASE	5000289- 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Sat																												0	0	0.00	0.00	
02 Sun																														0.00	0.00	
03 Mon			559.50				12.45			20.05						201.40	32.50				244.45	185.40		12.40	76.05	135.35		64	3	1479.55	1479.55	
04 Tue			2,611.00							186.20	11.40					284.95			36.15		200.35	102.85			208.20	167.60		122	2	3808.70	5288.25	
05 Wed			1,951.20				38.85	130.35		83.65						33.10			49.40		212.10	219.80	24.80	32.00	92.65	148.50		92	6	3016.40	8304.65	
06 Thu			2,219.50					19.75		44.95	11.50								74.60	11.25	212.05	156.50	90.75	64.10	168.55	188.05		106	7	3261.55	11566.20	
07 Fri			2,345.50				12.35			147.65	32.85					447.65		36.05	43.65		71.95	204.30		25.30	264.90	97.20		129	5	3729.35	15295.55	
08 Sat																												0	0	0.00	15295.55	
09 Sun																														0.00	15295.55	
10 Mon																												0		0.00	15295.55	
11 Tue										19.75	53.45							18.70			97.45	98.70		32.85	84.15	130.35		22	1	535.40	15830.95	
12 Wed			2,135.05				11.70			45.05	69.70					33.15	19.35	54.85	12.55		218.25	136.70	45.10	64.40	158.25	105.50		102	5	3109.60	18940.55	
13 Thu			1,849.00					32.30		53.70	41.25					101.25		840.30			106.05	39.25			241.50	72.20		105	4	3376.80	22317.35	
14 Fri			1,844.75							20.30	68.35					203.95	19.40	649.20			221.95	143.40		32.25	93.10	109.60		109	5	3406.25	25723.60	
15 Sat																												0	0	0.00	25723.60	
16 Sun																														0.00	25723.60	
17 Mon										32.35	79.65					20.40	39.50	319.10	19.60		201.05	98.35	25.05		189.05	218.80		53	7	1242.90	26966.50	
18 Tue			1,746.35				12.45			118.80	165.65							65.75	64.85		239.80	196.55	50.90		410.40	205.85		112	6	3277.35	30243.85	
19 Wed			732.40					12.30		134.30							64.25	90.35			195.80	109.90	32.15		276.20	84.10		72	4	1731.75	31975.60	
20 Thu								65.90		186.15								32.60			195.15	168.55	45.80		197.20	149.80		45	6	1041.15	33016.75	
21 Fri			2,093.40					19.80		52.25						49.80	59.15	22.90	10.95		234.40	97.65			173.30	233.65		98	8	3047.25	36064.00	
22 Sat																												0	0	0.00	36064.00	
23 Sun																														0.00	36064.00	
24 Mon								22.95		46.40						35.15		12.15			84.15	97.80			77.00	50.65		19	2	426.25	36490.25	
25 Tue										10.80											98.40	32.00			50.10	66.15		11	0	257.45	36747.70	
26 Wed										34.75															93.60			6	0	128.35	36876.05	
27 Thu							12.05	12.25		86.25											64.85	85.60	12.15		145.05	45.10		25	1	463.30	37339.35	
28 Fri							12.25			12.85						23.60			19.05		98.65	161.15			10.80	96.25		18	0	434.60	37773.95	
29 Sat																												0	0	0.00	37773.95	
30 Sun																														0.00	37773.95	
																														0.00	37773.95	
Product Totals	0.00	0.00	20,087.65	0.00	0.00	0.00	112.10	315.60	0.00	1,336.20	533.80	0.00	0.00	0.00	0.00	1,434.40	234.15	2,141.95	330.80	11.25	2,996.85	2,334.45	326.70	263.30	3,010.05	2,304.70	0.00	1310	72	37773.95	37773.95	0
Average T/Day	0.00	0.00	803.51	0.00	0.00	0.00	4.48	12.62	0.00	53.45	21.35	0.00	0.00	0.00	0.00	57.38	9.37	85.68	13.23	0.45	119.87	93.38	13.07	10.53	120.40	92.19	0.00	52	Actual Mth average Truck movements			0
																													50			0

Average tonnes/day	1,511 t	Mth Working days	20	Days worked	25	Work days remaining	-5	SAP Sales Budget	22,113 t	Prog. Forecast Mth Total	30,219 t

July 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029-SELECT FILL	5000031 - OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071 - 14MM DRAIN	5101087- 20MM DRAIN	5066522- 300MM ROCK	5000260- 150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128 - SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000239- 40MM R/BASE	5000259 -40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214 - CRUSHER DUST	QFOXMS- MAN SAND	5000122- SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Mon			152.35				12.80	12.00								52.90	5.00	12.45			102.75	95.80			155.75	64.80		26	1	666.60	666.60	
02 Tue			1,962.70				12.45	78.00		118.90						180.15		24.90			98.90	65.05	39.15		56.95	25.65		81	3	2662.80	3329.40	
03 Wed			2,430.95				12.80	9.70		85.05						19.45		382.90			193.70	150.55			419.15	97.55		115	3	3801.80	7131.20	
04 Thu			1,560.40				25.25	44.90		160.90						215.15	4.95	44.55	24.20		215.55	196.70	25.50		148.55	220.05		95	6	2886.65	10017.85	
05 Fri			1,720.65														48.00				32.85	32.10			12.15	64.30		55	1	1910.05	11927.90	
06 Sat			1,869.35																									48	0	1869.35	13797.25	
07 Sun																														0.00	13797.25	
08 Mon			2,406.35				12.60			17.80						46.00	39.95	153.95			195.40	78.00		100.40	169.30	149.10		105	7	3368.85	17166.10	
09 Tue			177.30				20.65			63.15									7.90		223.10	57.15	51.80	254.70	253.55	149.00		60	2	1258.30	18424.40	
10 Wed		96.85	25.55													107.50						131.75			213.15	65.75		31	0	640.55	19064.95	
11 Thu			22.50				9.90	33.15		24.70						429.20		31.70				65.60	32.80		122.00	65.50		36	0	837.05	19902.00	
12 Fri			2,023.85				20.20	14.45		219.65						608.00						202.40	12.75		123.70	215.85		120	1	3440.85	23342.85	
13 Sat			966.70																									25	0	966.70	24309.55	
14 Sun																														0.00	24309.55	
15 Mon			103.20					12.45		45.00						256.45		9.00				194.30	24.40	163.30	207.60	171.40		64	2	1187.10	25496.65	
16 Tue			1,977.55				12.25	39.75		25.65						281.15						97.90			152.85	132.75		81	0	2719.85	28216.50	
17 Wed			1,015.10					45.00		12.85						138.95						201.00	25.50		283.45	203.40		75	2	1925.25	30141.75	
18 Thu			2,004.60				65.95	71.35		140.90						225.70		45.65				285.55	20.20	32.70	89.55	142.85		100	2	3125.00	33266.75	
19 Fri			2,014.70							50.90						543.75		32.90			31.90	226.70	19.50		199.35	170.30		112	2	3290.00	36556.75	
20 Sat			1,012.15																									31	0	1012.15	37568.90	
21 Sun																														0.00	37568.90	
22 Mon			2,037.35				32.25	89.15		243.00						98.80		32.70			52.85	98.20	19.55	32.30	192.60	154.45		93	3	3083.20	40652.10	
23 Tue			1,634.25					32.50		12.60						48.00	89.60					130.55	25.75		248.25	66.50		82	0	2288.00	42940.10	
24 Wed			2,000.00					11.80		109.80							37.35	12.70			65.55	142.60	12.35		118.25	150.50		85	2	2660.90	45601.00	
25 Thu			1,523.30					71.85		38.25						225.75	32.65				64.70	148.25	25.35		213.25	188.80		81	1	2532.15	48133.15	
26 Fri			2,518.50				49.20	23.25		65.15						417.05					32.40	101.25	31.95		269.35	162.10		122	0	3670.20	51803.35	
27 Sat																												0	0	0.00	51803.35	
28 Sun																														0.00	51803.35	
29 Mon		129.45	1,499.70					112.55		61.45						372.40	25.30					130.00	24.70		193.85	137.20		93	4	2686.60	54489.95	
30 Tue			1,066.85	646.30			23.55			25.95						543.55	109.90	63.95				105.30	12.40		147.95	124.25		104	1	2869.95	57359.90	
31 Wed										66.10						82.45	12.30					65.75	37.80		121.80	138.65		32	2	524.85	57884.75	
Product Totals	0.00	226.30	35,725.90	646.30	0.00	0.00	309.85	701.85	0.00	1,587.75	0.00	0.00	0.00	0.00	0.00	4,892.35	405.00	847.35	32.10	0.00	1,309.65	3,002.45	441.45	583.40	4,112.35	3,060.70	0.00	1952	45	57884.75	57884.75	0
Average T/Day	0.00	8.38	1,323.18	23.94	0.00	0.00	11.48	25.99	0.00	58.81	0.00	0.00	0.00	0.00	0.00	181.20	15.00	31.38	1.19	0.00	48.51	111.20	16.35	21.61	152.31	113.36	0.00	72	Actual Mth average Truck movements			0
																													71			0

Average tonnes/day	2,144 t	**Mth Working days**	22	**Days worked**	27	**Work days remaining**	-5	**SAP Sales Budget**	22,572 t	**Prog. Forecast Mth Total**	47,165 t	

August 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031 - OVERBURDEN	5000257 - 10MM ASPHALT	5000403 - 14MM ASPHALT	5202209 - 7MM DRAIN	5101086 - 10MM DRAIN	5104071 - 14MM DRAIN	5101087 - 20MM DRAIN	5066522-300MM ROCK	5000260-150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000299- 40MM R/BASE	5000299- 40MM COBBLE	5000024 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Thu										26.60											20.30	96.70			189.30	45.50		24	0	378.40	378.40	
02 Fri		86.85						7.50		39.75						22.00					65.45	98.45	45.20		85.15	110.40		27	2	560.75	939.15	
03 Sat																												0	0	0.00	939.15	
04 Sun																														0.00	939.15	
05 Mon		33.15	1,634.05					34.00		24.85						12.85	13.20				131.30	64.90	32.55		26.05	98.85		68	3	2105.75	3044.90	
06 Tue		749.70	2,094.85	12.30												101.25	58.70	46.30				109.20	51.00		263.85	115.90		117	1	3603.05	6647.95	
07 Wed		715.45	2,080.85				2.75	5.70		106.25	4.95					227.45		12.55			32.60	163.45			184.95	32.15		112	0	3569.10	10217.05	
08 Thu		93.55	2,064.70				2.00	17.85		123.30						487.20	62.40				137.55	97.95	25.40		73.45	91.35		115	4	3276.70	13493.75	
09 Fri		292.85	2,078.15				12.65			12.75						594.55	59.70				190.05	213.15	24.90		184.75	53.20		130	2	3716.70	17210.45	
10 Sat			1,193.10							24.00												65.55	12.75		79.65	32.35		44	0	1407.40	18617.85	
11 Sun																														0.00	18617.85	
12 Mon		1,651.05		35.85				71.45		25.45						170.55					97.90	130.35			84.30	97.30		86	2	2364.20	20982.05	
13 Tue		1,520.25		47.45			33.05	57.65		3.20						123.15		12.40			195.65	379.20	19.75		185.80	183.70		97	1	2761.25	23743.30	
14 Wed								21.30		65.75						407.00		159.40			202.20	240.95	24.90		332.60	272.40		64	1	1726.50	25469.80	
15 Thu		1,419.70	586.45				51.80	50.80		14.45						410.70	25.35	954.55			33.15	130.25	12.80		220.05	64.55		139	1	3974.60	29444.40	
16 Fri		1,363.05		23.25			12.50	11.40		38.05						258.35	114.35	1,091.20			248.65	357.50	24.85		54.20	191.10		132	0	3788.45	33232.85	
17 Sat																												0	0	0.00	33232.85	
18 Sun																														0.00	33232.85	
19 Mon			98.85	38.45				11.80		320.10						77.20					206.35	193.30	32.70		252.20	115.10		69	1	1346.05	34578.90	
20 Tue				7.50				18.75		129.05	35.00					356.55	112.95	636.65			155.20	244.10	90.05		283.55	136.40		101	11	2205.75	36784.65	
21 Wed		108.60					65.45									52.35	12.40	446.95			182.20	130.65	66.05		483.50	150.50		74	4	1698.65	38483.30	
22 Thu		1,672.25	379.55							32.70											136.10	179.70	64.70		244.05	102.90		104	5	2811.95	41295.25	
23 Fri			25.35					12.50		250.00						19.10		983.45			98.70	168.10	12.85		184.50	98.05		72	6	1852.60	43147.85	
24 Sat																												0	0	0.00	43147.85	
25 Sun																														0.00	43147.85	
26 Mon		1,787.75								50.60						580.10		32.30			20.05	85.65			130.90	70.70		90	3	2758.05	45905.90	
27 Tue			38.45				62.20			111.10						759.75		468.80			257.35	244.60	12.50		359.80	233.20		104	5	2547.75	48453.65	
28 Wed		191.20	38.30				33.10	49.15		51.85						387.55		8.95			200.10	174.90	32.75		148.55	195.35		60	5	1511.75	49965.40	
29 Thu		1,285.85								129.80						182.85		35.50			164.35	188.65	32.90		87.65	109.75		75	5	2217.30	52182.70	
30 Fri		1,115.85								78.35						253.35		164.50			98.10	233.35	33.30		98.30	71.35		71	0	2146.45	54329.15	
31 Sat																												0	0	0.00	54329.15	
Product Totals	**0.00**	**14,087.10**	**12,312.65**	**164.80**	**0.00**	**0.00**	**275.50**	**369.85**	**0.00**	**1,657.95**	**39.95**	**0.00**	**0.00**	**0.00**	**0.00**	**5,483.85**	**459.05**	**5,053.50**	**0.00**	**0.00**	**2,873.30**	**3,990.60**	**651.90**	**0.00**	**4,237.10**	**2,672.05**	**0.00**	**1975**	**52**	**54329.15**	**54329.15**	**0**
Average T/Day	**0.00**	**521.74**	**456.02**	**6.10**	**0.00**	**0.00**	**10.20**	**13.70**	**0.00**	**61.41**	**1.48**	**0.00**	**0.00**	**0.00**	**0.00**	**203.11**	**17.00**	**187.17**	**0.00**	**0.00**	**106.42**	**147.80**	**24.14**	**0.00**	**156.93**	**98.96**	**0.00**	**73**	Actual Mth average Truck movements **71**			**0**
																																0

Average tonnes/day	2,012 t	**Mth Working days**	23	**Days worked**	27	**Work days remaining**	-4	**SAP Sales Budget**	24,176 t	**Prog. Forecast Mth Total**	46,280 t
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September 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	500029- SELECT FILL	5000031 - OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086 - 10MM DRAIN	5104071- 14MM DRAIN	5101087- 20MM DRAIN	5066522- 300MM ROCK	5000260- 150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000239- 40MM R/BASE	5000259- 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000802- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Sun																														**0**	**0**	
02 Mon		1,971.70	138.15	362.35			33.00			58.25						346.40		26.85			141.80	135.40			188.25	65.05		110	1	**3467**	**3467**	
03 Tue		1,959.10	104.30					84.55		82.75						23.40		18.15			163.95	141.10	69.50		184.05	92.40		99	5	**2923**	**6390**	
04 Wed		1,931.35					31.80			98.85						20.30		14.70			97.10	214.20	50.30		80.05	150.10		90	5	**2689**	**9079**	
05 Thu		1,744.15								122.55						23.55	37.85	327.95			169.85	234.25	25.10		243.05	111.50		98	3	**3040**	**12119**	
06 Fri		1,584.50	76.85							89.65							147.65	261.50			169.15	247.00	32.60		448.25	200.70		113	2	**3258**	**15377**	
07 Sat																												0	0	**0**	**15377**	
08 Sun																														**0**	**15377**	
09 Mon		1,810.75					65.60	39.00		44.35						107.60		130.55			144.25	163.00	12.40		118.00	117.40		91	1	**2753**	**18130**	
10 Tue		1,193.90								69.40						322.80		180.45			163.75	293.90	69.55		376.00	136.05		99	2	**2806**	**20936**	
11 Wed		962.65					38.25			174.45						939.20	25.55	5.95			89.10	140.30	45.30		213.45	103.35		98	6	**2738**	**23673**	
12 Thu										25.75						914.30	90.30	101.05			92.30	206.10			182.50	77.45		75	4	**1690**	**25363**	
13 Fri			25.00					9.95		103.25						707.85	4.55	34.00			202.20	97.75	79.05		88.15	180.85		66	2	**1533**	**26895**	
14 Sat																												0	0	**0**	**26895**	
15 Sun																														**0**	**26895**	
16 Mon		1,436.70						29.90		58.75							24.75				193.45	266.80	51.10		103.30	116.15		75	4	**2281**	**29176**	
17 Tue		1,399.50								56.95						209.15					194.55	333.65	78.15		166.50	175.00		99	9	**2613**	**31790**	
18 Wed		1,532.75	32.45					65.55		46.60	11.85					281.80	32.30				163.85	194.35	20.10		215.70	142.25		91	6	**2740**	**34529**	
19 Thu		1,462.15						96.05								162.05					165.20	183.75	25.45		176.95	196.40		82	3	**2468**	**36997**	
20 Fri		1,271.20	229.65					31.75		109.30						135.35					32.40	103.45	40.20		216.30	90.10		78	7	**2260**	**39257**	
21 Sat																												0	0	**0**	**39257**	
22 Sun																														**0**	**39257**	
23 Mon		1,346.90	20.00					44.55		50.65						94.70					111.65	132.75	64.55		260.95	156.70		78	5	**2283**	**41540**	
24 Tue		1,499.65	31.75							64.90						24.05					78.50	151.00			87.55	85.40		63	5	**2023**	**43563**	
25 Wed		1,380.40	31.90				38.60	47.30		29.55						7.50	11.90				131.00	98.15	24.90		171.45	98.05		63	3	**2071**	**45634**	
26 Thu		1,689.85	64.70				8.05			103.05						24.90					116.65	189.65	32.55		253.55	69.45		85	6	**2552**	**48186**	
27 Fri		1,516.15					37.25			44.70											150.05	182.30	38.35		244.55	109.80		73	5	**2323**	**50510**	
28 Sat																												0	0	**0**	**50510**	
29 Sun																														**0**	**50510**	
30 Mon		2,261.10								131.60						566.75	1.75				129.25	194.25			168.20	128.80		114	1	**3582**	**54091**	
																														0	**54091**	
Product Totals	**0.00**	**29,954.45**	**754.75**	**362.35**	**0.00**	**0.00**	**252.55**	**448.60**	**0.00**	**1,565.30**	**11.85**	**0.00**	**0.00**	**0.00**	**0.00**	**4,911.65**	**376.60**	**1,101.15**	**0.00**	**0.00**	**2,900.00**	**3,903.10**	**759.15**	**0.00**	**4,186.75**	**2,602.95**	**0.00**	**1840**	**85**	**54091**	**54091**	**0**
Average T/Day	**0.00**	**1,198.18**	**30.19**	**14.49**	**0.00**	**0.00**	**10.10**	**17.94**	**0.00**	**62.61**	**0.47**	**0.00**	**0.00**	**0.00**	**0.00**	**196.47**	**15.06**	**44.05**	**0.00**	**0.00**	**116.00**	**156.12**	**30.37**	**0.00**	**167.47**	**104.12**	**0.00**	**74**	Actual Mth average Truck movements **70**			**0**
																																0

Average tonnes/day	2,164 t	**Mth Working days**	20	**Days worked**	25	**Work days remaining**	-5	**SAP Sales Budget**	22,409 t	**Prog. Forecast Mth Total**	43,273 t

October 2019

	5000263-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031 - OVERBURDEN	5000257- 10MM ASPHALT	5000403- 14MM ASPHALT	5202209- 7MM DRAIN	5101086- 10MM DRAIN	5104071 -14MM DRAIN	5101087- 20MM DRAIN	5066522- 300MM ROCK	5000260- 150MM ROCK	5000059- DGB 20 R/BASE	5000060- DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261- NO.1 R/BASE	5000262- NO.2 R/BASE	5000239- 40MM R/BASE	5000259- 40MM COBBLE	5000024- 63MM BALLAST	QFOX10- 10MM AGG	QFOX20- 20MM AGG	QFOX7- 7MM AGG	5000602- QUARRY SAND	5000214- CRUSHER DUST	QFOXMS- MAN SAND	5000123-SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN TRUCK MOVEMENTS
01 Tue		1,949.45						77.75		45.75						176.50		105.35			95.10	130.55	13.00		634.40	130.90		102	3	3358.75	3358.75	
02 Wed		2,052.20	32.40					45.60		194.85						243.50					131.90	195.85	32.40		101.20	96.05		96	4	3125.95	6484.70	
03 Thu			214.35	204.05				37.65		52.25						145.15					310.10	212.85			236.50	206.50		61	1	1619.40	8104.10	
04 Fri		1,690.20					32.50									32.30	26.35				66.80	243.00	32.50		134.45	196.15		75	5	2454.25	10558.35	
05 Sat																												0	0	0.00	10558.35	
06 Sun																														0.00	10558.35	
07 Mon																														0.00	10558.35	
08 Tue		2,021.45	102.00				64.05	105.10									10.80	195.30			130.35	196.15	52.60		82.80	262.05		101	2	3222.65	13781.00	
09 Wed		1,280.40	130.70					57.95		72.45						172.40		64.45			202.80	283.70			195.50	135.70		83	4	2596.05	16377.05	
10 Thu		1,990.15						66.45		66.70						97.20					196.00	227.15	65.45		150.25	176.20		94	3	3035.55	19412.60	
11 Fri		1,318.75	38.75							20.15						85.10					117.50	128.55	12.65		85.85	163.20		61	3	1970.50	21383.10	
12 Sat																												0	0	0.00	21383.10	
13 Sun																														0.00	21383.10	
14 Mon		2,385.30					33.15			25.20						99.40					174.90	390.45	20.35		91.20	163.75		101	4	3383.70	24766.80	
15 Tue		2,273.00						38.60		130.65						99.00					149.55	240.40	83.95		169.45	155.95		102	7	3340.55	28107.35	
16 Wed		2,191.65	88.35					58.15		69.00						85.50					168.75	161.90			46.50	228.00		98	2	3097.80	31205.15	
17 Thu		2,078.35	43.15				65.00	25.80		143.20						89.40					98.60	335.85	25.20		145.50	171.00		99	4	3221.05	34426.20	
18 Fri		2,038.75	10.75					84.90		12.50						117.50		38.40			235.35	297.80	71.60		291.10	201.35		104	3	3400.00	37826.20	
19 Sat																												0	0	0.00	37826.20	
20 Sun																														0.00	37826.20	
21 Mon		2,306.80					38.30	39.25		91.05						469.80		904.05			151.95	182.95	38.90		228.25	149.55		144	4	4600.85	42427.05	
22 Tue			10.55				76.95	12.75		143.00						129.75		115.95			66.55	97.35			169.10	64.30		36	5	886.25	43313.30	
23 Wed		1,914.15	805.40					63.75		122.90						64.45		115.80			64.20	137.45	51.80		231.65	84.95		108	6	3656.50	46969.80	
24 Thu			261.85					105.10		107.85						13.00					201.05	260.30			376.85	164.00		54	5	1490.00	48459.80	
25 Fri										167.95						140.90					196.80	163.45	25.65		131.75	207.45		43	4	1033.95	49493.75	
26 Sat																												0	0	0.00	49493.75	
27 Sun																														0.00	49493.75	
28 Mon			38.40					25.20		130.20						116.40		491.20			184.10	263.35	57.85		88.90	110.25		52	4	1505.85	50999.60	
29 Tue		2,042.10								135.95						113.00		90.25			97.00	64.75	12.50		387.35	99.35		103	7	3042.25	54041.85	
30 Wed		1,808.10						38.05		85.10						339.60					71.20	136.60	44.90		83.00	148.75		87	5	2755.30	56797.15	
31 Thu										60.15						12.50		21.55			203.20	164.55	52.90		55.95	213.75		31	1	784.55	57581.70	
Product Totals	0.00	31,340.80	1,776.65	204.05	0.00	0.00	309.95	882.05	0.00	1,876.85	0.00	0.00	0.00	0.00	0.00	2,842.35	37.15	2,142.30	0.00	0.00	3,313.75	4,514.95	694.20	0.00	4,117.50	3,529.15	0.00	1835	86	57581.70	57581.70	0
Average T/Day	0.00	1,205.42	68.33	7.85	0.00	0.00	11.92	33.93	0.00	72.19	0.00	0.00	0.00	0.00	0.00	109.32	1.43	82.40	0.00	0.00	127.45	173.65	26.70	0.00	158.37	135.74	0.00	71	Actual Mth average Truck movements			0
																													67			0

Average tonnes/day	2,215 t	Mth Working days	22	Days worked	26	Work days remaining	-4	SAP Sales Budget	22,400 t	Prog. Forecast Mth Total	48,723 t

November 2019

	5000283-ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031 - OVERBURDEN	5000257 - 10MM ASPHALT	5000403 - 14MM ASHALT	5202209 - 7MM DRAIN	5101086 - 10MM DRAIN	5104071 - 14MM DRAIN	5101087 -20MM DRAIN	5066522 - 300MM ROCK	5000260 - 150MM ROCK	5000059 - DGB 20 R/BASE	5000060 - DGS 20 R/BASE	5201128 - SIDE & OVERLAY	5000261 - NO.1 R/BASE	5000262 - NO.2 R/BASE	5000299 - 40MM R/BASE	5000259 - 40MM COBBLE	5000024 - 63MM BALLAST	QFOX10 - 10MM AGG	QFOX20 - 20MM AGG	QFOX7 - 7MM AGG	5000602 - QUARRY SAND	5000214 - CRUSHER DUST	QFOXMS - MAN SAND	5000123 - SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN MOVEMENTS TRUCK
01 Fri							70.40			127.95						222.20	20.05	375.65			97.20	65.45	12.50		179.25	91.30		44	3	1261.95	1261.95	
02 Sat																		744.10								66.30		24	0	810.40	2072.35	
03 Sun																														0.00	2072.35	
04 Mon		2,072.45								32.30								321.45			161.50	136.30	20.20		143.95	110.85		86	1	2999.00	5071.35	
05 Tue		1,919.65	291.70							13.20						38.55					102.45	97.40	38.10		127.60	137.15		80	1	2765.80	7837.15	
06 Wed		1,955.25	338.65					32.35		74.70	24.95										97.75	232.80			164.00	163.05		95	0	3083.50	10920.65	
07 Thu		1,908.90	306.80							35.55						68.65					130.20	200.60	20.05		222.00	142.20		106	1	3034.95	13955.60	
08 Fri		1,511.00	24.95							116.85						189.20						194.00	19.90		173.75	186.85		83	1	2416.50	16372.10	
09 Sat																												0	0	0.00	16372.10	
10 Sun																														0.00	16372.10	
11 Mon		2,080.50								68.00						197.75		32.25				126.60	12.55		87.40	162.25		93	3	2767.30	19139.40	
12 Tue		1,868.40	12.75							44.35						242.95		472.80				128.90	37.65		322.85	97.25		111	7	3227.90	22367.30	
13 Wed		1,926.40								199.65						49.10		38.35				97.00			177.85	97.95		78	0	2586.30	24953.60	
14 Thu			36.80							49.80						214.20		823.00				97.10			52.00	130.80		54	0	1403.70	26357.30	
15 Fri										101.40						431.55		227.70			20.00	97.35	12.50		140.90	164.25		50	1	1195.65	27552.95	
16 Sat																												0	0	0.00	27552.95	
17 Sun																														0.00	27552.95	
18 Mon			25.00							134.00						504.60		771.05			130.90	193.54	71.20		96.95	129.60		76	0	2056.84	29609.79	
19 Tue			9.95							119.15						1,168.05		64.45			199.10	167.40	25.15		214.60	128.49		86	3	2096.34	31706.13	
20 Wed								7.80		107.20						719.35					236.20	194.20	12.95	13.40	319.20	98.40		75	0	1708.70	33414.83	
21 Thu								39.15		213.25	15.50					236.20					223.30	258.26			213.25	175.88		61	1	1374.79	34789.62	
22 Fri										64.40	4.45					140.25					129.90	130.65	13.00		175.10	182.75		41	2	840.50	35630.12	
23 Sat																												0	0	0.00	35630.12	
24 Sun																														0.00	35630.12	
25 Mon										26.90						176.85						277.70			93.80	264.40		40	0	839.65	36469.77	
26 Tue										15.95						95.50					32.35	129.95		26.50	92.10	192.20		29	0	584.55	37054.32	
27 Wed			139.00							133.85						602.25							25.70		239.90	118.15		62	4	1258.85	38313.17	
28 Thu			23.20	253.95						66.50						497.35		11.45					12.40		236.50	214.80		72	1	1316.15	39629.32	
29 Fri								7.85		65.20						375.10									388.70	65.25		33	1	902.10	40531.42	
30 Sat																												0	0	0.00	40531.42	
																														0.00	40531.42	
Product Totals	0.00	15,242.55	1,208.80	253.95	0.00	0.00	70.40	87.15	0.00	1,810.15	44.90	0.00	0.00	0.00	0.00	6,169.65	20.05	3,882.25	0.00	0.00	1,560.85	2,825.20	333.85	39.90	3,861.65	3,120.12	0.00	1479	30	40531.42	40531.42	0
Average T/Day	0.00	586.25	46.49	9.77	0.00	0.00	2.71	3.35	0.00	69.62	1.73	0.00	0.00	0.00	0.00	237.29	0.77	149.32	0.00	0.00	60.03	108.66	12.84	1.53	148.53	120.00	0.00	57	Actual Mth average Truck movements			0
																													56			0

Average tonnes/day	1,559 t	Mth Working days	22	Days worked	26	Work days remaining	-4	SAP Sales Budget	22,526 t	Prog. Forecast Mth Total	34,296 t

December 2019

	5000263- ROUGH SHALE	5000264-SOFT SHALE	5000029- SELECT FILL	5000031- OVERBURDEN	5000257 - 10MM ASPHALT	5000403 - 14MM ASPHALT	5202209 - 7MM DRAIN	5101086 - 10MM DRAIN	5104071-14MM DRAIN	5101087 - 20MM DRAIN	5066522 - 300MM ROCK	5000260 - 150MM ROCK	5000059 - DGB 20 R/BASE	5000060 - DGS 20 R/BASE	5201128- SIDE & OVERLAY	5000261 - NO.1 R/BASE	5000262 - NO.2 R/BASE	5000299 - 40MM R/BASE	5000259 -40MM COBBLE	5000024 - 63MM BALLAST	QFOX10 - 10MM AGG	QFOX20 - 20MM AGG	QFOX7 - 7MM AGG	5000602 - QUARRY SAND	5000214 - CRUSHER DUST	QFOXMS- MAN SAND	5000123 - SCALPS	TRUCK MOVEMENTS	SPLIT LOADS	Daily Total	Prog Daily Total	OVERBURDEN TRUCK MOVEMENTS
01 Sun																														0.00	0.00	
02 Mon			65.45					38.55		13.10						486.35							13.00		174.10	162.55		40	1	953.10	953.10	
03 Tue			65.25							151.10						449.15							12.70		172.85	141.20		45	0	992.25	1945.35	
04 Wed				113.80			12.00	47.80		7.40						201.30							19.95		185.40	77.50		42	1	665.15	2610.50	
05 Thu										67.10						794.50									128.00	160.35		60	0	1149.95	3760.45	
06 Fri								23.85								388.50							57.42		186.80	215.66		33	1	872.23	4632.68	
07 Sat																												0	0	0.00	4632.68	
08 Sun																														0.00	4632.68	
09 Mon								12.00		49.05						457.35							12.05		136.20	64.10		41	2	730.75	5363.43	
10 Tue			20.35					89.10		13.00						573.80							37.65		104.60	63.95		41	3	902.45	6265.88	
11 Wed										53.35						177.40							25.65		69.50	128.49		23	0	454.39	6720.27	
12 Thu			24.00							18.15						209.55							25.20		237.80	139.20		38	2	653.90	7374.17	
13 Fri			47.80					20.15								154.60							33.15		230.70	130.27		33	1	616.67	7990.84	
14 Sat																												0	0	0.00	7990.84	
15 Sun																														0.00	7990.84	
16 Mon										32.30						95.30					163.70		25.60		225.90	162.05		33	1	704.85	8695.69	
17 Tue			12.10							65.50						422.25		23.35			33.30		44.30		116.40	64.30		39	0	781.50	9477.19	
18 Wed			33.40					32.50		25.35						403.45							45.85		25.95	130.80		40	0	697.30	10174.49	
19 Thu			22.45							20.50						261.90					20.20		12.00		89.95	110.31		29	1	537.31	10711.80	
20 Fri																110.35									29.65			7	0	140.00	10851.80	
21 Sat																														0.00	10851.80	
22 Sun																														0.00	10851.80	
23 Mon																														0.00	10851.80	
24 Tue																														0.00	10851.80	
25 Wed																														0.00	10851.80	
26 Thu																														0.00	10851.80	
27 Fri																														0.00	10851.80	
28 Sat																														0.00	10851.80	
29 Sun																														0.00	10851.80	
30 Mon																														0.00	10851.80	
31 Tue																														0.00	10851.80	
Product Totals	0	0	291	114	0	0	12	264	0	516	0	0	0	0	0	5186	0	23	0	0	217	0	365	0	2114	1751	0.00	544	13	10851.80	10851.80	0
Average T/Day	0	0	17	7	0	0	1	16	0	30	0	0	0	0	0	305	0	1	0	0	13	0	21	0	124	103	0.00	32	Actual Mth average Truck movements			0
																													31			0

Av. tonnes/day	638 t	Mth Working days	15	Days worked	17	Work days remaining	-2	SAP Sales Budget	16,093 t	Prog. Forecast Mth Total	9,575 t

APPENDIX 5

2018 – 2019 Return For Extractive Materials Form

Planning, Industry & Environment

Form S 1

RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2019

Quote RIMS ID in all correspondence

Quarry Id: 5879	Rims ID: 400633
Operators Name:	HOLCIM (AUSTRALIA) PTY LTD
Address:	PO BOX 1143 MILTON QLD 4064
Email:	heabs.accounting-hanz@lafargeholcim.com
Quarry Name:	TEVEN QUARRY
Quarry Address:	STOKERS LANE

Inquiries please telephone: (02) 4063 6713

Completed or Nil Returns Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below)

Please amend name, postal address and location of mine or quarry if incorrect or incomplete.

2018-2019

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, RESOURCE PLANNING & PROJECTS, NSW DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2019**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment** and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature and whether the area being worked is held under a mining title or otherwise.

Director, Resource Planning & Projects

Please complete all of the following information to assist in identifying the location of the Quarry

Typical Geology MetaArgillite- weathered rock to fresh

Nearest Town to Quarry Teven

Local Council Name Ballina

Deposited Plan and Lot Number/s of Quarry Lot2,3 - DP732288

Email Address of Operator garth.stacey@lafargeholcim.com

Name of Owner or Licensee Holcim

Postal Address of Licensee Level 2, 18 Little Cribb St (Po Box 11430,Milton QLD 4064

Licence/Lease Number/s (if any)

From Mineral Resources NSW (Industry & Investment NSW) _____

From Department of Lands or other Department EPL 3293

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land _____

To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

- **SIGNATURE of PROPRIETOR or MANAGER** _____ **DATE** 17/10/2019
- **CONTACT PERSON for this return** David Smith
- **NAME** (Block letters) _____ **Telephone** 0447604895

SALES During 2018-2019

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		1650
5mm to 30mm		101886
Under 5mm		
Natural Sand		
Manufactured Sand		74886
Prepared Road Base & Sub Base		146043
Other Unprocessed Materials		60488
Recycled Materials		
• **Crushed Coarse Aggregates**		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• **River Gravel**		
Over 30mm		
5mm to 30mm		
Under 5mm		
• **Construction Sand**	Excluding Industrial	
• **Industrial Sand**		
Foundry, Moulding		
Glass		
Other (Specify)		
• **Dimension Stone**	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
• **Decorative Aggregate**	Including Terrazzo	
• **Loam**	Soil for Topdressing, Garden soil, Horticultural purposes)	
• **TOTAL SITE PRODUCTION**		384953
• **Gross Value ($) of all Sales**		
• **Type of Material**		
• **Number of Full-Time Equivalent (FTE) Employees**	Employees: 10	Contractors

Please Note: A return for clay based products can be obtained by contacting the inquiry number.