

WALKER QUARRIES PTY.LTD

(ACN: 003 061 890)

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT and ANNUAL REVIEW

For the

Wallerawang Quarry (ML1633)

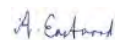
01 July 2016 – 30 June 2017

Distribution:

*NSW Department of Planning and Environment
Department of Environment, Climate Change and Water – EPA
Sydney Catchment Authority
Greater City of Lithgow Council
Wallerawang Quarry Community Consultative Committee
Forestry Corporation of NSW*

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**Date: 28th August, 2017
Amended 24th November, 2017**

Table 1 – Annual Review Title Block

Name of operation	Wallerawang Quarry
Name of operator	Walker Quarries Pty. Ltd.
Development Consent/project approval #	344-11-2001
Name of holder of Development Consent	Sitegoal Pty. Ltd.
Mining Lease #	ML 1633
Name of holder of Mining Lease	Walker Quarries Pty. Ltd.
MOP start date	14 August 2016
MOP end date	14 February 2018
Annual Review/Annual Environmental Management Report start date	1 July 2016
Annual Review/Annual Environmental Management Report end date	30 June 2017
I, Anne Eastwood, certify that this audit report is a true and accurate record of the compliance status of Wallerawang Quarry, based on the information provided to me, for the period 1 st July 2016 to the 30 th June, 2017, and that I am authorised to make this statement on behalf of Walker Quarries Pty. Ltd.	
Name of authorised reporting officer	Anne Eastwood
Title of reporting officer	Senior consulting Geologist Rangott Mineral Exploration Pty. Ltd.
Signature of authorised reporting officer	<i>A Eastwood</i>
Date	28.08.2017

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Amendments 24/11/2017 in blue text

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1.0 STATEMENT OF COMPLIANCE

Statement of Compliance

Were all conditions of the relevant approvals complied with?	
Development Consent	NO
Environmental Protection Licence	NO
Mining Lease	YES

Table 1A- Statement of Compliance table

Relevant approval	Condition #	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
DC 344-11-2001	2.23	Stormwater discharge limits including pH 6.5 – 8.5, and TSS – 30mg/L	Non-compliant	pH of stormwater discharge analysis – 8.53 TSS of discharge – 115 mg/L, 120 mg/L	Section 7.2
EPL 13172	L2	As above	Non-compliant	As above	Section 7.2
DC 344-11-2001	1.2 Schedule 2	The Applicant shall carry out the development generally in accordance with the: (a) DA No. 344-11-2001 (b) EIS titled Proposed Wallerawang Quarry, Report 01/206.1 dated November 2001, and prepared by Pacrim Environmental (c) Report titled Supplementary Report to the EIS for the Proposed Wallerang Quarry, Report 02/206.1 dated July 2002, and prepared by Pacrim Environmental: and (d) Conditions of the consent	Non-compliant	Clearing of vegetation at 'Proposed stockpile' and 'New Stockpile' not in accordance with condition. A Penalty Notice was served on Walker Quarries	Section 5

Table 1B – Non-compliance

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> Potential for serious environmental consequences, but is unlikely to occur, or Potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> Potential for moderate environmental consequences, but is unlikely to occur, or Potential for low environmental consequences, but is likely to occur
Administrative non-compliance	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).

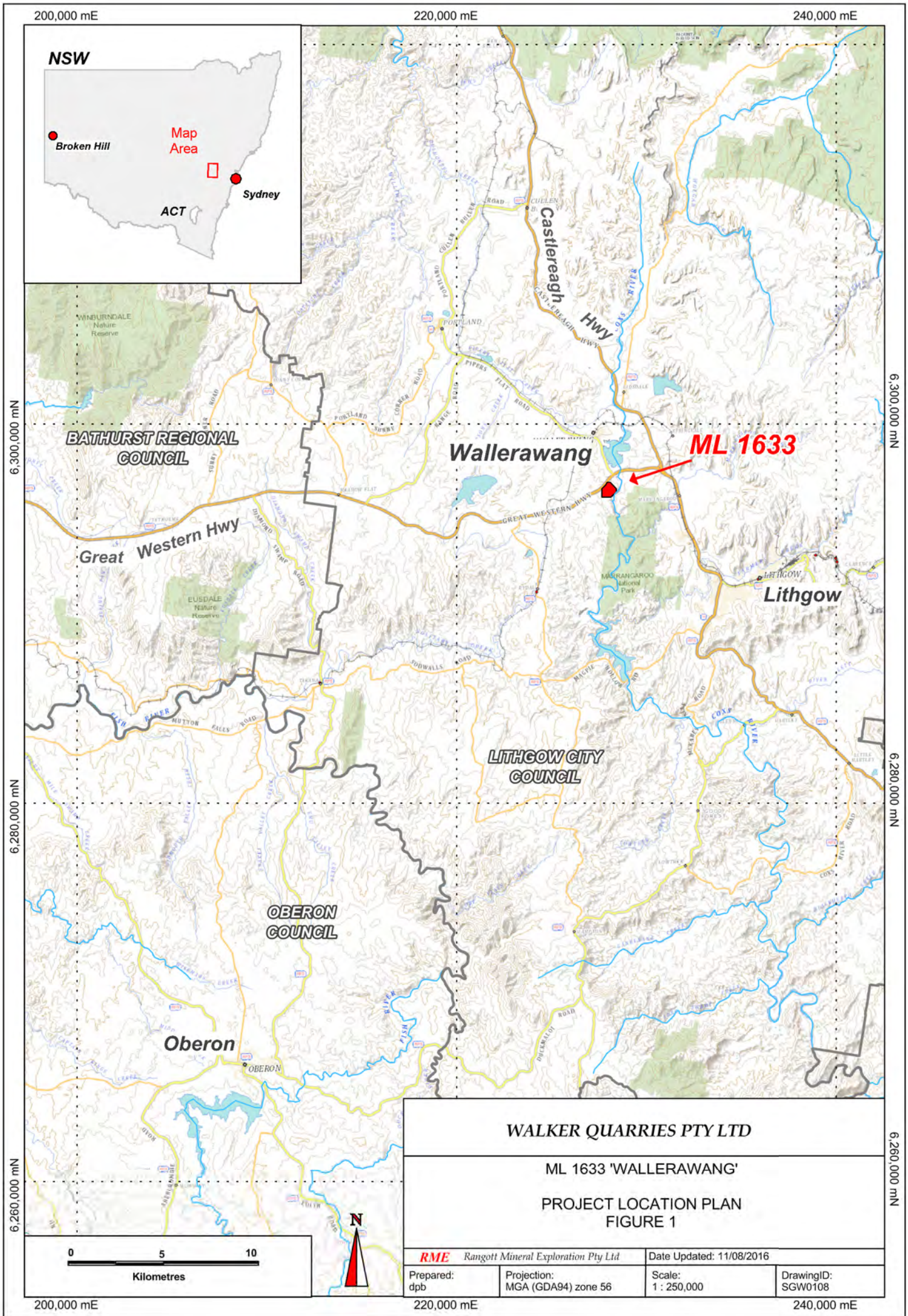
Compliance status key for **Table 1B**

The following details are provided in relation to non-compliance over the reporting period:

1. A Penalty Notice was issued to Walker Quarries by the DPE for clearing, as detailed in **Table 1A**, on the 20th December, 2016. Walker Quarries paid the penalty.
2. A Draft Order was issued to Walker Quarries by the DPE in December, 2016 in relation to the same unauthorised clearing (point 1). The order was to rectify the non-compliance with Schedule 2 Condition 1.2 of the Consent. Walker quarries then applied for a modification of the approval to include the clearing, and the modification was approved (25th August, 2017) with the additional requirement for a biodiversity offset strategy to be made.
3. The DPE questioned the compliance status of the sand processing that was being carried out on site. The DPE asked that sand processing be stopped until Walker Quarries could ensure

compliance. An application to modify the Consent to include sand-processing was made by Walker Quarries, and was approved after the reporting period (25th August, 2017).

4. During December, 2016, the DPE determined that Blast Monitoring at Monitoring Point 2 (Lake Wallace Dan Wall) had not been carried out as stated in the 2016 Annual Review. Walker Quarries stated that they had monitored a point closer to the quarry instead, and as there were no exceedances at that point, it was assumed that there would have been none further away at Monitoring Point 2. The DPE stipulated on the 21st December 2016 that monitoring is required to be undertaken at Monitoring Point 2 for all future blasts in accordance with the Blast Management Plan unless the management plan is revised to remove this monitoring location and this amendment is approved by the Department. Blast monitoring by Walker Quarries after 21st December, 2017 was resumed at Monitoring Point 2.
-



2.0 INTRODUCTION

This is the Seventh Annual Environmental Management Report (AEMR) produced for the Wallerawang Quarry, prepared in accordance with AEMR Guidelines for Mining Operations Plans (MOPs) prepared to the EDG03 requirements of NSW Planning and Environment – Division of Resources & Geoscience (DRG), and with the Annual Review guidelines provided by the NSW Department of Planning & Environment (DPE). The quarry site is currently in Stage 1 of the operational phase, as described in the MOP. During the reporting period, work comprised extraction, processing, haulage off-site and land preparation. Haulage off-site was begun in the previous reporting period, following the completion of the main access road and highway intersection. Located approximately 2.5km southeast of Wallerawang and 10km northwest of Lithgow on the southern side of the Great Western Highway (**Figure 1**), the quarry is owned and operated by Walker Quarries Pty. Ltd.. Prior to the 28th April, 2017, the quarry was operated by Dukes Civil Pty. Ltd.. Within the reporting period, the quarry was kept in a Care and Maintenance phase from the 28th April, 2017 to the 17th July, 2017, pending the arrival to site of new plant and machinery.

2.1 Mine Contacts

The management personnel responsible for operation and environmental performance at the Wallerawang Quarry and his relevant contact details are as follows:

- Ray Sharwood, Mine Manager – oversees most of the day-to-day activities at the site, including environmental and rehabilitation performance across the site. Contact (02) 63 51-2931, 0429 272 148

3.0 APPROVALS

Consents, Lease and Licences

Table 2 identifies the leases, licence and approvals in place for the Wallerawang Quarry at the end of the Reporting period, the issuing / responsible authorities, dates of issue, duration (where limited) and relevant comments. The list is presented chronologically according to the date of issue.

Table 2. Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of lease, Licence, Approval	Date of issue	Expiry	Comments
NSW Trade & Investment - Mineral Resources	Exploration Licence (EL4473)	1 st March 1994	11 th January 2017 (Renewal sought)	Approval for exploration (pre-existing title)
Minister for Planning	Project Approval (DA) 344-11-2001 (Appendix 1) A Modification submitted by Walker Quarries is currently being assessed	19 th October 2004	15 th July 2019 (10 years from the grant date of the ML)	Approval for the Quarry
NSW Trade and Investment - Mineral Resources	ML 1633	15 th July 2009	15 th July 2019	Tenure of Quarry Site
NSW Environment Protection Authority	Environment Protection Licence No. 13172 (Appendix 2)	21 st October 2009	Nil Anniversary date: October	Approval for Quarry to produce 500,000tpa.

The *Mining Operations Plan* (MOP) for Wallerawang Quarry commenced on 15/07/2008 and was set to expire on 14/07/2016, but a one month extension of the MOP (to 14/08/2016), and then a further MOP extension (to 31/08/2016) was granted by the DRE. A new MOP for an eighteen-month period (expiring 14/02/2018) was submitted to the DRE and was approved on the 22nd August 2016. The Annual Environmental Management Report/ Annual Review is based on that MOP which was current over most of the reporting period (MOP August 2016 to February 2018). A MOP Amendment (MOP Amendment B) was submitted to the Environmental Sustainability Unit of the Division of Resources & Energy during the reporting period, and was approved on the 19th of June, 2017, with conditions. The 2016 MOP and the MOP Amendment B is included in **APPENDIX IV** of this report.

The following new site Management Plans were submitted by Walker Quarries to NSW Planning in September, 2016, and were approved on the 29th September, 2016:

- Environmental Management Strategy
- Noise Management Plan
- Blast Management Plan

- Air Quality Management Plan
- Flora and Fauna Management Plan
- Water Management Plan
- Environmental Monitoring Program 2016
- Bushfire Management Plan.

These plans are included in **APPENDICES X-XII** of this report.

4.0 OPERATIONS DURING THE REPORTING PERIOD

4.1 Exploration

Exploration activities included a detailed topographic survey over the Lease area and two diamond drillholes (WQDD002 and WQDD003). The drillhole details are presented in **Table 3B**. The drillhole collars were plugged and the topsoil replaced, and the sites having been rehabilitated in accordance with the NSW Division of Resources & Geoscience (DRG) Guideline for mineral exploration drilling, drilling and integrity of petroleum exploration and production wells (2016) and Exploration Code of Practice: Rehabilitation (2015). The aim of the drilling was chiefly to explore for quartzite beds to the west and east of the main quartzite body currently being extracted.

4.2 Land Preparation

No land preparation was done in the reporting period, and therefore no topsoil was removed.

4.3 Construction

No construction was carried out over the reporting period.

4.4 Mining

Quartzite and overburden was extracted from the pit in accordance with the MOP and the Stage 1 described in the EIS, with an elongate pit around 150m x 60m (at widest point), and a total pit and surrounds disturbance area of around 1.24 ha (**Figure 2**). The current height of the highest wall is 15m, and the walls are stable. The extraction figures are given in **Table 3**. During the reporting period, blasting was conducted twice, and in accordance with the MOP and the Environmental Management Plan, and with the new, approved Blast Management Plan (September, 2016) after September, 2016. A new detailed topographic survey of the quarry area was carried out (**APPENDIX XIII**). Within the reporting period, the quarry was kept in a Care and Maintenance phase from the 28th April, 2017 to the 17th July, 2017, pending the arrival to site of new plant and machinery.

4.5 Mineral Processing

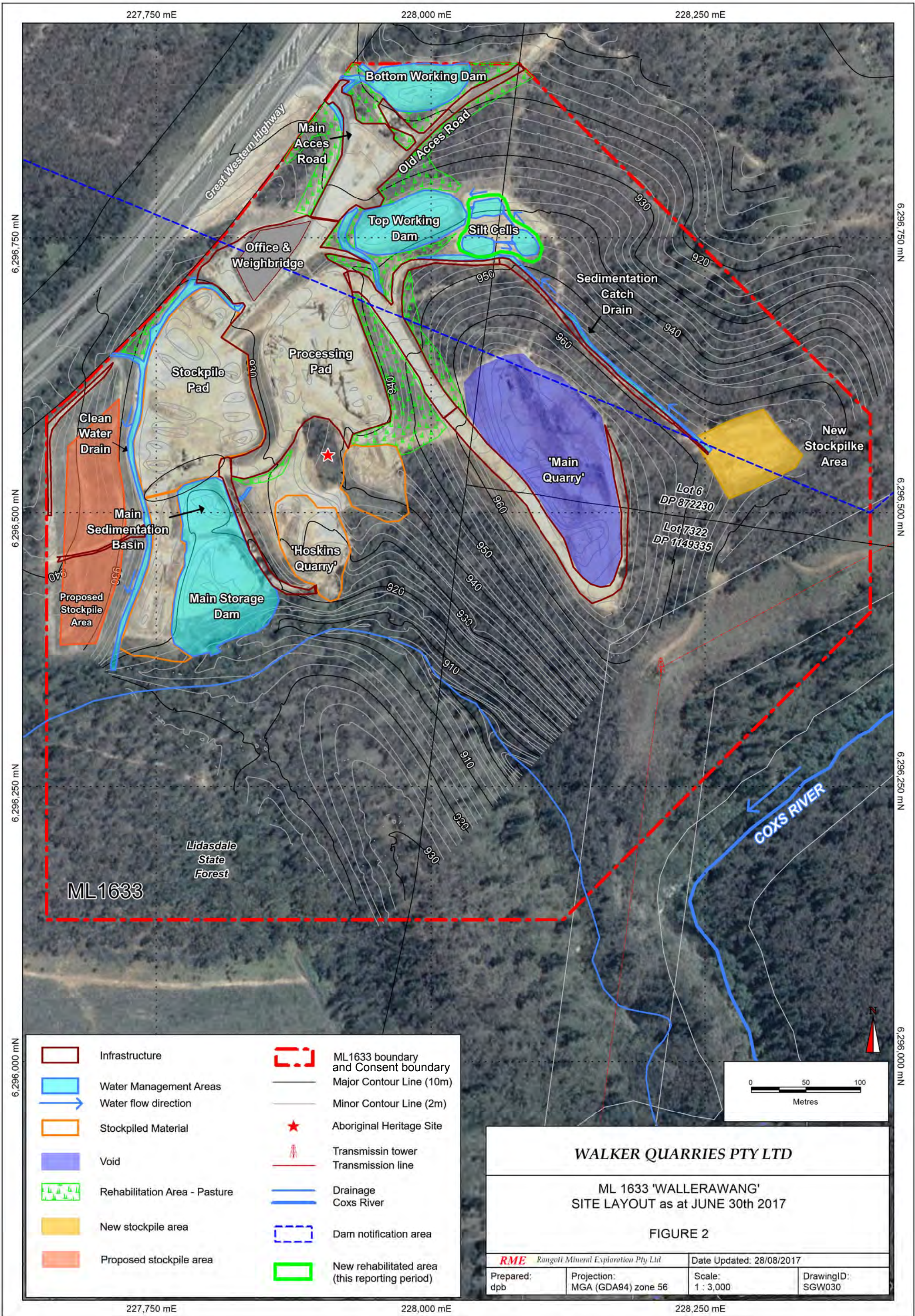
Processing involved crushing and screening quartzite in accordance with the current MOP, **Sections 2.2 and 3.2**. Overburden materials other than quartzite were also processed, in accordance with the Development Consent and the MOP. The processing was confined to the Processing Pad and pit. The processing figures are given in **Table 3**. During the reporting period, a sand washing plant was added to the processing area to facilitate processing and sales. The sand washing plant components are either free-standing or mobile, except for small concrete footings.

4.6 Waste Management

The only waste produced at the quarry was overburden. Overburden on site is weathered quartzite/quartzite derivatives, sandstone and shale. Overburden is not regarded as waste because it is used onsite for building infrastructure or is sold. Overburden was used for building the hardstand areas and processing pad, and is rarely stockpiled on site as it is used for infrastructure or sold as road base, pebbles or sand. The waste (overburden) rock volumes shown in **Table 3** have been used for infrastructure on site (the processing pad and stockpile pads), and the volumes estimated for the next reporting period are likely to be sold as road base before, or shortly after, stockpiling. There is little to no processing waste produced at the quarry. Any processing waste produced can be stockpiled and sold for a number of purposes.

4.7 Ore, Product and Topsoil Stockpiles

Stockpiling of ore, product and topsoil has been conducted in accordance with the MOP, **Sections 2.2 and 3.2**. At the end of the reporting period, the total product stockpile volume was around 11,150m³ (not including timber, topsoil or cobbles stockpiles (~4,000m³). Waste rock (overburden) is never stockpiled for more than three months as it is sold as road base. Rejects, including unsold overburden material and fine rejects from the screening process are being stockpiled for later use in rehabilitation works. The volume of the topsoil stockpile remained unchanged over the reporting period, as recorded in **Table 3**. During an inspection in a previous reporting period by a representative of NSW Trade & Investment, Division of Resources & Energy, Environmental Sustainability Unit, in October, 2014, Walker Quarries received advice from the representative that the stockpiled topsoil should be subject to quality testing for use in rehabilitation. A stored topsoil sample – WQS-1 – was subsequently analysed at ALS Environmental for pH, Electrical Conductivity, Moisture Content, Exchangeable cations, Ammonia, Nitrate, Nitrite, Nitrogen and Phosphorus. The Cation Exchange Capacity of the topsoil (1.6 meq/100g) is low but not unexpectedly so for the low fertility soils on site. At 5.4, the pH of the topsoil is at an ideal level. The results of the topsoil analysis show that the fertility of the topsoil



has not significantly deteriorated due to stockpiling, and that the topsoil remains useful for rehabilitation purposes.

4.8 Next reporting period

The following changes are planned to be made to the operations in the next reporting period:

- Although sand washing will continue to be carried out on the processing pad, crushing and processing will be moved to the pit floor, leaving most of the processing pad area available for stockpiling

Table 3. Production and Waste Summary

	Cumulative Production (cubic metres)		
	Start of Reporting Period	At end of Reporting Period	End of next reporting (estimated)
Topsoil Stripped	38,062	38,062	38,062
Topsoil used/spread	20,062	20,062	20,062
Waste Rock (Overburden)	75,000	75,000	75,000
Ore (88,000	148,714	240,000
Processing Waste	0	0	0
Product (units tonnes)	123,200	208,200	336,000

*Topsoil stripping commenced on 25th April 2014

Table 3B: Summary of drilling conducted in the reporting period

DRILLHOLE ID	Easting (MGA94z55)	Northing (MGA94z55)	Elevation (AHD)	Drill site Rehabilitation Status
WQDD002	785,683.7	6,295,934.9	919.9	Rehabilitated as per DRG guidelines
WQDD003	785,720.7	6,295,934.9	923.9	Rehabilitated as per DRG guidelines

Table 4. Stored Water

	Volumes held (cubic metres)		
	Start of Reporting Period	At end of Reporting Period [#]	Storage Capacity
Clean Water	3,000	2,500	5,000
Dirty Water	800	600	1,000
Controlled discharge water (salinity trading schemes)	N/A	N/A	N/A
Contaminated Water	N/A	N/A	N/A

[#] Estimates



Figure 3: Initial tubestock plantings on highway frontage – June 2017



Figure 4: Initial tubestock plantings at quarry entrance – June 2017



Figure 5: Revegetating bank opposite the office and weighbridge – June 2017



Figure 6: Top working Dam, looking NW towards office – Jun 2017



Figure 7: Seed-sprayed cutting above silt cells - June 2017



Figure 8: Cleaned-out silt cells, looking SW – June 2017



Figure 9: The Stockpile Pad, looking SE – June 2017



Figure 10: Western side of the Stockpile Pad, looking north – June 2017



Figure 11: Within the pit, looking SE – June 2017



Figure 12: Erosion control feature on the eastern perimeter of pit – June 2017



Figure 13: Looking west towards the topsoil stockpile – June 2017



Figure 14: From the Sediment Basin, looking towards Main Storage Dam – June 2017



Figure 15: Looking east across the wall of the Main Storage Dam towards the Hoskins Quarry – June 2017



Figure 16: Looking east along silt fence downslope from the Main Storage Dam wall – June 2107



Figure 17: Geotextile applied to erosion area west of the Main Storage Dam – June 2017



Figure 18: Dirty water drain east of the pit, looking SW – June 2017



Figure 19: Looking east across the Eastern Stockpile Area – June 2017

5.0 FEEDBACK AND ACTIONS REQUIRED BY DPE and DRE FROM PREVIOUS ANNUAL REVIEW

An AEMR meeting and site inspection was undertaken at the Mining Lease 1633 on the 14th November, 2016 by representatives of Walker Quarries Pty. Ltd., Lithgow City Council, the Environmental Protection Authority, the Department of Planning and Environment and the Division of Resources and Energy. A number of actions (**Table 5**) were required to be taken by Walker Quarries.

Table 5: Feedback and Actions required from the DPE and DRE regarding the previous Annual Review (2016)

Comment by DPE and Action Required	Requested by	Action taken	Where dealt with in Annual Review
Revegetation and stabilisation of bare area around the new silt cells to progress more quickly	DRE	Commenced. Seed spraying was done around the silt cells	Section 8.2
“It is requested that the following matters are addressed in future Annual Reviews: (a) Include a discussion and comparison of complaints to previous years; (b) include the time that noise monitoring was undertaken; (c) Include in Table 5 the actions that were identified in the response to the previous Annual Review and where they are addressed in the current Annual Review; (d) Indicate in Figure 18 the old location of dust deposition gauge 4 and the new location; (d) provide a listing in Table 1A – Statement of Compliance table of all non-compliances identified during the reporting period. It is noted that while non-compliances identified in the compliance audit undertaken by the Department or in the Independent Environmental Audit are included in the report, they are not referenced in this table.....” (f) provide timeframes for actions as identified in Section 12	DPE	(a) A discussion and comparison of complaints to previous years (b) The noise monitoring times are included (c) Comments included in this table (d) Figure 20 amended (e) Table amended (f) Actions completed	(a) Section 9.1 (b) Section 6.2.1 (c) Here in Table 5 (d) Figure 20 (e) Section 1, Section 5
“It is noted in Table 11 that monitoring has not been undertaken at Monitoring Point 2 since September 3 2014. A response is requested by 4 November 2016 advising why monitoring has not been undertaken at Monitoring Point 2.”	DPE	Response supplied.	Response letter in APPENDIX XIV

<p>"In addition it is noted that:</p> <p>(a) In accordance with Condition 3.14, copies of the minutes of Community Consultative Committee meetings are to be provided to the Department within one month of the meeting:</p> <p>(b) Exceedances of limits should be notified to the Department as soon as practical after identification of the non-compliance"</p>	DPE	No immediate action taken.	
A small erosion scour in the southwestern section of the site needs to be repaired and monitored	DRE	Geotextile was applied and a silt fence installed upslope. Area is regularly monitored.	Section 6.2. Figure 17 (photograph)
Ongoing weed control is required	DRE	Yearly weed spraying has continued.	Section 6.8
More detailed water management map to be included in the next AEMR	DRE	Completed	Figure 26: Water Management Features – ML1633

During the reporting period, two stockpile areas cleared of vegetation in the previous reporting period (labelled 'Proposed Stockpile Area' and 'New Stockpile Area' in **Figure 2**) were found by the DPE to have been cleared in breach of Development Consent Condition 1.2. A penalty notice was served on Walker Quarries, who were ordered not to use or disturb the cleared areas unless and until approval could be obtained for their use, with sediment and erosion control measures at the two locations to be effectively maintained in the interim.

6.0 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

Environmental risks are identified in **Table 3.3 Environmental Risk Assessment Results** in **Section 3.0** of the *Mining Operations Plan (2018-2018)*. The locations of environmental monitoring points are shown in **Figure 20**. Environmental monitoring results were posted on the Walker Quarries web site in order to provide public access to the monitoring results.

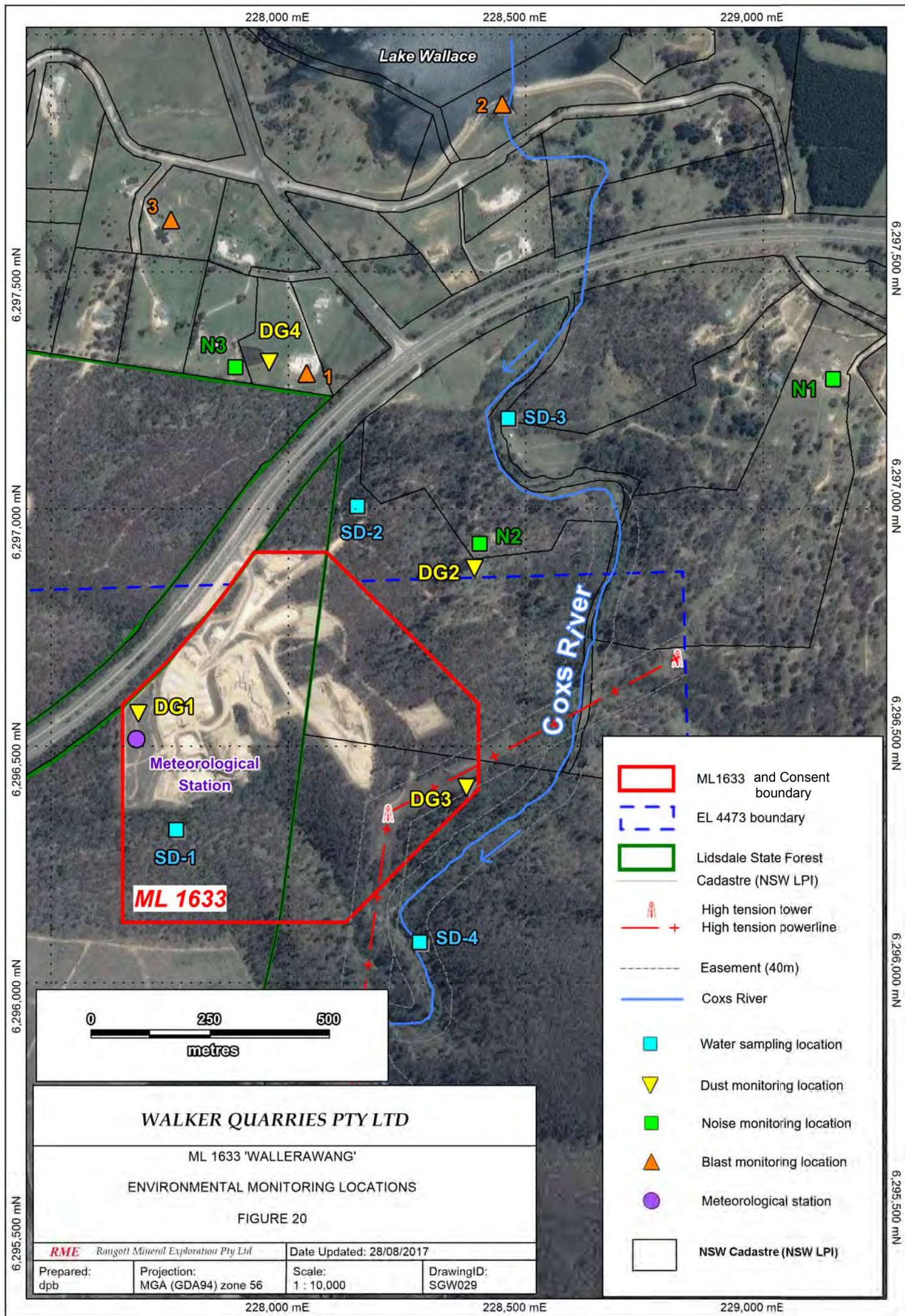
The following table (Table 6), summarises the analyses of the environmental monitoring data:

Aspect	Approval criteria/ EIS prediction	Performance during the reporting period	Trend/ key management implications	Implemented/proposed management actions
Air Quality	<p>Approval criteria – Development Consent -</p> <ol style="list-style-type: none"> 1. TSP does not exceed an annual average of $90\mu\text{m}/\text{m}^3$ at any privately-owned land 2. PM_{10} annual average does not exceed $30\mu\text{m}/\text{m}^3$ at any privately-owned land 3. PM_{10} 24- hourly average does not exceed $50\mu\text{m}/\text{m}^3$ at any privately-owned land 4. Deposited dust (insoluble solids) annual average does not exceed $2\text{g}/\text{m}^2/\text{month}$ maximum increase and the maximum total deposited dust level does not exceed $4\text{g}/\text{m}^2/\text{month}$ at any privately-owned land. Deposited dust is to be continuously monitored at the most-affected residence <p>EPL – Air monitoring to be done</p>	<p>TSP and PM_{10} were not measured in the reporting period. Annual averages of deposited dust – insoluble matter, did not exceed the criterion of $4\text{g}/\text{m}^2/\text{month}$. Annual average for deposited dust did not exceed a maximum increase of $2\text{g}/\text{m}^2/\text{month}$. Rolling twelve month averages exceeded the $4\text{g}/\text{m}^2/\text{month}$ limit for DG-4 and DG-3 in one month (July, 2016)</p> <p>Levels of deposited dust at DG4 and DG-3 were markedly increased during Late June-early July 2016, at the start of the reporting period.</p> <p>No complaints about dust were received in the reporting period.</p>	<p>The spurious increase in deposited dust at gauges DG-4 and DG-3 in July, was against the trend of decreased dust levels at all gauges for the rest of the reporting period. The rise in dust (one sample was coal-bearing – microscopy report in APPENDIX VI) during July is attributed to dominant NNW winds during late June – early July, 2016. The presence of coal in the sample indicates that the deposited dust did not emanate from the quarry.</p>	<p>In regard to the non-monitoring of TSP and PM_{10}, the approved Air Quality Management Plan (2016) prescribes a trigger for the implementation of particulate monitoring at gauge D4. The trigger – the exceedance of a rolling annual average for deposited dust of $3.5\text{g}/\text{m}^2/\text{month}$ – was exceeded in that part of the reporting period following the September, 2016 DPE approval of the Air Quality Management Plan. The particulate monitoring was not implemented because the result of $19.5\text{g}/\text{m}^2/\text{month}$ which distorted the rolling average was shown to be unrelated to quarry activities.</p>
	<p>EIS predictions – Modelling of likely dust emissions was undertaken for a range of production levels, and the results indicated that nuisance and health related impacts would be negligible at all production levels and under all wind conditions.</p>			

Noise	<p>Approval criteria –</p> <p>EPL – Noise from the premises must not exceed:</p> <ol style="list-style-type: none"> 1. 43dB(A) $L_{Aeq}(15 \text{ minute})$ during the day (7am to 6pm Monday to Friday and 7am to 1pm Saturday) and 2. 43 dB(A) $L_{Aeq}(15 \text{ minute})$ during the evening (6pm to 10pm) Monday to Friday and 3. At all other times 39 dB(A) $L_{Aeq}(15 \text{ minute})$. <p>The noise is to be measured at the most affected residence to determine compliance. The limits do not apply during certain weather conditions.</p> <p>Development Consent – Noise does not exceed the following limits on any privately-owned land: Day/Evening – 43dB(A) Night – 39 dB(A) $L_{Aeq}(15 \text{ minute})$. These conditions are modified during certain weather conditions.</p> <p>EIS – Modelling of predicted noise levels for potential receptors in the vicinity of the quarry site indicates that under calm atmospheric conditions, all noise assessment goals will be complied with. During adverse conditions (wind and temperature inversion), noise assessment goals may be exceeded at some receptor locations.</p>	<p>The two attended noise audits conducted in July, 2016 and in January, 2017 confirmed that the EPL noise limit of 43dB(A) $L_{Aeq}(15 \text{ minute})$ was satisfied at the three reference receptor locations. The operating conditions of the Development Consent were satisfied during the reporting period.</p> <p>No noise complaints were received in the reporting period.</p>	<p>There is no trend, either increasing or decreasing, between noise monitored in the reporting period and noise monitored previously.</p>	<p>Noise monitoring will be done monthly in the next reporting period.</p>
Water	<p>Approval criteria-</p> <p>Development Consent – Stormwater discharge from the development must comply with the following 100 percentile concentration limits: TSS – 30mg/L Sulphate – 250mg/L</p>	<p>Discharges from dams occurred twice in the reporting period:</p> <ol style="list-style-type: none"> 1. <u>September, 2016</u> EXCEEDANCES Samples taken from SD-1 – TSS- 115 mg/L, 	<p>No informative trend analysis is yet possible as only one discharge occurred and was sampled in the previous reporting period</p>	<p>In the reporting period, Walker Quarries acted to achieve compliance on TSS limits during discharge by adding flocculant to the Main Storage and Bottom</p>

	<p>G & O – 5 mg/L EC – 1500 MS/cm pH – 6.5 – 8.5</p> <p>EPL – Some monitoring points are prescribed in the EPL – SD1, SD2 and SD3. Any discharge waters must be sampled and tested and must not exceed the following 100 percentile concentration limits: TSS – 30 mg/L Sulphate – 250 mg/L G & O - 10 mg/L pH – 6.5 – 8.5.</p> <p>EIS predictions – The quarry development will operate as a zero discharge site under the majority of climatic conditions .It may be necessary to discharge water after heavy rainfall.</p>	<p>SD-2 not sampled</p> <p>2. <u>March, 2017</u> EXCEEDANCES Samples taken from SD-1 – TSS – 120, pH – 8.53 SD-2 TSS - 58</p> <p>Sampling of the Cox's River water upstream (SD-3) and downstream (SD-4) of the quarry began in the reporting period, but was not carried out after October, 2016, when the new, approved <i>Water Management Plan</i> was adopted. The WMP prescribed only annual sampling of water in the Cox's River upstream at SD-3 and downstream at SD-4.</p>	<p>(SD-1 TSS 75mg/L). The trend is for TSS exceedances during discharge.</p> <p>No significant difference in analytical results between river samples upstream and downstream of the quarry were found, as for previous reporting periods.</p>	Working Dams (Section
Blasting	<p>Approval criteria – Development Consent – The <i>airblast overpressure</i> level must not exceed the following criteria at any residence on privately-owned land or noise-sensitive building: 115dB (Lin Peak) – 5% of the total number of blasts over a period of 12 months may exceed this limit. 120dB(Lin Peak) – 0% of blasts may exceed this limit (with qualifiers for types equipment having different cut-off frequencies).</p> <p>The <i>ground vibration</i> level must not exceed the following criteria when measured at any point within 1 metre of any affected residence on privately-owned land or</p>	<p>Two blasts monitoring events were completed :</p> <ol style="list-style-type: none"> 1. 18 th July, 2016 2. The 6th February, 2017. <p>The limits of the approvals were not exceeded at any time.</p>	<p>The trend for blast overpressure and vibration is generally stable.</p>	

	<p>other noise-sensitive location: 5mm/s – 5% of the total number of blasts over a 12 month period may exceed this limit. 10 mm/s - 0% of blasts may exceed this limit. Blast overpressure and ground vibration are to be monitored at the nearest and most affected residence and at least 2 other locations within 2 kilometres of the development site. EPL – The <i>airblast overpressure</i> must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. The airblast overpressure must not exceed 115dB (Lin Peak) at any sensitive noise locations for more than 5% of the total number of blasts over each reporting period. <i>Ground vibration</i> peak particle velocity must not exceed 10mm/sec at any noise sensitive locations. Ground vibration peak particle velocity must not exceed 5mm/sec for more than 5% of the total number of blasts over each reporting period. For all these criteria, the error margins of the monitoring equipment must not be taken into account in determining whether or not the limit has been exceeded.</p>			
	<p>EIS predictions – Modelling indicated that the prescribed allowable level of blast noise will not be exceeded at any time.</p>			



6.1 Air Pollution

Two dust monitoring gauges (DG2 and DG4) have been used to collect deposited dust data on a monthly basis for the past 6 years. From April, 2016, two more dust gauges (DG1 and DG3) were installed and are being monitored on a monthly basis, in accordance with **Condition P1.1** of the EPL and **Condition 2.41** of the Development Consent. From September, 2016, when approval was obtained for the new Quarry Management Plans, Dust Gauges 2 and 3 were moved slightly further away from their previous locations, to better monitor any spread of dust away from the quarry. Refer to **Figure 20** for the current dust gauge locations.

Table 5 (below) and graphs present a summary of the dust monitoring data collected over this reporting period, as required by the EPA licence conditions. Deposited dust was monitored in units of g/m²/month, regularly, averaging results monthly and annually, using sampling method AM-19.

Particulate matter (PM₁₀) was not measured, as the trigger levels prescribed in the *Air Quality Management Plan (2016)* were not considered to have been triggered by dust emanating from the quarry.

6.1.1 Monitoring stations

Two extra monitoring stations (D1 and D3) were begun to be used late in the reporting period, and will continue to be monitored monthly.

Location of gauges	<i>All coordinates are in MGA, zone 56</i>
Gauge DG-1	227,700mE/ 6,296,550mN (inside the northwestern corner of the Lease, near the Mitchell Highway)
Gauge DG-2 (62)	228,370 mE / 6,296,900 mN (on the fence line of the nearest residence. North-east of the quarry)
Gauge DG-3	228,380mE/ 6,296,430mN (inside the south-western corner of the Mining Lease)
Gauge DG-4 (64)	227,600 mE / 6,297,320 mN (North of the quarry site and north of the Mitchell Highway, at the nearest residence (off Barton Avenue) and outside the Mining Lease area).

6.1.2 Monitoring results and trend analysis

Table 7. Dust monitoring data collected from July 2016 to June 2017

Note: Gauge DG2 was formerly named 62, gauge DG4 was formerly named 64. Dust gauges 2 and 3 have been moved outwards from the quarry, but in the same general area. Dust gauge 2 is now located adjacent to the nearest residence.

Date	Site	Comments Limit is 4g/m ² /month	Insoluble Solids (g/m ²)	Combustible Matter (g/m ²)	Ash (g/m ²)
Jul-16	DG-1	Clear, insects, fine brown/grey dust & coarse brown/black/grey dust	1.2	0.4	0.8
	DG-2 62	Slightly cloudy, insects,, organic matter, fine brown dust & coarse brown/black dust	4.6	3.2	1.4
	DG-3	Clear, insects, organic matter, fine brown/grey dust & coarse brown/black dust	0.3	0.2	0.1
	DG-4 64	Slightly cloudy, insects, organic matter, fine brown dust & coarse brown/black/ grey/green dust	19.5	4.4	15.1
Aug-16	DG-1	Clear, insects, organic matter, fine brown/grey dust & coarse brown/black/green dust	0.4	0.3	0.1
	DG-2 62	Slightly cloudy, insects, organic matter, fine brown dust & coarse brown/black dust	3.2	2.3	0.9
	DG-3	Clear, organic matter, fine grey dust & coarse brown/black dust	1.0	0.2	0.8
	DG-4 64	Clear, insects, organic matter, fine brown dust & coarse brown/black dust	0.7	0.3	0.4
Sep-16	DG-1	Clear, insects, organic matter, fine brown/grey dust & coarse brown/black dust	<0.1	<0.1	<0.1
	DG-2 62	Slightly cloudy, insects, organic matter, fine brown/green dust & coarse brown/black dust	1.5	1.2	0.3
	DG-3	Clear, insects, organic matter, fine brown dust & coarse brown/black dust	<0.1	<0.1	<0.1
	DG-4 64	Clear, insects, organic matter, fine brown dust & coarse brown/black dust	0.9	0.5	0.4
Oct-16	DG-1	Clear, insects, organic matter, fine brown dust & coarse brown dust	0.5	0.5	<0.1
	DG-2 62	Clear, organic matter, fine brown/green dust & coarse brown/black dust	0.8	0.8	<0.1
	DG-3	Clear, organic matter, fine brown/green dust & coarse brown/green dust	1.4	0.9	0.5
	DG-4 64	Clear, insects, organic matter, fine brown /green dust & coarse brown/black dust	0.4	0.3	0.1
Nov-16	DG-1	Clear, insects, organic matter, fine brown dust & coarse black dust	0.1	0.2	<0.1

	DG-2 62	Clear, organic matter, fine grey dust & coarse brown/black dust	0.3	0.2	0.1
	DG-3	Clear, insects, fine grey dust & coarse brown/black dust	0.3	0.3	<0.1
	DG-4 64	Clear, insects, organic matter, fine brown dust & coarse brown dust	0.6	0.4	0.2
Dec- 16	DG-1	Clear, insects, organic matter, fine brown dust & coarse brown dust	0.2	0.3	<0.1
	DG-2 62	Clear, organic matter, fine brown dust & coarse brown dust	0.2	0.3	<0.1
	DG-3	Clear, insects, fine brown dust & coarse brown/black dust	2.5	2.0	0.5
	DG-4 64	Clear, insects, organic matter, fine brown dust & coarse brown/black dust	0.7	0.4	0.3
Jan-17	DG-1	Clear, insects, organic matter, fine brown/grey dust & coarse black dust	0.4	0.4	<0.1
	DG-2 62	Clear, insects, fine grey dust & coarse black dust	0.3	0.4	<0.1
	DG-3	Clear, organic matter, fine grey dust & coarse black dust	<0.1	<0.1	<0.1
	DG-4 64	Clear, insects, fine grey dust & coarse black/blue dust	<0.1	0.1	<0.1
Feb- 17	DG-1	Clear, insects, fine brown dust & coarse brown dust	1.4	0.6	0.8
	DG-2 62	Clear, insects, organic matter, fine brown dust & coarse brown dust	0.5	0.3	0.2
	DG-3	Clear, insects, fine brown dust & coarse brown dust	1.1	0.3	0.8
	DG-4 64	Clear, insects, fine brown dust & coarse brown dust	0.9	0.5	0.4
Mar- 17	DG-1	Clear, insects, fine black dust & coarse brown dust	0.4	0.2	0.2
	DG-2 62	Clear, insects, organic matter, fine brown dust & coarse black dust	0.5	0.2	0.3
	DG-3	Clear, insects, fine brown dust & coarse black dust	0.8	0.3	0.5
	DG-4 64	Slightly cloudy, insects, fine brown dust & coarse black dust	0.6	0.3	0.3
Apr- 17	DG-1	Broken bottle – no sample			
	DG-2 62	Clear, insects, fine brown dust & coarse brown dust	0.3	0.1	0.2
	DG-3	Clear, insects, fine brown dust & coarse brown dust	0.3	0.1	0.2

	DG-4 64	Clear, insects, fine brown dust & coarse brown/black dust	1.6	0.5	1.1
May-17	DG-1	Clear, Insects, Fine Brown Dust & Coarse Brown Dust	0.2	0.2	<0.1
	DG-2 62	Clear, Insects, Fine Brown Dust & Coarse Brown Dust	0.3	0.2	<0.1
	DG-3	Clear, Insects, Organic Matter, Fine Green Dust & Coarse Brown/Green Dust	4.0	2.8	1.2
	DG-4 64	Clear, Insects, Organic Matter, Fine Brown/Grey Dust, Coarse Brown/Black Dust	0.9	0.3	0.6
Jun-17	DG-1	Clear, insects, fine brown dust & coarse brown dust	1.0	0.2	0.8
	DG-2 62	Slightly cloudy, insects, organic matter, fine brown/grey dust & coarse brown/black dust	0.3	0.1	0.2
	DG-3	Clear, insects, organic matter, fine brown/grey dust & coarse brown/black dust	0.3	0.2	0.1
	DG-4 64	Broken bottle and funnel	0.8	0.3	0.5

Laboratory certificates for the dust monitoring results are presented in **APPENDIX VI**.

A laboratory report on the examination of dust gauge deposits (DG4 (19.5 g/m²/month, and DG 2 (4.6 g/m²/month, on 07/07/2016) by stereomicroscopy and scanning electron microscopy was done by ALS ACIRL for Walker Quarries. The report (CO2202#2) is presented in **APPENDIX VI**. The deposited dust was found to be a combination of soil or rock dust, copper fungicide sludge, polysaccharide slime & fungi, insect & plant debris, and a trace of coal. The presence of coal dust and copper suggests that the deposited dust emanated from a source other than the quarry, borne on winds from the coal mining areas outside the quarry. Weather records from the Lithgow meteorological station (Coerwull # 63226) and the quarry site meteorological records (**APPENDIX XV**) show that wind direction over the month 7th June, 2016 to 7th July, 2016 were dominantly from the NNW, not from the southwest where the quarry is located. Also, deposited dust levels at DG4 would be expected to be lower than at the other gauges if the deposited dust emanated from the quarry site, as the DG4 gauge is the furthest from the quarry of the four gauges.

Table 8: Annualised averages for deposited dust -

	Annual Average Insoluble matter (g/m ² /month)				
Monitoring point	July 2013 – June 2014	July 2014 – June 2015	July 2015 – June 2016	July 2016 – June 2017	Incremental Increase > 2g/m ² /month from previous year?
DG1	No data	No data	0.85	0.53	No
DG2	2.07	0.99	1.8	1.12	No
DG3	No data	No data	1.2	1	No
DG4	0.48	1.71	3.36	2.5	No

Table 9: Rolling 12-month averages – Insoluble matter

ALS AIRBORNE DUST



	Dust Gauge No 1		Dust Gauge No 2		Dust Gauge No 3		Dust Gauge No 4	
Date Collected	Insoluble Solids	Rolling 12 months Average	Insoluble Solids	Rolling 12 months Average	Insoluble Solids	Rolling 12 months Average	Insoluble Solids	Rolling 12 months Average
Jul-15		0.00	2.9	0.00		0.00	1.5	0.00
Aug-15		0.00	3.8	0.00		0.00	0.5	0.00
Sep-15		0.00	1.3	0.00		0.00	2.2	0.00
Oct-15		0.00	0.3	0.00		0.00	0.6	0.00
Nov-15		0.00	3.7	0.00		0.00	1.3	0.00
Dec-15		0.00	0.9	0.00		0.00	0.8	0.00
Jan-16		0.00	1.1	0.00		0.00	8.3	0.00
Feb-16		0.00	0.6	0.00		0.00	14.4	0.00
Mar-16		0.00	0.7	0.00		0.00	1.6	0.00
Apr-16		0.00	0.9	0.00		0.00	5.3	0.00
May-16	1	0.00	0.4	0.00	1.1	0.00	0.5	0.00
Jun-16	0.7	0.00	5.4	1.83	1.3	0.00	0	3.08
Jul-16	1.2	0.00	4.6	1.98	0.3	0.00	19.5	4.58
Aug-16	0.4	0.00	3.2	1.93	1	0.00	0.7	4.60
Sep-16	0.1	0.00	1.5	1.94	0.1	0.00	0.9	4.49
Oct-16	0.3	0.00	0.5	1.96	1.4	0.00	0.4	4.48
Nov-16	0.1	0.00	0.3	1.68	0.3	0.00	0.6	4.42
Dec-16	0.2	0.00	0.2	1.62	2.5	0.00	0.7	4.41
Jan-17	0.4	0.00	0.3	1.55	0.1	0.00	0.1	3.73
Feb-17	1.4	0.00	0.5	1.54	1.1	0.00	0.9	2.60
Mar-17	0.4	0.00	0.5	1.53	0.8	0.00	0.6	2.52
Apr-17	0.1	0.53	0.3	1.48	0.3	0.86	1.6	2.21
May-17	0.2	0.46	0.3	1.47	4	1.10	0.9	2.24
Jun-17	1	0.48	0.3	1.04	0.3	1.02	0.8	2.31
Jul-17	0.1	0.39	1.6	0.79	0.2	1.01		

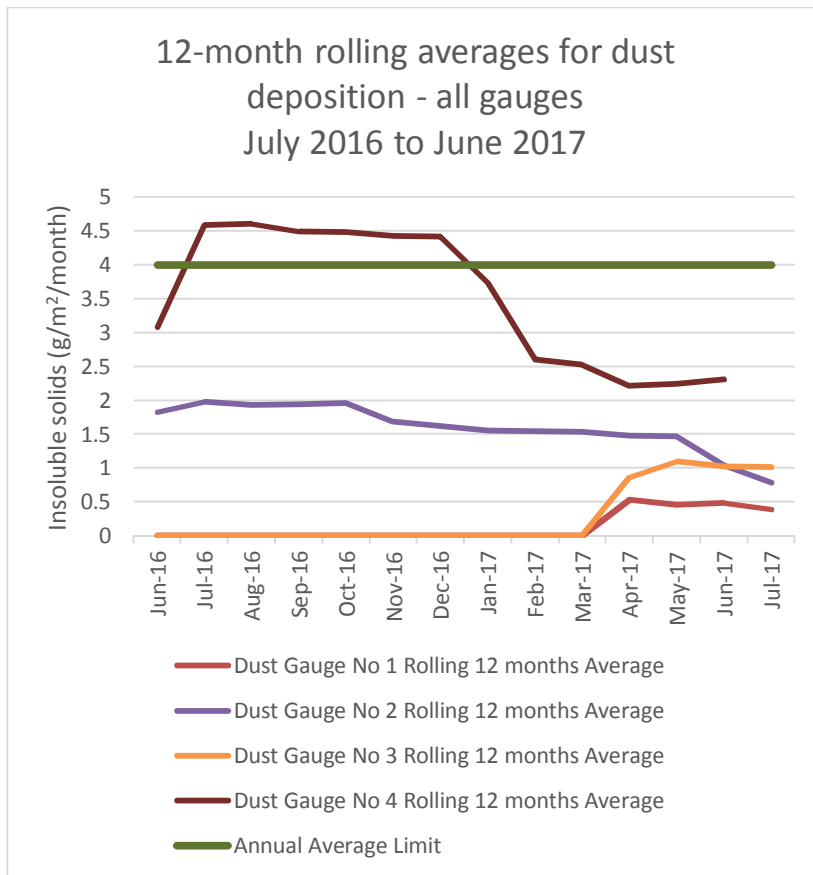


Figure 21: Deposited dust 12-month rolling averages – insoluble solids

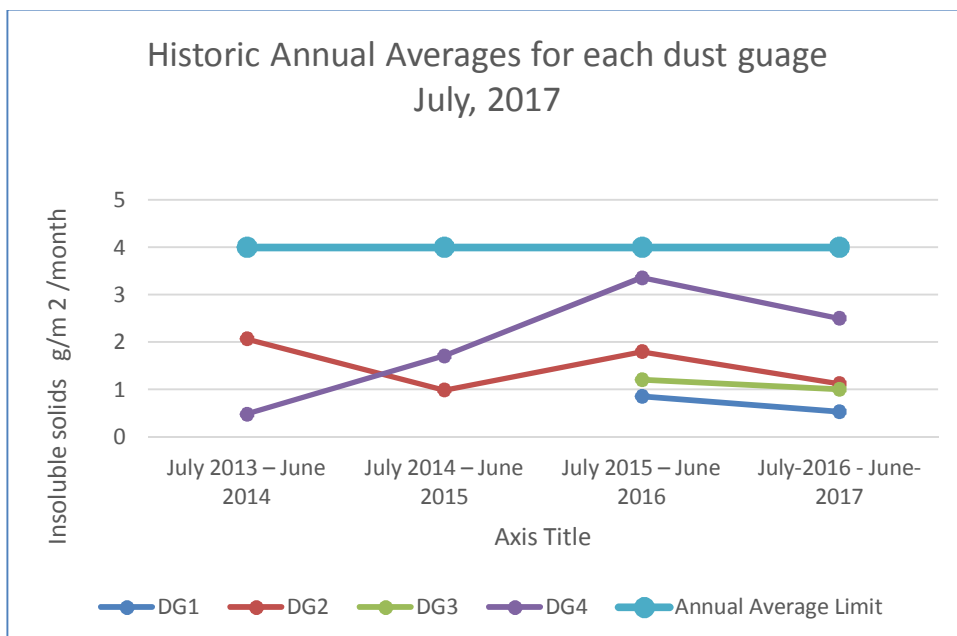
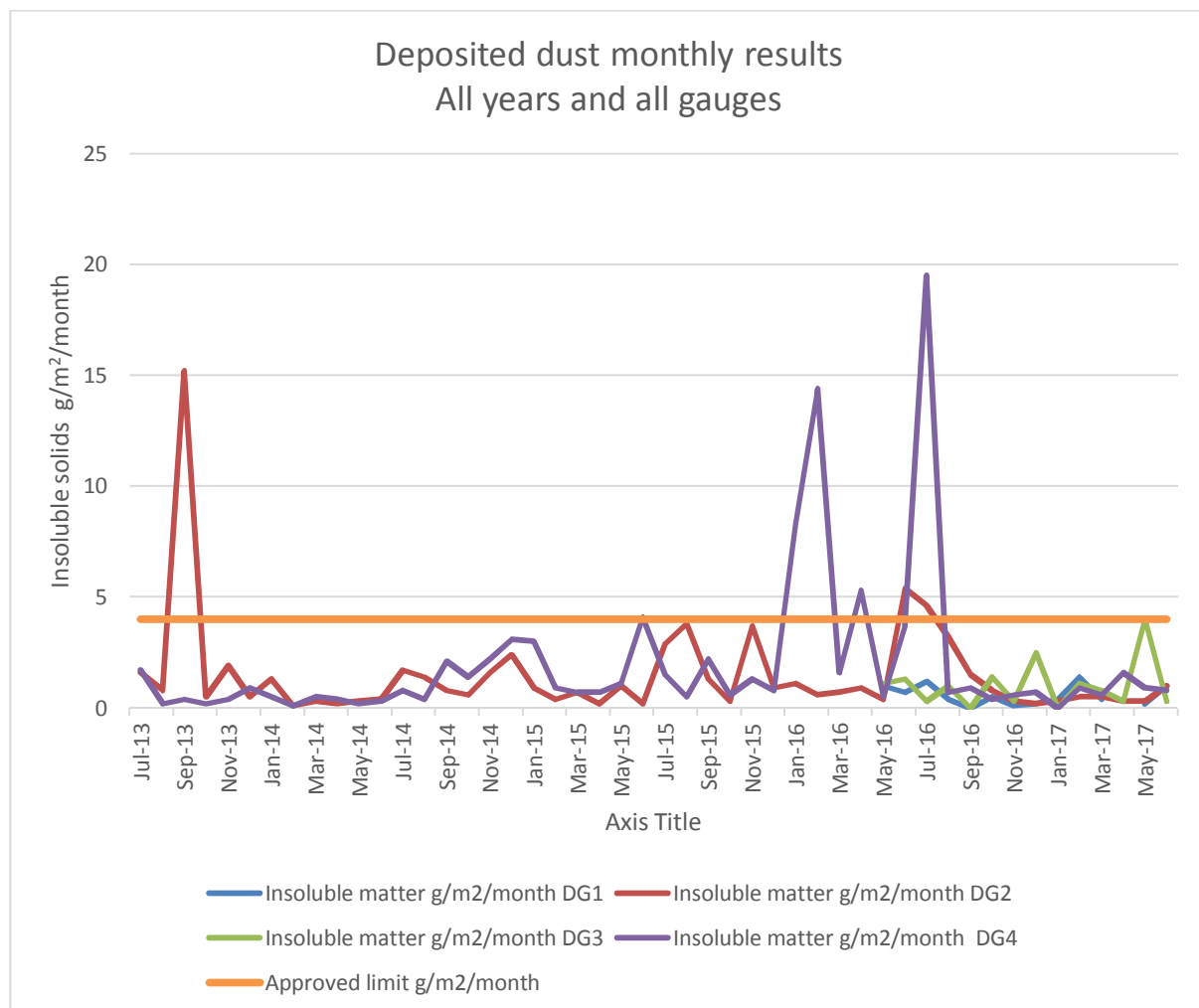


Figure 22: Deposited dust – historic annual averages for each dust gauge

Figure 23: Deposited dust monthly results – all years and all gauges



A review of **Table 7** and deposited dust data analyses in **Figures 21, 22 and 23** indicates that dust levels generally decreased over the reporting period, and that the annual average for deposited dust decreased at all gauges. The placement of the quarry into temporary 'Care and Maintenance' mode from April to July, 2017, would have had the effect of decreasing deposited dust at all gauges, if only slightly. The rolling average for deposited dust at D4 exceeded the Annual Average limit of 4 g/m²/month for several months in the first half of the reporting period. The exceedance in rolling average figures is caused by one spurious result of 19.5 g/m²/month in July, 2016. The presence of coal dust in the sample at D-3 for the same month, and the predominance of NNW winds in the first half of July, indicate that the dust did not emanate from the quarry. Analyses of deposited dust current and historic annual averages, show that mean annual total insoluble solids (deposited dust) criteria were satisfied as per the air quality criteria applicable to the Wallerawang Quarry specified

in **Condition 2.39 DA 344-11-2001 (Table 6) (Appendix 1)**. The approved *Air Quality Management Plan* (2016) prescribes a trigger for the implementation of particulate matter monitoring if the rolling average of deposited dust exceeds 3.5 g/m²/month. As the rolling average results was shown to be spurious, the monitoring of particulate matter was not implemented. The limits for deposited dust are 2g/m²/month for a maximum increase in the deposited dust level, and 4 g/m²/month for the maximum total deposited dust level. No limits on air quality are imposed by the Environmental Protection Licence.

A revised Air Quality Monitoring Plan was submitted and approved by the DPE.

6.1.3 Results compared to EIS predictions

The EIS states that the increases in dust deposition rates for the area surrounding the quarry will not exceed 0.1g/m²/month. The monthly increases have exceeded 0.1 g/m²/month both within and outside the Mining Lease in the reporting period. The monthly deposited dust results in **Table 7** show that the dust deposition rates and monthly increases have significantly exceeded the EIS predictions.

6.2 Erosion and sediment

Management of erosion and sediment control during the reporting period was done according to the methods in the current MOP (2009-2016)(**Section 15.3**) and site *Water Management Plan* and *Soil and Water Management (During Construction) Plan* and *Stormwater Management Plan* prepared in accordance with **DA 244-11-2001**, and after September, 2016, with the newly approved *Water Management Plan* and *Environmental Monitoring program*.

The following tasks were undertaken in the reporting period:

- Weekly monitoring of the stability of the dam walls, water management features and topsoil stockpile, and improvements/repairs made where necessary
- Silt fencing at the toe of the Main Storage Dam was remade with new material to improve its effectiveness
- Hay bale silt fencing and geotextile mesh was applied to the erosion scour on the slope west of the Main Storage Dam
- The bare banks around the silt cells were sprayed with seed-bearing organic material
- A shallow bund wall was made on the floor of the Hoskins Quarry to prevent the movement of run-off and stockpiled sand
- A small erosion scour on the slope west of the Main Storage Dam was covered in geotextile mesh, and hay-bale silt fencing was emplaced above the scour.

6.3 Operational Noise

Noise monitoring has been conducted during the reporting period in accordance with the NSW Industrial Noise Policy and AS 1055: *Acoustics - Description and Measurement of Environmental Noise*. This noise emission criteria, identified in the Environmental Protection Licence no. 13172 (see **Appendix II**) and the *Development Consent (Appendix I)* as applicable to the Wallerawang Quarry is as follows;

L4.1 Noise from the premises must not exceed:

- 43 dB(A) $L_{Aeq(15 \text{ minute})}$ during the day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday; and
- 43 dB(A) $L_{Aeq(15 \text{ minute})}$ during the evening (6pm to 10pm) Monday to Friday; and
- At all other times 39 dB(A) $L_{Aeq(15 \text{ minute})}$ except as expressly provided by the EPA.

Where L_{Aeq} means the equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

The noise emission limits identified in this licence apply under all meteorological conditions except:

- during rain and wind speeds (at 10m height) greater than 3m/s; and
- under “non-significant weather conditions”.

6.3.1 Monitoring sites

The following three monitoring sites, shown in **Figure 20**, were monitored over the reporting period:

- | | |
|-----|--|
| N1: | Gemalong Place - a neighbouring residence to the east of the quarry
<i>229,170mE, 6,297,220mN (MGA z56)</i> |
| N2: | Inside the property boundary of a neighbouring nearest residence, NE of the quarry
<i>228,394mE, 6,296,908mN (This monitoring point was moved closer to the residence in the reporting period (September 2016))</i> |
| N2: | Nearest residence – in Cypress Place, north of the quarry
<i>227,900mE, 6297,370mN.</i> |

A noise monitoring audit by Atkins Acoustics, completed a few weeks after the end of the reporting period ([Monday, 4th July, 2016, between the times of 8.00 am and 1.00 pm](#)) is presented in **APPENDIX VIII**. A second noise monitoring assessment was done on [Thursday, 12th January, 2017 \(between the times of 8.25 am and 12.42 pm\)](#) by Muller Acoustic Consulting Pty. Ltd. (report in **APPENDIX VIII**).

Six-monthly noise monitoring was done in the reporting period, in accordance with the new *Noise Management Plan* (2016) approved by the DPE.

6.3.2 Monitoring results and trend analysis

Table 10: Summary of noise measurement results – all years

Date of measurement	Measured Statistical Noise Levels (dB(A))			Estimated quarry contribution	Comments
	L _{Aeq} . 15 min	L _{A90} . 15 min	L _{Amin} . 15 min	L _{Aeq} . 15 min	
	N1: Gemalong property				
January 2017 8.25 am to 12.42 pm	45	43		Quarry inaudible	8:25 am Highway traffic, birds, local residential noise, dog barely audible
	60	59		Quarry inaudible	12:42pm Highway traffic, birds, local residential noise, aircraft, horse
July 2016 8am to 1pm	48.6	44.7	43.2	<34	Quarry operations inaudible. Ambient noise controlled by highway road traffic
December 2014	45.5	41.4	39.6	<30	Quarry operation inaudible. Ambient noise influenced by road traffic on highway, insects, birds and breeze in trees
N2: Cockatoo Pines gates(Cockatoo Pines property boundary after September, 2016)					
January 2017	47	46		Quarry inaudible	9:05 am Highway traffic, birds, insects
	47	46		Quarry inaudaible	12:00 Noon Highway traffic, birds, insects
July 2016	59.1	48.3	48.1	<38	Quarry operations inaudible. Ambient noise controlled by highway road traffic
December 2014	56.3	50.9	49.6	<40	Quarry operations inaudible. Ambient noise influenced by road traffic on highway and Barton Avenue, local domestic (lawnmower), birds, dog and insects
N3: Cypress Place property					
January 2017	45	43		Quarry inaudible	9:26 am Highway traffic, aircraft, birds
	43	41		Quarry inaudible	12:24 pm Birds, highway traffic, insects, lawn mower

July 2016	52.4	43.0	42.2	<33	Quarry operations generally inaudible. Quarry reversing alarm audible L _{Amax} <30dBA; Ambient noise influenced by highway and Barton Avenue road traffic, dogs and birds
December 2014	53.1	50.0	48.8	<39	Quarry operations inaudible. Ambient noise influenced by road traffic on highway, insects, birds and breeze in trees

Observations during the July 2016 audit confirmed that quarry operations were generally inaudible at the three reference monitoring locations, accordingly the noise contributions from the quarry operations were 10dB or more below the measured L_{A90} levels and satisfied the 43dB(A) noise limit in accordance with *EPL 13172*. The operating conditions of the *Development Consent (Conditions – 2.9 to 2.14)* were satisfied during the reporting period. The results of the second audit in January, 2017, were that the noise emissions generated by Wallerawang Quarry comply with relevant statutory noise limits specified in NMA and EPL at all assessed locations. In summary, quarry noise was inaudible during all measurements and was dominated by extraneous noises unrelated to quarry operations. The latest noise measurements show that noise levels have not increased significantly since the previous audit was done.

6.3.3 Results compared to EIS predictions

Modelling of predicted noise levels for potential receptors in the vicinity of the quarry site indicates that under calm atmospheric conditions, all noise assessment goals will be complied with. During adverse conditions (wind and temperature inversion), noise assessment goals may be exceeded at some receptor locations.

6.4 Blasting

Blasting criteria for the Wallerawang Quarry is nominated in *Development Approval DA 344-11-2001 (Appendix 1)* and the *Environmental Protection Licence No. 13172 (Appendix II)* and specifies that:

- Blasting must only be carried out between 9.00am and 5.00pm Monday to Friday, 9.00am - 1.00pm on Saturdays and at no time on Sundays or Public Holidays.
- The overpressure level from blasting operations must not:

- exceed 115dB (Lin peak) for more than 5% of the total number of blasts over each Reporting Period; and
- exceed 120dB (Lin Peak) at any time,
at any residence on privately-owned land.
- Ground vibration peak particle velocity from the blasting operations must not:
 - Exceed 5mm/s for more than % of the total number of blasts during each reporting period; and
 - Exceed 10mm/s at any time,
at any residence on privately-owned land.

Flyrock, air vibration, ground vibration and dust from blasting are controlled using a combination of design and operational methods which are detailed in the MOP and the /or documented blasting procedures. The results of the blast monitoring that was conducted in accordance with **Section M7.1** of the Environmental Protection Licence, are presented in **Appendix VII**. Blast reports from the reporting period are included in this Appendix. From September, 2016, blasting was carried out in accordance with the new *Blast Management Plan* approved by the DPE. Monitored air blast levels did not exceed 115dB(L) and ground vibration levels did not reach or exceed 5mm/s. Monitoring results showed that blasting during the reporting period complied with the conditions set out in this section.

6.4.1 Blast monitoring locations

Three blast monitoring sites, shown in **Figure 20**, were used for monitoring in the reporting period:

1. 228,040mE, 6,297,270mN (MGA, z56) – Nearest residence to the quarry – north of the highway – Cypress Place
2. 228,390mE, 6,297,820mN – Dam wall – Lake Wallace (NNE of the quarry)
3. 227,710mE, 6,297,630mN – Private residence – Beacroft Place off Forest Ridge Drive (north of the quarry).

Two blast monitoring sessions were carried out in this reporting period and a third was carried out shortly after the end of the period. The monitoring was done by Premier Drill and Blast, in accordance with the site Blast Management Plan. No exceedances were found, and the trend is neither decreasing nor increasing, but stable. Blasting was not carried out outside the hours and days permitted by the EPL and the Development Consent.

6.4.2 Monitoring results and analysis

Table 11: Summary of blast monitoring results - all years and all receivers

		Vibration (mm/s)					Overpressure (dB(L))					Weather
EPA Limits		5mm/s					115dBa					
Date	Time	Receiver 1 – Cypress Place	Receiver 2 – dam wall	Receiver 3 – Beacroft Place	Old access gate	Gas pipe line	Receiver 1 – Cypress Place	Receiver 2 – dam wall	Receiver 3 – Beacroft Place	Old access gate	Gas pipe line	
3.9.14	1303	0.66	0.76				101.9	101.9				Sunny, wind SW 20kph
9.10.14	1328	0.52			0.98		100.0			102.8		Sunny, wind NW 12kph
19.11.14	1156	0.74		1.02		0.57	97.5		95.9		104.	Warm, negligible wind
8.7.15	1402	0.9		1.0			106.5		104.2			Sunny
7.12.15	1358	1.4		1.3			103.5		104.9			Hot & sunny, wind ENE 13kph
18.7.16		0.8		0.6			110.6		108.0			
6.2.17		0.7	Not triggered	Not triggered			107.5	Not triggered	Not triggered			Sunny, hot, west winds, 13km/h with gusts to 17 km/h

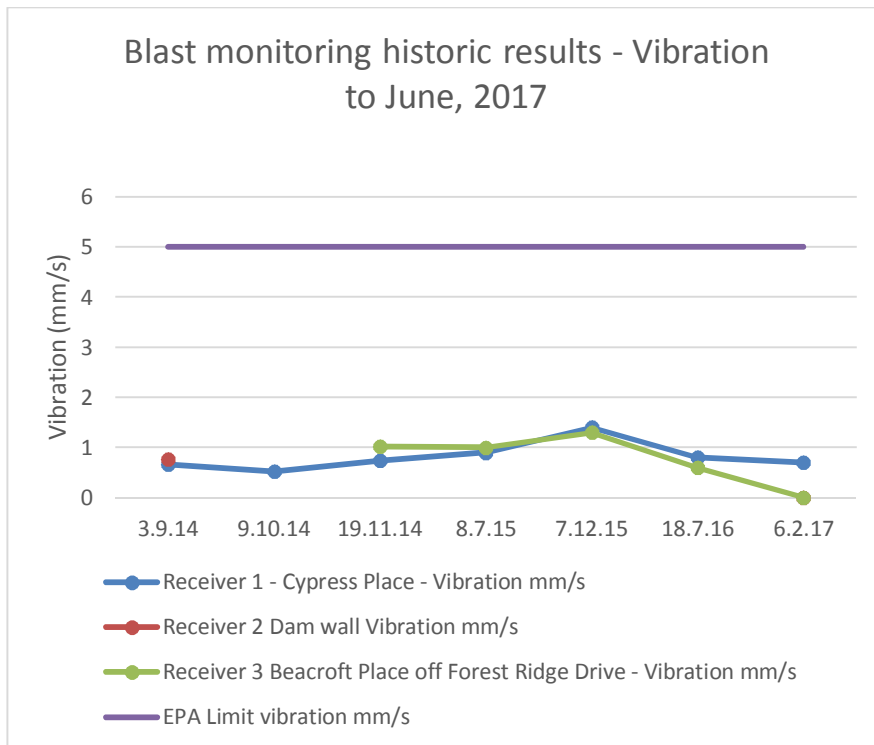


Figure 24: Blast monitoring historic results – vibration

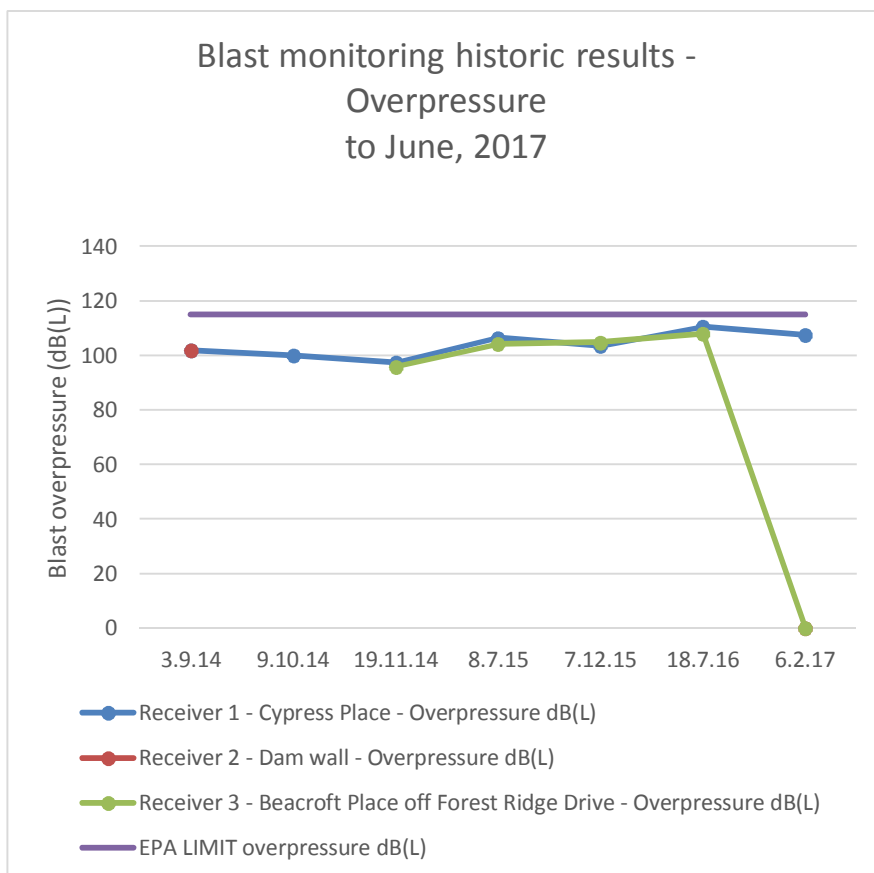


Figure 25: Blast monitoring historic results - overpressure

6.4.3 Comparison of results with EIS predictions

The EIS predicted that the EPA limits would not be exceeded. An initial assessment of blasting impacts by Atkins Acoustics estimated that the long term vibration goal of 2mm/s would be achieved, based on the maximum charge and highest bench assessed. The blast monitoring results to date accord with the EIS predictions.

6.5 Contaminated polluted land

Prior to mining, the project approval area was a greenfields site. During the preparation of the EIS it was revealed that no environmentally harmful products had been used on the landholding nor had there been any disposal of potential environmental contaminants. This situation has remained unchanged throughout the reporting period, and consequently there is no reason to expect that contaminated lands would be present within the project area.

6.6 Threatened flora

Three Threatened tree species have been recorded as being sighted within a 10 x 10 kilometre area surrounding the lease area, as indicated by a search of the Bionet Atlas of NSW wildlife database. No individuals of these species have been recorded in the tenement area or in its surroundings – the nearest recorded occurrence is located 2km north of the quarry. No threatened tree species were discovered in the Lease area in the reporting period. The new *Fauna and Flora Management Plan* (approved September, 2016), in accordance with **Section 2.38** of the *Development Consent* DA 344-11-2001 was implemented during the reporting period, except that comprehensive ecological monitoring was not done. The plant *Bursaria Spinosa* does not have Threatened Species status, but is important to conserve as it is the larval food source of the endangered Bathurst Copper Butterfly. Stands of *Busaria Spinosa* were documented during the reporting period, in areas south and southwest of the quarry site in an October, 2016 report *Purple Copper Butterfly* by Lesrock Environmental (**APPENDIX XVI**).

6.7 Threatened fauna

Ten Threatened Species of fauna have been recorded as being sighted within a 10 x 10 kilometre area surrounding the lease area, as indicated by a search of the Bionet Atlas of NSW wildlife and the NSW Fisheries database. Of these species, only the endangered Bathurst Copper Butterfly *Paralucia spinifera* is recorded as having been sighted in the Lease area. No sightings of the butterfly were made during the reporting period. The new (September, 2016) *Fauna and Flora Management Plan*, in accordance with **Section 2.38** of the *Development Consent* DA 344-11-2001 was implemented during the reporting period. An ecologist's report – *Purple Copper Butterfly* (**APPENDIX XVI**) was completed in

the reporting period.

6.8 Weeds

Weed management within at the site during the reporting period involved weed spraying and targeted inspections to determine levels of weed infestation. Weed control is undertaken by contractors annually in spring and summer for different types of weeds. The main weed type to germinate in the Lease area is thistle. Flat weeds and blackberry bushes are less common. Weeds proliferation increased at the start of the reporting period due to frequent rainfall, but weeds are adequately controlled at the site. The compulsory wheel wash that trucks must undergo before leaving site stops the spread of weeds from the site. All persons involved with weed control hold the required chemical handling certificates.

6.9 Visual, stray light

The only lighting used after dark during the reporting period was security lighting at the office building. This lighting is directed downwards and is not categorised as stray light. **Conditions 2.50 and 2.51** of the *Development Consent* DA No. 344-11-2001 state that all practicable measures are taken to prevent and/or minimise any off-site lighting impacts from the development, and that all external lighting shall comply with Australian Standard AS4282(NT) 1995 – *Control of Obtrusive Effects of Outdoor Lighting*. These conditions were met during the reporting period.

6.10 Aboriginal heritage

The Aboriginal open camp site identified during a February, 2000 archaeological survey in the quarry area, must be protected under the conditions of the Mining Lease, and the *Development Consent* DA No. 344-11-2001. **Condition 2.44** of the *Development Consent* states that the Applicant (Walker Quarries) shall not disturb the area marked “potential site area” on Figure 23 of Attachment 1. The Aboriginal site is located on the northern side of the former Hoskins Quarry. **Condition 2.45** states that the Applicant shall protect and conserve the area subject to **Condition 2.44**, in consultation with the Bathurst Local Aboriginal Land Council and to the satisfaction of the Director-General. The site has been fenced-off to exclude access to the site, and has been left undisturbed by the operators of the quarry. The fence condition was monitored during the reporting period and found to be in good condition. A silt fence is present between the topsoil stockpile and the Aboriginal site to further protect the site. New employees and contractors at the site during the reporting period were informed about the location of the site and the need to leave it undisturbed.

6.11 Natural heritage

There are no features of Natural Heritage within the development approval area and hence, no specific management procedures are required.

6.12 Spontaneous combustion

Risk of spontaneous combustion has been identified as 'non-existent' within the planned mining operations area.

6.13 Bushfire

Under the Rural Fires Act 1997, there are a number of obligations that must be met by Walker Quarries with respect to managing their land. These are detailed in the MOP (2009-2016) and were met during the reporting period. The *Development Consent* DA No. 344-11-2001 contains **Conditions 2.53 and 2.54** for Walker Quarries to prepare a *Bushfire Management Plan*, to ensure that the development is equipped to respond to any fires on-site, and that as much assistance as possible is to be given to the Rural Fire Service and emergency services if there is a fire on-site. The site's *Bushfire Management Plan* was followed and there were no fires on-site during the reporting period. A new *Bushfire Management Plan* was submitted to the DPE and approved in September, 2016.

6.14 Mine subsidence

Mine subsidence is not an issue with quarries and hence it is not an issue with the Wallerawang Quarry.

6.15 Hydrocarbon contamination

Walker Quarries' site objectives are that:

- All bulk hydrocarbons, ie. oils, grease etc (both new and waste) retained at the mine be contained within designated bunded areas;
- All fixed or portable equipment incorporate self-contained bunding;
- Hydrocarbon-contaminated materials be disposed of appropriately; and
- Minor spillages, if occurring, are cleaned up with onsite spill kits and the contaminated soil either bio-remediated or transferred off-site to an appropriately licensed waste disposal area.

Major spillages, if they occur, would be treated in the quarry's 'Hydrocarbon Management Plan'. No hydrocarbon spillages occurred during the reporting period. All of the objectives were met in the reporting period.

6.16 Methane drainage/ventilation

Methane drainage / ventilation are not of relevance to quarries and hence are not an issue at the Wallerawang Quarry.

6.17 Public safety

The Quarry property is fenced and has a lockable gate at the entrance. Warning signs are present and visible on the fences on all sides of the quarry, including a sign warning that video surveillance is in place at the site. Only authorised vehicles are permitted on the quarry access road and haul road, which leads to the administration and mining area.

Visitors to the quarry are required to report to the quarry office, and unauthorised personnel are not be permitted to move around the quarry area unaccompanied. Procedures are in place with respect to blasting to ensure the area around each blast site is clear of personnel and that all surrounding residents are advised in advance of proposed blasts. No public safety incidents occurred during the reporting period.

6.18 Hazardous Material Management

Hazardous materials have been managed as per **Section 4.4** of the Environmental Impact Statement, 2001, and **Section 4.3** of the MOP. A Pollution Incident Management Response Plan is held in the site office as required by EPL 13172. No explosive material has been or will be retained within the Wallerawang Quarry. Premier Drill & Blast, which is the site blasting contractor, has a storage facility off-site, which removes the requirement for on-site storage. Mixing of nitropril with distillate to produce an explosive will be undertaken on the day of each blast using a purpose built explosives mixer and in a quantity adequate only for that particular blast. Materials Safety Data Sheets (MSDS) are retained on-site for all hazardous materials, independent of quantity. Additionally, all contractors are required to supply MSDS sheets for any hazardous goods they may bring on to the site.

6.19 Effluent Management

A bunded 'pump-out' sewage system is present, close to the office buildings on site (**Figure 5**). The system is fitted with a 'height alarm' flashing light that activates with 3 days' notice of capacity being reached. The Quarry Manager then calls the relevant contractor to come to site to pump out the tanks.

6.20 Meteorological monitoring

Meteorological monitoring was done during the reporting period from a weather station position shown in **Figure 20**. The records of the quarry site weather station, together with weather records from the Bureau of Meteorology weather station at Lithgow (Cooerwull) - obtained for reference purposes - are presented in **APPENDIX XV**.

6.21 Other issues and risks

No other issues or risks were been identified during this reporting period.

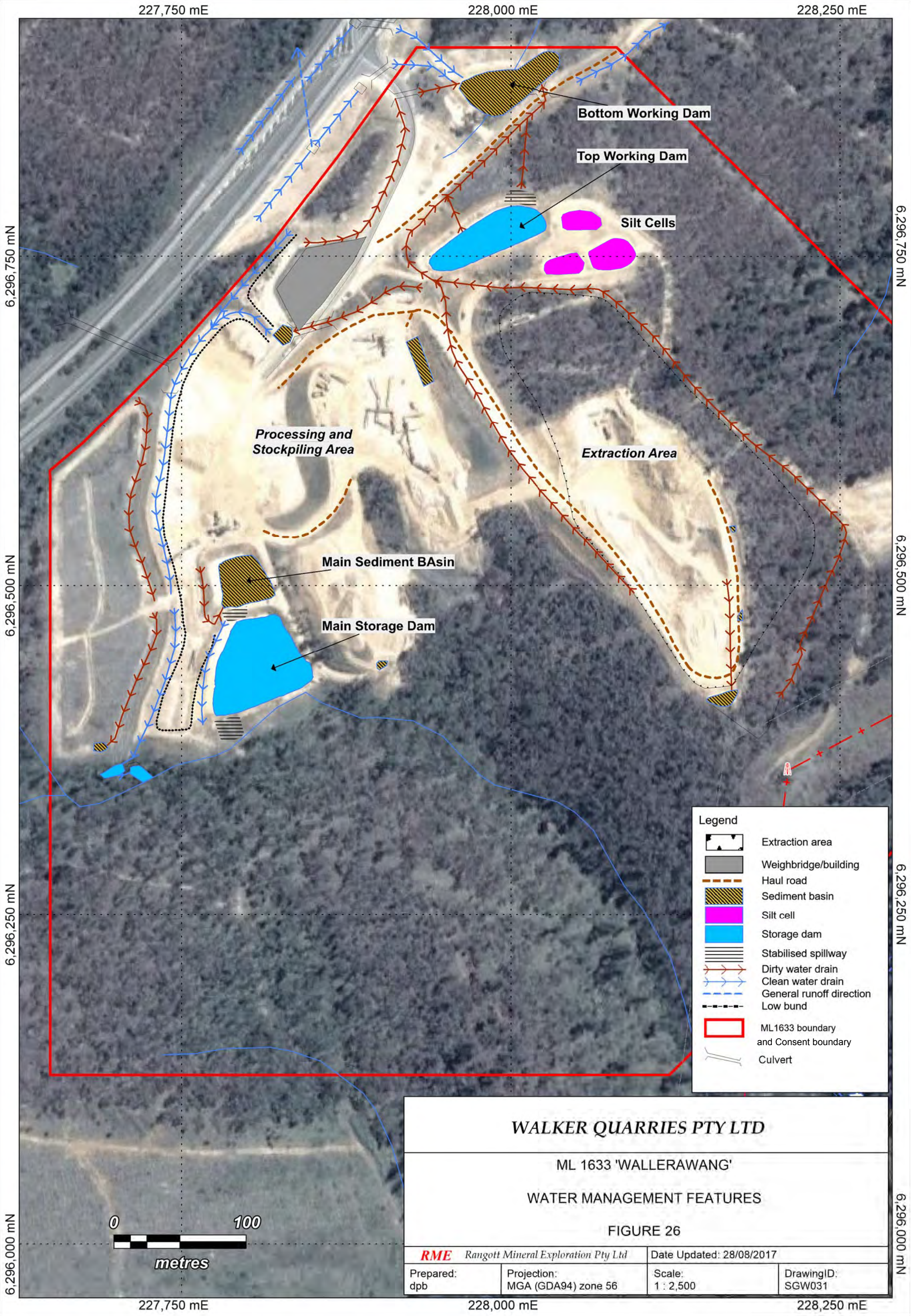
7.0 WATER MANAGEMENT

7.1 Water Management

The principal objective of water management at the site is the maintenance of existing water quality within the Cox's River. This is achieved by ensuring that there are no discharges from site in the majority of circumstances, and that unavoidable site discharges are treated sufficiently, in compliance with EPA requirements. Water management on site was done in accordance with the site *Water Management Plan* (new WMP approved by the DPE in September, 2016 – **APPENDIX XII**), the MOP, the Mining Lease and Development Consent conditions and the EPA requirements. The relevant section of the MOP is **Section 3**. Water from disturbed areas is captured, transported and stored in a series of water management structures constructed on site (**Figure 26**). Main Storage Water is managed according to the MOP and the Management Plan mentioned above. Water re-use and efficiency is maximised by using water stored in the water management dam for the majority of on-site water requirements, mainly for dust suppression purposes. An irrigation component is included in the water management design and ensures that adequate storage is available on site for the majority of storm events. The Water Management Plan includes the amount of water storage that is to be kept available in the Water Management Dam to allow for a 1 in 20- year storm. Two discharge events occurred during the reporting period. Water is also stored in the Top storage dam (**Figure 26**) near the quarry entrance, and a small sediment dam is located east of the quarry entrance. Three silt cells were constructed in the previous reporting period to enhance sediment control and water recycling. The water sampling at SD-1 and SD-2 will be done monthly in conjunction with the air quality monitoring.

7.2 Surface water pollution

Surface water management was conducted during the reporting period as proposed in the approved *Water Management Plan* (2016) by the Department of Planning. Siltation levels in the two sediment trap dams were monitored with a measuring pole at each dam. The clean and dirty water drains were monitored regularly for effectiveness. The water management structures completed in the reporting period are working effectively. Monthly water quality analysis and monitoring during discharge is required by the Environmental Protection Licence if discharge occurs. The monitoring locations (SD-1 to SD-4) are shown in **Figure 20**. Two dam discharge events occurred during the reporting period – in September, 2016 and in March, 2017. The discharge sample results are shown in **Table 12**. The discharge at each event was sampled and analysed by ALS, Lithgow. Sampling of the Cox's River water upstream (SD-3) and downstream (SD-4) of the quarry began in the reporting period, but was not carried out after October, 2016, when the new, approved *Water Management Plan* was adopted. The



WALKER QUARRIES PTY LTD

ML 1633 'WALLERAWANG'
WATER MANAGEMENT FEATURES

FIGURE 26

RME Rangott Mineral Exploration Pty Ltd		Date Updated: 28/08/2017	
Prepared: dpb	Projection: MGA (GDA94) zone 56	Scale: 1 : 2,500	DrawingID: SGW031

WMP prescribed only annual sampling of water in the Cox's River upstream at SD-3 and downstream at SD-4.

Location of monitoring points

All coordinates are Map Grid of Australia, zone 56

SD-1	227,800mE/ 6,296,368N (Spillway from Main Storage Dam)
SD-2	228,111 mE / 6,297,000 mN (unnamed stream tributary of the Cox's River)
SD-3	228,420mE/ 6,297,180mN (Cox's River upstream of the quarry)
SD-4	228,260 mE / 6,296,180 mN (Cox's River downstream of the quarry)

Samples were collected and analysed by ALS-ACIRL, Lithgow.

7.2.1 Monitoring results and analysis

Approval criteria-

Development Consent –

Stormwater discharge from the development must comply with the following 100 percentile concentration limits:

TSS – 30mg/L

Sulphate – 250mg/L

G & O – 5 mg/L

EC – 1500 MS/cm

pH – 6.5 – 8.5

EPL –

Some monitoring points are prescribed in the EPL – SD1, SD2 and SD3.

Any discharge waters must be sampled and tested and must not exceed the following 100 percentile concentration limits:

TSS – 30 mg/L

Sulphate – 250 mg/L

G & O - 10 mg/L

pH – 6.5 – 8.5.

Laboratory certificates for the analyses are presented in **APPENDIX VI**.

Table 12: Water sampling results for the reporting period

Date	Site	pH	Total Suspended Solids mg/L	Oil & Grease mg/L	Sulphate mg/L	Electrical conductivity MS/cm	Comments
Jul-16	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3 Upstream	8.72	<5	<5	208	1170	Sampled 7.7.2016
	SD-4 downstream	8.84	<5	<5	206	1122	Sampled 7.7.2016
Aug-16	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3 Upstream	8.24	<5	<5	149	840	Sampled 8.8.2016
	SD-4 downstream	8.41	<5	<5	141	803	Sampled 8.8.2016
Sep-16	SD-1	7.81	115	<5	4	73	Discharge sampled 21.9.2016
	SD-2	-	-	-	-	-	
	SD-3 Upstream	7.66	<5	<5	144	597	Sampled 12.9.2016
	SD-4 downstream	8.48	<5	<5	143	593	Sampled 12.9.2016
Oct-16	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3 Upstream	7.5	<5	<5	111	614	Sampled 7.10.2016
	SD-4 downstream	8.14	<5	<5	91	513	Sampled 7.10.2016
Nov-16	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3	-	-	-	-	-	Not sampled
	SD-4	-	-	-	-	-	Not sampled
Dec-16	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3	-	-	-	-	-	Not sampled

	SD-4	-	-	-	-	-	Not sampled
Jan-17	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3	-	-	-	-	-	Not sampled
	SD-4	-	-	-	-	-	Not sampled
Feb-17	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3	-	-	-	-	-	Not sampled
	SD-4	-	-	-	-	-	Not sampled
Mar-17	SD-1	8.53	120	<5	1	46	Discharge sampled 22.3.2017
	SD-2	8.34	58	<5	1	19	Discharge sampled 22.3.2017
	SD-3	-	-	-	-	-	
	SD-4	-	-	-	-	-	
Apr-17	SD-1	-	-	-	-	-	Not sampled – no discharge
	SD-2	-	-	-	-	-	
	SD-3 Upstream						
	SD-4 Downstream						
May-17	SD-1						Not sampled – no discharge
	SD-2						
	SD-3 Upstream						
	SD-4 Downstream						
Jun-17	SD-1						Not sampled – no discharge
	SD-2						
	SD-3 Upstream						
	SD-4 Downstream						

Table 12 shows that there is no decrease in pH from the upstream sampling site (SD3) to the downstream sampling site (SD4). There is no significant variation in the other analytes between the SD-3 and SD-4 sampling points. Water discharge results are discussed below.

Discharge monitoring results

Analyses from the water discharged from the Main Storage dam and the Bottom Working Dam in June, 2016, are summarised as follows:

Table 13: SD-1 Main Storage Dam and SD-2 Bottom Working Dam Discharge Results Summary

SD-1 Main Storage Dam and SD-2 Bottom Working Dam Discharge Results Summary							
ANALYTE	SD-1 result		SD-2 result	EPL Limit – 100 th percentile	Development Consent Limit - 100 th percentile	Exceedance?	
	21 September 2016	22 March 2017	22 March 2017			21 September 2016	22 March 2017
Total Suspended solids mg/L	115	120	58	30	30	Yes	Yes
pH	7.81	8.53	8.34	6.5-8.5	6.5 – 8.5	No	Yes
Sulphate mg/L	4	1	1	250	250	No	No
Grease & Oil mg/L	<5	<5	<5	10	10	No	No
Electrical Conductivity MS/cm	73	46	19	-	1500	No	No

Table 13 shows that the discharge at SD-1 in the reporting period did not comply with the approval and licence limits/ranges in relation to pH and Total Suspended Solids. [Also, the discharge at SD-2 in March exceeded the approval and licence limit for Total Suspended Solids.](#)

The action taken by Walker Quarries to achieve compliance was to add flocculant to the Bottom Working Dam and the Main Storage Dam.

No significant trend analysis is yet possible, as only one discharge sample was taken for analysis in the previous reporting period. The sample indicated a TSS of 75 mg/L, an exceedance under the conditions of the Development Consent and the EPL.

7.3 Ground water pollution

With the exception of oils, no materials will be retained on the quarry site which are likely to be a source of groundwater pollution. Fuel is not kept on site, as refuelling trucks arrive onsite regularly to refuel equipment.

Contamination of groundwater was managed by controlling chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up; and
- Oil and greases being stored within a bunded area, constructed in accordance with AS 1240-2004 and/[or the Environment Protection Authority.](#)

8.0 REHABILITATION

8.1 Buildings

No buildings were re-located or demolished during the reporting period.

8.2 Rehabilitation of Disturbed Land

Wallerawang Quarry's rehabilitation/land use objectives for the quarry site in the short term (during the reporting period), as stated in the MOP (2009 – 2016) were as follows:

- Stabilising all earthworks, drainage lines and disturbed areas that are no longer required for mine related activities; and
- Reducing the visibility of mining activities from adjacent properties and the local road network.

Areas affected by mining - long term

- Creating a low maintenance, geotechnically stable and safe landform which is commensurate with the forestry, lifestyle residential and nature conservations land uses on and around the quarry site;
- Blending of the final landform with the surrounding topography such that the visual impact of the post-mining landform is minimised; and

Areas to be unaffected by mining

- Stock exclusion through fencing of the entire mining lease. This includes areas disturbed and rehabilitated with native vegetation and existing agricultural land.

The site will be fenced-off to exclude stock and allowed to naturally revegetate.

Few disturbed areas of the site are ready for permanent rehabilitation as most areas are active.

Most rehabilitating areas that are being revegetated are temporary but long-term rehabilitation areas, as some of these areas may have to be reshaped to achieve the final rehabilitation goal.

Silt cells seed spraying

During the reporting period, Walker Quarries began rehabilitation on some disturbed areas around the three silt cells near the Top Storage Dam (Figure 2). Seed spraying was done to cover all of the bare banks.

Highway frontage revegetation

The quarry *Landscape Planting Plan* (**APPENDIX XVI**) was commenced during the reporting period. A local nursery collected seeds of local species and propagated them to tubestock. Over 500 tubestock were planted on the highway frontages and around the quarry entrance (**Figures 3 & 4**).

The only areas that are final rehabilitation areas rather than temporary stabilisation areas are the areas flanking the access road as it enters the Mining Lease, as recorded in **Table 14**. The rehabilitation activities are in accordance with the stated rehabilitation objectives described in the MOP and listed in this section. There are no pollution risks associated with the rehabilitation areas, as they are stable and regularly monitored for weed growth and stability.

Mine Area Type	Previous reporting period	This reporting period	Next reporting period (forecast)
	Year 2016 (ha)	Year 2017 (ha)	2018 (ha)
A. Total Mine Footprint	11.7	11.7	12.5
B. Total Active disturbance	11.4	10.2	11
C. Land being prepared for rehabilitation	0	0	0
D. Land under active rehabilitation	0.274	1.5	1.5
E. Completed rehabilitation	0	0	0

Table 14: Rehabilitation status

8.3 Other Infrastructure

Timber batting was spread over the cleared new, approved planned stockpile area to the west of the main stockpile pad (**Figure 2**) to prevent erosion.

8.4 Rehabilitation Trials and Research

Apart from monitoring of the revegetation progress on the rehabilitation areas, no rehabilitation trial and research was undertaken during this reporting period.

8.5 Further Development of the Final Rehabilitation Plan

The final rehabilitation plan is currently that described in the MOP (2009-2016) **Section 9**. The final rehabilitation plan for the quarry will be developed in detail over the next MOP period, in consultation with the landholders – Forestry Corporation of New South Wales (FCNSW) and NSW Crown Lands. During the reporting period, consultation with a landholder, Forestry Corporation of New South Wales, was undertaken in order to begin the final rehabilitation plans. The FCNSW representative stated that Forestry would like to see the quarry site return to native bushland for conservation and recreation purposes, with no dams, voids or tracks remaining.

9.0 COMMUNITY RELATIONS

9.1 Environmental Liaison

The Wallerawang Quarry maintains a liaison / complaints telephone line, which is manned during office hours 5 days per week. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on a “Complaints Form”. Any complaints that are made are reported to the Community Consultative Committee. Complaints received during the reporting period are listed in the following table:

DATE	COMPLAINT DELIVERY	COMPLAINTEE	NATURE OF COMPLAINT	ACTIONS TAKEN	REASON FOR NO ACTION
Nil complaints in reporting period					

Table 15: Complaints Register for the Reporting Period

The following table shows the trend since 2015 of the number of complaints received:

	REPORTING YEAR			
	2014	2015	2016	2017
Number of community complaints	0	6	0	0

Table 16: Comparison of numbers of complaints over previous reporting periods

The trend of complaints over time is stable and decreasing since 2015.

9.2 Community Liaison

In accordance with **Condition 3.13 of Schedule 3** of DA 344-11-2001 a Community Consultative Committee (CCC) was initially formed in January 2010. The committee comprises representatives of Lithgow council, Walker Quarries and the community, and is currently chaired by Ms Sue Graves. Minutes are available from committee members and are on display at Lithgow City Council libraries. During the reporting period, a community consultative meeting was held on the 12th December, 2016 and on the 20th June, 2017.

10.0 INDEPENDENT AUDIT

Independent Environmental Audit (IEA)

An IEA was not conducted in the reporting period. An independent audit of compliance by SLR Consulting for the reporting year ending 30th June, 2016 was completed in March, 2016, and was forwarded to the NSW Department of Planning and Environment. The audit report (IEA) and IEA Action Plan and monthly reports were presented in the previous Annual Review/AEMR.

The DPE confirmed that no further monthly reports were required on 17th October, 2016.

11.0 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

There were no incidents or non-compliances during the reporting period other than the non-compliances listed in **Section 1.0**.

12.0 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

Activities in the next AEMR period will be according to the current approved MOP and site management plans, and will include:

1. Activities described in *MOP Amendment B*, including the encasement of the clean water drain in the northwestern section of the quarry, adjacent to the highway, in a large diameter pipe to allow vehicular crossing
2. Local seed collection and planting on rehabilitating areas
3. Concentrated revegetation efforts around the three silt cells, as required by the Environmental Sustainability Unit of the Division of Resources & Geoscience
4. Environmental monitoring and documentation
5. Further ecological surveys as described in the *Flora and Fauna Management Plan* (2016).

Walker Quarries Pty Ltd

**Annual Environmental Management Report
For the
Wallerawang Quarry
(ML1633)**

APPENDIX I

Development Consent (DA) 344-111-2001

Walker Quarries Pty Ltd

**Annual Environmental Management Report
For the
Wallerawang Quarry
(ML1633)**

APPENDIX II

Environment Protection Licence No. 13172

Walker Quarries Pty Ltd

Annual Environmental Management Report

For the

Wallerawang Quarry

(ML1633)

APPENDIX III

EPA Statement of Compliance

Walker Quarries Pty Ltd

Annual Environmental Management Report
For the
Wallerawang Quarry
(ML1633)

APPENDIX IV

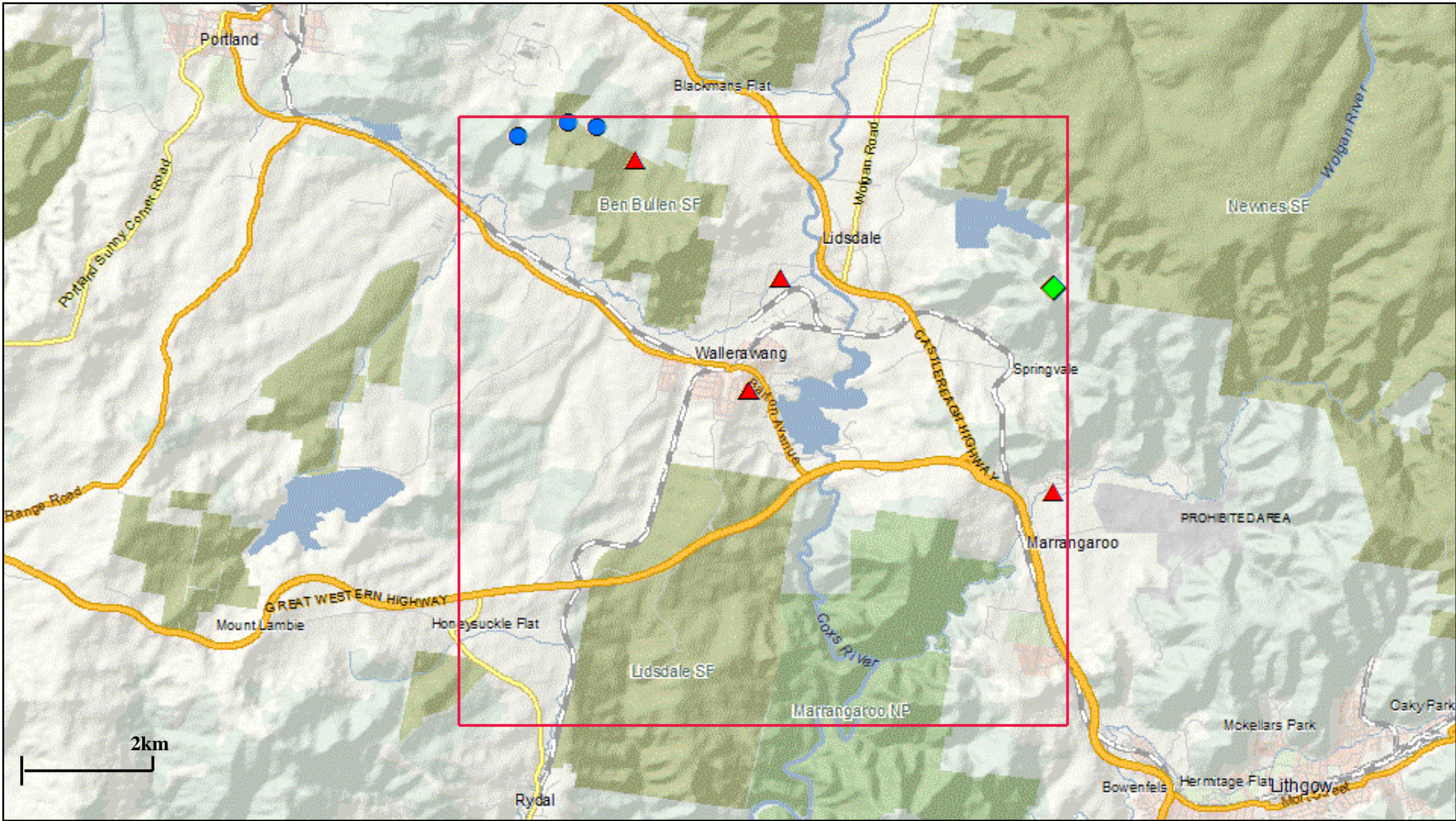
Mining Operations Plan 2016 - 2018
Wallerawang Quarry
and MOP Amendment B

Walker Quarries Pty Ltd




Annual Environmental Management Report
For the
Wallerawang Quarry
(ML1633)

APPENDIX V

NSW Bionet Atlas – Species Location Map



Legend

-  Black Gum (*Eucalyptus aggregata*)
-  Capertee Stringybark (*Eucalyptus cannonii*)
-  Silver-leafed Gum (*Eucalyptus pulverulenta*)

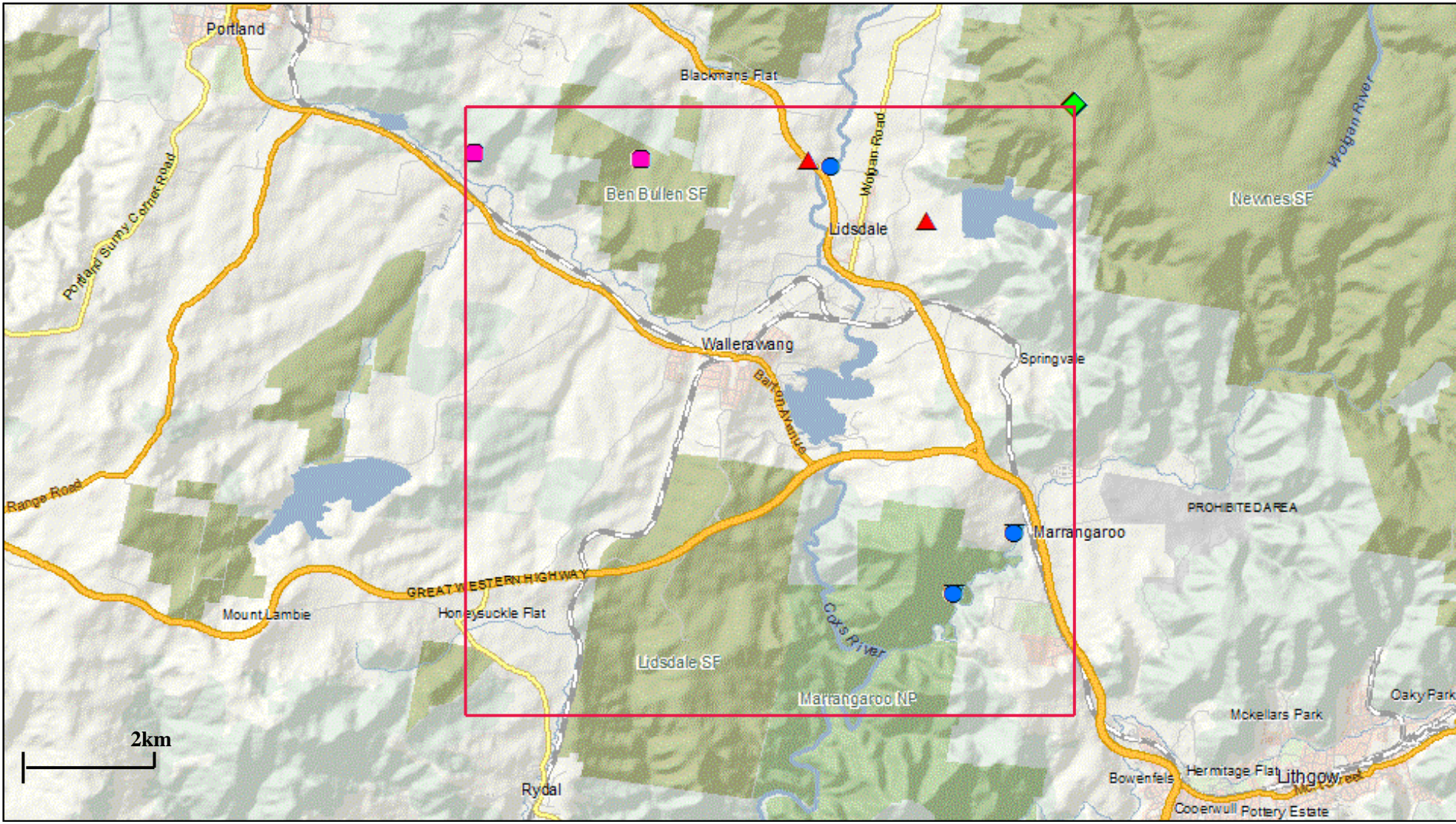
**Atlas of NSW Wildlife records
ML1633_Flora Search**



Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. Location accuracy varies. Maps from the website are interactive: map displays can be modified from the original extent and a maximum of 5 species can be selected to display. Map may contain errors and omissions. Neither the Office of Environment and Heritage nor any other data custodian will accept liability for any loss, damage, cost or expenses incurred as a result of the use of, or reliance upon, the information in the map. Map copyright the State of NSW through the Office of Environment and Heritage.

Your Selection: Public Report of all Valid Records of Entities in selected area [North: -33.37 West: 150.01999999999998 East: 150.11999999999998 South: -33.47] returned a total of 2,223 records of 804 species.

Report generated on 9/07/2014 11:10 AM



Legend

- ▲ White's Skink (*Liopholis whitii*)
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)
- ^Gang-gang Cockatoo (*Callocephalon fimbriatum*)
- ◆ ^Barking Owl (*Ninox connivens*)
- ▼ ^Powerful Owl (*Ninox strenua*)

^ Category 3 sensitive spp. 0.01° (~1km) rounded

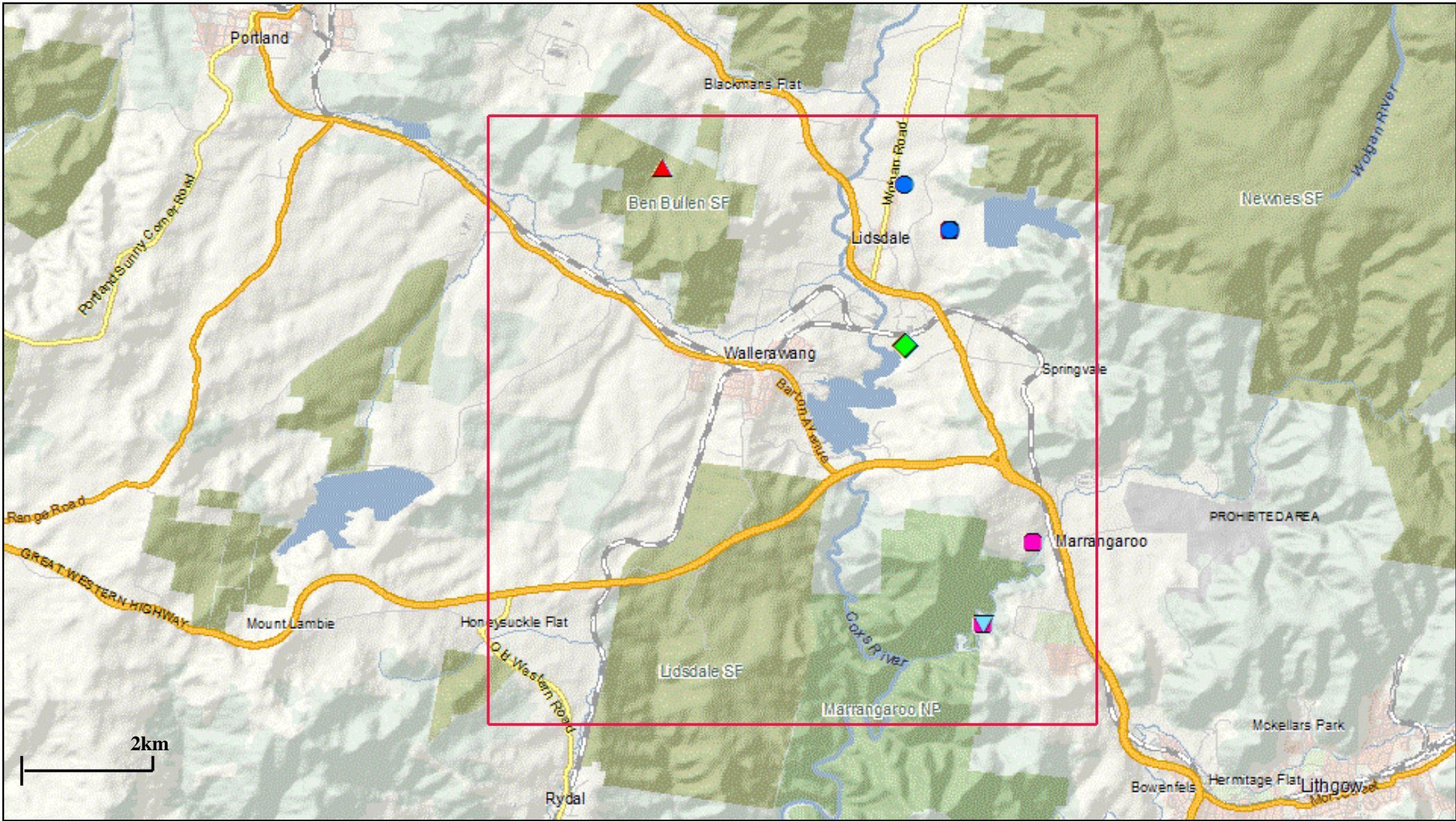
**Atlas of NSW Wildlife records
ML1633**



Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. Location accuracy varies. Maps from the website are interactive: map displays can be modified from the original extent and a maximum of 5 species can be selected to display. Map may contain errors and omissions. Neither the Office of Environment and Heritage nor any other data custodian will accept liability for any loss, damage, cost or expenses incurred as a result of the use of, or reliance upon, the information in the map. Map copyright the State of NSW through the Office of Environment and Heritage.

Your Selection: Public Report of all Valid Records of Entities in selected area [North: -33.37 West: 150.01999999999998 East: 150.11999999999998 South: -33.47] returned a total of 2,223 records of 804 species.

Report generated on 9/07/2014 11:03 AM



Legend

- ▲ Painted Honeyeater (*Grantiella picta*)
- Scarlet Robin (*Petroica boodang*)
- ◆ Koala (*Phascolarctos cinereus*)
- ▼ Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)

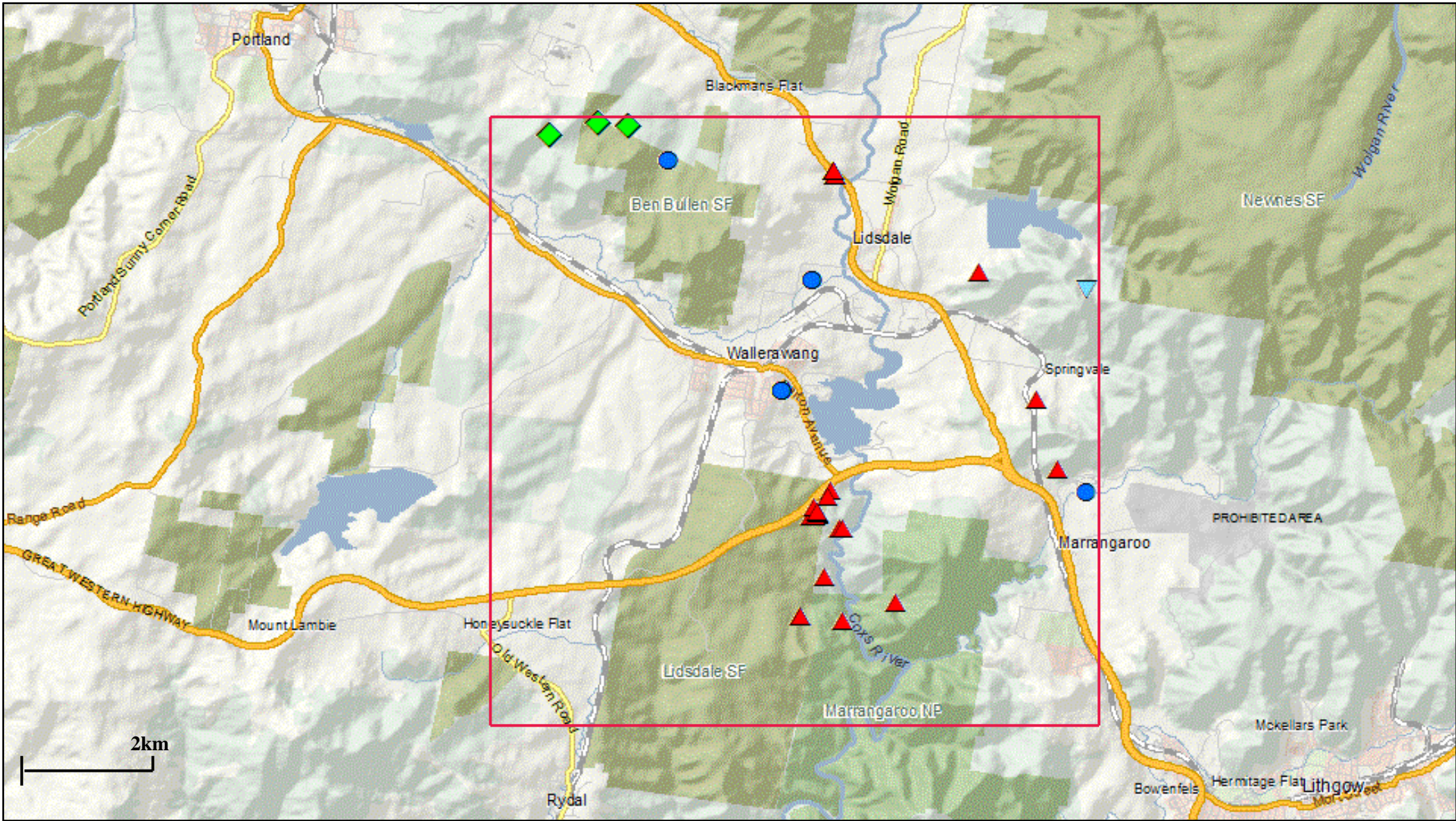
Atlas of NSW Wildlife records ML1633_map part







Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. Location accuracy varies. Maps from the website are interactive: map displays can be modified from the original extent and a maximum of 5 species can be selected to display. Map may contain errors and omissions. Neither the Office of Environment and Heritage nor any other data custodian will accept liability for any loss, damage, cost or expenses incurred as a result of the use of, or reliance upon, the information in the map. Map copyright the State of NSW through the Office of Environment and Heritage.

Your Selection: Public Report of all Valid Records of Entities in selected area [North: -33.37 West: 150.01999999999998 East: 150.11999999999998 South: -33.47] returned a total of 2,223 records of 804 species.

Report generated on 9/07/2014 11:10 AM



Legend

-  Bathurst Copper Butterfly (*Paralucia spinifera*)
-  Black Gum (*Eucalyptus aggregata*)
-  Capertee Stringybark (*Eucalyptus cannonii*)
-  Silver-leafed Gum (*Eucalyptus pulverulenta*)

Atlas of NSW Wildlife records ML1633_



Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. Location accuracy varies. Maps from the website are interactive: map displays can be modified from the original extent and a maximum of 5 species can be selected to display. Map may contain errors and omissions. Neither the Office of Environment and Heritage nor any other data custodian will accept liability for any loss, damage, cost or expenses incurred as a result of the use of, or reliance upon, the information in the map. Map copyright the State of NSW through the Office of Environment and Heritage.

Your Selection: Public Report of all Valid Records of Entities in selected area [North: -33.37 West: 150.01999999999998 East: 150.11999999999998 South: -33.47] returned a total of 2,223 records of 804 species.

Report generated on 9/07/2014 11:10 AM

Walker Quarries Pty Ltd

**Annual Environmental Management Report
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APPENDIX VI

Dust and Water Monitoring Results

Walker Quarries Pty Ltd

**Annual Environmental Management Report
For the
Wallerawang Quarry
(ML1633)**

APPENDIX VII

Blast monitoring reports

PREMIER DRILL AND BLAST - POST BLAST REPORT

SUMMARY

SHOT NUMBER	#1-15	CUSTOMER	Dukes
DATE	8/07/2015	HOLES PER DELAY	1
SHOTFIRER	PA	KG PER DELAY	114
TIME OF BLAST	2:02pm		
INITIATION TYPE	NONEL	POWDER FACTOR	0.52

BLAST GEOMETRY

BLAST HOLES	73		
DIAMETER	102	STEMMING	3
AVG HOLE DEPTH	15.7	ROCK DENSITY	2.6
SUB DRILL	0	BLAST VOLUME	16142
BURDEN	3.5	BLAST TONNES	41969
SPACING	4	METERS DRILLED	1148.6

EXPLOSIVES USED

BOOSTERS			SURFACE CONNECTORS	
TYPE	QUANTITY		TYPE	QUANTITY
			4.9m/100ms	21
Pentex PPP	73		4.9m/65ms	43
Pentex H	66		4.9m/42ms	6
DOWNLINES			BULK EXPLOSIVES	
TYPE	QUANTITY		TYPE	QUANTITY
24m/#12	73		CENTRA	8324
6.1m/#12.5	66			

MONITOR READINGS

Monitor 1		Monitor 2		Monitor 3	
location	1st Resident	location	2nd Resident	location	
Ground Vibration	0.9 mm/s	Ground Vibration	0.99 mm/s	Ground Vibration	
Over Pressure	106.5 dB	Over Pressure	104.2 dB	Over Pressure	

BLAST NOTES

Good result, not too much movement, would pay to speed up initiation timing next shot.

WEATHER CONDITIONS

SUNNY/OVERCAST	Sunny
WIND DIRECTION	
WIND SPEED	
GPS CO-ORDINATES	

THIS IS A TRUE AND ACCURATE RECORD OF BLAST

FIRED ON 8/7/15

SHOTFIRER

Peter Andrews

SIGNATURE

[Signature]

PREMIER DRILL AND BLAST - POST BLAST REPORT

SUMMARY WALKER QUARRIES #1-17 A

SHOT NUMBER	#1-17 A	CUSTOMER	DUKES
DATE	6/02/2017	HOLES PER DELAY	1
SHOTFIRER	NEIL	KG PER DELAY	85
TIME OF BLAST	2.07PM		
INITIATION TYPE	NONEL	POWDER FACTOR	0.57

BLAST GEOMETRY

BLAST HOLES	69		
DIAMETER	102	STEMMING	3
AVG HOLE DEPTH	9.3	ROCK DENSITY	2.6
SUB DRILL	0	BLAST VOLUME	7071
BURDEN	2.9	BLAST TONNES	18385
SPACING	3.8	METERS DRILLED	640

EXPLOSIVES USED

BOOSTERS			SURFACE CONNECTORS	
TYPE	QUANTITY		TYPE	QUANTITY
PPP	69		25MS 6M	10
			655MS 6M	59
DOWNLINES			BULK EXPLOSIVES	
TYPE	QUANTITY		TYPE	QUANTITY
12M 12	69		CENTRA	4090

MONITOR READINGS

Monitor 1		Monitor 2		Monitor 3	
location	GW/HWY	location	DAM ROAD	location	RESIDENTS
Ground Vibration	0.661mm/s	Ground Vibration	NILL TRIGGER	Ground Vibration	NILL TRIGG
Over Pressure	107.5db(L)	Over Pressure	NILL TRIGGER	Over Pressure	NILL TRIGG

BLAST NOTES

HOLE H5 BLOCKED & NOT LOADED

WEATHER CONDITIONS

SUNNY/OVERCAST	SUNNY HOT
WIND DIRECTION	WEST
WIND SPEED	13KM/H GUSTS TO 17KM/H

THIS IS A TRUE AND ACCURATE RECORD OF BLAST WQ #1-17 A FIRED ON 6/2/17

SHOTFIRER	NEIL FALCONER	SIGNATURE	
-----------	---------------	-----------	--

PREMIER DRILL AND BLAST - POST BLAST REPORT

SUMMARY WALKER QUARRIES #1-17 B

SHOT NUMBER	#1-17 B	CUSTOMER	DUKES
DATE	23/01/2017	HOLES PER DELAY	1
SHOTFIRER	NEIL	KG PER DELAY	95KG
TIME OF BLAST	2.07PM		
INITIATION TYPE	NONEL	POWDER FACTOR	0.56

BLAST GEOMETRY

BLAST HOLES	86		
DIAMETER	102	STEMMING	3
AVG HOLE DEPTH	9.5	ROCK DENSITY	2.6
SUB DRILL	0	BLAST VOLUME	9832
BURDEN	3	BLAST TONNES	25563
SPACING	4	METERS DRILLED	819.3

EXPLOSIVES USED

BOOSTERS			SURFACE CONNECTORS	
TYPE	QUANTITY		TYPE	QUANTITY
PPP	86		65MS 6M	21
			25MS 6M	65
DOWNLINES			BULK EXPLOSIVES	
TYPE	QUANTITY		TYPE	QUANTITY
12M 12	86		CENTRA	5590

MONITOR READINGS

Monitor 1		Monitor 2		Monitor 3	
location	GW/HWY	location	DAM ROAD	location	RESIDENTS
Ground Vibration	0.661mm/s	Ground Vibration	NILL TRIGGER	Ground Vibration	NILL TRIGG
Over Pressure	107.5db(L)	Over Pressure	NILL TRIGGER	Over Pressure	NILL TRIGG

BLAST NOTES

HOLES ADDED TO BLAST AFTER PREBLAST REPORT
D9 E9 F9 G9 H9 I9 J9 K9

WEATHER CONDITIONS

SUNNY/OVERCAST	SUNNY HOT
WIND DIRECTION	WEST
WIND SPEED	13KM/H WITH GUSTS 17KM/H

THIS IS A TRUE AND ACCURATE RECORD OF BLAST #1-17 B FIRED ON 6/2/17

SHOTFIRER	NEIL FALCONER	SIGNATURE	
-----------	---------------	-----------	---

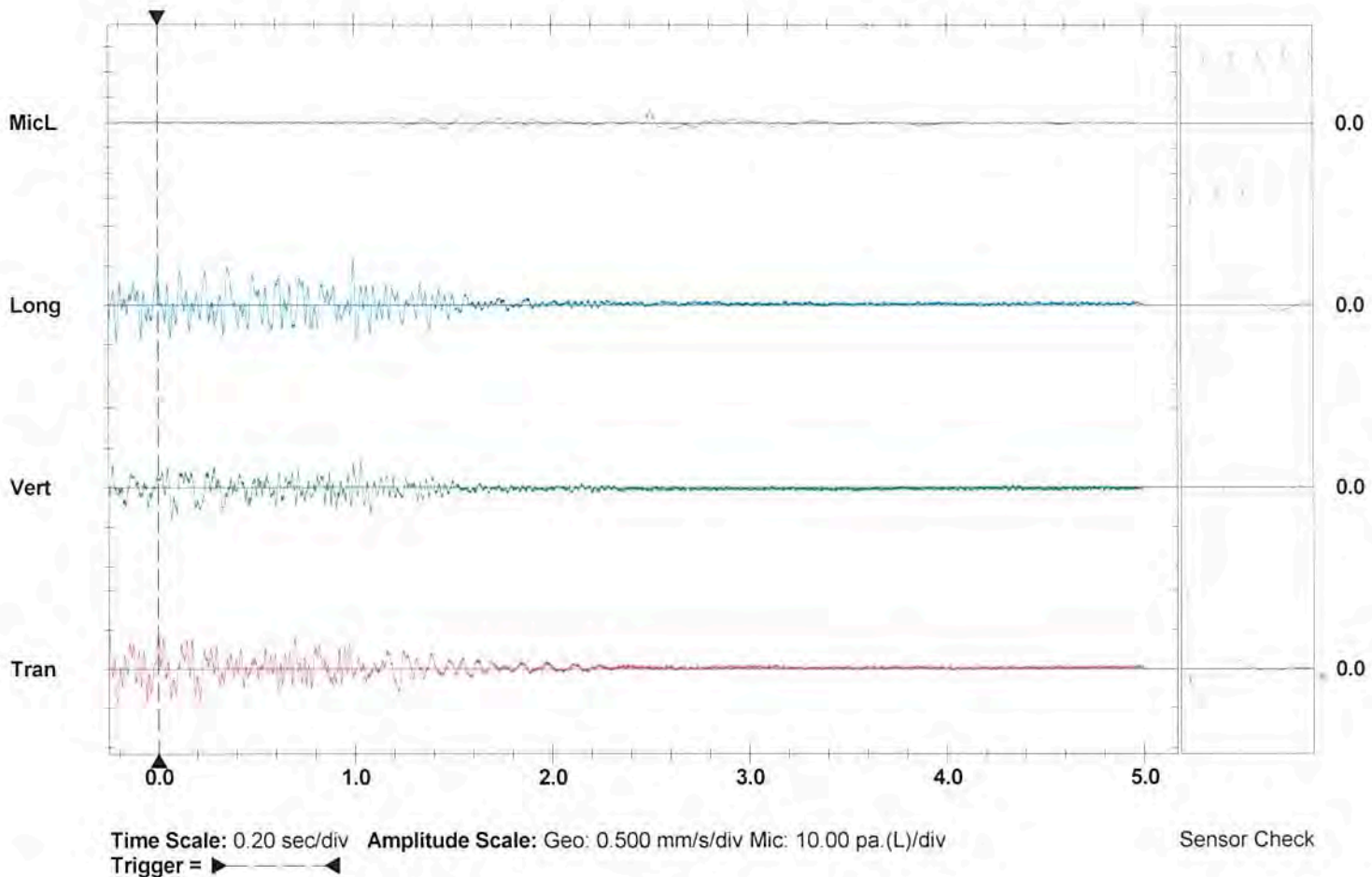
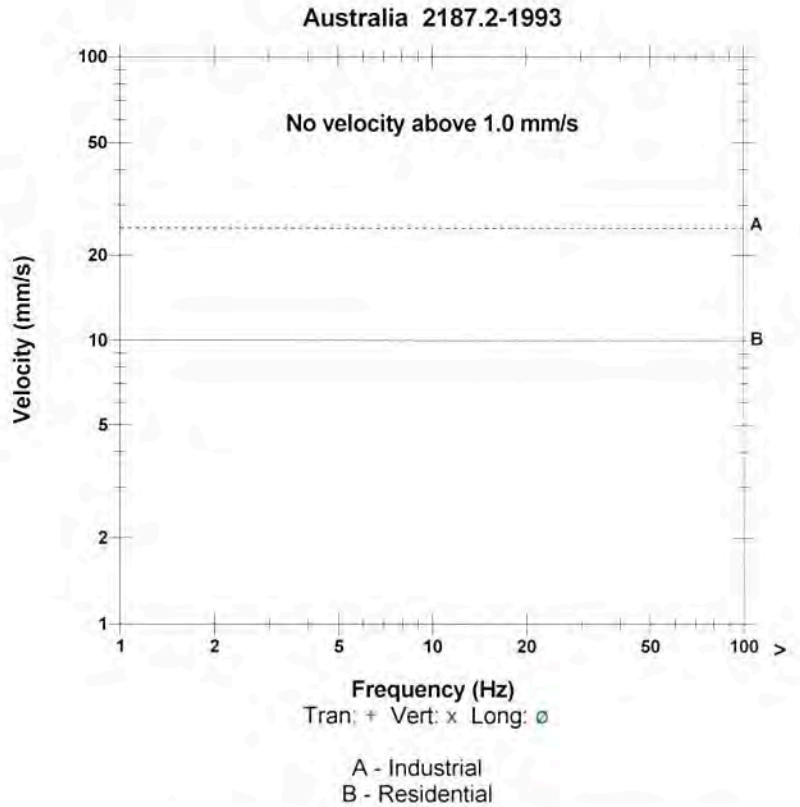
Date/Time Tran at 14:07:14 February 6, 2017
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.7 mm/s
Record Time 5.0 sec at 1024 sps
Notes
 Location:
 Client:
 User Name: Premier Drill and Blast Pty Ltd
 General: Premier Drill and Blast Pty Ltd

Serial Number BE13312 V 10.72-1.1 Minimate Blaster
Battery Level 6.0 Volts
Unit Calibration March 15, 2016 by Saros (Int)
File Name __TEMP.EVT
Post Event Notes
 CRN GREAT WESTERN HWY AN BARTON AVE

Microphone Linear Weighting
PSPL 107.5 dB(L) at 2.502 sec
ZC Freq 11 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 456 mv)

	Tran	Vert	Long	
PPV	0.508	0.413	0.571	mm/s
ZC Freq	8.5	11	24	Hz
Time (Rel. to Trig)	0.000	0.070	0.995	sec
Peak Acceleration	0.00994	0.0116	0.00994	g
Peak Displacement	0.00615	0.00562	0.00575	mm
Sensor Check	Check	Passed	Passed	
Frequency	8.2	7.5	7.2	Hz
Overswing Ratio	3.4	3.2	3.6	

Peak Vector Sum 0.661 mm/s at 0.000 sec



Date: 8-02-2017

Attention: Ray Sharwood

Subject: Notification of no trigger of blast monitor

This letter is to confirm that on Monday 6th February 2017 at Walker Quarry the Monitor Serial No. 12399 was not triggered as the levels of vibration and noise encountered during the blast event being Walker Quarry #1-17 due to blasting operations were below the set minimum levels required to record a blast event.

The blast monitor trigger levels for the above blast were set at 88 dB(L) for Airblast over-pressure and 0.5mm/s for ground vibration.

Details regarding the monitoring are below.

- Time of Blast: 14:07
- Weather conditions: Sunny/Hot
- Monitor location: Resident
- Blast Location: Hilltop
- Shot No: Walker Quarry #1-17
- Distance from monitor to blast: approx 1200 metres

Please contact me if further information is required

Yours sincerely

 8-2-2017

Peter Andrews
Drill and Blast Manager
Premier Drill and Blast

Title	Date	Author	Revision
No trigger letter	01-02-2016	PA	02

Date: 8-02-2017

Attention: Ray Sharwood

Subject: Notification of no trigger of blast monitor

This letter is to confirm that on Monday 6th February 2017 at Walker Quarry the Monitor Serial No. 18013 was not triggered as the levels of vibration and noise encountered during the blast event being Walker Quarry #1-17 due to blasting operations were below the set minimum levels required to record a blast event.

The blast monitor trigger levels for the above blast were set at 88 dB(L) for Airblast over-pressure and 0.5mm/s for ground vibration.

Details regarding the monitoring are below.

- Time of Blast: 14:07
- Weather conditions: Sunny/Hot
- Monitor location: Access road to dam wall
- Blast Location: Hilltop
- Shot No: Walker Quarry #1-17
- Distance from monitor to blast: approx 1400 metres

Please contact me if further information is required

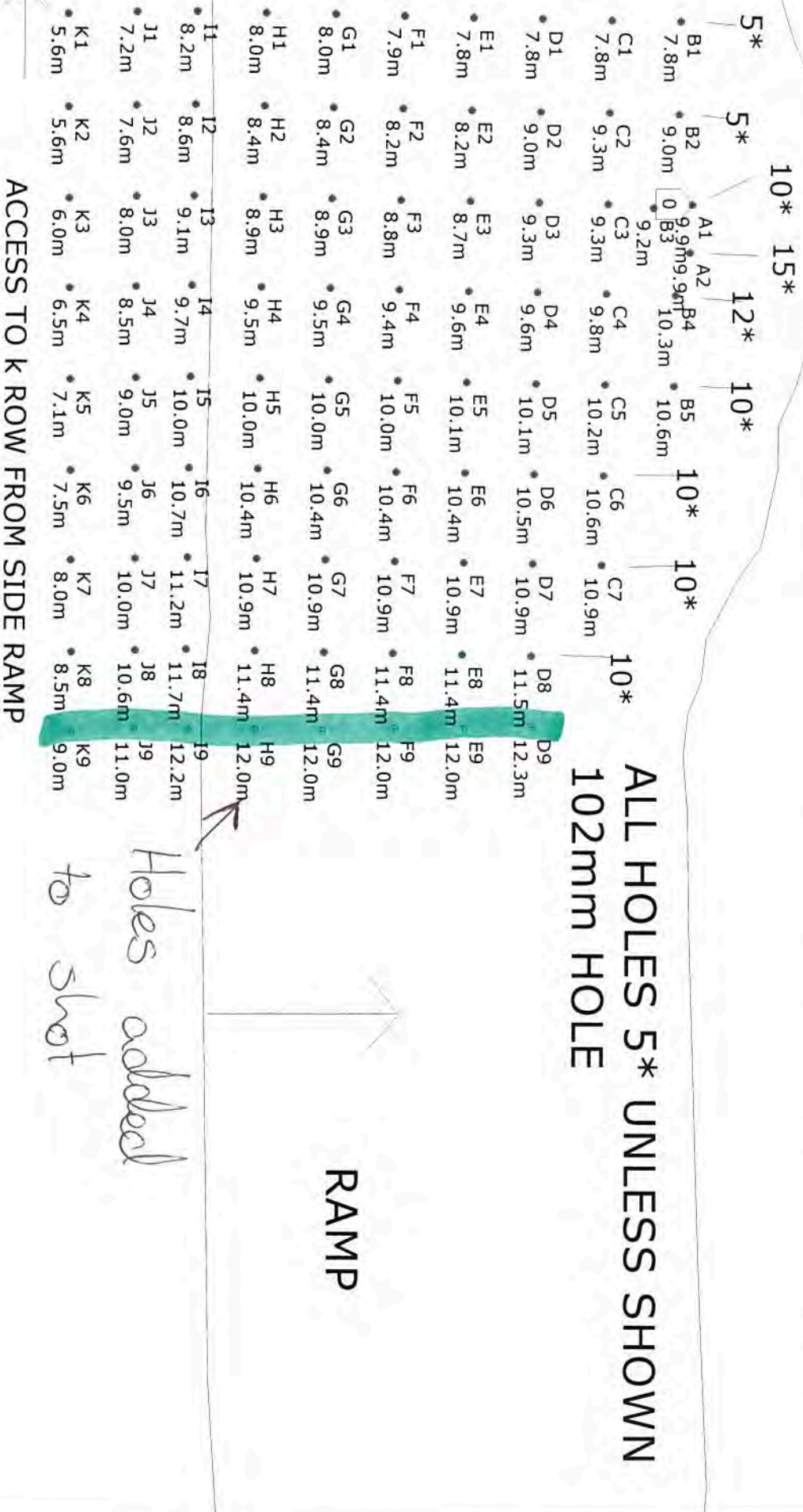
Yours sincerely

 8-2-2017

Peter Andrews
Drill and Blast Manager
Premier Drill and Blast

Title	Date	Author	Revision
No trigger letter	01-02-2016	PA	02

WALKER QUARRIES #1-17 B



Not to scale

SHOTPlus 5.6.0.0

8/02/2017

Mine WALKER

Location RAMP

Title/author WALKER QUARRY NEIL

Filename WALKER #1-17 B.spf

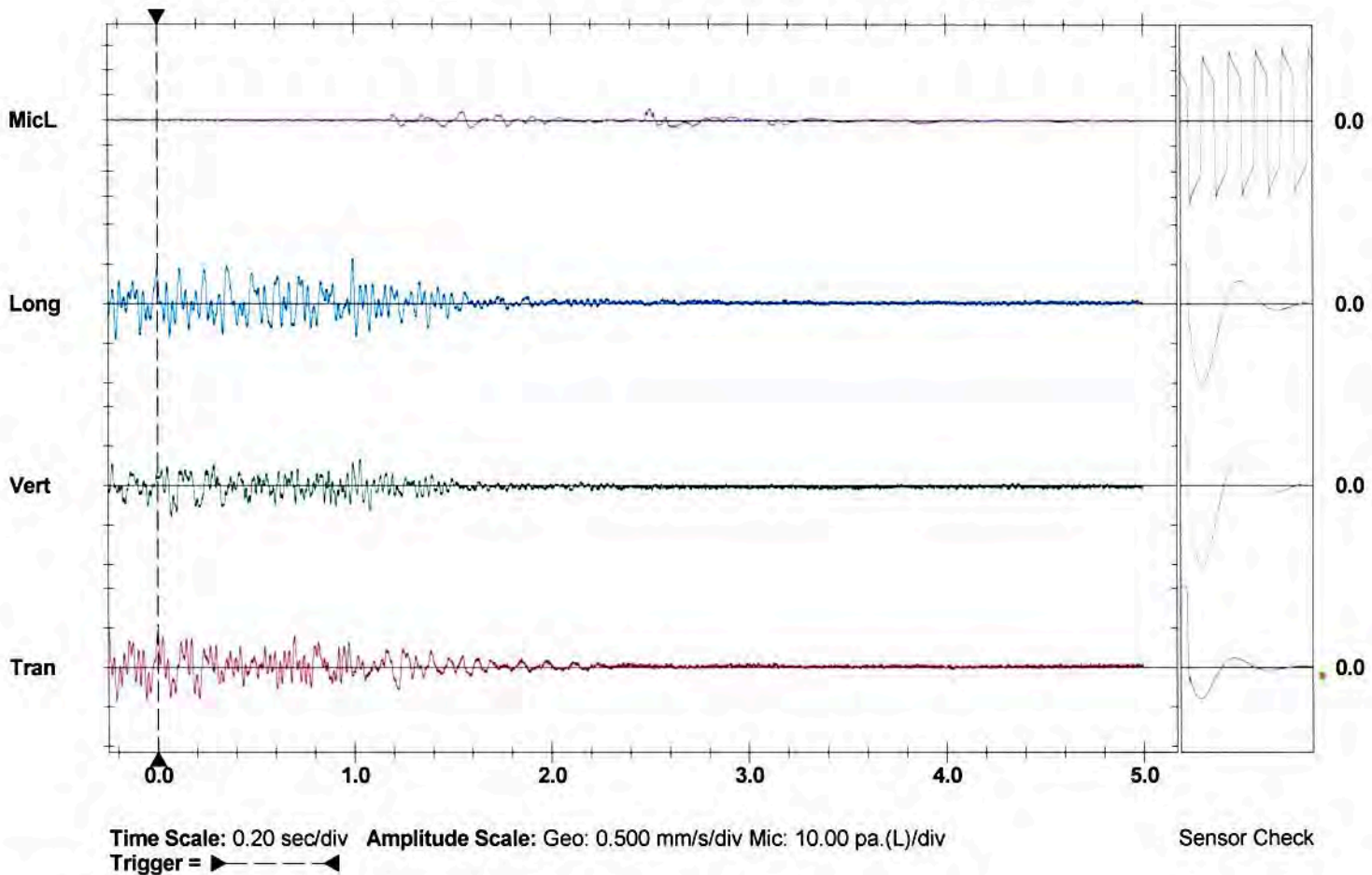
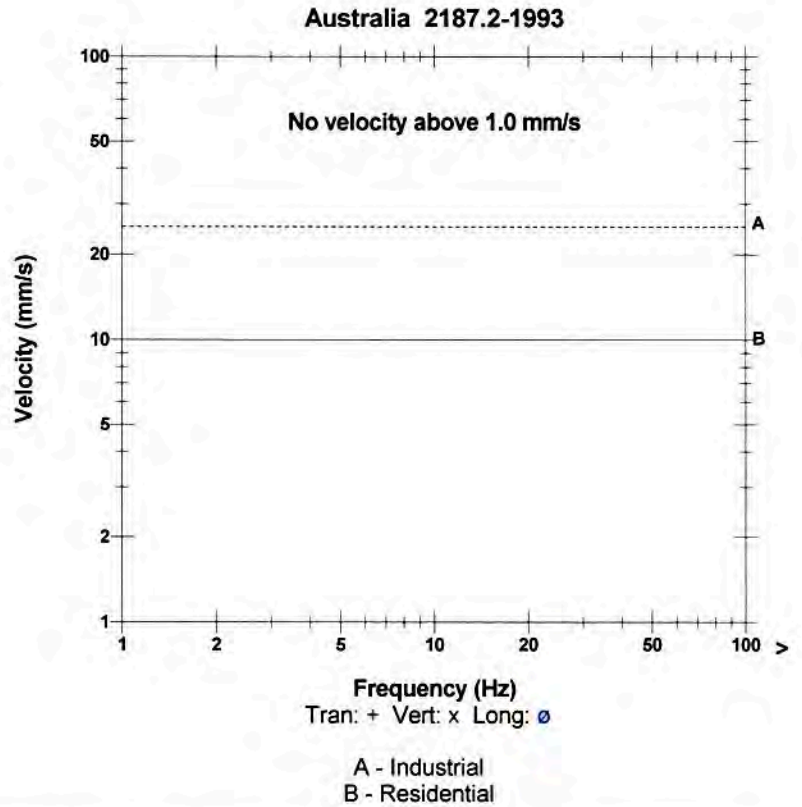
Date/Time Tran at 14:07:14 February 6, 2017
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.7 mm/s
Record Time 5.0 sec at 1024 sps
Notes
 Location:
 Client:
 User Name: Premier Drill and Blast Pty Ltd
 General: Premier Drill and Blast Pty Ltd

Serial Number BE13312 V 10.72-1.1 Minimate Blaster
Battery Level 6.0 Volts
Unit Calibration March 15, 2016 by Saros (Int)
File Name __TEMP.EVT
Post Event Notes
 CRN GREAT WESTERN HWY AN BARTON AVE

Microphone Linear Weighting
PSPL 107.5 dB(L) at 2.502 sec
ZC Freq 11 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 456 mv)

	Tran	Vert	Long	
PPV	0.508	0.413	0.571	mm/s
ZC Freq	8.5	11	24	Hz
Time (Rel. to Trig)	0.000	0.070	0.995	sec
Peak Acceleration	0.00994	0.0116	0.00994	g
Peak Displacement	0.00615	0.00562	0.00575	mm
Sensor Check	Check	Passed	Passed	
Frequency	8.2	7.5	7.2	Hz
Overswing Ratio	3.4	3.2	3.6	

Peak Vector Sum 0.661 mm/s at 0.000 sec



Date: 8-02-2017

Attention: Ray Sharwood

Subject: Notification of no trigger of blast monitor

This letter is to confirm that on Monday 6th February 2017 at Walker Quarry the Monitor Serial No. 12399 was not triggered as the levels of vibration and noise encountered during the blast event being Walker Quarry #1-17 due to blasting operations were below the set minimum levels required to record a blast event.

The blast monitor trigger levels for the above blast were set at 88 dB(L) for Airblast over-pressure and 0.5mm/s for ground vibration.

Details regarding the monitoring are below.

- Time of Blast: 14:07
- Weather conditions: Sunny/Hot
- Monitor location: Resident
- Blast Location: Hilltop
- Shot No: Walker Quarry #1-17
- Distance from monitor to blast: approx 1200 metres

Please contact me if further information is required

Yours sincerely

A handwritten signature in black ink, appearing to read "P. Andrews".

8-2-2017

Peter Andrews
Drill and Blast Manager
Premier Drill and Blast

Title	Date	Author	Revision
No trigger letter	01-02-2016	PA	02

Date: 8-02-2017

Attention: Ray Sharwood

Subject: Notification of no trigger of blast monitor

This letter is to confirm that on Monday 6th February 2017 at Walker Quarry the Monitor Serial No. 18013 was not triggered as the levels of vibration and noise encountered during the blast event being Walker Quarry #1-17 due to blasting operations were below the set minimum levels required to record a blast event.

The blast monitor trigger levels for the above blast were set at 88 dB(L) for Airblast over-pressure and 0.5mm/s for ground vibration.

Details regarding the monitoring are below.

- Time of Blast: 14:07
- Weather conditions: Sunny/Hot
- Monitor location: Access road to dam wall
- Blast Location: Hilltop
- Shot No: Walker Quarry #1-17
- Distance from monitor to blast: approx 1400 metres

Please contact me if further information is required

Yours sincerely

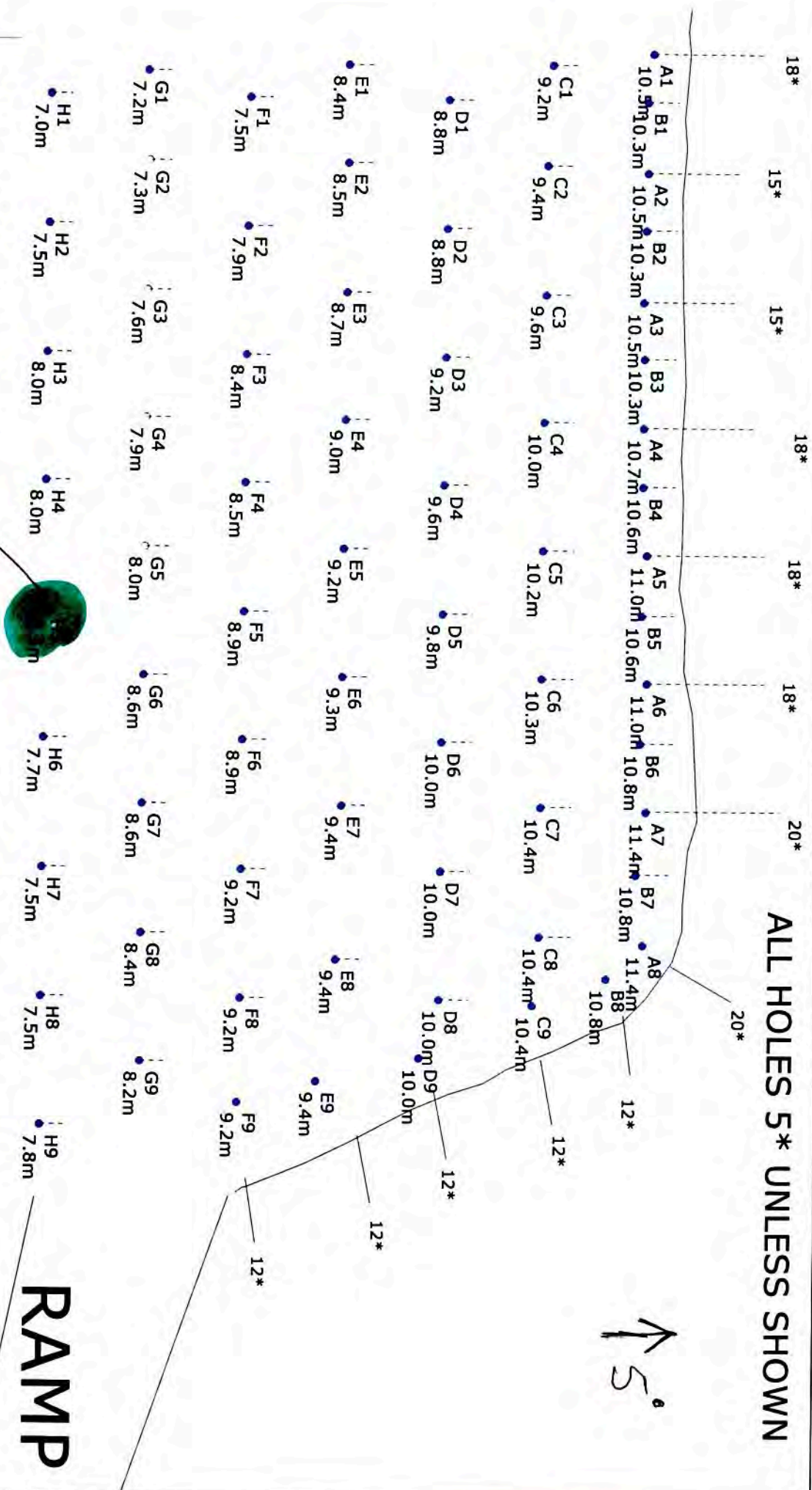
A handwritten signature in black ink, appearing to read "P. Andrews".

8-2-2017

Peter Andrews
Drill and Blast Manager
Premier Drill and Blast

Title	Date	Author	Revision
No trigger letter	01-02-2016	PA	02

ALL HOLES 5* UNLESS SHOWN



WALKER QUARRY #1-17A

RAMP



Not to scale

Blocked not loaded

ShotPlus 5.5.1.0

20/01/2017

Mine	WALKER
Location	FLOOR 1
Title/author	WALKER QUARRY NEIL
Filename	

Walker Quarries Pty Ltd

Annual Environmental Management Report

For the

Wallerawang Quarry

(ML1633)

APPENDIX VIII

Noise audit results

Walker Quarries Pty Ltd

Annual Environmental Management Report

For the

Wallerawang Quarry

(ML1633)

APPENDIX VIII

Noise audit results

Noise Monitoring Assessment

Wallerawang Quarry, Wallerawang, NSW.



Document Information

Noise Monitoring Assessment

Wallerawang Quarry, 12 January 2017

Prepared for: Walker Quarries 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	Signed
MAC160392RP1	Final	23 January 2017	Oliver Muller (MAAS)	

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APPENDIX A - GLOSSARY OF TERMS		

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Walker Quarries Pty Ltd to complete a Noise Monitoring Assessment (NMA) for Wallerawang Quarry ('the quarry').

The NMA involved quantifying the noise contribution of the quarry by direct attended measurements to compare quarry emissions against relevant criteria. Monitoring has been conducted at three representative receiver locations in accordance with the Walker Quarry Noise Management Plan (NMP) and the quarries Environmental Protection License (ref: 13172).

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

- NSW Environment Protection Authority (EPA), Industrial Noise Policy (INP), 2000;
- Environment Protection Licence EPL 13172 (EPL),
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures; and
- Wallerawang Quarry Noise Management Plan (NMP).

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

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2 Environmental Protection License Noise Limits

Table 1 reproduces the noise criteria for the quarry as per Condition L4.1 of EPL 13172.

Table 1 Noise Limits, dBA			
Location	Day	Evening	Night
	LAeq(15min)	LAeq(15min)	LAeq(15min)
All privately owned residences	43	43	39

Note 1: Day Period is 7am to 6pm, Evening Period is 6pm to 10pm, Night Period is 10pm to 7am.

It is noted that Condition L4.3 of EPL 13172 identifies conditions under which the noise criteria do not apply and include:

- a) Wind speeds greater than 3m/s at 10m above ground level;
- b) Temperature inversion conditions greater than 3 degrees Celsius / 100m; or
- c) Under “non-significant weather conditions”

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3 Methodology

3.1 Locality

Wallerawang is located approximately 10km to the north west of Lithgow, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential and for consistency the naming conventions for each receiver has been retained from the NMP. The monitoring locations with respect to the quarry are presented in the locality plan shown in **Figure 1**.

3.2 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" the EPL and NMP. The measurements were carried out using Svantek Type 1, 971 noise analyser on Thursday 12 January 2017. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Two day time measurements of 15 minutes in duration were completed at each location before and after 12pm on Thursday 12 January 2017. Where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15\text{min})$ quarry noise contribution for comparison against the relevant EPL limits.

Prevailing meteorological conditions for the monitoring period were assessed during each attended measurement and analysed in accordance with Appendix E4 of the INP to determine the stability category present at the time of each measured sample. This was undertaken to determine applicability of results in accordance with Condition L4.3 of the EPL.





FIGURE 1

LOCALITY PLAN

REF: MAC160392



KEY

-  **N1** RECEIVER / MONITORING LOCATION
-  PROJECT SITE

4 Results

The monitoring and assessment results are presented in individual tables for each assessment location.

4.1 Assessment Results - Location N1

The results of the attended noise measurements at location N1 for Thursday 12 January 2017 are summarised in **Table 2** along with prevailing meteorological conditions at the time of each survey, relevant EPL limits and the quarry noise contribution.

Table 2 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology	Comments
		L _A max	L _A eq	L _A 90			
12/01/2017	8:25	72	45	43	43	Dir: NW 2-3 m/s	Highway traffic
							Birds
							Local residential noise
							Dog barely audible
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible
12/01/2017	12:42	76	60	59	43	Dir: NW 1-2 m/s	Highway traffic
							Birds
							Local Residential noise
							Aircraft
Quarry Site L _A eq(15min) Contribution							Horse
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible

4.2 Assessment Results - Location N2

The results of the attended noise measurements at location N2 for Thursday 12 January 2017 are summarised in **Table 3** along with prevailing meteorological conditions at the time of each survey, relevant EPL limits and the quarry noise contribution.

Table 3 Operator-Attended Noise Survey Results – Location N2

Date	Time (hrs)	Descriptor (dBA re 20 μPa)			EPL Limit	Meteorology	Comments
		L _A max	L _A eq	L _A 90			
12/01/2017	9:05	63	47	46	43	Dir: NW 1-2 m/s	Highway traffic
							Birds
							Insects
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible
12/01/2017	12:00	65	47	46	43	Dir: NW 2-3 m/s	Highway traffic
							Birds
							Insects
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible

4.3 Assessment Results - Location N3

The results of the attended noise measurements at location N3 for Thursday 12 January 2017 are summarised in **Table 4** along with prevailing meteorological conditions at the time of each survey, relevant EPL limits and the quarry noise contribution.

Table 4 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology	Comments
		LAmax	LAeq	LA90			
12/01/2017	9:26	58	45	43	43	Dir: NW 1-2 m/s	Highway traffic
							Aircraft
							Birds
Quarry Site LAeq(15min) Contribution							Quarry Inaudible
12/01/2017	12:24	61	43	41	43	Dir: NW 1-2 m/s	Birds
							Highway traffic
							Insects
							Lawn mower
Quarry Site LAeq(15min) Contribution							Quarry Inaudible

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5 Discussion

5.1 Discussion of Results – Location N1

Monitoring on Thursday 12 January 2017, identified that Wallerawang Quarry noise was inaudible for both attended measurements. Therefore, the noise contribution from the quarry satisfied the relevant noise limits of 43dBA LAeq(15min). Extraneous non-quarry related noise sources included highway traffic, birds, local residential noise, dogs, aircraft and livestock.

5.2 Discussion of Results – Location N2

Monitoring results for N2 were dominated by highway traffic that was constantly audible during all measurements. Quarry emissions were inaudible on all occasions. Furthermore, quarry contributions remained below the relevant noise limit of 43dBA LAeq(15min). Extraneous sources were also dominant throughout the 12 January 2017 survey with highway traffic, birds and insects all constantly audible.

5.3 Discussion of Results – Location N3

Monitoring results for N3 were dominated by highway traffic that was constantly audible during all measurements. Quarry emissions were not audible. Therefore, quarry contributions remained below the relevant criteria of 43dBA LAeq(15min). Extraneous sources were dominant during measurements with highway traffic, aircraft, local residential noise, birds and insects audible.

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6 Conclusion

MAC has completed a Noise Monitoring Assessment on behalf of Walker Quarries Pty Ltd. The assessment was completed to assess Wallerawang Quarry noise emissions against relevant criteria presented in EPL13172.

Attended monitoring for 12 January 2017 identified that noise emissions generated by Wallerawang Quarry comply with relevant statutory noise limits specified in NMA & EPL at all assessed locations. In summary, quarry noise was inaudible during all measurements and was dominated by extraneous noises unrelated to quarry operations.

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Appendix A - Glossary of Terms

Several technical terms have been used in this report and are explained in **Table A1**.

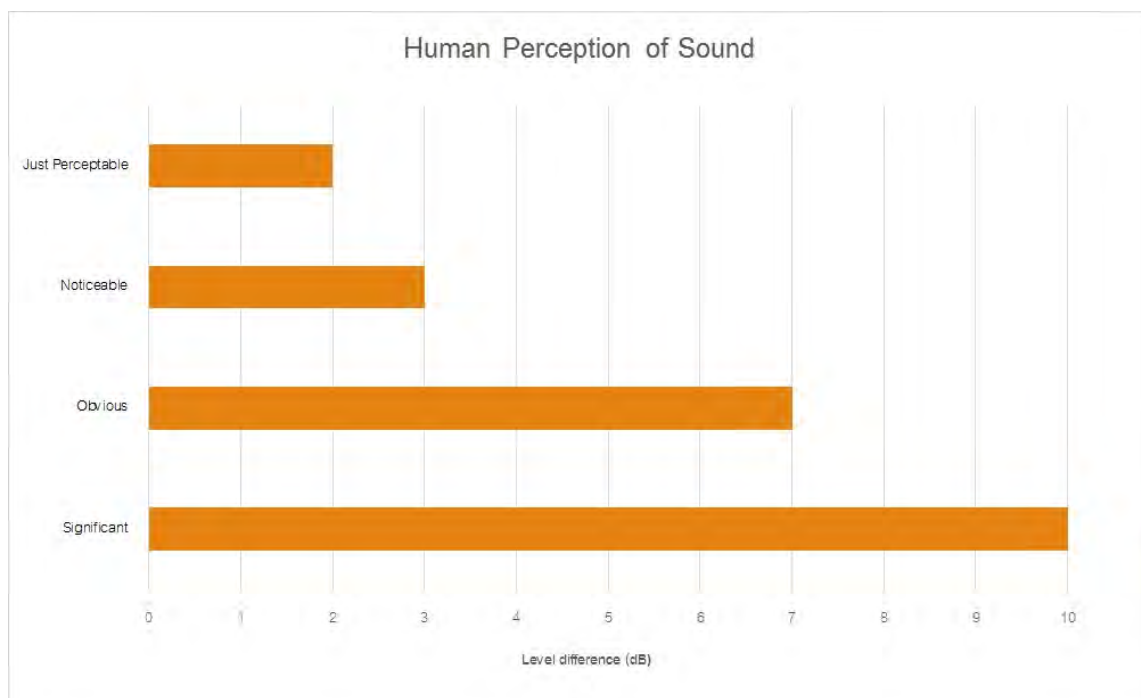
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
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)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (SWL)	<p>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 :</p> $= 10 \cdot \log_{10} (W/W_0)$ <p>Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.</p>

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

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

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

Figure A1 – Human Perception of Sound



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Walker Quarries Pty Ltd

Annual Environmental Management Report

For the

Wallerawang Quarry

(ML1633)

APPENDIX IX

Complaints register

No data – Nil complaints received

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APPENDIX X

**Environmental Management Strategy – Wallerawang Quarry
(Including the Environmental Monitoring Program)**

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APPENDIX XI

**Noise Management Plan for Wallerawang Quarry
Blast Management Plan for Wallerawang Quarry
Air Quality Management Plan for Wallerawang Quarry
Flora and Fauna Management Plan for Wallerawang Quarry
Bushfire Management Plan**

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APPENDIX XII:

Water Management Plan for Wallerawang Quarry

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APPENDIX XIII:

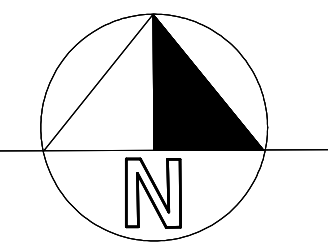
Current surveyed Layout of Quarry



WALKER QUARRIES
AERIAL SITE PLAN WITH 2m CONTOURS

SCALE - 1:2500

DATUM: A.H.D.



CEH SURVEY

CONSULTING LAND, ENGINEERING AND MINING SURVEYORS

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DATE	12-12-2016
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APPENDIX XIV:

CORRESPONDENCE

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APPENDIX XV

Meteorological Records for Lithgow (BoM) during the reporting period

Wallerawang Quarry weather station records

APPENDIX XVI

**Ecological monitoring report –
Purple Copper Butterfly**

Wallerawang Quarry Landscape Planting Plan

WALLERAWANG QUARRY
LANDSCAPE PLANTING PLAN

Purpose

This Landscape Planting Plan has been prepared to satisfy Condition 2.48 of DA 344-11-2001 which requires:
The Applicant shall install bunds at strategic locations around the development site, and plant additional trees along the boundary of the development site to the satisfaction of the Director-General in order to screen the development, as far as practicable, from external viewers.

Scope

The LPP has been prepared to:

- identify strategic planting zones;
- define objectives for each planting zone;
- identify the target vegetation types and species (where applicable) to be used in landscape planting; and
- outline planting procedures and schedules.

Strategic Planting Zones and Objectives

Two strategic planting zones have been identified (see Figure L1).

External Highway Batters

- Identified as Areas A, B and C on Figure L1, these exposed surfaces were created as a result of the construction of the Quarry entrance and are visible to traffic on the Great Western highway.
- The objective of landscape planting within these areas is to establish a shrubby woodland / forest vegetation community.

Internal Dam Walls

- Identified as Areas E and F, these surfaces form the outer walls or catchment zones of Quarry dams. These exposed surface may be visible to traffic on the Great Western Highway
- To ensure the structural integrity of the dams, trees and deep rooted vegetation will be avoided.
- The objective of landscape planting within these areas will be to establish a sustainable and perennial cover of grass (>70% coverage).

Vegetation Types and Species¹

External Highway Batters

Trees	Shrubs	Grasses
Ribbon Gum	Provenance Wattyl (acacia) and hakea species	Wallaby Grass
Mountain Gum		Kangaroo Grass
Snow Gum		Snow Grass
Black Sally		

Internal Dam Walls

Grasses		Shrubs
Initial cover	Perennial	
Sterile exotic pasture or cover crop species	Wallaby Grass	
	Kangaroo Grass	
	Snow Grass	

Planting Procedures

Planting will be completed by a local horticultural business or consultancy.

Specific procedures will be implemented by the responsible party, however, the following will be enforced by Walker Quarries.

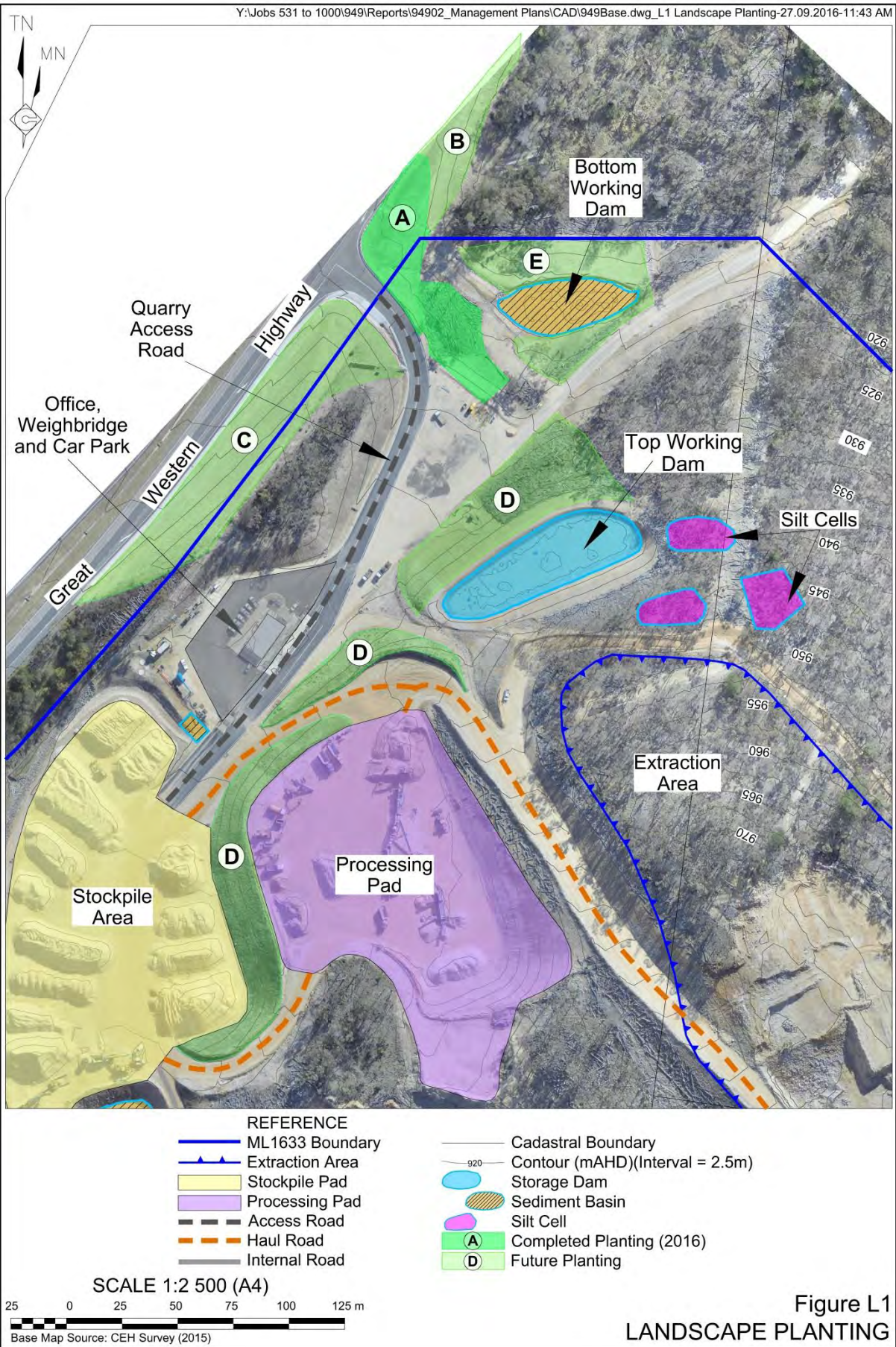
- With the exception of sterile exotic and cover crop species, seed and tube stock will have provenance on or adjoining the Quarry.
- Tube stock planting will be undertaken over two planting periods (to allow for a review of planting success and avoid over competition).
- Tube stock will be planted at density of no less than 1 tree / 5m².
- Tube stock will be provided with biodegradable protective sleeves.

Planting Schedules

The chart below provides the proposed planting / seeding schedule.

Note 1: Subject to availability of seed stock / provenance tubestock

Schedule	2016		2017				2018			
	Sep	Dec	Mar	June	Sep	Dec	Mar	June	Sep	Dec
External Highway Batters										
Area A										
Area B										
Area C										
Internal Dam Walls										
Area D										
Area E										
Monitoring (and In-fill Planting / Seeding As Required)										
Areas A/B/C										
Areas D/E										



REV	DATE	BY	APP.	REVISION DETAILS	DRAWING STATUS		
0	27/09/16	AI		Original	DESIGN BY:	N/A	
					DRAWN BY	N/A	
					FINAL APPROVAL	N/A	



Walker Quarries

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