

**Hy-Tec Industries Pty Ltd-
Adelaide Brighton Limited
Annual Review for the
Austen Quarry
Hartley
Amendment 1**

PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 79 103 636 353

Reporting Period: 16th September 2016 to 30th June 2017



Image Sourced from NSW Department of Planning and Environment Compliance Audit (2015)

Prepared by:

VGT Pty Ltd

in conjunction with

**Hy-Tec Industries Pty Ltd
Adelaide Brighton Limited**



Environmental
Compliance
Solutions

Hy-Tec Industries Pty Ltd- Adelaide Brighton Limited Annual Review for the Austen Quarry Hartley

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Reporting Period: 16th September 2016 to 30th June 2017

Prepared by:

VGT Pty Ltd
4/30 Glenwood Drive,
Thornton NSW 2322
PO Box 2335 Greenhills NSW 2323

ph: (02) 4028 6412
email: mail@vgt.com.au
www.vgt.com.au
ABN: 79 103 636 353

Report Date:

23/11/2017

Report Number:

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Copy Number:

Report Authorised by:

Darryl Thiedeke
Tara O'Brien

Date: 23/11/2017

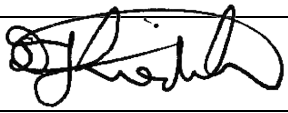
Date: 23/11/2017

Checked by:

LT

23/11/2017

Title Block

Name of operation	Austen Quarry
Name of operator	Hy-Tec Industries Pty Ltd
Development consent approval number	SSD-6084
Name of holder of development consent approval	Hy-Tec Industries Pty Ltd
Mining Lease Number	Not Applicable
Water Licence Numbers	WAL 37423, WAL 25616
Name of holder of water licences	WAL 37423: HY-TEC Industries Pty Ltd WAL 25616: AUS-10 RHYOLITE Pty Limited
Rehabilitation Management Plan start date	02/12/2016
Rehabilitation Management Plan end date	30/06/2050
Annual Review start date	16/09/2016
Annual Review end date	30/06/2017
<p>I, <i>Darryl Thiedeke</i>, certify that this audit report is a true and accurate record of the compliance status of Hy-Tec Industries Austen Quarry for the period 16th September 2016 – 30th June 2017 and that I am authorised to make this statement on behalf of Hy-Tec Industries Pty Ltd.</p> <p>Note. a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000. b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</p>	
Name of authorised reporting officer	Darryl Thiedeke
Title of authorised reporting officer	National Planning and Development Manager
Signature of authorised reporting officer	
Date	23/11/2017

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Section 1. DPE Response to Previously Submitted Report

An annual review was submitted to the DPE on the 13th of October 2017 for the reporting period 16th September 2016 to the 30th June 2017. The department reviewed the review and determined the following information is to be provided in the Annual Review by the 24th November 2017.

Item	Action	Where Addressed in this Review
A plan showing the location of offset areas.	The plans contained in the review have been amended to show the offset areas	Figure 3 & Figure 4
A plan showing the status of mining and rehabilitation at the end of the reporting period.	The plans contained in the review have been amended to show the offset areas	Figure 3 & Figure 4
Surface water monitoring data for all Environmental Protection Licence (EPL) points in accordance with Condition 4b) of Schedule 5.	Results were not included in the previous version of the review however the report directed the DPE to the company website to obtain the data. The data has now been downloaded from the website and included in the appendices. A link to the webpage to navigate to the results has been included in this review.	Section 6.13.2, Appendix M
A year on year comparison of complaints received at the project.	A table has been included in this version of the review.	Section 8
It is requested that a table is provided in future Annual Reviews that lists the improvement opportunities proposed in the previous Annual Review for the current reporting period and the action taken to progress then, as well as listing any comments from the regulatory agencies on the previous Annual Review, and where they have been addressed in the current Annual Review.	A table will be included in future reports, however a brief note has been made in this review, being the first under the new consent.	Section 3.5
In accordance with Condition 26 of Schedule 3, please provide evidence that suitable arrangements were made by 15 th July 2017 to provide appropriate long-term security for the land within the Biodiversity Offset Strategy to the satisfaction of the Secretary	Correspondence from the DPE was included in the previous review (Appendix K) stating the revised date for securing the Biodiversity Offset Areas is the 15 th of September 2018. No action required at this stage.	Appendix K
In accordance with Condition 30 of Schedule 3, please provide evidence that the Conservation and Rehabilitation Bond was lodged with the Department by 2 June 2017.	A copy of the bond was included in Appendix L of the previous review. No action required.	Appendix L

Item	Action	Where Addressed in this Review
<p>A review of the website did not identify any monitoring data under the heading 'Monitoring Data'. It is noted in the Annual Review that EPL monitoring data was published on the Hy-Tec website. Please confirm that the data is available and how Hy-tec has complied with condition 10a) dot point 4 and Condition 10b) of Schedule 5.</p>	<p>As described above, readers were directed to search the Hy-Tec website in the previous review for EPL monitoring data. Result are now included in Appendix M and a link to the website is also included.</p>	<p>Section 6.13.2, Appendix M</p>

Section 2. Statement of Compliance

Table 1. Statement of Compliance

Relevant Approval	All Conditions Compliant?
Development Consent SSD-6084	No
Water Access Licences 25616 and 37423	Yes
EPL 12323	Yes

Table 2. Compliance Status Key

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

Table 3. Non-Compliances – SSD-6084

Condition #	Condition Description	Compliance Status	Comment	Section addressed in Annual Review
Schedule 3 Condition 4 (c)	<i>Carry out noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent.</i>	Non-compliant	To commence during the upcoming reporting period	6.1
Schedule 3 Condition 20	<i>The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary.</i>	Non-Compliant	WMP was still under negotiation as at 30/06/2017(end of the report period) and has not been approved by the Secretary at the time of this report.	6.13

Table 4. Non-Compliances – Water Access Licence

Licence #	Condition Description	Compliance Status	Comment	Where addressed in Annual Review
WAL25616	All	Compliant	N/A	N/A
10WA103330	All	Compliant	N/A	N/A
WAL37423	All	Compliant	N/A	N/A
10WA119180	All	Compliant	N/A	N/A

Table 5. Non-Compliances – EPL12323

Licence #	Condition Description	Compliance Status	Comment	Where addressed in Annual Review
12323	All	Compliant	N/A	N/A

Section 3. Introduction

3.1. Background

3.1.1. Quarry History

The Austen (Hartley) Quarry is operated by Hy-Tec Industries Pty Ltd, a wholly owned subsidiary of Adelaide Brighton Limited. The site is comprised of some 128 Ha from which rhyolitic material is extracted, processed and transported offsite.

Consent (DA103/94) for the establishment of a hard rock quarry and associated processing area at the Hartley site, was first awarded to Aus-10 Rhyolite Pty Ltd during March 1995. Production at the Austen Quarry commenced during 2005 with rhyolitic material being extracted, processed and transported offsite. During 2014, consent DA 103/94 was modified to allow for the extraction of up to three additional benches with a final level at 685 metres AHD.

On the 15th of July 2015, State Significant Development (SSD) 6084 was issued to the Austen Quarry. The consent allows for the continued extraction of hard rock material and the extension of quarry into the approved additional reserve areas.

3.1.2. Quarry Operations

Rhyolitic Material is extracted by drill and blast methods, fragmenting the material into smaller manageable pieces. The fragmented material is then loaded into a primary crusher. Crushed material is then passed through a scalping plant and transferred to the processing area via a conveyer system.

Once at the processing area, the material is passed through a secondary crusher and screen to produce a variety of quarry products. The different products are then stockpiled and moved offsite via haul trucks to the regional and Sydney markets.

3.2. Location

The Austen Quarry is located on freehold land privately owned by Hartley Pastoral Corporation (HPC) and is contained within Lots 1, 2 DP1005511 and Lot 31 DP 1009967. The site is bounded by remnant natural bushland to the south and pastoral land to the north (see *Figure 1*). According to Lithgow City Council Local Environmental Plan, the Austen (Hartley) Quarry is situated on land categorised as RU1: Primary Production. Access to the Austen site is via the sealed site access road which intersects Jenolan Caves Road.

Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Site Location	Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Google Map - Image Date 06/10/2015 & Google Maps 2015	Our Ref:	4574_HY_H_AR16-17_C001_V0_F1.cdr
Figure:	ONE	Council:	Lithgow City Council	Survey:	N/A	Plan By:	JD
Sheet:	1 of 1	Tenure:	N/A	Projection:	N/A	Project Manager:	TO
Version/Date:	V0 22/08/2017	Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton Limited	Contour Interval:	N/A	Office:	Thornton

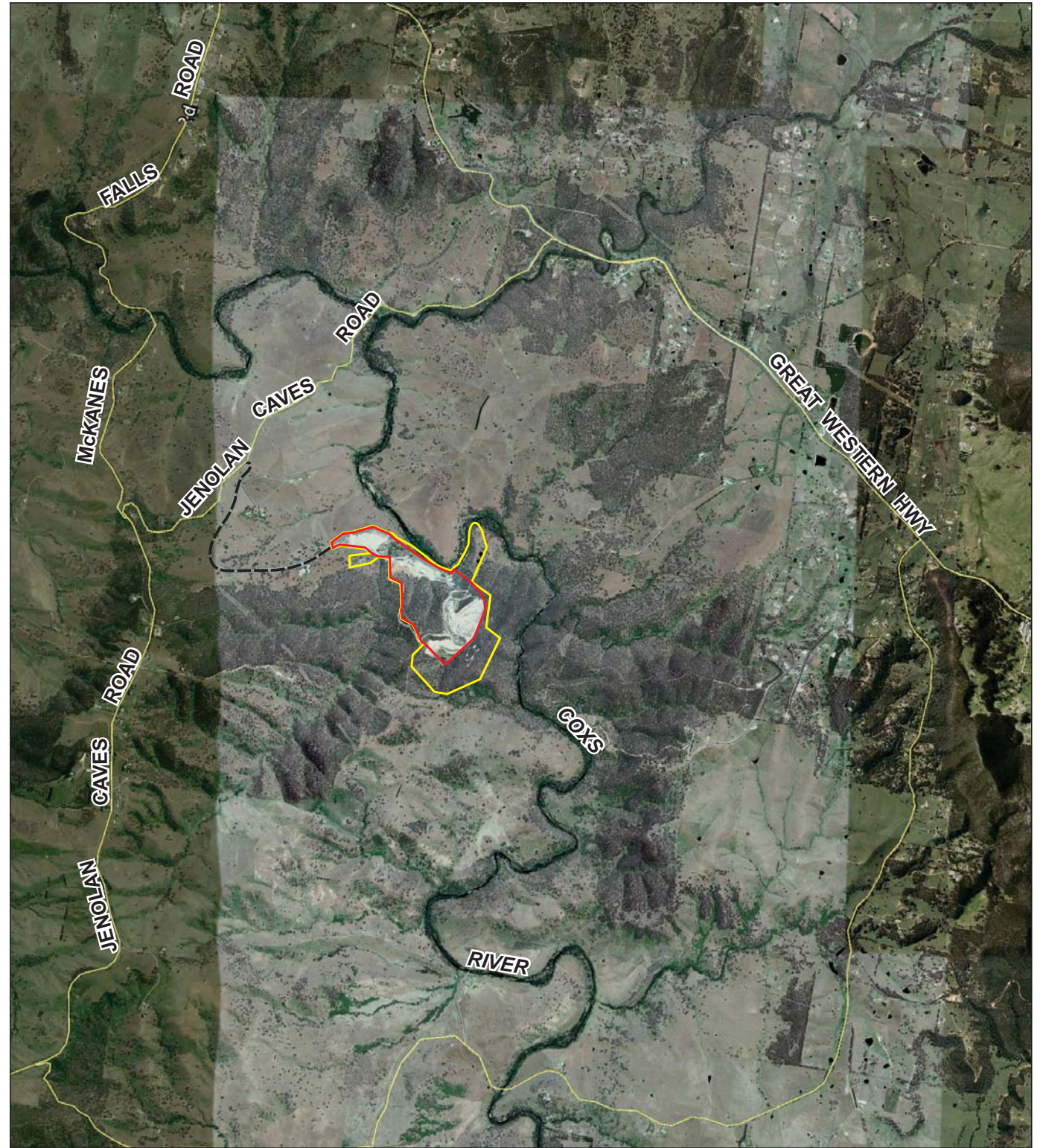
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Approx Scale: 0 2 4km

Legend

- Stage 1
- Stage 2
- Quarry Access Road



Approx Scale: 0 0.5 1.0 1.5km

Manager/Authorisation Holder
Hy-Tec Industries: Darryl Thiedeke
Signed: *[Signature]*
Date: 23/11/2017
Project Manager VGT: Lisa Thomson
Signed: *[Signature]*
Date: 23/11/2017

3.3. Scope

This Annual Review for the Austen (Hartley) Quarry has been prepared by VGT Pty Ltd on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec). This Annual Review summarises all site activities, condition compliance, environmental performance and rehabilitation progression during the reporting period 16th September 2016 to 30th June 2017, in accordance with Schedule 5 Condition 4:

By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:

(a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;

(b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:

- relevant statutory requirements, limits or performance measures/criteria;*
- requirements of any plan or program required under this consent;*
- monitoring results of previous years; and*
- relevant predictions in the EIS;*

(c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;

(d) identify any trends in the monitoring data over the life of the development;

(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

(f) describe what measures will be implemented over the current financial year to improve the environmental performance of the development.

SSD 6084 was issued to the Austen Quarry on the 15/07/2015. The consent allowed for the continued extraction of hard rock material and the extension of the quarry into areas of the approved reserves. As a requirement of Schedule 3 of SSD 6084, the following Environmental Management Plans were prepared and submitted to the relevant authorities:

- Noise Management Plan ^{Ref. 14}
- Blast Management Plan ^{Ref. 15}
- Air Quality Management Plan ^{Ref. 13}
- Surface Water Audit and Water Management Improvement Program ^{Ref. 20}
- Water Management Plan ^{Ref. 21}
- Traffic Management Plan ^{Ref. 19}
- Landscape and Rehabilitation Management Plan ^{Ref. 18}

With the submission of these documents, SSD 6084 was thus activated, however the physical commencement of Stage 2 operations had not yet occurred. Operations upon the site continued under consent DA 103/94 until the approval of the EMPs, and an Environmental Management Report covering the period 1/01/2016 to 15/09/2016 was completed by VGT in November 2016 and subsequently submitted to the relevant authorities.

Operations at the Austen Quarry have been conducted in accordance with SSD 6084 since 16/09/2016 with the operations continuing to operate under the previously approved plans as required by condition 16 of schedule until the all of the plans except the Water Management plan were approved by the department on the 2nd of December 2016. It is advised, the Water Management plan has been submitted to the Department on the 20th September 2017 after receiving final comments from the Office of Water.

3.4. Site Contacts

Table 6. Site Contacts

Contact	Daniel Reed	Darryl Thiedeke	Rodd Welsh
Title	Project Manager	National Planning and Development Manager	Austen Quarry Production Manager
Address	PO Box 6770, Silverwater NSW, 1811	PO Box 6770, Silverwater NSW, 1811	391 Jenolan Caves Road, Hartley NSW 2790
Mobile	0428 688 895	0409 652 022	0418 292 843
Phone	N/A	N/A	02 6355 0268
Email	Daniel.Reed@adbri.com.au	Darryl.Thiedeke@adbri.com.au	rod.welsh@adbri.com.au

3.5. Actions required from previous Annual Review

This Annual Review Report for the Austen Quarry is the first report to be submitted to the Department of Planning to satisfy condition 4 in schedule 5 of SSD-6084. There have been no previous annual reviews submissions under this consent.

The Austen Quarry Environmental Management Report for the reporting period 1st January to 15th September 2016 was submitted to both Lithgow City Council and the Department during November 2016. During this period, operations at the Austen Quarry were being conducted under DA 103/94. There were no actions required as a result of that report submission.

Section 4. Approvals

4.1. DA 103/94

Development approval for the Austen Quarry was first granted to Hartley Pastoral Company Pty Limited on the 22nd of March 1995 for the extraction of hard rock. During 2014, modification to DA 103/94 was approved allowing for the extraction to 685 metres AHD. The consent has been summarised in *Table 7*. DA 103/94 was surrendered on the 15th September 2016.

Table 7. Council Development Application Summary

Consent Number	Approved	Expiry	Notes
DA 103/94	22/03/1995	22/03/2020	Hard rock quarry and associated processing plant.
Modification (DA103/94)	22/12/2014	Surrendered 15/09/2016	Consent extension for an additional 5 years to extraction depth of 685 metres AHD granted 27/11/2014.

4.2. SSD 6084

On the 15th of July 2015, State Significant Development 6084 was granted to Hy-Tec Industries. The consent allows for the continued extraction of hard rock material and the extension of the quarry. SSD 6084 has been summarised below in *Table 8* and included in *Appendix B*.

Table 8. State Significant Development Summary

Consent Number	Approved	Expiry	Notes
SSD 6084	15/07/15	30/6/2050	Extension of quarrying activities into stage 2 reserves. Quarrying to be completed by 30 th June 2050. Rehabilitation activities may continue.

4.3. Environment Protection Licence

The NSW EPA has issued Environment Protection Licence (EPL) number 12323. The licensee is AUS-10 Rhyolite Pty Limited and the scheduled activity is Land-based extraction 500,000 – 2,000,000 tonnes annual capacity to extract, process or store. A summary is given below, and the conditions included in *Appendix C*.

Table 9. Environment Protection Licence Summary

Licence Number	Anniversary Date	Monitoring Point Number	Type of Monitoring
12323	01-July	1	Discharge to waters: Dam 1
		2	Ambient water monitoring: upstream of processing area
		3	Ambient water monitoring: downstream of processing area
		4	Ambient air monitoring: AQD-1
		5	Ambient air monitoring: AQD-2
		6	Ambient air monitoring: AQD-3
		8	Discharge to waters: Dam 2
		9	Discharge to waters: Dam 3
		10	Discharge to waters: Dam 4
		11	Discharge to waters: Dam 5
		12	Weather Analysis

There are also conditions with limits on noise and blast impacts and operating hours.

4.4. Water Licences

There are two water access licences relevant to the operations. The licences are summarised in *Table 10* and the conditions included in *Appendix D*.

Table 10. Water Licences Summary

Water Licence Number	Work Approval Number	Issued	Expiry	Notes
WAL37423	10WA119180	25/03/2015	24/03/2025	Coxs River Fractured Rock Groundwater Source, Lots 1&2 DP1005511, 20.00 ML
WAL25616	10WA103330	1/07/2011	24/11/2025	Upper Nepean and Upstream Warragamba Water Source, Lot 31 DP1009967, 20.00 ML

Section 5. Operations Summary

5.1. Mining Operations

Current extraction operations are based on the extraction operations detailed in the Environmental Impact Statement (2014) ^{Ref. 1}.

Extraction operations under SSD 6084 are to continue to be undertaken using conventional drill, blast, load and haul methods. Overburden is stripped prior to extraction and stockpiled for future rehabilitation. Once extracted, blasted material passes through the primary and secondary crusher to create a variety of aggregate size fractions. The different size fractions are stockpiled and hauled offsite as required.

The stage two development encompasses the stage one extraction area and extends approximately 100 metres to the east and 500 metres to the south. Extraction is constrained to a depth of 685 metres AHD.

Extraction during the reporting period predominantly remained within the existing stage one development area. Quarrying activities within the stage two development area were restricted to preliminary works in preparation for the quarry extension.

Annual production data is summarised below in *Table 11*. The Extractive Materials return for the year ending 30/06/2017 is included in *Appendix E*.

Table 11. Extraction/Production Summary

Material	Previous reporting period 1/01/2016 to 15/09/2016 Production Volume (t)	This reporting period 16/09/2016 to 30/06/2017 Production Volume (t)	Financial Year 1/07/16 to 30/06/17 Quarry Sales (t)	Next reporting period 1/07/2017 to 30/06/2018 Forecasted Quarry Sales (t)
Waste rock / overburden	10,000	100,000		100,000
Saleable product	592,300 (extracted)	745,290	1,058,563	1,000,000

5.1.1. Quarry Progress

During the reporting period, quarrying activities continued predominantly within the existing stage one extraction area with some preliminary works undertaken in the Stage 2 area, see *Figure 2*.

5.1.2. Extractive Material Transportation


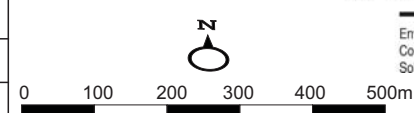
Material transportation during the reporting period is summarised in *Table 12* below. Laden truck movement data is summarised in *Section 6.7*.

Table 12. Material Transportation

	Reporting Period 16/09/2016 to 30/06/2017	Financial Year to 30/6/17	Limit during Financial Year
Product transported (t)	839,211	1,058,563	1,100,000
Trucks Dispatched	26,688	33,318	45,450
Average Trucks Dispatched per day	115	113	150
Maximum Trucks Dispatched per day	203	203	250

Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Site Layout	Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Client 2016 & Google Map - Image Date 31/07/2015. Proposed Stage 2 Offset & Conservation Area from Niche Environmental & Heritage Biodiversity Offset Management Plan Figure 4/2916 19/08/2016, not surveyed.	Our Ref:	4574_HY_H_AR16-17_C006_V0_F2.cdr
Figure:	TWO	Council:	Lithgow City Council	Survey:	Client 2016	Plan By:	TO/JD
Sheet:	1 of 1	Tenure:	N/A	Projection:	MGA	Project Manager:	LT
Version/Date:	V0 22/11/2017	Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton Limited	Contour Interval:	5m	Office:	Thornton

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Legend


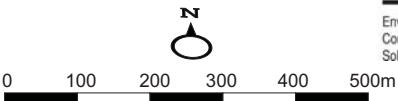
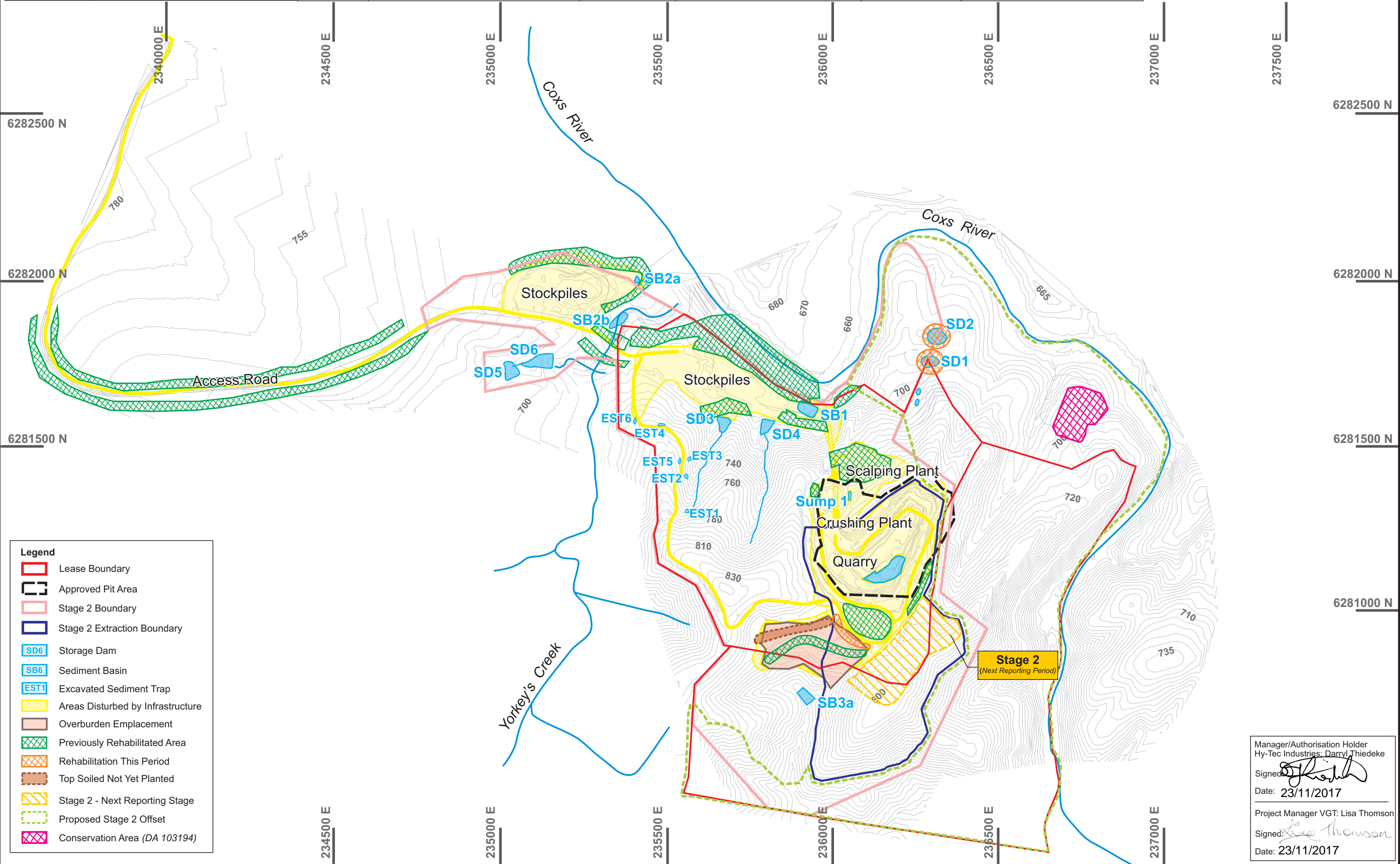
	Lease Boundary
	Stage 2 Boundary
	Storage Dam
	Sediment Basin
	Excavated Sediment Trap
	Catchment Boundary
	EPA Licence Monitoring Point
	Weather Station

Manager/Authorisation Holder
Hy-Tec Industries: Darryl Thiedeke
Signed: 
Date: 23/11/2017

Project Manager VGT: Lisa Thomson
Signed: 
Date: 23/11/2017


Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Existing Site Operations	Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Client 2016 & Google Map - Image Date 31/07/2015. Proposed Stage 2 Offset & Conservation Area from Niche Environmental & Heritage Biodiversity Offset Management Plan Figure 4/2916 19/08/2016, not surveyed.	Our Ref:	4574_HY_H_AR16-17_C002_V3_F3.cdr
Figure:	THREE	Council:	Lithgow City Council	Survey:	Client 2016	Plan By:	TO/JD
Sheet:	1 of 1	Tenure:	N/A	Projection:	MGA	Project Manager:	LT
Version/Date:	V3 23/11/2017	Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton Limited	Contour Interval:	5m	Office:	Thornton

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Legend	
	Lease Boundary
	Approved Pit Area
	Stage 2 Boundary
	Stage 2 Extraction Boundary
	Storage Dam
	Sediment Basin
	Excavated Sediment Trap
	Areas Disturbed by Infrastructure
	Overburden Emplacement
	Previously Rehabilitated Area
	Rehabilitation This Period
	Top Soiled Not Yet Planted
	Stage 2 - Next Reporting Stage
	Proposed Stage 2 Offset
	Conservation Area (DA 103194)

Manager/Authorisation Holder
 Hy-Tec Industries: Darryl Thiedeke
 Signed: 
 Date: 23/11/2017

Project Manager VGT: Lisa Thomson
 Signed: 
 Date: 23/11/2017

5.2. Operation of Plant and Equipment

Plant used at the Austen Quarry are summarised in *Table 13*.

Table 13. Plant and Equipment

Plant	Number	Purpose
PC 850 Excavator	1	Loading of haul trucks with extracted material.
HD325 Dump Truck	2	Haul extracted material to crusher and overburden to the emplacement areas.
HD605 Dump Truck	1	Haul extracted material to crusher and overburden to the emplacement areas.
475 Dozer	1	Overburden stripping and emplacement formation, Stockpile management
Volvo A40 Water Truck	1	Dust suppression
WA500 Front End Loader	2	Loading of product into highway haul trucks and used in the creation of product stockpiles
Blast Drill Rig	1	Drilling of blast holes


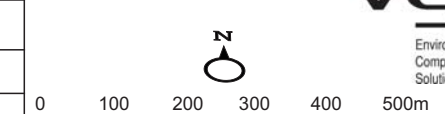
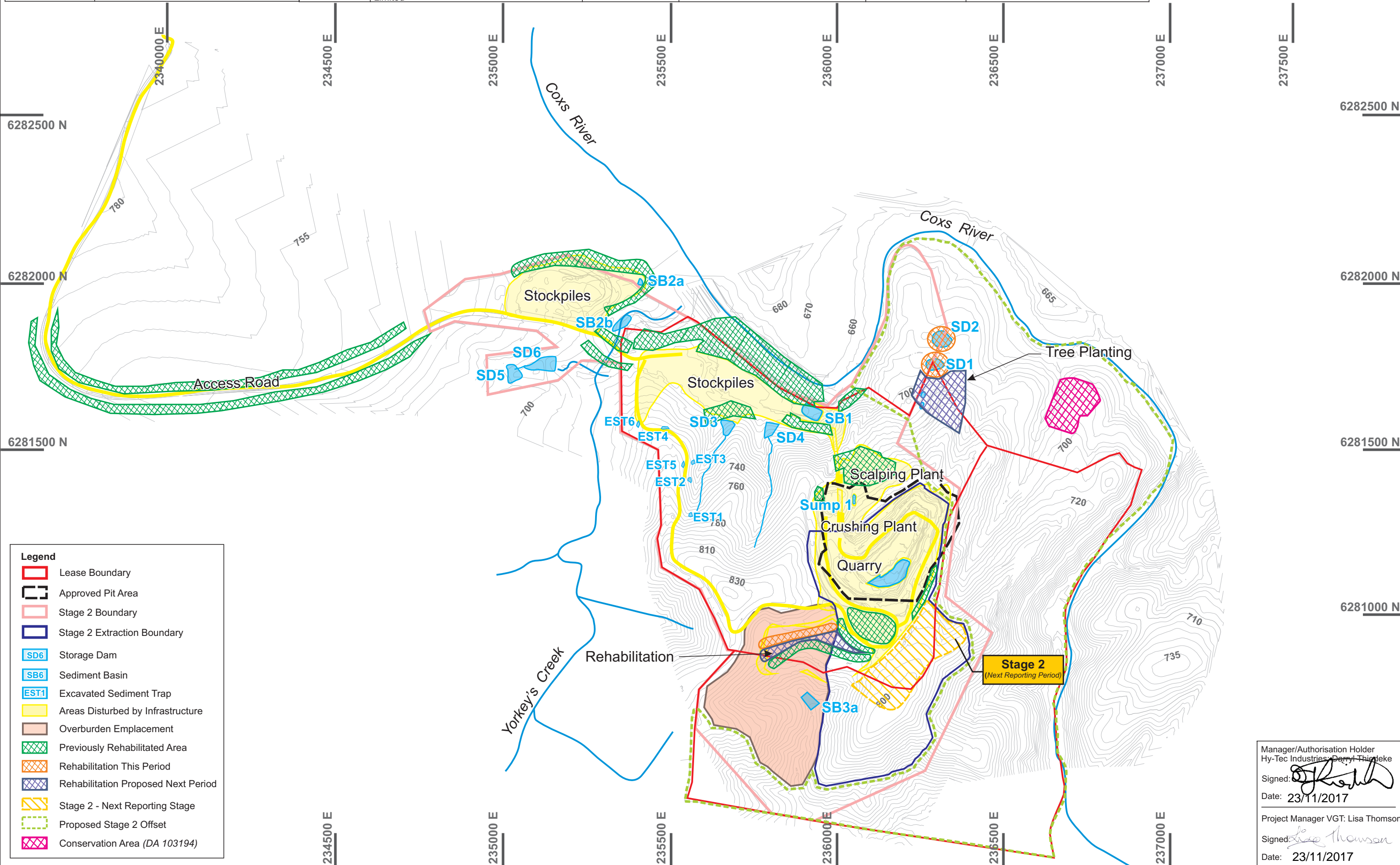
Hy-Tec ensures that plant used at the site is maintained and operated in an efficient manner. Plant maintenance records are available on request.

5.3. Other Operations

Activities during the reporting period have consisted of the extraction and transportation of rhyolite products. There have been no other operations conducted during the reporting period.

Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Proposed Site Operations	Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Client 2016 & Google Map - Image Date 31/07/2015. Proposed Stage 2 Offset & Conservation Area from Niche Environmental & Heritage Biodiversity Offset Management Plan Figure 4/2916 19/08/2016, not surveyed.	Our Ref:	4574_HY_H_AR16-17_C003_V3_F4.cdr
Figure:	FOUR	Council:	Lithgow City Council	Survey:	Client 2016	Plan By:	TO/JD
Sheet:	1 of 1	Tenure:	N/A	Projection:	MGA	Project Manager:	LT
Version/Date:	V3 23/11/2017	Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton Limited	Contour Interval:	5m	Office:	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

Legend

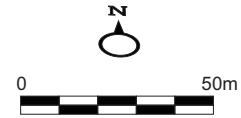
	Lease Boundary
	Approved Pit Area
	Stage 2 Boundary
	Stage 2 Extraction Boundary
	Storage Dam
	Sediment Basin
	Excavated Sediment Trap
	Areas Disturbed by Infrastructure
	Overburden Emplacement
	Previously Rehabilitated Area
	Rehabilitation This Period
	Rehabilitation Proposed Next Period
	Stage 2 - Next Reporting Stage
	Proposed Stage 2 Offset
	Conservation Area (DA 103194)

Manager/Authorisation Holder
Hy-Tec Industries, Darryl Thieleke
Signed: 
Date: 23/11/2017

Project Manager VGT: Lisa Thomson
Signed: 
Date: 23/11/2017

Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Spot Survey May 2017
Figure:	FIVE
Sheet:	1 of 1
Version/Date:	V2 22/11/2017

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Client - CEH Survey Drawing No:HQ0517 - Stage 2 Pit Limit & Levels 29/09/2017	Our Ref:	4574_HY_H_AR16-17_C004_V2_F5.cdr
Council:	Lithgow City Council	Survey:	Client - CEH Survey, Consulting Land, Engineering & Mining Surveyors	Plan By:	JD
Tenures:	N/A	Projection:	N/A	Project Manager:	LT
Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton	Contour Interval:	N/A	Office:	Thornton



DRAWING No: HQ0517 - STG2 & LEVELS	AUSTEN QUARRY - HARTLEY STAGE 2 SITE BOUNDARY & LEVELS - MAY 2017	SCALE: 1:2500 DATUM: AHD
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		CEH SURVEY CONSULTING LAND, ENGINEERING AND MINING SURVEYORS <small>"Astrolabe" 1 Rutherford Lane, LITHGOW 2790</small> ABN: 66 056 544 551 Office: (02) 6351 2281 Email: survey@ceh.com.au Website: www.ceh.com.au	<table border="1"> <tr> <td>DATE</td> <td>29-09-2017</td> </tr> <tr> <td>AMENDED</td> <td></td> </tr> <tr> <td>SURVEYOR</td> <td>TH</td> </tr> <tr> <td>DRAWN</td> <td>TH</td> </tr> <tr> <td>CHECKED</td> <td></td> </tr> </table>	DATE	29-09-2017	AMENDED		SURVEYOR	TH	DRAWN	TH	CHECKED		Manager/Authorisation Holder Hy-Tec Industries Pty Ltd Signed: Date: 23/11/2017 Project Manager VGT: Lisa Thomson Signed: Date: 23/11/2017
		DATE	29-09-2017											
		AMENDED												
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Section 6. Environmental Performance

6.1. Climate

Climate averages for the reporting period as recorded by the onsite weather station is summarised in *Appendix J*.

The rainfall for the reporting period (a 10 month period) was 564mm. The annual average rainfall in Lithgow is 862 mm per year according to BOM data.

As can be seen in *Graph 2 and Graph 3 (Appendix J)*, 9:00am wind direction was predominately east to south east with occasional westerly winds. This differs from the long term averages showing a predominance of westerly winds (BOM data for the Lithgow Station for 9:00am wind data).

By 3pm, winds had strengthened and remained predominately from the west. The patterns observed were very similar to the long term averages for Lithgow.

6.2. Noise

6.2.1. Performance and Management

Noise generation at the Austen Site principally relates to “*those operational activities required to clear vegetation and strip topsoil and subsoil, drill and blast extraction of raw materials, load and haul of materials for processing through crushing and screening or emplacement of overburden, stockpiling and transport of final products and miscellaneous equipment use within the Quarry.*” Ref. 13.

6.2.1.1. Implemented Environmental Measures for Noise

Hy-Tec has implemented the following proactive measures outlined in the Noise Management Plan 2016:

- All operations will be undertaken in accordance with the approved hours of operation presented in SSD6084 Table 1,
- All fixed plant to remain in current locations,
- Continued operation of the primary conveyor between the primary crushing station and secondary processing area,
- Sequencing the proposed Stage 2 extraction area to reduce the noise attenuation,
- Stockpiles and ancillary equipment will be positioned to limit potential noise impacts,
- Ancillary equipment will be enclosed, where feasible,
- Compliance with the maximum number of truck movements per day nominated in Condition 8 of Schedule 2 of SSD-6084.
- All drivers are required to sign the Drivers Code of Conduct and Chain of Responsibility,
- Internal roads to be maintained,
- New roads are to be constructed to current access road standards,
- All equipment on site would be serviced in accordance with Original Equipment Manufacturer (OEM) requirements to ensure sound power levels of each item remains at or below that nominated for noise modelling purposes and;
- Operations at exposed locations and under unfavourable weather conditions will be modified, where necessary, to reduce potential noise-related impacts.

In addition, Hy-Tec has implemented the following reactive measures outlined in the Noise Management Plan 2016:

- Any noise complaint received directly, through the EPA or another regulatory agency will trigger the implementation of the response and corrective action measures,
- Any record of noise exceeding the criteria nominated will trigger the response and corrective action measures,
- Any request from police or in the event of an emergency will result in the activation of reactive management measures and;
- If any of the meteorological conditions detailed in Appendix 5 Condition 1 of SSD-6084 are observed reactive management measures will be triggered.

6.2.1.2. Performance During Reporting Period

During September 2016, Todoroski Air Sciences on behalf of Hy-Tec conducted attended and unattended compliance noise monitoring for the Austen Quarry (see Appendix F). The monitoring program consisted of attended monitoring at R31 R48 and R24 receiver locations and unattended monitoring at the nearest residential location (R31).

No significant audible noise was detected at nearby resident locations under noise enhancement conditions (early morning). A single truck movement was received and the audible noise was below the 35dB(A) criteria.

Noise associated with traffic movements was received at sampling location R48. Noise received at this location is confined to traffic along public roads. Noise from the site has been considered inaudible at the R48 location.

The monitoring program indicates that noise emissions from the Austen Quarry during the reporting period were within the limits set by SSD 6084 and EPL 12323.

Results of the noise monitoring and compliance with SSD Conditions has been summarised in *Table 1* and *Table 2* in *Appendix J*.

6.2.1.3. Proposed Environmental Performance Improvements

SSD 6084 Schedule 3 Condition 4 states the applicant shall:

“Carry out noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent”.

During September 2016, a single monitoring campaign was conducted and determined that the implemented Noise Management strategies are adequate to mitigate noise emitted by quarrying operations.

During the forthcoming reporting period biannual noise monitoring will be undertaken to determine compliance with the relevant SSD 6084 conditions. New equipment purchased will be tested to ensure any noise emissions are within the modelling parameters undertaken for the noise assessment ^{Ref. 3}.

6.3. Blasting

6.3.1. Performance and Management

Blasting at the Austen Quarry is undertaken using conventional drill, blast, load and haul methods. Blast holes are drilled using a track mounted drill rig to a desired depth. These blast holes are loaded with explosives and detonated in a controlled explosion. The produced material is loaded onto haul trucks for transportation to the primary crusher.

Blasts at the Austen Quarry occur approximately on a fortnightly basis.

6.3.1.1. *Implemented Environmental Measures for Blasting*

To ensure the safety of the personnel and the public, Hy-Tec has implemented the following proactive measures outlined in the Blast Management Plan (2016) ^{Ref. 15:}

- Site personnel notified of a blast by way of a notification board in the crib room and during toolbox meetings.
- Residents within 2km radius of the quarry are notified of scheduled blasts by letter drop,
- Notifications will be issued a minimum of 24 hours before the scheduled blast,
- Seasonal conditions are reviewed annually to modify long term planning of blasts,
- Long-term (annual) scheduling of activities to limit blasting activities during the daily periods when adverse conditions are most likely to occur,
- Short-term modification of blasting activities in response to forecasting of adverse conditions in the short-term,
- Blast contractors, in conjunction with the Quarry Production Manager, will review blast monitoring records to enable continuous improvement and quality control, resulting in continual development of optimum blast parameters,
- Quality control practices are to be implemented on the ground to ensure blasts are kept within design tolerances,
- Adequate burden is to be maintained on all faces to prevent blowouts and blast anomalies,
- Blast energies are to be minimised as far as possible,
- Adequate exclusion / clearance zones are to be maintained to ensure that the safety of people, equipment, vehicles or livestock on nearby land will not be affected by blasting,
- Best practice methodology is used to ensure fly-rock and fumes as low as reasonably practicable levels,
- Blasts are only fired in optimal weather conditions. In the event that unfavourable meteorological conditions are identified, the shot-firer will liaise with the Quarry Production Manager to determine whether to postpone a blast,
- Each blast will be monitored to confirm compliance with air blast overpressure and ground vibration criteria at the nearest non owned sensitive location and must not exceed 2mm/s at the most sensitive location within Hartley Village and;
- Training will be provided to all relevant personnel on environmental obligations in relation to blasting controls.

To minimise dust produced by blasting, Hy-Tec has implemented the following:

- Monitoring of blast performance with improvements to be made in response to elevated ground vibration or air overpressure,
- Restricting blast firing to times of optimal weather conditions, where practical,
- Use of high quality stemming products and;
- Minimising blast energies.

To minimise fume emissions generated from blasts, monitoring and calibration of the explosive manufacturing and the use of emulsion based explosives is implemented.

6.3.1.2. Performance during the Reporting Period

There were no performance management issues that arose during the report period.

There were no complaints received by the Austen Quarry in regards to blasting.

Compliance with SSD Conditions has been summarised in *Table 3 and Table 4 of Appendix J*. All blasts were compliant with required standards.

6.3.1.3. Proposed Environmental Performance Improvements

There are no proposed environmental performance improvements in regards to blasting. Blasting operations will continue as per the Blasting Management Plan. Monitoring of overpressure and ground vibrations are to continue in forthcoming reporting periods.

6.3.2. Monitoring Data

Monitoring of noise and vibration during the reporting period was conducted to the Environmental Protection License requirements of peak particle velocity (ppv) and air blast overpressure for each of the blasts initiated. Monitoring was undertaken at the Hartley village. Data on overpressure and ground vibration due to blasting activities can be found in *Appendix J*.

During the reporting period there were 25 blasts; one recorded a ground vibration of greater than the trigger of 0.51mm/s. This result is within the criteria set out in SSD 6084. There were no overpressure events recorded during the reporting period.

6.4. Air Quality

6.4.1. Performance and Management

6.4.1.1. Implemented Environmental Measures for Air Quality

Hy-Tec Industries have implemented the following management systems to mitigate the effect of the quarry on air quality ^{Ref. 13}:

- Operations hours as per Table 4 SSD6084,
- The northern ridge within the quarry retained,
- Primary crusher to remain in the purpose built depression within the extraction area,
- Primary conveyor replacing haul truck movements,
- Conveyor transfer points partially enclosed,
- Quarry access road sealed from Jenolan Caves Road ,
- Surface disturbance areas planned to limit the total surface disturbance at any one time,
- Progressive rehabilitation will include initial revegetation to provide a suitable groundcover that limits disturbance and potential dust “lift off”,
- Exposed areas that are not covered in gravel under dry and windy conditions are watered as required,
- Internal roads are surfaced with graded material to limit dust production,
- All vehicles travelling on internal roads limited to a speed appropriate for the conditions and safety,
- Load sizes are limited,
- Care to be taken to avoid spillage during loading,
- Dump heights from plant to be minimised,
- Blasts scheduled to avoid higher wind conditions’
- Truck queuing, unnecessary trips reduced where possible,
- Water sprays installed on the approach to the quarry weighbridge and the quarry stockpile areas.

Air quality at the Austen Quarry is monitored via static dust gauges and an Air Monitoring Station - "E" Sampler which continuously monitor and capture airborne dust. Three dust gauges are set up in strategic locations surrounding the site (see *Figure 6*). Monthly, three gauges are collected and analysed by ACIRL Lithgow. Air quality monitoring results are summarised in *Appendix J*. Hy-Tec installed a continuous Particulate Monitor (PM₁₀ in µg/m³) to the west south west of the site in March 2017 with monitoring commencing on the 14/03/2017. Total Suspended Particulates (TSP) is calculated from the PM₁₀ fraction in accordance with the following statement from Todoroski Air Sciences:



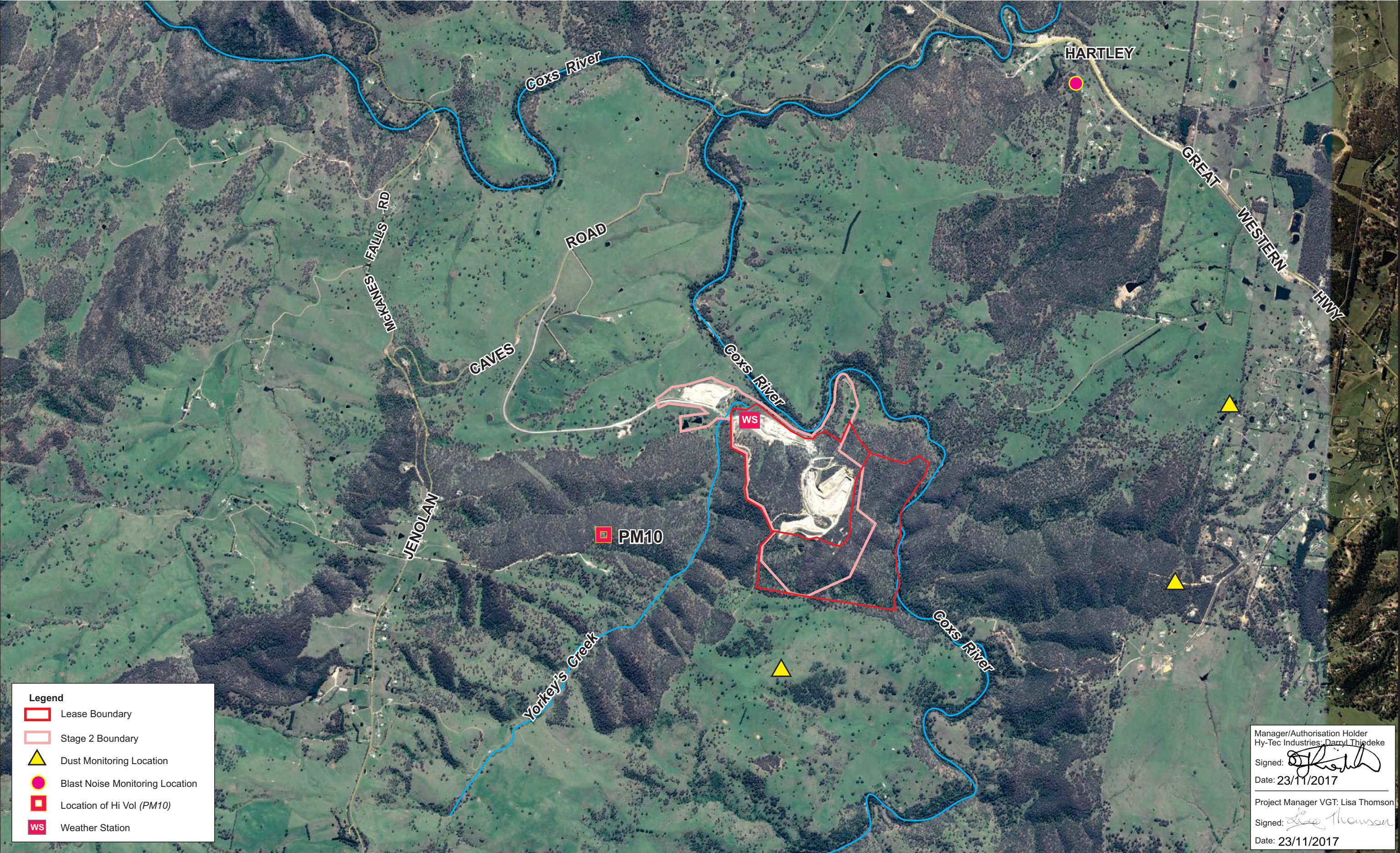
“In accordance with the approved Air Quality Management Plan, compliance with criteria for total suspended particulates (TSP) is to be considered through monitored PM10, recognising that PM10 constitutes approximately 40% of TSP. Thus the TSP levels can be reasonably calculated to be 2.5 times the measured PM₁₀ level..”

“For these reasons TSP levels for the Austen Quarry should be calculated by inference to the measured PM10 level. The approach allows the operation to focus on measurement of PM10, which is a better indicator of potential impact.”

Particulate Matter monitoring results are included in *Appendix G*.

Plan of:	Annual Review for the Austen Quarry Extension July 2016 to June 2017 - Air Quality and Blast Monitoring Sites	Location:	Off Jenolan Caves Road, Hartley, NSW	Source:	Client and Google Map - Image Date 31/07/2015	Our Ref:	4574_HY_H_AR16-17_C005_V1_F6.cdr
Figure:	SIX	Council:	Lithgow City Council	Survey:	Client	Plan By:	TO/JD
Sheet:	1 of 1	Tenure:	N/A	Projection:	MGA	Project Manager:	LT
Version/Date:	V1 22/11/2017	Client:	Hy-Tec Industries Pty Ltd - Adelaide Brighton Limited	Contour Interval:	5m	Office:	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

To minimise the emissions of Greenhouse Gases during the life of the quarry, the following measure are implemented;

- Optimisation of quarry design to minimise
 - Travel distance,
 - Rehandling of overburden, products and by-products,
- Use of mobile equipment which is maintained and serviced in accordance with Original Equipment Manufacturer (OEM) requirements to maximise efficiency,
- Minimise the quarry footprint to reduce land disturbance and travel distance for mobile equipment and;
- Optimise the design of the processing plant to:
 - Maximise the use of gravity to move material throughout the plant,
 - Maximise the use of energy efficient monitors.

6.4.1.2. Performance during the Reporting Period

Adverse weather conditions relating to dust production were monitored via the on-site weather station. At times of adverse weather, mining activities have been and will continue to be modified as appropriate.

Static dust was monitored during the reporting period as per EPL12323. Ash and insoluble material recorded were below the EPA's and consent condition's limits.

Since the commencement of PM₁₀ monitoring, there have been no reported exceedances of the 24 hour maximum as per Schedule 3 Condition 10 SSD6084. Annual monitoring data is not yet available and thus it is not possible to review against the annual average criteria.

There have been no complaints regarding air quality in the report period.

Air quality monitoring data and compliance with the relevant conditions is summarised in *Appendix J*

6.4.1.3. Proposed Environmental Improvement Measures

There are no additional environmental performance measures proposed for the forthcoming reporting periods. Implemented air quality management strategies are to be maintained and dust monitoring is to continue.

6.5. Biodiversity Offset

6.5.1. Performance and Management

The Biodiversity Offset Area (BOA) is situated to the north, west and south of the stage 2 limit of disturbance. Management of the offset area consist specifically of the conservation of native vegetation, fauna habitat and silver leaved mountain gum populations to offset the impacts of the Austen Quarry Stage 2 extension.

6.5.1.1. *Implemented Environmental Measures for Biodiversity Offsets*

Hy-Tec have implemented the following Environmental Measures as described in the Biodiversity Offset Management Plan ^{Ref. 17, Ref. 16}:

- Existing fences are to be maintained around the BOA,
- Access tracks are to be maintained,
- Seed collection of local native flora to occur initially for the initial propagation of the Silver Leaved Mountain Gum tube stock and associated native species.
- Weed management consisted of spot spaying at regular intervals.
- Regular weed maintenance to occur for the first 3 years (once a month during late winters, spring and wet summers) after the installation of tube stock and then twice yearly onwards.
- The presence of herbaceous feral animals are to be monitored,
- Pre-clearing surveys are conducted in which habitat features (hollows, large nests, rocky habitats, logs termite mounds etc.) are recorded,
- No part of the BOA, will be subject to fire less than 15 years, or more than 40 to 50 years, from the previous fire event in that particular area,
- Managed burning will be excluded from all rehabilitation areas,
- Conservation exclusion zones around the stage 2 area implemented to exclude vehicles, plant and staff within the rehabilitation areas and the BOA unless for monitoring and maintenance purposes,
- The core population and non-core occurrences of silver-leaved mountain gum within the BOA are to be monitored. An initial monitoring event will occur following approval of the SLMGMP and be repeated biennially in spring thereafter for the life of the quarry. (as per approved Silver-leaved Mountain Gum management Plan) and;

6.5.1.2. *Performance during Reporting Period*

During the reporting period, Onsite Environmental Management conducted an ecological monitoring program as a part of the ongoing ecological monitoring program (see *Appendix H*). The three day, two night monitoring program was consisted of Diurnal and Nocturnal fauna surveys as well as flora transects. These surveys/transects were conducted in the following locations:

- Biological Offset Areas (BOA) to the north east and south of the quarry operations;
- Rehabilitation Area and;
- New quarry operation areas.

The surveys/transects within the Biodiversity offset include transect 1 and 3.

Three pre-clearance surveys were undertaken in November 2016 and April 2017 with results and reports included in *Appendix H*. Clearing was undertaken in accordance with the recommendations of the ecologist.

An aerial weed spraying program was undertaken during November 2016 targeting Serrated Tussock grass.

Hy-Tec also planted 1000 Eucalyptus Pulverulenta and 500 mixed native shrubs and trees.

The monitoring within the BOA indicates that there has been no significant change in flora and fauna communities during the reporting period. Monitoring during the reporting period is summarised in *Appendix J*.

6.5.1.3. Proposed Environmental Improvement Measures

There are no additional environmental performance measures proposed for the forthcoming reporting periods.

Tree guards are to be placed around previously planted tube stocks and any future plantations. The ongoing control of weeds and feral animals is to continue where possible.

Soil won during preliminary work for the development of the Stage Two development area will continue to be retained and used for future rehabilitation.

Hy-Tec is currently developing the Biodiversity Offset Strategy. Hy-Tec envisages that the offset strategy will be implemented within the upcoming reporting period and before the target date of 15th September 2018.

6.6. Heritage

6.6.1. Performance and Management

The Austen Quarry is situated within the tribal boundaries of the Wiradjuri people. The Wiradjuri were more dependent on terrestrial and freshwater food sources than aboriginal tribes situated within the Sydney basin. With the site proximity to the Coxs River, it is assumed that the area surrounding the Austen Quarry was of high importance to the local aboriginal people.

6.6.1.1. Implemented Environmental Performance Measures for Aboriginal Heritage

The Indigenous Heritage Assessment conducted by Niche Environmental and Heritage Pty Ltd (2014) ^{Ref. 9} concluded that due to no discoveries of aboriginal artefacts within the stage 2 development area, the development is unlikely to impact aboriginal cultural heritage values. The following measures have been implemented to ensure that aboriginal heritage values are maintained in accordance with the Indigenous Heritage Assessment:

- All personnel and sub-contractors involved with the proposed works should complete a relevant cultural heritage induction/training or information session prior to the commencement of works.
- If an unexpected find of a suspected Aboriginal Heritage Item occurs, the Hy-Tec site management team will ensure that:
 - All work in the vicinity ceases,
 - The location of the find is fenced off,
 - A 10 metre buffer around the item is cordoned off,
 - The Office of Environment and heritage is notified,
 - An archaeologist and a representative of the aboriginal community are to be contacted.
 - An Aboriginal Site Impact Recording Form is prepared and;
 - The find is reported.

6.6.1.2. Performance during Reporting Period

During the reporting period, there were no items of Aboriginal heritage significance discovered during quarrying activities.

6.6.1.3. Proposed Environmental Improvement Measures

If items of Aboriginal heritage significance are discovered, the management measures listed in *Section 6.6.1.1* will be implemented.

6.7. Transport

6.7.1. Performance and Management

Traffic enters the Austen Quarry via a private sealed access road which intersects Jenolan Caves Road. The site access road is the only access road for Hy-Tec personnel and product transportation. Traffic around the site use a number of unsealed access tracks, trails and haul roads.

6.7.1.1. *Implemented Environmental Performance Measures for Traffic*

Hy-Tec have implemented the following Environmental Measures as described in Traffic Management Plan (2016) ^{Ref. 19}.

- All loading and dispatch is undertaken in accordance to the approved hours of operations outlined in SSD 6084,
- Transportation of material offsite limited to 1.1 million tonnes in any financial year,
- Loaded truck movements limited to 250 per day,
- Loaded truck dispatch limited 150 per day averaged over total number of dispatch days
- Records of quarry material haulage truck movements exiting the site are monitored and recorded
- All trucks should display the appropriate signage,
- All laden trucks have loads covered,
- Operating hours restricted to the hours specified in Table 4 of SSD 6084,
- All transport operations are inducted and familiar with Hy-Tec policies and procedures,
- All road regulations are observed,
- All loads securely covered,
- All drivers required to avoid using local roads unless its impractical or unsafe to do so,
- Randomly selected driver vehicle checklists are completed to ensure that vehicles have had a prestart completed and visually appear to be in good condition.

6.7.1.2. *Performance during Reporting Period*

During the reporting period, truck movements have remained under the limits listed in Schedule 2 Condition 8 (SSD 6084), see *Table 12* in *Section 5.1.2*.

Truck movements can be found on Hy-Tec's website and are summarised in *Appendix J*

6.7.1.3. *Proposed Environmental Improvement Measures*

There are no proposed environmental improvement measures in relation to truck movements from the Austen Quarry. Truck movements and tonnages will continue to be monitored via the weighbridge.

6.8. Visual

6.8.1. Performance and Management

The Austen Quarry is visible from a number of local viewpoints including Jenolan Caves Road, the Great Western Highway, Hassan Walls Lookout to the north of the site and Mt York Lookout.

6.8.1.1. *Implemented Environmental Performance Measures for Visual Amenity*

Hy-Tec has implemented the following environmental performance measures to mitigate the visual amenity impact of operations:

- Stock pile size significantly reduced within the Yorkies Creek stockpile area as a short term mitigation measure,
- Where possible terminal faces, overburden emplacement and profiled slopes will be progressively rehabilitated,
- Maintenance of existing visual barriers including the northern face of the extraction area maintained where possible and safe to do so,
- Dust suppression via watering of exposed areas,
- Maintenance to ensure a tidy and organised site,
- Minimisation of light pollution by:
 - Directing lights away from critical receptors and;
 - Minimising the Lume created by lights.
- Primary Crusher to remain within the Stage 1 extraction area and;
- Restriction of the expansion of the secondary processing area to the minimum areas required for continued operations.

6.8.1.2. *Performance during the Reporting Period*

Monitoring of the site's visual amenity has been conducted by the quarry manager during the reporting period. Monitoring consisted of taking photographs from advantage points around the site. Photographs of the site's visual amenity are included in *Appendix J*.

There have been no complaints regarding the visual amenity of the site during the reporting period.

6.8.1.3. *Proposed Environmental Improvement Measures*

To further reduce the visual amenity of the Austen Quarry, a bituminous film will be applied to the western facing slopes during October and November 2017. The aim of its application is to reduce the contrast in colour between the exposed rhyolite and adjacent vegetation.

6.9. Waste, Liquid Storage and Dangerous Goods

6.9.1. Performance and Management

Principally wastes produced at the Austen Quarry consist of domestic wastes, scrap steel, trackable wastes (batteries, oils, tyres etc.) and domestic wastewaters.

6.9.1.1. *Implemented Environmental Performance Measures for Wastes, Liquid Storage and Dangerous Goods*

Hy-Tec has implemented the following environmental performance measures to mitigate the potential impacts of Wastes, Liquid Storage and Dangerous Goods:

- Appropriate waste water management systems to be maintained,
- The storage, handling and transport of dangerous goods is conducted in accordance with the relevant Australian standards,
- Sewage produced onsite is removed by Williams Liquid Waste Services for transport to the Lithgow Sewage Treatment plant,
- Waste skip bins to be emptied when required to prevent overtopping,
- Waste skip bins lids to be closed when not in use,
- Wastes that are not disposed of in skip bins, to be stored in a neat and orderly manner and clearly marked as wastes.
- Wastes segregated on site into categories (general, scrap metal, oily recyclables etc.) accordingly,
- Wastes to be removed by licenced contractors and;
- Liquid wastes are banded appropriately with bands exceeding 110% of the storage tanks capacity.

6.9.1.2. *Performance during the Reporting Period*

Wastes have been stored, transported offsite and disposed of appropriately during the reporting period. There have been no complaints regarding waste and dangerous goods.

6.9.1.3. *Proposed Environmental Improvement Measures*

Current waste management measures are to continue. There are no proposed environmental improvement measures regarding wastes and dangerous goods.

6.10. Bushfire

6.10.1. Performance and Management

Fire is a natural event in many ecological communities within Australia. For the Grassy Woodlands and Dry Sclerophyll ecological communities surrounding the Austen Quarry, the NPWS prescribes a fire occurrence interval of 5 to 50 years. For the Silver Leaved Mountain Gum, fire is only required once every 15 years.

6.10.1.1. *Implemented Environmental Performance Measures for Bushfires*

Although a natural occurrence, Hy-Tec has implemented the following environmental performance measures to mitigate the possible effects of Bushfires:

- First controlled burn for stage 2 of the Austen Quarry to occur within the first 5 years of development, (Excluding the BOA).
- Controlled fires to take place in late summer/autumn only to allow spring regeneration and;
- No more than a third of the Silver Leaves Mountain Gum population to be affected by controlled burns at any one time.

To ensure the safety of the site and personnel, Hy-Tec is equipped with the appropriate firefighting equipment to assist the NSW Rural Fire Service.

In relation to deliberately lit / out of control fires, Hy-Tec has implemented the following measures:

- Refuelling is only undertaken within designated fuel bays,
- Vehicle engines are turned off during refuelling,
- Emergency evacuation pints are well sign posted and personnel are informed of their locations,
- Fire extinguishers are maintained within the refuelling area and vehicles,
- If a fire is ignited, a water truck will assist in firefighting efforts,
- Access trials are to be maintained,
- Access to water is maintained and;
- Firefighting training is provided to Hy-Tec personnel.

6.10.1.2. *Performance during the Reporting Period*

During the reporting period, there were no controlled or uncontrolled burns at the Austen site.

6.10.1.3. *Proposed Environmental Improvement Measures*

There are no proposed Environmental Improvement Measures in regards to bushfire management.

The first controlled burn as a part of the stage 2 development will be conducted within the first 5 years of development. Timing of the controlled burn is yet to be determined.

6.10.2. Monitoring Data

There has been no bushfire activity in the vicinity of the Austen Quarry during the reporting period.

6.11. Terrestrial Ecology

6.11.1. Performance and Management

The Austen site is situated upon the western fall of the Blue Mountains with the south, west and eastern boundaries of the development area being well vegetated. Previous flora and fauna monitoring programs have indicated that a number of threatened species exist within the site boundaries.

6.11.1.1. *Implemented Environmental Performance Measures for Terrestrial Ecology*

The following measures have been implemented to mitigate the impacts of the development on the terrestrial ecology;

- Implementation of the Biodiversity offset area to the east and south of the quarry disturbance area See *Section 6.5*.
- Avoidance, minimisation and offset impacts where possible,
- Implementation of Incident Management and notification reporting,
- Staff training and awareness and;
- Weed spraying when required.

6.11.1.2. *Performance during the Reporting Period*

During November 2016, Onsite Environmental Management on behalf of Hy-Tec conducted terrestrial ecological monitoring program. The monitoring program was conducted over a three day and 2 night period within the BOA, Riparian zone and rehabilitation area using the following survey techniques:

Diurnal fauna survey

- 20 minute bird census periods at discrete points along flora transects,
- 20 minute reptile searched beneath logs and rocks at bird census points,
- Bird Call taping at dusk and dawn for 1 hour periods at impact and control locations and;
- Opportunistic survey along flora transects.

Nocturnal fauna survey

- Spotlight transects in all vegetation communities over one night,
- Call playback and listening for threatened fauna species from elevated positions at dusk,
- Amphibian call recording for 2 hour at dusk and spotlight searches where calls were detected,
- Echo-location call recording for 2 x 2hour periods at impact and control sites and;
- Infrared camera bait station recording at two locations.

In conjunction with fauna surveys, flora surveys were conducted using 2 x 50m transects within each vegetation community survey location. Transects were set up and the presence of vegetation, bare areas, rock and leaf litter was recorded at 1m intervals along the transect to provide 100 survey points. In addition to this, all plant species present were recorded using two 20 x 20m plots located at each end of the transects.

The monitoring program determined that the ridge surrounding the site continues to show low levels of weed species establishment in both impact and control sites. Higher abundance's of weeds were identified in close vicinity of the stage two expansion area.

The riparian zone continues to show a trend of weed concentrations exceeding the native concentrations with little native groundcover existing in these areas. There was no indication of quarrying activities impacting these areas.

Monitoring of rehabilitated areas (1, 2 and 3) continued during this period adjacent to the quarry pit operations as shown in Figure 5 and described in Section 4 of the *Onsite Ecological Monitoring Report November 2016* (Appendix H).

Rehabilitation Site 1 was established in 2010 and is currently consisted of native canopy species 5-6 metres tall. Weeds and native ground cover species are present ground layers. Native species are believed to be establishing via self-recruitment from adjacent bushland. Topsoil development is ongoing.

Rehabilitation Area 2 growth is progressing well with most plants observed to be healthy. Couch crop dominated the ground cover restricting the natural germination and recruitment of native groundcover species.

Rehabilitation Area 3 has previously been treated with topsoil and crop cover treatment. Weed and grass growth has previously been heavy however, natives were noted in higher abundance during the 2016 survey. Planted species are progressing well.

Most fauna groups were recorded during the reporting period in similar numbers to the previous year's results with more mammals being identified across the site.

Monitoring Data is summarised in *Appendix J*.

An aerial weed eradication program targeting serrated tussock grass was undertaken in November 2016.

6.11.1.3. Proposed Environmental Improvement Measures

It is recommended that Hy-Tec continue its management of noxious weed infestations of serrated tussocks at riparian sites and Impact Ridge (see *Figure 2 Appendix H*) via herbicide spraying. A control program for feral animals is also recommended, in conjunction with the landowner and OEH to ensure fox, rabbit and cat numbers do not increase.

6.12. Aquatic Ecology

6.12.1. Performance and Management

The Austen Quarry is situated directly adjacent to the Coxs River a part of the Hawkesbury-Nepean catchment. The river flows through both natural and disturbed catchments resulting in variances in water quality and aquatic ecological health.

6.12.1.1. *Implemented Environmental Performance Measures for Aquatic Ecology*

The following measures have been implemented to mitigate the impacts of the development on aquatic ecology:

- Disturbance of the riparian zone and aquatic habitat limited where feasible,
- Establishment of a riparian buffer zone,
- The implementation of the Sediment and Erosion Control Plan,
- Maintenance of water diversion bunds and bunded storage areas,
- Minimisation vehicle access to the Coxs River,
- Refuelling prohibited within 30 metres of the Coxs River or any drainage lines,
- Installation of scour protection measures at pipe outlet points,
- Continued dust suppression activities,
- Discharges occurring at EPL discharge points once water quality parameters outlined in EPL 12323 are met,
- Reporting of uncontrolled discharges and;
- Pollution incident response as per the Pollution Incident Response Management Plan.

6.12.1.2. *Performance during the Reporting Period*

During Spring 2016, Aquascience on behalf of Hy-Tec, conducted an aquatic ecological survey at the Austen Quarry as a part of the ongoing Coxs River aquatic ecological monitoring program. Six sites were sampled during the monitoring program grouped into the following categories:

- Quarry treatment (Sites 1 and 2),
- Quarry Control (Site 7 and 8) and;
- Upstream Control (Sites 4 and 5)

Each group was subject to the following field sampling:

- Water parameters: recorded including temperature (°C), Electrical Conductivity (EC), pH, Dissolved Oxygen (5 saturation and mg/L) and Turbidity (NTU).
- Marco-vertebrate sampling: collected using the NSW AUSRIVAS sampling protocol. Once sample collected from both “riffle” and “edge” habitats collected over a 3-5 minute period in 10m intervals. Live picking was conducted for each collected sample to remove as many macroinvertebrates as possible from each sample.

The 2016 aquatic ecological survey (see *Appendix I*) concludes that:

“There were no distinct negative patterns of variability in the aquatic macroinvertebrate fauna observed at the Quarry Treatment location compared to either of the Control locations that could be attributed to the activities of the Quarry. Results suggest that, at present, the ecological health of the river (as measured through aquatic macroinvertebrate assemblages) within the vicinity of Austen Quarry is no different, or sometimes better, than other areas of the river not influenced by quarry operations. Any impacts on aquatic macroinvertebrates from quarry discharges are most likely to be short term in duration due to the transient nature of the discharge and the various management practices of the quarry to manage pollution events.”

6.12.1.3. Proposed Environmental Improvement Measures

There are no proposed aquatic ecology improvement measures.

6.12.2. Monitoring Data

Monitoring of the quality of aquatic habitats, physico-chemical parameters, macroinvertebrate surveys is presented within the report in *Appendix I*.

Table 14. Aquatic Ecological Monitoring Summary

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Monitor the aquatic ecology from the sites identified in Figure 4.41 of the EIS using the AUSRIVAS methodology as stated in Section 4.8.6 of the EIS	Compliant	Nil negative effects	Continue annual monitoring from the sites identified in Figure 4.41 of the EIS using the AUSRIVAS methodology.

6.13. Water Management

6.13.1. Performance and Management

The Austen quarry is characterised by a series of ridge lines which direct water flows towards the Coxs River and Yorkeys Creek. Water catchments within the project area are divided into the following:

- Catchment 1: Extraction Area, processing area, quarry access road and site facilities
- Catchment 2: Overburden emplacement,
- Catchment 3: Site access road, Yorkeys Creek crossing and;
- Catchment 4: Site Access Road.

Outside the project area, water flows through partly to undisturbed vegetation eventually draining into the Coxs River. Clean water from the vegetated areas flowing towards the project area is diverted via water diversion bunds around the perimeter of the development.

6.13.1.1. Implemented Environmental Performance Measures for Water Management

The following measures have been implemented to mitigate the impacts of the development on water management.

- Dewatering and treatment of waters collected within the extraction area,
- Controlled release of waters from designated EPL points once parameters outlined in EPL 12323 have been met,
- Runoff from undisturbed areas diverted around areas disturbed by quarry operations where practicable,
- Liquid storage bunding to be maintained,
- Refuelling of vehicles to be conducted within designated areas,
- Water basin constructed to have a designed holding capacity for a 95th percentile 5 day rainfall event,
- Water licences WAL37423 and WAL25616 obtained and conditions adhered to.

6.13.1.2. Performance during the Reporting Period

During the reporting period, water monitoring has continued at EPL 12323 monitoring locations. Parameters recorded during monitoring are compliant with the limits set by

EPL12323. There have been no uncontrolled discharges of water from the site during the reporting period.

Monitoring data is summarised in *Section 6.13.2*

6.13.1.3. Proposed Environmental Improvement Measures

A number of audits, strategies and plans regarding water management on the site were required by the consent and finalised during this report period, as summarised in the table below.

Table 15. Water Management Requirements

Report Description	Latest Version Date	Approval Status
Surface Water Audit Report	April 2016	Approved by EPA, WaterNSW
Water Management Improvement Program	April 2016	Approved by EPA, WaterNSW
Water Management Plan including: <ul style="list-style-type: none"> • Site Water Balance • Surface Water Management Plan • Groundwater Management Plan • Surface and Groundwater Contingency Strategy 	July 2017	Approved by WaterNSW 25/08/17, EPA 15/09/17, DPI-W 20/09/17

The Water Management Plan will be implemented in the next reporting period.

6.13.2. Monitoring Data

6.13.2.1. Surface Water Quality

There were no discharges from EPL points 1, 8, 11 during the reporting period. Monitoring was undertaken at EPL points 2, 3, 9, 10 in compliance with the licence. Results are published on the Hy-Tec website <http://www.hy-tec.com.au/quarry-documentation> under the links listed under EPL Monitoring Reports. The results are also included in *Appendix M*.

6.13.2.2. Water Taken in accordance with Water Licences

Table 16. Water Taken

Water Licence #	Plan / Source / Management Zone	Entitlement	Passive take / inflows	Active Pumping	Total
25616	Upper Nepean and Upstream Warragamba Water Source, Dharabuladh Management Zone	20.00 ML		Nil	0
37423	Coxs River Fractured Rock Groundwater Source	20.00 ML	Not Detectable		0

Section 7. Rehabilitation

7.1. Rehabilitation Activities Undertaken during Report Period

During the reporting period rehabilitation activities have been undertaken in accordance with the Landscape and Rehabilitation Management Plan ^{Ref. 18}. There are currently no terminal batters prepared for rehabilitation. As terminal batters are prepared, they will be progressively rehabilitated as per the Landscape and Rehabilitation Management Plan.

7.2. Summary of Rehabilitation Performance

Operations undertaken during the report period are shown on *Figure 2* and operations planned for the next period on *Figure 4*. Rehabilitation status is summarised in the table below.

Table 17. Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual) ha	Current Reporting Period (Actual) ha	Next Reporting Period (Estimate) ha
A. Total Mine Footprint	128	128	128
B. Total Active Disturbance	45.93	45.93	53.83
C. Land being prepared for rehabilitation	Nil	0.5	0
D. Land under active rehabilitation	0.3	1.45	0.85
E. Completed Rehabilitation	14.63	14.93	16.03

Soil was placed around the overburden stockpiles as shown on *Figure 2*. Some soil was vegetated, and this vegetation will be monitored during the next reporting period provided suitable spring rains prevail. Areas not currently vegetated will be planted during the spring when conditions are optimum.

The areas around SD1 and SD2 were planted with additional trees. These were attacked by native and non-native animals and will be re-planted during the spring.

7.3. Rehabilitation of Buildings

No buildings have been rehabilitated during the reporting period.

7.4. Agreed Post Rehabilitation Land Use

The Austen quarry final landuse is to be consisted of passive biodiversity conservation and agriculture.

Land consisting of the stockpile, processing, extraction and overburden emplacement areas are to be reshaped as per the Landscape and Rehabilitation Management Plan (2016) and revegetated with woodland and open woodland species similar to the adjacent remnant vegetation. A final water retention basin will also be constructed.

Areas to the west of the stockpile area will be revegetated with pasture species for possible agricultural uses.

7.5. Other Rehabilitation Activities

Other rehabilitation activities during the reporting period have been confined to the desilting of sediment dams around the site. Removed material was transported to the overburden emplacement area.

7.5.1. Monitoring Data

Compliance with the Landscape and Rehabilitation Management plan has been summarised in *Table 18*.

Table 18. Rehabilitation Monitoring Summary

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Infrastructure no required for future landuse removed	Not Triggered	N/A	N/A
Contamination is identifies and removed	Not Triggered	N/A	N/A
Final Landform equivalent to [EIS] Figure 4	Not Triggered	N/A	N/A
Soil is stockpiled in accordance with the management measures described in Section 8.4.1.5 (LRMP)	Compliant	N/A	N/A

Section 8. Community

Austen Quarry community participation includes ongoing funding of voluntary planning agreements.

It is advised, during the last reporting period a number of informal catch up meetings were held with members of the Hartley District Progress association and other local community members, along with meetings with Lithgow City Council staff.

The Quarry continues to play an active support role with other local organizations such as Hartley Historic Site Advisory Committee, Rhodo Festival Blackheath etc.

There were no complaints from the local community regarding operations at the Austen Quarry. Complaints are also recorded on a complaints register, a copy of which may be found on the website in the link <http://www.hy-tec.com.au/sites/hytec/media/pdf/austen-quarry-development-approval-docs/compliants-register---austen-quarry-oct-2017.pdf>.

Table 19. Complaints Summary

Date	Details	Action	Where Addressed in Report
2015-2016	No complaints	N/A	-
2016-2017	No complaints	N/A	-

Section 9. Incidents and Non-Compliances

9.1. Independent Audit

There have been no independent audits undertaken during the reporting period. An independent audit, conducted by Australian Quality Assurance & Superintendence Pty Ltd (Aquas) is scheduled in October 2017. Once completed, Hy-Tec will respond to the audit's findings, then undertake a review of management plans and strategies.

9.2. Incidents

There have been no reportable incidents at the Austen Quarry during the reporting period.

9.3. Non-Compliances

During the reporting period there were 2 Administrative non compliances against the conditions required by SSD 6084.

9.3.1. Non-Compliance 1

Schedule 3 Condition 4 (c) states that the applicant shall:

“Carry out noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent.”

Tordoski Air Services Pty Ltd, conducted a single noise monitoring campaign during September 2016. The monitoring campaign determined that noise emitted by the Austen Quarry compliant with the limits set by SSD6084.

To bring the site to compliance, Hy-Tec Industries have engaged noise monitoring contractors to commence noise monitoring as soon as possible.

9.3.2. Non-compliance 2

Schedule 3 Condition 20 states:

“The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary. This plan must:

(a) be prepared by suitably qualified person/s approved by the Secretary;

(b) be prepared in consultation with the EPA, NOW and Water NSW;

(c) be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;

(d) include a:

(i) Site Water Balance ;

(ii) Surface Water Management Plan,

(iii) Groundwater Management Plan,

(iv) Surface and Ground Water Contingency Strategy.”

The Austen Quarry Water Management Plan was still under negotiation up to the 30th of June 2017, the end of the reporting period. Hy-Tec received correspondence in August and September 2017 towards acceptance of this plan but approval is still pending at the time of this report. It will be implemented once approved.

Compliance tables for SSD 6084, EPL12323 and WALs are included in *Appendix A*.

Section 10. Actions Planned for Next Report Period

The following activities are planned for the 2017/18 reporting period:

- Ongoing extraction of material from the Stage One extraction area,
- Commencement of extraction within the Stage Two resource area,
- Rehabilitation activities around the current overburden emplacement, replanting of trees around SD1,SD2 and other areas around the site,
- Planting of 2,000 Silver Leaved Gums,
- Planting of 1,000 mixed native tree species (Stringy Bark/Yellow Box etc) ,
- Continued liaison with the local community, and
- Installation of piezometers in accordance with the Water Management Plan

Section 11. References

- Ref. 1.** R.W Corkery and Co. Pty. Limited, 2014, Austen Quarry – Stage 2 Extension Project Environmental Impact Statement
- Ref. 2.** Benbow Environmental, 2014, Air Quality Assessment
- Ref. 3.** Benbow Environmental, 2014, Noise and Vibration Impact Assessment
- Ref. 4.** Ground doctor, 2014, Groundwater Assessment
- Ref. 5.** Groundwork Plus, 2014, Surface Water Assessment
- Ref. 6.** GTA Consultants, 2014. Road Transport Assessment
- Ref. 7.** Niche Environmental and Heritage. 2014, Aquatic Ecology Assessment
- Ref. 8.** Niche Environmental and Heritage. 2014, Historical Heritage Assessment
- Ref. 9.** Niche Environmental and Heritage. 2014, Indigenous Heritage Assessment
- Ref. 10.** Niche Environmental and Heritage. 2014, Terrestrial Ecology Assessment
- Ref. 11.** Niche Environmental and Heritage. 2014, Soil and Land Capability Assessment
- Ref. 12.** Groundwork Plus, 2016, Austen Quarry Environmental Strategy and Plan
- Ref. 13.** R.W Corkery and Co. Pty. Limited, 2016, Appendix L, Austen Quarry Air Management Plan
- Ref. 14.** R.W Corkery and Co. Pty. Limited, 2016, Appendix M: Austen Quarry Noise Management Plan.
- Ref. 15.** R.W Corkery and Co. Pty. Limited, 2016, Appendix N Austen Quarry: Blasting Management Plan
- Ref. 16.** Niche Environmental and Heritage, 2016, Appendix O: Austen Quarry: Silver Leaved Mountain Gum Management Plan.
- Ref. 17.** Niche Environmental and Heritage, 2016, Appendix P: Austen Quarry: Biodiversity Offset Management Plan
- Ref. 18.** R.W Corkery and Co. Pty. Limited, 2016, Appendix Q: Austen Quarry: Landscape and Rehabilitation Management Plan
- Ref. 19.** R.W Corkery and Co. Pty. Limited, 2016, Appendix R Austen Quarry: Traffic Management Plan
- Ref. 20.** Groundwork Plus, April 2016, Surface Water Audit and Water Management Improvement Program
- Ref. 21.** Groundwork Plus, July 2016, Water Management Plan

Appendix A: Compliance Tables

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

DA Conditions: SSD 6084

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
Compliant				
Non Compliant: High Risk Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence				
Non Compliant: Medium Risk Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur				
Non Compliant: Low Risk Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur				
Non Compliant: Administrative 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 Summary				
		Number of Conditions Non-compliant		
Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		2		
General				
2	1	In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or <u>rehabilitation of the development</u> .	Compliant	
	2	The Applicant shall carry out the development generally in accordance with the: (a) EIS; (b) Statement of Commitments; and (c) <u>conditions of this consent</u> .	Compliant	
	3	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of <u>any inconsistency</u> .	Compliant	
	4	The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent; (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this consent; or (c) the implementation of any actions or measures contained in these <u>documents</u> .	Compliant	
	5	If the development has not been physically commenced within 5 years of the date of this consent, then this development consent shall lapse	Compliant	
	6	The Applicant shall not extract extractive materials below a level of 685 m AHD.	Compliant -Current depth of extraction 717.3m AHD	See Figure 4
	7	The Applicant may carry out quarrying operations on the site until 30 June 2050.	Compliant	
	8 a)	The Applicant shall not: a) transport more than 1.1 million tonnes of quarry products from the <u>site during any financial year</u> ;	Compliant	
	8 b)	dispatch more than 250 laden trucks from the site on any one day and;	Compliant	
	8 c)	dispatch more than 150 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.	Compliant	
	9	Within 12 months of the date of this consent, or as otherwise agreed by the Secretary, the Applicant shall surrender the development consent (DA 103/94) for the existing operations on the site in <u>accordance with Section 104A of the EP&A Act</u> .	Compliant - DA 103/94 surrendered 15/09/2016	
	10	Prior to the surrender of development consent DA 103/94, the conditions of this consent shall prevail to the extent of any inconsistency with the conditions of development consent DA 103/94.	Compliant	
	11	The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Compliant	
	12	The Applicant shall ensure that all demolition work is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version	Compliant	
	13	The Applicant shall: a. repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and b. relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the <u>development</u>	Compliant	
	14	The Applicant shall ensure that all the plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) <u>operated in a proper and efficient manner</u> .	Compliant	
	15	To ensure that strategies, plans and programs required under this consent are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the development, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis. With the agreement of the Secretary, the Applicant may prepare a revision of or a stage of a strategy, plan or program without undertaking consultation with all parties nominated under the <u>applicable condition in this consent</u> .	Compliant	
	16	Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall implement the existing strategies, plans or programs for the site that have been <u>approved under DA 103/94</u>	Compliant	
	17 a)	provide annual quarry production data to DRE using the standard form for that purpose;	Compliant	
	17 b)	Include a copy of this data in the Annual Review (see condition 4 of Schedule 5).	Compliant	
	18	By 30 September 2015, unless otherwise agreed with the Secretary, the Applicant shall: (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the development area; and (b) submit a survey plan of these boundaries with applicable GPS <u>coordinates to the Secretary</u> .	Compliant - Stage 2 extraction boundary marked out and pegged with steel posts	See Figure 4
	19	While quarrying operations are being carried out, the Applicant shall ensure that these boundaries are clearly marked at all times in a manner that allows operating staff to clearly identify the approved <u>limits of extraction</u>	Compliant - Stage 2 extraction boundary marked out and pegged with steel posts	See Figure 4

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

DA Conditions: SSD 6084

Compliant	
Non Compliant: High Risk	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Non Compliant: Medium Risk	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Non Compliant: Low Risk	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Non Compliant: Administrative	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)

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review															
	20	Within 6 months of the date of this consent, unless otherwise agreed by the Secretary, the Applicant shall enter into a planning agreement with the Council in accordance with Division 6 of Part 4 of the EP&A Act; and the terms specified in Appendix 7. If there is any dispute between the Applicant and Council on the planning agreement, then either party may refer the matter to the Secretary for resolution.	Compliant																
3	1	The Applicant shall comply with the operating hours set out in Table 1. <table border="1"> <caption>Table 1: Operating Hours</caption> <thead> <tr> <th>Activity</th> <th>Permissible Hours</th> </tr> </thead> <tbody> <tr> <td>• Extraction operations • Processing operations • Overburden Management • Stockpile Management</td> <td>• 6 am to 10 pm Monday to Friday, • 6 am to 3 pm Saturday, and • At no time on Sundays or public holidays.</td> </tr> <tr> <td>• Blasting</td> <td>• 10 am to 3 pm Monday to Friday (except public holidays).</td> </tr> <tr> <td>• Loading and dispatch</td> <td>• 5 am to 10 pm Monday to Friday, • 5 am to 3 pm Saturdays, and • At no time on Sundays or public holidays.</td> </tr> <tr> <td>• Maintenance</td> <td>• Anytime.</td> </tr> </tbody> </table>	Activity	Permissible Hours	• Extraction operations • Processing operations • Overburden Management • Stockpile Management	• 6 am to 10 pm Monday to Friday, • 6 am to 3 pm Saturday, and • At no time on Sundays or public holidays.	• Blasting	• 10 am to 3 pm Monday to Friday (except public holidays).	• Loading and dispatch	• 5 am to 10 pm Monday to Friday, • 5 am to 3 pm Saturdays, and • At no time on Sundays or public holidays.	• Maintenance	• Anytime.	Compliant						
Activity	Permissible Hours																		
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• Maintenance	• Anytime.																		
	2 a)	The following activities may be carried out on the site outside the hours specified in condition 1: delivery or dispatch of materials as requested by Police or other authorities; and	Compliant																
	2 b)	emergency work to avoid the loss of lives, property and/or to prevent environmental harm.	Compliant																
	3	The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land <table border="1"> <caption>Table 2: Noise criteria dB(A)</caption> <thead> <tr> <th>Receiver</th> <th>Day dB(A)_{L_{eq}(15 min)}</th> <th>Evening dB(A)_{L_{eq}(15 min)}</th> <th>Morning Shoulder dB(A)_{L_{eq}(15 min)}</th> </tr> </thead> <tbody> <tr> <td>All privately-owned residences</td> <td>35</td> <td>35</td> <td>35</td> </tr> </tbody> </table>	Receiver	Day dB(A) _{L_{eq}(15 min)}	Evening dB(A) _{L_{eq}(15 min)}	Morning Shoulder dB(A) _{L_{eq}(15 min)}	All privately-owned residences	35	35	35	Compliant								
Receiver	Day dB(A) _{L_{eq}(15 min)}	Evening dB(A) _{L_{eq}(15 min)}	Morning Shoulder dB(A) _{L_{eq}(15 min)}																
All privately-owned residences	35	35	35																
	4 a)	The Applicant shall implement best practice management to minimise the operational and road transportation noise of the development;	Compliant																
	4 b)	minimise the noise impacts of the development during meteorological conditions when the noise criteria in this consent do not apply (see Appendix 5)	Compliant																
	4 c)	carry out noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent; and	A single noise monitoring campaign conducted during September 2016	Section 1 and Section 5.2															
	4 d)	regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent.	Compliant																
	5 a)	The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with EPA;	Compliant																
	5 b)	be submitted to the Secretary at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary	Compliant																
	5 c)	describe the measures that would be implemented to ensure: <input type="checkbox"/> compliance with the noise criteria in this consent; <input type="checkbox"/> best practice management is being employed; and <input type="checkbox"/> the noise impacts of the development are minimised during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 5);	Compliant																
	5 d)	describe the proposed noise management system; and	Compliant																
	5 e)	include a monitoring program to be implemented to measure noise from the development against the noise criteria in Table 2, and which evaluates and reports on the effectiveness of the noise management system on site.	Compliant																
	6	The Applicant shall ensure that blasting on site does not cause any exceedance of the criteria in Table 3. <table border="1"> <caption>Table 3: Blasting Criteria</caption> <thead> <tr> <th>Receiver</th> <th>Airblast overpressure (dB(Lin Peak))</th> <th>Ground vibration (mm/s)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Any residence on privately-owned land</td> <td>120</td> <td>10</td> <td>0%</td> </tr> <tr> <td>115</td> <td>5</td> <td>5% of the total number of blasts over a period of 12 months</td> </tr> </tbody> </table>	Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	Any residence on privately-owned land	120	10	0%	115	5	5% of the total number of blasts over a period of 12 months	Compliant					
Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance																
Any residence on privately-owned land	120	10	0%																
	115	5	5% of the total number of blasts over a period of 12 months																
	7	The Applicant may carry out a maximum of 1 blast per calendar week, unless an additional blast is required following a blast misfire. This condition does not apply to blasts required to ensure the safety of the quarry or workers on site.	Compliant																
	8 a)	During blasting operations, the Applicant shall implement best practice management to: <input type="checkbox"/> protect the safety of people and livestock in the areas surrounding blasting operations; <input type="checkbox"/> protect public or private infrastructure/property in the surrounding area from damage from blasting operations and <input type="checkbox"/> minimise the dust and fume emissions of blasting;	Compliant																
	8 b)	operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and	Compliant																
	8 c)	carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary																	
	9 a)	The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;	Compliant																
	9 b)	describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;	Compliant																
	9 c)	include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;	Compliant																
	9 d)	include community notification procedures for the blasting schedule; and	Compliant																
	9 e)	include a protocol for investigating and responding to Complaints	Compliant																
	10	The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land. <table border="1"> <caption>Table 4: Air quality criteria</caption> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>Annual</td> <td>4.0 µg/m³</td> </tr> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>24 hour</td> <td>50 µg/m³</td> </tr> <tr> <td>Total suspended particulates (TSP)</td> <td>Annual</td> <td>4.0 µg/m³</td> </tr> <tr> <td>^c Deposited dust</td> <td>Annual</td> <td>^b 2 g/m²/month ^{a,d} 4 g/m²/month</td> </tr> </tbody> </table>	Pollutant	Averaging Period	Criterion	Particulate matter < 10 µm (PM ₁₀)	Annual	4.0 µg/m ³	Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³	Total suspended particulates (TSP)	Annual	4.0 µg/m ³	^c Deposited dust	Annual	^b 2 g/m ² /month ^{a,d} 4 g/m ² /month	Compliant	
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Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

DA Conditions: SSD 6084

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
	Compliant			
	Non Compliant: High Risk	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence		
	Non Compliant: Medium Risk	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur		
	Non Compliant: Low Risk	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur		
	Non Compliant: Administrative	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)		
	11 a)	The Applicant shall implement best practice management to minimise the dust emissions of the development;	Compliant	
	11 b)	regularly assess meteorological and air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this consent;	Compliant	
	11 c)	minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 4);	Compliant	
	11 d)	monitor and report on compliance with the relevant air quality conditions in this consent; and	Compliant	
	11 e)	minimise the area of surface disturbance and undertake progressive rehabilitation of the site, to the satisfaction of the Secretary.	Compliant	
	12 a)	The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent unless otherwise agreed by the Secretary	Compliant	
	12 b)	describe the measures that would be implemented to ensure: • compliance with the relevant conditions of this consent; • best practice management is being employed; and • the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events;	Compliant	
	12 c)	describe the proposed air quality management system;		
	12 d)	include an air quality monitoring program that: • is capable of evaluating the performance of the development; • includes a protocol for determining any exceedances of the relevant conditions of consent; • effectively supports the air quality management system; and • evaluates and reports on the adequacy of the air quality management system	Compliant	
	13	For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.	Compliant - Operational meteorological weather station on site	
	14	The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.	Compliant	
	15	The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply, to the satisfaction of the Secretary.	Compliant	
	16	The Applicant shall comply with the discharge limits in any EPL, or with section 120 of the POEO Act	Compliant	
	17 a)	Within three months of the date of this consent, the Applicant shall commission independent surface water expert/s, approved by the Secretary, to undertake an audit of current and proposed surface water management practices and infrastructure on the site. The audit shall be undertaken in consultation with EPA and WaterNSW	Compliant	
	17 b)	fully describe and audit existing site water management practices and consider the EIS's proposed water management practices;	Compliant	
	17 c)	identify all reasonable and feasible measures to improve surface water management on the site, with particular reference to opportunities to divert clean water away from the site; and	Compliant	
	17 d)	recommend design parameters for proposed water management systems on the site	Compliant	
	18	Unless otherwise agreed with the Secretary, the Applicant shall submit the Surface Water Audit report to the Secretary within six months of commissioning the audit. The report must be accompanied by a Water Management Improvement Program, based on the report's recommendations, to improve surface water management practices on the site, including a program of proposed timeframes for implementation	Compliant	
	19	The Applicant must implement the Water Management Improvement Program to the satisfaction of the Secretary.	Compliant	
	20 a)	The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary. This plan must: be prepared by suitably qualified person/s approved by the Secretary;	Water Management Plan was still under negotiation as of 30/6/17.	Section 1, Section 8.3.2
	20 b)	be prepared in consultation with the EPA, NOW and Water NSW;		
	20 c)	be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;		
	20 d)	include a: (i) Site Water Balance ; (ii) Surface Water Management Plan, (iii) Groundwater Management Plan, (iv) Surface and Ground Water Contingency Strategy.		
	21	The Applicant shall keep accurate records of all laden truck movements to and from the site (hourly, daily, weekly, monthly and annually) and publish a summary of records on its website every 6 months.	Compliant	
	22 a)	The Applicant shall ensure that: all reasonable measures are taken such that laden trucks have appropriate signage, including a contact phone number, so they can be easily identified by road users;	Compliant	
	22 b)	all laden trucks entering or exiting the site have their loads covered;	Compliant	
	22 c)	all laden trucks exiting the site are cleaned of material that may fall on the road, before leaving the site; and	Compliant	
	22 d)	no trucks queue at the entrance to the quarry access road before 5 am.	Compliant	
	23 a)	The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must: be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;	Compliant	
	23 b)	describe the measures that would be undertaken to monitor the level of service at the Jenolan Caves Road and Great Western Highway intersection and maintain an acceptable level of service at this intersection;	Compliant	
	23 c)	include a Drivers' Code of Conduct to minimise the impacts of development-related trucks on local residences and road users including measures to minimise use of local roads; and	Compliant	
	23 d)	describe the measures that would be put in place to ensure compliance with the Drivers' Code of Conduct.	Compliant	
	24 a)	If any item or object of Aboriginal heritage significance is identified on site, the Applicant shall ensure that: all work in the immediate vicinity of the suspected Aboriginal item or object ceases immediately;	Compliant	
	24 b)	a 10 m buffer area around the suspected item or object is cordoned off; and	Compliant	
	24 c)	the OEH is contacted immediately.	Compliant	
	25	The Applicant shall implement the Biodiversity Offset Strategy, described in the EIS and including Conservation Area H, shown conceptually in Appendix 6, to the satisfaction of the Secretary.	The Biodiversity Offset Strategy is still under negotiation and the revised date (from the DPE) for securing the BOA's is the 15/9/2018.	

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

DA Conditions: SSD 6084

Compliant	
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Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review												
	26	Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Strategy, to the satisfaction of the Secretary.	Compliant													
	27	The Applicant shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and the conceptual final landform in Appendix 4 and must comply with the objectives in Table 5. <table border="1"> <caption>Table 5: Rehabilitation Objectives</caption> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Site (as a whole)</td> <td> <ul style="list-style-type: none"> Safe, stable and non-polluting Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land </td> </tr> <tr> <td>Surface Infrastructure</td> <td>Decommissioned and removed, unless DRE agrees otherwise</td> </tr> <tr> <td>Quarry Benches</td> <td>Landscaped and vegetated using native tree and understorey species</td> </tr> <tr> <td>Quarry Pit Floor</td> <td>Landscaped and revegetated using native tree and understorey species</td> </tr> <tr> <td>Final Void</td> <td> <ul style="list-style-type: none"> Minimise the size, depth and slope of the batters of the final void Minimise the drainage catchment of the final void </td> </tr> </tbody> </table>	Feature	Objective	Site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land 	Surface Infrastructure	Decommissioned and removed, unless DRE agrees otherwise	Quarry Benches	Landscaped and vegetated using native tree and understorey species	Quarry Pit Floor	Landscaped and revegetated using native tree and understorey species	Final Void	<ul style="list-style-type: none"> Minimise the size, depth and slope of the batters of the final void Minimise the drainage catchment of the final void 	Compliant	
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	28	The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.	Compliant													
	29 a)	The Applicant shall prepare and implement a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must: be prepared in consultation with OEH and be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent unless the Secretary agrees otherwise;	Compliant													
	29 b)	provide details of the conceptual final landform and associated land uses for the site;	Compliant													
	29 c)	describe how the implementation of the Biodiversity Offset Strategy would be integrated with the overall rehabilitation of the site;	Compliant													
	29 d)	include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and rehabilitation of the site, including triggers for any necessary remedial action;	Compliant													
	29 e)	describe the short, medium and long term measures that would be implemented to: <ul style="list-style-type: none"> manage remnant vegetation and habitat on site, including within the Biodiversity Offset Strategy area; and NSW Government Department of Planning and Environment 13 ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent; 	Compliant													
	29 f)	include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial approval of the plan) including the procedures to be implemented for: <ul style="list-style-type: none"> maximising the salvage of environmental resources within the approved disturbance area, including tree hollows, vegetative and soil resources, for beneficial reuse in the enhancement of the offset area or site rehabilitation; restoring and enhancing the quality of native vegetation and fauna habitat in the biodiversity and rehabilitation areas through assisted natural regeneration, targeted vegetation establishment and the introduction of fauna habitat features; protect, conserve, propagate, plant and/or regenerate Silver-leafed Mountain Gum (Eucalyptus pulverulenta) (including the propagation and planting of at least 1,000 individuals of this species); protecting vegetation and fauna habitat outside the approved disturbance area on-site; minimising the impacts on native fauna, including undertaking pre-clearance surveys; establishing vegetation screening to minimise the visual impacts of the site on surrounding receivers; ensuring minimal environmental consequences for threatened species, populations and habitats; collecting and propagating seed; controlling weeds and feral pests; controlling erosion; 	Compliant													
	29 g)	include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;	Compliant													
	29 h)	identify the potential risks to the successful implementation of the Biodiversity Offset Strategy, and include a description of the contingency measures that would be implemented to mitigate these risks; and	Compliant													
	29 i)	include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Compliant													
	30 a)	Within 6 months of the approval of the Landscape Management Plan, the Applicant shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and relevant conditions of this consent. The sum of the bond shall be determined by: calculating the cost of implementing the Biodiversity Offset Strategy over the next 3 years;	Compliant													
	30 b)	calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and	Compliant													
	30 c)	employing a suitably qualified quantity surveyor or other expert to verify the calculated costs, to the satisfaction of the Secretary.	Compliant													
	31 a)	Within 3 months of each Independent Environmental Audit (see condition 8 of Schedule 5), the Applicant shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must consider the: effects of inflation;	Compliant													
	31 b)	likely cost of implementing the Biodiversity Offset Strategy and rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the development); and	Compliant													
	31 c)	performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.	Compliant													
	32	The Applicant shall implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development to the satisfaction of the Secretary.	Compliant													
	33 a)	The Applicant shall: manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council;	Compliant													
	33 b)	minimise the waste generated by the development;	Compliant													
	33 c)	ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and	Compliant													

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

DA Conditions: SSD 6084

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
	33 d)	report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary	Compliant	
	34	Except as expressly permitted in an EPL, the Applicant must not receive waste at the site for storage, treatment, processing, reprocessing or disposal.	Compliant	
	35	The Applicant shall ensure that all tanks and similar facilities for storage of liquids (other than for water) are protected by appropriate bunding, which must exceed 110% of the stored volume of the liquid.	Compliant	
	36	The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.	Compliant	
	37 a)	The Applicant shall: ensure that the development is suitably equipped to respond to any fires on site; and	Compliant	
	37 b)	assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.	Compliant	
4	1 a)	As soon as practicable after obtaining monitoring results showing: an exceedance of any relevant criteria in Schedule 3, the Applicant shall notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria; and	Compliant	
	1 b)	an exceedance of any relevant air quality criteria in Schedule 3, the Applicant shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).	Compliant	
	2 a)	If an owner of privately-owned land considers the development to be exceeding the relevant criteria in 2.Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Applicant shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to: <input type="checkbox"/> consult with the landowner to determine his/her concerns; <input type="checkbox"/> conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and <input type="checkbox"/> if the development is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the	Compliant	
	2 b)	give the Secretary and landowner a copy of the independent review.	Compliant	
	1 a)	The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must: be submitted to the Secretary for approval within 6 months of the date of this consent:	Compliant	
5	1 b)	(b) provide the strategic framework for environmental management of the development;	Compliant	
	1 c)	(c) identify the statutory approvals that apply to the development;	Compliant	
	1 d)	(d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;	Compliant	
	1 e)	(e) describe the procedures that would be implemented to: <input type="checkbox"/> keep the local community and relevant agencies informed about the operation and environmental performance of the development; <input type="checkbox"/> receive, record, handle and respond to Complaints; <input type="checkbox"/> resolve any disputes that may arise during the course of the development; <input type="checkbox"/> respond to any non-compliance; <input type="checkbox"/> respond to emergencies; and	Compliant	
	1 f)	(f) include: <input type="checkbox"/> copies of any strategies, plans and programs approved under the conditions of this consent; and <input type="checkbox"/> a clear plan depicting all the monitoring to be carried out under the conditions of this consent.	Compliant	
	2 a)	The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: detailed baseline data;	Compliant	
	2 b)	a description of: <input type="checkbox"/> the relevant statutory requirements (including any relevant approval, licence or lease conditions); <input type="checkbox"/> any relevant limits or performance measures/criteria; and <input type="checkbox"/> the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Compliant	
	2 c)	a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Compliant	
	2 d)	a program to monitor and report on the: <input type="checkbox"/> impacts and environmental performance of the development; and <input type="checkbox"/> effectiveness of any management measures (see (c) above);	Compliant	
	2 e)	contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Compliant	
	2 f)	a program to investigate and implement ways to improve the environmental performance of the development over time;	Compliant	
	2 g)	a protocol for managing and reporting any: <input type="checkbox"/> incidents; <input type="checkbox"/> Complaints; <input type="checkbox"/> non-compliances with statutory requirements; and <input type="checkbox"/> exceedances of the impact assessment criteria and/or performance criteria; and	Compliant	
	2 h)	a protocol for periodic review of the plan	Compliant	
	3 a)	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;	Compliant	
	3 b)	consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and	Compliant	
	3 c)	implement remediation measures as directed by the Secretary;	Compliant	
	4 a)	By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:	Compliant	

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

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	4 b)	include a comprehensive review of the monitoring results and Complaints records of the development over the previous financial year, which includes a comparison of these results against the: <ul style="list-style-type: none"> <input type="checkbox"/> relevant statutory requirements, limits or performance measures/criteria; <input type="checkbox"/> requirements of any plan or program required under this consent; <input type="checkbox"/> monitoring results of previous years; and 	Compliant	
	4 c)	identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;	Compliant	
	4 d)	identify any trends in the monitoring data over the life of the development;	Compliant	
	4 e)	identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Compliant	
	4 f)	describe what measures will be implemented over the current financial year to improve the environmental performance of the development.	Compliant	
	5 a)	Within 3 months of the submission of an: annual review under condition 4 above;	Compliant	
	5 b)	incident report under condition 6 below;	Compliant	
	5 c)	audit report under condition 8 below; and	Compliant	
	5 d)	any modifications to this consent, the Applicant shall review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.	Compliant	
	6	The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Compliant	
	7	The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Compliant	
	8 a)	Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: <ul style="list-style-type: none"> be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; 	Compliant	
	8 b)	include consultation with the relevant agencies;	Compliant	
	8 c)	assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the development (including any assessment, strategy, plan or program required under these approvals);	Compliant	
	8 d)	review the adequacy of strategies, plans or programs required under the abovementioned approvals; and	Compliant	
	8 e)	recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals	Compliant	
	9	Within 6 weeks of completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	Compliant	
		Within 6 months of the date of this consent, the Applicant shall: <ul style="list-style-type: none"> (a) make the following information publicly available on its website: <ul style="list-style-type: none"> <input type="checkbox"/> the documents listed in condition 2 of Schedule 2; <input type="checkbox"/> current statutory approvals for the development; <input type="checkbox"/> all approved strategies, plans and programs required under the conditions of this consent; <input type="checkbox"/> a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; <input type="checkbox"/> a Complaints register, updated monthly; <input type="checkbox"/> the annual reviews of the development; <input type="checkbox"/> any independent environmental audit, and the Applicant's response to the recommendations in any audit; and 	Compliant	
	10 a)	keep this information up-to-date,	Compliant	
	10 b)	to the satisfaction of the Secretary	Compliant	

- Compliant
- Non Compliant: High Risk
- Non Compliant: Medium Risk
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- Non Compliant: Administrative

Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence

Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur

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WAL Conditions

Compliant	
Non Compliant: High Risk	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Non Compliant: Medium Risk	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Non Compliant: Low Risk	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Non Compliant: Administrative	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)

WAL 37423

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
Compliance Summary		Number of Conditions Non-compliant		
Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		Nil		

General

	MW0929-001	From 1 July 2018, if the water supply work nominated on this access licence is located at or less than 40 m from the top of the high bank of a river then: A. water must not be taken in this groundwater source when flows are in the Very Low Flow Class for an unregulated river access licence in that river. B. This restriction will only apply when the system that confirms when water can be taken is available on DPI Water website. C. DPI Water will inform the licence holder in writing of the applicable restrictions and how to access the information on its website when this system becomes operative	Compliant	
	MW0605-00001	Water must be taken in compliance with the conditions of the approval for the nominated work on this access licence through which water is to be taken	Compliant	
	MW0919-00001	A maximum water allocation of 0.1 ML/unit share may be carried over in the account for this access licence from one water year to the next water year if a water meter is installed on each water supply work nominated on this licence and each meter is maintained in working order.	Compliant	
	MW0547-00001	The total volume of water taken under this licence in any water year must not exceed a volume equal to: A. the sum of water in the account from the available water determination for the current year, plus B. the water carried over in the account from the previous water year, plus C. the net amount of water assigned to or from the account under a water allocation assignment, plus D. any water re-credited by the Minister to the account.	Compliant	
	MW2338-00001	The completed logbook must be retained for five (5) years from the last date recorded in the logbook.	Compliant	
	MW2336-00001	The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.	Compliant	
	MW2337-00001	The following information must be recorded in the logbook for each period of time that water is taken: A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and B. the access licence number under which the water is taken, and C. the approval number under which the water is taken, and D. the volume of water taken for domestic consumption and/or stock watering	Compliant	
	MW2339-00001	A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by DPI Water.	Compliant	
	MW0051 00002	Once the licence holder becomes aware of a breach of any condition on this access licence, the licence holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: water.enquiries@dpi.nsw.gov.au, or B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call	Compliant	

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

WAL Conditions

Compliant	
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Non Compliant: Medium Risk	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Non Compliant: Low Risk	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Non Compliant: Administrative	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)

10WA103330

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
Compliance Summary		Number of Conditions Non-compliant		
Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		Nil		

General

	MW0655-00001	Any water supply work authorised by this approval must take water in compliance with the conditions of the access licence under which water is being taken.	Compliant	
	MW0491-00001	When a water supply work authorised by this approval is to be abandoned or replaced, the approval holder must contact the relevant licensor in writing to verify whether the work must be decommissioned. The work is to be decommissioned, unless the approval holder receives notice from the Minister not to do so. Within sixty (60) days of decommissioning, the approval holder must notify the relevant licensor in writing that the work has been decommissioned.	Compliant	
	MW0481-00001	A logbook must be kept and maintained at the authorised work site or on the property for each water supply work authorised by this approval, unless the work is metered and fitted with a data logger.	Compliant	
	MW2338-00001	The completed logbook must be retained for five (5) years from the last date recorded in the logbook.	Compliant	
	MW0482-00001	Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.	Compliant	
	MW0051-00001	Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: water.enquiries@dpi.nsw.gov.au, or B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.	Compliant	
	DK0888-00001	Any water supply work authorised by this approval used for the purpose of conveying, diverting or storing water must be constructed or installed to allow free passage of floodwaters flowing into or from a river or lake.	Compliant	
	DK0878-00001	A. The construction, installation or use of the water supply work authorised by this approval must not cause or increase erosion to the channel or bank of the watercourse. B. If erosion is observed, the area must be stabilised with grass cover, stone pitching or any other material that will prevent any further occurrence of erosion.	Compliant	

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

WAL Conditions

Compliant	
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WAL 25616

Schedule	Condition	Condition Text	Details of compliance status	Where addressed in Annual Review
Compliance Summary		Number of Conditions Non-compliant		
Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		Nil		
General				
	MW0112-00001	The maximum water allocation that may be carried over in the account for this access licence from one water year to the next water year is: A. a volume equal to 100 % of the share component of the licence, or B. 1 ML/unit share of the share component of the licence.	Compliant	
	MW0017-00023	From 1 July 2011, water must not be taken from the Dharabuladh Management Zone of the Upper Nepean and Upstream Warragamba Water Source when flows are in the Very Low Flow Class, which means that the flow at Coxs River at the Island Hill gauge [No. 212045] is: A. equal to or less than 17 ML/day on a rising river, or B. equal to or less than 15 ML/day on a falling river. This restriction does not apply if water is to be taken from a runoff harvesting dam or an in-river dam pool.	Compliant	
	MW0036-00002	The volume of water taken in any three (3) consecutive water years from 1 July 2012 must be recorded in the logbook at the end of those three water years. The maximum volume of water permitted to be taken in those years must also be recorded in the logbook.	Compliant	
	MW0605-00001	Water must be taken in compliance with the conditions of the approval for the nominated work on this access licence through which water is to be taken.	Compliant	
	MW0670-00001	Water must only be taken if there is visible flow in the water source at the location where water is to be taken. This restriction does not apply if water is to be taken: A. from an off-river pool, an in-river pool, a runoff harvesting dam or an in-river dam pool, or B. from the following Weirs: Maldon, Douglas Park, Menangle, Camden, Sharpes, Cobbity, Mount Hunter Rivulet, Brownlow Hill, Theresa Park and Wallacia.	Compliant	
	MW0004-00002	From 1 July 2012, the total volume of water taken in any three (3) consecutive water years under this access licence must not exceed a volume which is equal to the lesser of either: A. the sum of: i. water in the account from the available water determinations in those 3 consecutive water years, plus ii. water in the account carried over from the water year prior to those 3 consecutive water years, plus iii. any net amount of water assigned to or from this account under a water allocation assignment in those 3 consecutive water years, plus iv. any water re-credited by the Minister to the account in those 3 consecutive water years, or B. the sum of: i. the share component of this licence at the beginning of the first year in those 3 consecutive water years, plus ii. the share component of this licence at the beginning of the second year in those 3 consecutive water years, plus iii. the share component of this licence at the beginning of the third year in those 3 consecutive water years, plus iv. any net amount of water assigned to or from this account under a water allocation assignment in those 3 consecutive water years, plus v. any water re-credited by the Minister to the account in those 3	Compliant	
	MW2337-00001	The following information must be recorded in the logbook for each period of time that water is taken: A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and B. the access licence number under which the water is taken, and C. the approval number under which the water is taken, and D. the volume of water taken for domestic consumption and/or stock watering.	Compliant	
	MW2339-00001	A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by the relevant licensor.	Compliant	
	MW0051-00002	Once the licence holder becomes aware of a breach of any condition on this access licence, the licence holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: water.enquiries@dpi.nsw.gov.au, or B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.	Compliant	

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Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		Nil		
	MW0655-00001	Any water supply work authorised by this approval must take water in compliance with the conditions of the access licence under which water is being taken.	Compliant	
	MW0097-00001	If contaminated water is found above the production aquifer during the construction of the water supply work authorised by this approval, the licensed driller must: A. notify the relevant licensor in writing within 48 hours of becoming aware of the contaminated water, and B. adhere to the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time.	Compliant	
	MW0487-00001	The water supply work authorised by this approval must be constructed within three (3) years from the date this approval is granted.	Compliant	
	MW0044-00001	A. When a water supply work authorised by this approval is to be abandoned or replaced, the approval holder must contact the relevant licensor in writing to verify whether the work must be decommissioned. B. The work is to be decommissioned, unless the approval holder receives notice from the Minister not to do so. C. When decommissioning the work the approval holder must: i. comply with the minimum requirements for decommissioning bores prescribed in the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time, and ii. notify the relevant licensor in writing within sixty (60) days of decommissioning that the work has been decommissioned.	Compliant	
	MW0484-00001	Before water is taken through the water supply work authorised by this approval, confirmation must be recorded in the logbook that cease to take conditions do not apply and water may be taken. The method of confirming that water may be taken, such as visual inspection, internet search, must also be recorded in the logbook. If water may be taken, the: A. date, and B. time of the confirmation, and C. flow rate or water level at the reference point in the water source must be recorded in the logbook.	Compliant	
	MW2338-00001	The completed logbook must be retained for five (5) years from the last date recorded in the logbook.	Compliant	
	MW2336-00001	The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.	Compliant	
	MW2337-00001	The following information must be recorded in the logbook for each period of time that water is taken: A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and B. the access licence number under which the water is taken, and C. the approval number under which the water is taken, and D. the volume of water taken for domestic consumption and/or stock watering.	Compliant	
	MW0482-00001	Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.	Compliant	
	MW2339-00001	A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by the relevant licensor.	Compliant	
	MW0051-00001	Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: water.enquiries@dpi.nsw.gov.au, or B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.	Compliant	
	MK0485-00001	Within sixty (60) days of completing construction of the water supply work authorised by this approval, the approval holder must provide a completed Form A for that work to the relevant licensor.	Compliant	
	DS2431-00001	A. Within 6 months of granting this approval, a monitoring plan to measure the water table, groundwater and surface water quality must be submitted to, and approved by, the relevant licensor, Parramatta Office. B. Then, the water table, groundwater and surface water quality must be measured according to the approved plan. C. All monitoring records must be kept for 10 years and provided to the relevant licensor when requested.	Compliant	

Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

EPL12323

Compliant	
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Non Compliant: High Risk		Nil	See Table Below	See Table Below
Non Compliant: Medium Risk		Nil		
Non Compliant: Low Risk		Nil		
Non Compliant: Administrative		Nil		

General

A	1.1	This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition. Scheduled Activity Fee Based Activity Scale > 500000 - 2000000 T annual capacity to extract, process or store	Compliant																																			
	2.1	The licence applies to the following premises: Premises Details AUS-10 QUARRY 391 JENOLAN CAVES ROAD HARTLEY NSW 2790 LOT 1 DP 1005511, LOT 2 DP 1005511, LOT 31 DP 1009967	Compliant																																			
	3	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	Compliant																																			
P	1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.	Compliant																																			
		<table border="1"> <thead> <tr> <th colspan="4">Air</th> </tr> <tr> <th>EPA Identification no.</th> <th>Type of Monitoring Point</th> <th>Type of Discharge Point</th> <th>Location Description</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>Ambient air monitoring</td> <td></td> <td>Dust monitoring location identified as "AQD-1" on Figure 1 Environment Protection Licence Monitoring Points - provided to EPA on 19/09/11 (DOC1140371).</td> </tr> <tr> <td>5</td> <td>Ambient air monitoring</td> <td></td> <td>Dust monitoring location identified as "AQD-2" on Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.</td> </tr> <tr> <td>6</td> <td>Ambient air monitoring</td> <td></td> <td>Dust monitoring location identified as "AQD-3" on Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.</td> </tr> <tr> <td>12</td> <td>Weather Analysis</td> <td></td> <td>Weather monitoring location as identified on "Figure 2 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.</td> </tr> </tbody> </table>	Air				EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description	4	Ambient air monitoring		Dust monitoring location identified as "AQD-1" on Figure 1 Environment Protection Licence Monitoring Points - provided to EPA on 19/09/11 (DOC1140371).	5	Ambient air monitoring		Dust monitoring location identified as "AQD-2" on Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.	6	Ambient air monitoring		Dust monitoring location identified as "AQD-3" on Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.	12	Weather Analysis		Weather monitoring location as identified on "Figure 2 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC1140371.	Compliant											
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1.2	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Compliant																																				
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Hy-Tec Industries Austen (Hartley) Quarry Conditions Compliance Summary 15th September 2016 - 30th June 2017

EPL12323

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L	1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Compliant																									
	2.1	For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	Compliant																									
	2.2	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Compliant																									
	2.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table/s.	Compliant																									
	2.4	Water and/or Land Concentration Limits	Compliant																									
		<p>POINT 11,8,9,10,1</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>80 percentile concentration limit</th> <th>90 percentile concentration limit</th> <th>30GM concentration limit</th> <th>100 percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Oil and Grease</td> <td>milligrams per litre</td> <td></td> <td></td> <td></td> <td>10</td> </tr> <tr> <td>pH</td> <td>pH</td> <td></td> <td></td> <td></td> <td>6.5 - 8.5</td> </tr> <tr> <td>Total suspended solids</td> <td>milligrams per litre</td> <td></td> <td></td> <td></td> <td>30</td> </tr> </tbody> </table>	Pollutant	Units of Measure	80 percentile concentration limit	90 percentile concentration limit	30GM concentration limit	100 percentile concentration limit	Oil and Grease	milligrams per litre				10	pH	pH				6.5 - 8.5	Total suspended solids	milligrams per litre				30	Compliant	
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	Total suspended solids	milligrams per litre				30																						
	3.1	<p>The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and meeting the definition, if any, in the column titled "Description" in the table below.</p> <p>Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled "Activity" in the table below.</p> <p>Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the table below.</p> <p>This condition does not limit any other conditions in this licence.</p>	Compliant																									
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4.1	Noise from the premises must not exceed 35 dB(A)LAeq (15 minute) at any time. Where LAeq means the equivalent continuous noise level - the level of noise equivalent to the energy-average of noise levels occurring over a measurement period	Compliant																										
4.2	To determine compliance with condition(s) L4.1 noise must be measured at, or computed for, any affected noise sensitive locations (such as a residence, school or hospital). A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "Environmental Noise Management - NSW Industrial Noise Policy (January 2000)".	Compliant																										
4.3	The noise emission limits identified in this licence apply under all meteorological conditions except: a) during rain and wind speeds (at 10m height) greater than 3m/s; and b) under "non-significant weather conditions".	Compliant																										
5.1	Blasting in or on the premises must only be carried out between 1000 hours and 1500 hours Monday to Friday. Blasting in or on the premises must not take place on Saturdays, Sundays or Public Holidays without the prior approval of the EPA.	Compliant																										
5.2	The airblast overpressure level from blasting operations in or on the premises must not exceed: a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and b) 120 dB (Lin Peak) at any time. At the most affected noise-sensitive location not under the ownership or control of the licensee .	Compliant																										
5.3	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and b) 10 mm/s at any time. At the most affected sensitive location not under the ownership or control of the licensee .	Compliant																										
5.4	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed 2 mm/s at the most sensitive location within Hartley Village.	Compliant																										
6.1	Activities covered by this licence must only be carried out between the hours of 0600 hours and 1800 hours Monday to Friday, and 0700 hours and 1500 hours Saturday, and at no time on Sundays and Public Holidays.	Compliant																										
6.2	The loading and unloading of trucks at the Premises and transport to and from the Premises is permitted between 0500 hours and 2000 hours Monday to Friday and between 0500 hours and 1500 hours on Saturdays only.	Compliant																										

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Non Compliant: Administrative	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)

O	1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Compliant																																	
	2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	Compliant																																	
	3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Compliant																																	
M	1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Compliant																																	
	1.2	Air records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Compliant																																	
	1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Compliant																																	
	2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	Compliant																																	
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2.4	For the purposes of the table(s) above Special Frequency 1 means the collection of samples monthly, with the exception of when a discharge is occurring from Point 1, where samples must be collected daily.	Compliant																																		
3.1	must be done in accordance with: a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.	Compliant																																		
3.2	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted	Compliant																																		
4.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Compliant																																		
4.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Compliant																																		
4.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Compliant																																		
4.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Compliant																																		
5.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	Compliant																																		
5.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Compliant																																		
5.3	The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.	Compliant																																		
6.1	For each discharge point or utilisation area specified below, the licensee must monitor: a) the volume of liquids discharged to water or applied to the area; b) the mass of solids applied to the area; c) the mass of pollutants emitted to the air;	Compliant																																		
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	7.1	<p>TO determine compliance with condition(s) L5.2, L5.3 and L5.4</p> <p>a) Airblast overpressure and ground vibration must be measured and electronically recorded at the nearest residence or sensitive receiver or as otherwise directed by an authorised officer of the EPA for all blasts carried out in or on the premises; and</p> <p>b) Instrumentation used to measure the airblast overpressure and ground vibration must meet the requirements of Australian Standard AS 2187.2-2006.</p>	Compliant																															
	8.1	<p>Requirement to monitor weather</p> <p>The applicant must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The applicant must use the sampling method, units of measure, averaging period and sample at the frequency specified opposite in the other columns unless otherwise approved by the EPA:</p>	Compliant																															
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R	1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices.	Compliant	
	1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	Compliant	
	1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	Compliant	
	1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates	Compliant	
	1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	Compliant	
	1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	Compliant	
	1.7	Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	Compliant	
	1.8	The results of the blast monitoring required by condition M7.1 must be submitted to the EPA at the end of each reporting period	Compliant	
	2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	Compliant	
	2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	Compliant	
	3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	Compliant	
	3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	Compliant	
	3.3	following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	Compliant	
		The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	Compliant	

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G	1.1	A copy of this licence must be kept at the premises to which the licence applies.	Compliant	
	1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Compliant	
	1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	Compliant	
	2.1	The licensee must operate 24-hour telephone contact lines for the purpose of enabling the EPA to directly contact one or more representatives of the licensee who can: a) respond at all times to incidents relating to the premises; and b) contact the licensee's senior employees or agents authorised at all times to: i) speak on behalf of the licensee; and ii) provide any information or document required under this licence.	Compliant	
	2.2	The licensee is to inform the EPA of the representative or representatives and their telephone number within 3 months of the date of the issue of this licence. The EPA must be notified of the telephone number on commencement of its operation.	Compliant	
	2.3	The licensee is to inform the EPA in writing of the appointment of any subsequent contact persons, or changes to the person's contact details as soon as practicable and in any event within fourteen days of the appointment or change.	Compliant	
	3.1	The location of EPA point number(s) 1 to 7 inclusive must be clearly marked by signs that indicate the point identification number used in this licence and be located as close as practical to the point.	Compliant	

Appendix B: Consent

Development Consent

Section 89E of the *Environmental Planning and Assessment Act 1979*

As delegate of the Minister for Planning, I approve the development application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the on-going environmental management of the development.



Oliver Holm
Executive Director
Resource Assessments and Compliance

Sydney

15 / 7 /

2015

SCHEDULE 1

Application Number	SSD-6084
Applicant	Hy-Tec Industries Pty Ltd
Consent Authority:	Minister for Planning
Land:	Lots 1 and 2 DP 1000511 Lot 31 DP 1009967 Lot 4 DP 876394
Development	Austen Quarry Extension

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DEFINITIONS

Annual Review	The review required by condition 4 of Schedule 5
Applicant	Hy-Tec Industries Pty Ltd, or any other person/s who rely on this consent to carry out the development that is subject to this consent
BCA	Building Code of Australia
Conditions of consent	Conditions contained in Schedules 2 to 5 inclusive
Conservation Area H	The 2.2 ha conservation area shown as 'easement for conservation maintenance work' in Appendix 6 and established in accordance with condition 7b of DA 103/94
Construction	The demolition of buildings or works, carrying out of works and erection of buildings covered by this consent
Council	Lithgow City Council
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning and Environment
Development	The development as described in the documents listed in condition 2 of Schedule 2
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EIS	Environmental Impact Statement titled <i>Environmental Impact Statement for the Austen Quarry Stage 2 Extension Project</i> , dated October 2014, as modified by the Response to Submissions titled, <i>Austen Quarry Stage 2 Extension Project Response to Submissions</i> dated January 2015
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence under the POEO Act
Evening	The period from 6pm to 10pm
Feasible	Feasible relates to engineering considerations and what is practical to build
GPS	Global Positioning System
Incident	A set of circumstances that: <ul style="list-style-type: none"> • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this consent
Land	As defined in the EP&A Act, except where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this consent, where it is defined as the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this consent
Laden trucks	Trucks transporting quarry products from the site
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning, or delegate
Mitigation	Activities associated with reducing the impacts of the development
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Privately-owned land	Land that is not owned by a public agency or the Applicant (or its subsidiary)
Public infrastructure	Linear and other infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Quarrying operations	The extraction, processing and transportation of extractive materials on the site and the associated removal of vegetation, topsoil and overburden
Quarry products	Includes all saleable quarry products, but excludes tailings and other wastes
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the development to a good condition and for the purpose of establishing a safe, stable and non-polluting environment
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
Site	The land described in Schedule 1
Stage 2 Extraction Area	The area shown in Appendix 2 as the "Proposed Stage 2 Extraction Boundary" excluding the area shown as the "Stage 1 Extraction Boundary"
Statement of commitments	The Applicant's commitments in Appendix 3

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.

TERMS OF CONSENT

2. The Applicant shall carry out the development generally in accordance with the:
 - (a) EIS;
 - (b) Statement of Commitments; and
 - (c) conditions of this consent.

Note: The statement of commitments is reproduced in Appendix 3.

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.
4. The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
 - (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent;
 - (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this consent; or
 - (c) the implementation of any actions or measures contained in these documents.

LAPSING OF CONSENT

5. If the development has not been physically commenced within 5 years of the date of this consent, then this development consent shall lapse.

LIMITS ON CONSENT

Quarrying Operations

6. The Applicant shall not extract extractive materials below a level of 685 m AHD.
7. The Applicant may carry out quarrying operations on the site until 30 June 2050.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

Extractive Material Transport

8. The Applicant shall not:
 - (a) transport more than 1.1 million tonnes of quarry products from the site during any financial year;
 - (b) dispatch more than 250 laden trucks from the site on any one day; and
 - (c) dispatch more than 150 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.

SURRENDER OF EXISTING DEVELOPMENT CONSENTS

9. Within 12 months of the date of this consent, or as otherwise agreed by the Secretary, the Applicant shall surrender the development consent (DA 103/94) for the existing operations on the site in accordance with Section 104A of the EP&A Act.

Note: This requirement does not extend to the surrender of construction and occupation certificates for existing and proposed building works under Part 4A of the EP&A Act. Surrendering of consent should not be understood as implying that works legally constructed under a valid consent can no longer be legally maintained or used.

10. Prior to the surrender of development consent DA 103/94, the conditions of this consent shall prevail to the extent of any inconsistency with the conditions of development consent DA 103/94.

STRUCTURAL ADEQUACY

11. The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works; and*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development or project.*

DEMOLITION

12. The Applicant shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

13. The Applicant shall:
- (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
 - (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

Note: This condition does not apply to damage to roads caused as a result of general road usage.

OPERATION OF PLANT AND EQUIPMENT

14. The Applicant shall ensure that all the plant and equipment used at the site is:
- (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

UPDATING AND STAGING OF STRATEGIES, PLANS OR PROGRAMS

15. To ensure that strategies, plans and programs required under this consent are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the development, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.

With the agreement of the Secretary, the Applicant may prepare a revision of or a stage of a strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this consent.

Notes:

- *While any strategy, plan or program may be submitted on a staged basis, the Applicant will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.*
- *If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the development to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.*

16. Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall implement the existing strategies, plans or programs for the site that have been approved under DA 103/94.

PRODUCTION DATA

17. The Applicant shall:
- (a) provide annual quarry production data to DRE using the standard form for that purpose; and
 - (b) include a copy of this data in the Annual Review (see condition 4 of Schedule 5).

IDENTIFICATION OF APPROVED EXTRACTION LIMITS

18. By 30 September 2015, unless otherwise agreed with the Secretary, the Applicant shall:
- (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the development area; and
 - (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.

19. While quarrying operations are being carried out, the Applicant shall ensure that these boundaries are clearly marked at all times in a manner that allows operating staff to clearly identify the approved limits of extraction.

COMMUNITY ENHANCEMENT

20. Within 6 months of the date of this consent, unless otherwise agreed by the Secretary, the Applicant shall enter into a planning agreement with the Council in accordance with division
- Division 6 of Part 4 of the EP&A Act; and
 - the terms specified in Appendix 7.

If there is any dispute between the Applicant and Council on the planning agreement, then either party may refer the matter to the Secretary for resolution.

**SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS**

NOISE

Hours of Operation

1. The Applicant shall comply with the operating hours set out in Table 1.

Table 1: Operating Hours

Activity	Permissible Hours
<ul style="list-style-type: none"> • Extraction operations • Processing operations • Overburden Management • Stockpile Management 	<ul style="list-style-type: none"> • 6 am to 10 pm Monday to Friday; • 6 am to 3 pm Saturday; and • At no time on Sundays or public holidays.
<ul style="list-style-type: none"> • Blasting 	<ul style="list-style-type: none"> • 10 am to 3 pm Monday to Friday (except public holidays).
<ul style="list-style-type: none"> • Loading and dispatch 	<ul style="list-style-type: none"> • 5 am to 10 pm Monday to Friday; • 5 am to 3 pm Saturdays; and • At no time on Sundays or public holidays.
<ul style="list-style-type: none"> • Maintenance 	<ul style="list-style-type: none"> • Anytime.

2. The following activities may be carried out on the site outside the hours specified in condition 1:
- (a) delivery or dispatch of materials as requested by Police or other authorities; and
 - (b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

In such circumstances, the Applicant shall notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

Noise Impact Assessment Criteria

3. The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land

Table 2: Noise criteria dB(A)

Receiver	Day dB(A)_{L_{Aeq}(15 min)}	Evening dB(A)_{L_{Aeq}(15 min)}	Morning Shoulder dB(A)_{L_{Aeq}(15 min)}
All privately-owned residences	35	35	35

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Industrial Noise Policy*. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Operating Conditions

4. The Applicant shall:
- (a) implement best practice management to minimise the operational and road transportation noise of the development;
 - (b) minimise the noise impacts of the development during meteorological conditions when the noise criteria in this consent do not apply (see Appendix 5);
 - (c) carry out noise monitoring (at least every 6 months) to determine whether the development is complying with the relevant conditions of this consent; and
 - (d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary.

Note: Required frequency of noise monitoring may be reduced if approved by the Secretary.

Noise Management Plan

5. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with EPA;
 - be submitted to the Secretary at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;
 - describe the measures that would be implemented to ensure:
 - compliance with the noise criteria in this consent;
 - best practice management is being employed; and
 - the noise impacts of the development are minimised during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 5);
 - describe the proposed noise management system; and
 - include a monitoring program to be implemented to measure noise from the development against the noise criteria in Table 2, and which evaluates and reports on the effectiveness of the noise management system on site.

BLASTING

Blasting Impact Assessment Criteria

6. The Applicant shall ensure that blasting on site does not cause any exceedance of the criteria in Table 3.

Table 3: Blasting Criteria

Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Any residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

However, these criteria do not apply if the Applicant has a written agreement with the relevant owner to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.

Blasting Frequency

7. The Applicant may carry out a maximum of 1 blast per calendar week, unless an additional blast is required following a blast misfire. This condition does not apply to blasts required to ensure the safety of the quarry or workers on site.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Operating Conditions

8. During blasting operations, the Applicant shall:
- implement best practice management to:
 - protect the safety of people and livestock in the areas surrounding blasting operations;
 - protect public or private infrastructure/property in the surrounding area from damage from blasting operations and
 - minimise the dust and fume emissions of blasting;
 - operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and
 - carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary.

Blast Management Plan

9. The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:
- be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;
 - describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent;

- (c) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;
- (d) include community notification procedures for the blasting schedule; and
- (e) include a protocol for investigating and responding to complaints.

AIR QUALITY

Air Quality Impact Assessment Criteria

10. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.

Table 4: Air quality criteria

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

Notes to Table 4:

a Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).

b Incremental impact (ie increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development).

c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 11 and 12 to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Operating Conditions

11. The Applicant shall:
- (a) implement best practice management to minimise the dust emissions of the development;
 - (b) regularly assess meteorological and air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this consent;
 - (c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 4);
 - (d) monitor and report on compliance with the relevant air quality conditions in this consent; and
 - (e) minimise the area of surface disturbance and undertake progressive rehabilitation of the site, to the satisfaction of the Secretary.

Air Quality Management Plan

12. The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must:
- (a) be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;
 - (b) describe the measures that would be implemented to ensure:
 - compliance with the relevant conditions of this consent;
 - best practice management is being employed; and
 - the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events;
 - (c) describe the proposed air quality management system;
 - (d) include an air quality monitoring program that:
 - is capable of evaluating the performance of the development;
 - includes a protocol for determining any exceedances of the relevant conditions of consent;

- effectively supports the air quality management system; and
- evaluates and reports on the adequacy of the air quality management system.

Meteorological Monitoring

13. For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

Greenhouse Gas Emissions

14. The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.

SOIL AND WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain the necessary water licences for the development, including in respect of the extraction and/or interception of groundwater.

Water Supply

15. The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply, to the satisfaction of the Secretary.

Water Discharges

16. The Applicant shall comply with the discharge limits in any EPL, or with section 120 of the POEO Act.

Surface Water Audit and Water Management Improvement Program

17. Within three months of the date of this consent, the Applicant shall commission independent surface water expert/s, approved by the Secretary, to undertake an audit of current and proposed surface water management practices and infrastructure on the site. The audit shall:
- be undertaken in consultation with EPA and WaterNSW;
 - fully describe and audit existing site water management practices and consider the EIS's proposed water management practices;
 - identify all reasonable and feasible measures to improve surface water management on the site, with particular reference to opportunities to divert clean water away from the site; and
 - recommend design parameters for proposed water management systems on the site.
18. Unless otherwise agreed with the Secretary, the Applicant shall submit the Surface Water Audit report to the Secretary within six months of commissioning the audit. The report must be accompanied by a Water Management Improvement Program, based on the report's recommendations, to improve surface water management practices on the site, including a program of proposed timeframes for implementation.
19. The Applicant must implement the Water Management Improvement Program to the satisfaction of the Secretary.

Water Management Plan

20. The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary. This plan must:
- be prepared by suitably qualified person/s approved by the Secretary;
 - be prepared in consultation with the EPA, NOW and WaterNSW;
 - be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;
 - include a:
 - Site Water Balance that includes:
 - details of:
 - sources and security of water supply;
 - water use and management on site;
 - any off-site water transfers; and
 - reporting procedures.
 - measures that would be implemented to minimise clean water use on site;
 - Surface Water Management Plan, that includes:

- detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the development;
 - a detailed description of the surface water management system on site including the:
 - clean water diversion system;
 - erosion and sediment controls;
 - dirty water management system; and
 - water storages; and
 - a program to monitor and report on:
 - any surface water discharges;
 - the effectiveness of the water management system; and
 - surface water flows and quality in local watercourses;
- (iii) Groundwater Management Plan, that includes:
- baseline data on groundwater levels, yield and quality in local aquifers and privately-owned groundwater bores that could be potentially affected by the development;
 - a program to monitor and report on groundwater inflows to the quarry pit and the impacts of the development on surrounding aquifers and privately-owned groundwater bores; and
 - an analysis of these monitoring results to predict long-term water levels within the quarry void; and
- (iv) Surface and Ground Water Contingency Strategy, that includes:
- a protocol for the investigation, notification and mitigation of identified impacts on surface water flows and quality in water bodies and/or groundwater levels, yield and quality in local aquifers and privately-owned groundwater bores that could be potentially affected by the development; and
 - the procedures that would be followed if any unforeseen impacts are detected during the development.

TRANSPORT

Monitoring of Product Transport

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

Operating Conditions

22. The Applicant shall ensure that:
- (a) all reasonable measures are taken such that laden trucks have appropriate signage, including a contact phone number, so they can be easily identified by road users;
 - (b) all laden trucks entering or exiting the site have their loads covered;
 - (c) all laden trucks exiting the site are cleaned of material that may fall on the road, before leaving the site; and
 - (d) no trucks queue at the entrance to the quarry access road before 5 am.

Transport Management Plan

23. The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:
- (a) be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless otherwise agreed by the Secretary;
 - (b) describe the measures that would be undertaken to monitor the level of service at the Jenolan Caves Road and Great Western Highway intersection and maintain an acceptable level of service at this intersection;
 - (c) include a Drivers' Code of Conduct to minimise the impacts of development-related trucks on local residences and road users including measures to minimise use of local roads; and
 - (d) describe the measures that would be put in place to ensure compliance with the Drivers' Code of Conduct.

ABORIGINAL HERITAGE

24. If any item or object of Aboriginal heritage significance is identified on site, the Applicant shall ensure that:
- (a) all work in the immediate vicinity of the suspected Aboriginal item or object ceases immediately;
 - (b) a 10 m buffer area around the suspected item or object is cordoned off; and
 - (c) the OEH is contacted immediately.
- Work in the vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the *National Parks and Wildlife Act 1974*.

LANDSCAPE AND REHABILITATION

Biodiversity Offset Strategy

25. The Applicant shall implement the Biodiversity Offset Strategy, described in the EIS and including Conservation Area H, shown conceptually in Appendix 6, to the satisfaction of the Secretary.

Security of Offsets

26. Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Strategy, to the satisfaction of the Secretary.

Note: Mechanisms to provide appropriate long term security to the land within the Biodiversity Offset Strategy in accordance with the NSW Biodiversity Offset Policy for Major Projects 2014, including a Biobanking Agreement, Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome. Any mechanism must remain in force in perpetuity.

Rehabilitation Objectives

27. The Applicant shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and the conceptual final landform in Appendix 4 and must comply with the objectives in Table 5.

Table 5: Rehabilitation Objectives

Feature	Objective
Site (as a whole)	<ul style="list-style-type: none">• Safe, stable and non-polluting• Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land
Surface Infrastructure	<ul style="list-style-type: none">• Decommissioned and removed, unless DRE agrees otherwise
Quarry Benches	<ul style="list-style-type: none">• Landscaped and vegetated using native tree and understorey species
Quarry Pit Floor	<ul style="list-style-type: none">• Landscaped and revegetated using native tree and understorey species
Final Void	<ul style="list-style-type: none">• Minimise the size, depth and slope of the batters of the final void• Minimise the drainage catchment of the final void

Progressive Rehabilitation

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

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

Landscape and Rehabilitation Management Plan

29. The Applicant shall prepare and implement a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with OEH and be submitted to the Secretary for approval at least 3 months prior to the commencement of quarrying operations under this consent, unless the Secretary agrees otherwise;
 - provide details of the conceptual final landform and associated land uses for the site;
 - describe how the implementation of the Biodiversity Offset Strategy would be integrated with the overall rehabilitation of the site;
 - include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and rehabilitation of the site, including triggers for any necessary remedial action;
 - describe the short, medium and long term measures that would be implemented to:
 - manage remnant vegetation and habitat on site, including within the Biodiversity Offset Strategy area; and

- ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations in this consent;
- (f) include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial approval of the plan) including the procedures to be implemented for:
- maximising the salvage of environmental resources within the approved disturbance area, including tree hollows, vegetative and soil resources, for beneficial reuse in the enhancement of the offset area or site rehabilitation;
 - restoring and enhancing the quality of native vegetation and fauna habitat in the biodiversity and rehabilitation areas through assisted natural regeneration, targeted vegetation establishment and the introduction of fauna habitat features;
 - protect, conserve, propagate, plant and/or regenerate Silver-leafed Mountain Gum (*Eucalyptus pulverulenta*) (including the propagation and planting of at least 1,000 individuals of this species);
 - protecting vegetation and fauna habitat outside the approved disturbance area on-site;
 - minimising the impacts on native fauna, including undertaking pre-clearance surveys;
 - establishing vegetation screening to minimise the visual impacts of the site on surrounding receivers;
 - ensuring minimal environmental consequences for threatened species, populations and habitats;
 - collecting and propagating seed;
 - controlling weeds and feral pests;
 - controlling erosion;
 - controlling access; and
 - managing bushfire risk;
- (g) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;
- (h) identify the potential risks to the successful implementation of the Biodiversity Offset Strategy, and include a description of the contingency measures that would be implemented to mitigate these risks; and
- (i) include details of who would be responsible for monitoring, reviewing, and implementing the plan.

Conservation and Rehabilitation Bond

30. Within 6 months of the approval of the Landscape Management Plan, the Applicant shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the Biodiversity Offset Strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and relevant conditions of this consent. The sum of the bond shall be determined by:
- (a) calculating the cost of implementing the Biodiversity Offset Strategy over the next 3 years;
 - (b) calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and
 - (c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs, to the satisfaction of the Secretary.

Notes:

- *Alternative funding arrangements for long term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement, or transfer to conservation reserve estate can be used to reduce the liability of the conservation and rehabilitation bond.*
- *If capital and other expenditure required by the Landscape Management Plan is largely complete, the Secretary may waive the requirement for lodgement of a bond in respect of the remaining expenditure.*
- *If the Biodiversity Offset Strategy and rehabilitation of the site area are completed to the satisfaction of the Secretary, then the Secretary will release the bond. If the Biodiversity Offset Strategy and rehabilitation of the site are not completed to the satisfaction of the Secretary, then the Secretary will call in all or part of the bond, and arrange for the completion of the relevant works.*

31. Within 3 months of each Independent Environmental Audit (see condition 8 of Schedule 5), the Applicant shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must consider the:
- (a) effects of inflation;
 - (b) likely cost of implementing the Biodiversity Offset Strategy and rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the development); and
 - (c) performance of the implementation of the Biodiversity Offset Strategy and rehabilitation of the site to date.

VISUAL

32. The Applicant shall implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development to the satisfaction of the Secretary.

WASTE

33. The Applicant shall:
- (a) manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council;
 - (b) minimise the waste generated by the development;
 - (c) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and
 - (d) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.
34. Except as expressly permitted in an EPL, the Applicant must not receive waste at the site for storage, treatment, processing, reprocessing or disposal.

LIQUID STORAGE

35. The Applicant shall ensure that all tanks and similar facilities for storage of liquids (other than for water) are protected by appropriate bunding, which must exceed 110% of the stored volume of the liquid.

DANGEROUS GOODS

36. The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant *Australian Standards*, particularly AS1940 and AS1596, and the *Dangerous Goods Code*.

BUSHFIRE

37. The Applicant shall:
- (a) ensure that the development is suitably equipped to respond to any fires on site; and
 - (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the site.

SCHEDULE 4 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable after obtaining monitoring results showing:
 - (a) an exceedance of any relevant criteria in Schedule 3, the Applicant shall notify the affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria; and
 - (b) an exceedance of any relevant air quality criteria in Schedule 3, the Applicant shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).

INDEPENDENT REVIEW

2. If an owner of privately-owned land considers the development to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.

If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Applicant shall:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and
 - if the development is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria; and
- (b) give the Secretary and landowner a copy of the independent review.

**SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING**

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
 - (a) be submitted to the Secretary for approval within 6 months of the date of this consent;
 - (b) provide the strategic framework for environmental management of the development;
 - (c) identify the statutory approvals that apply to the development;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, record, handle and respond to complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this consent; and
 - a clear plan depicting all the monitoring to be carried out under the conditions of this consent.

Management Plan Requirements

2. The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria; and
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the development; and
 - effectiveness of any management measures (see (c) above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
 - (f) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Adaptive Management

3. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;
- (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- (c) implement remediation measures as directed by the Secretary; to the satisfaction of the Secretary.

Annual Review

4. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:
- (a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - requirements of any plan or program required under this consent;
 - monitoring results of previous years; and
 - relevant predictions in the EIS;
 - (c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;
 - (d) identify any trends in the monitoring data over the life of the development;
 - (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
 - (f) describe what measures will be implemented over the current financial year to improve the environmental performance of the development.

Revision of Strategies, Plans & Programs

5. Within 3 months of the submission of an:
- (a) annual review under condition 4 above;
 - (b) incident report under condition 6 below;
 - (c) audit report under condition 8 below; and
 - (d) any modifications to this consent,
- the Applicant shall review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.

Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.

REPORTING

Incident Reporting

6. The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

7. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.

INDEPENDENT ENVIRONMENTAL AUDIT

8. Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
- (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
 - (b) include consultation with the relevant agencies;
 - (c) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the

- development (including any assessment, strategy, plan or program required under these approvals);
- (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
 - (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Secretary.

- 9. Within 6 weeks of completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

- 10. Within 6 months of the date of this consent, the Applicant shall:
 - (a) make the following information publicly available on its website:
 - the documents listed in condition 2 of Schedule 2;
 - current statutory approvals for the development;
 - all approved strategies, plans and programs required under the conditions of this consent;
 - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
 - a complaints register, updated monthly;
 - the annual reviews of the development;
 - any independent environmental audit, and the Applicant's response to the recommendations in any audit; and
 - any other matter required by the Secretary; and
 - (b) keep this information up-to-date, to the satisfaction of the Secretary.

APPENDIX 1 DEVELOPMENT AREA

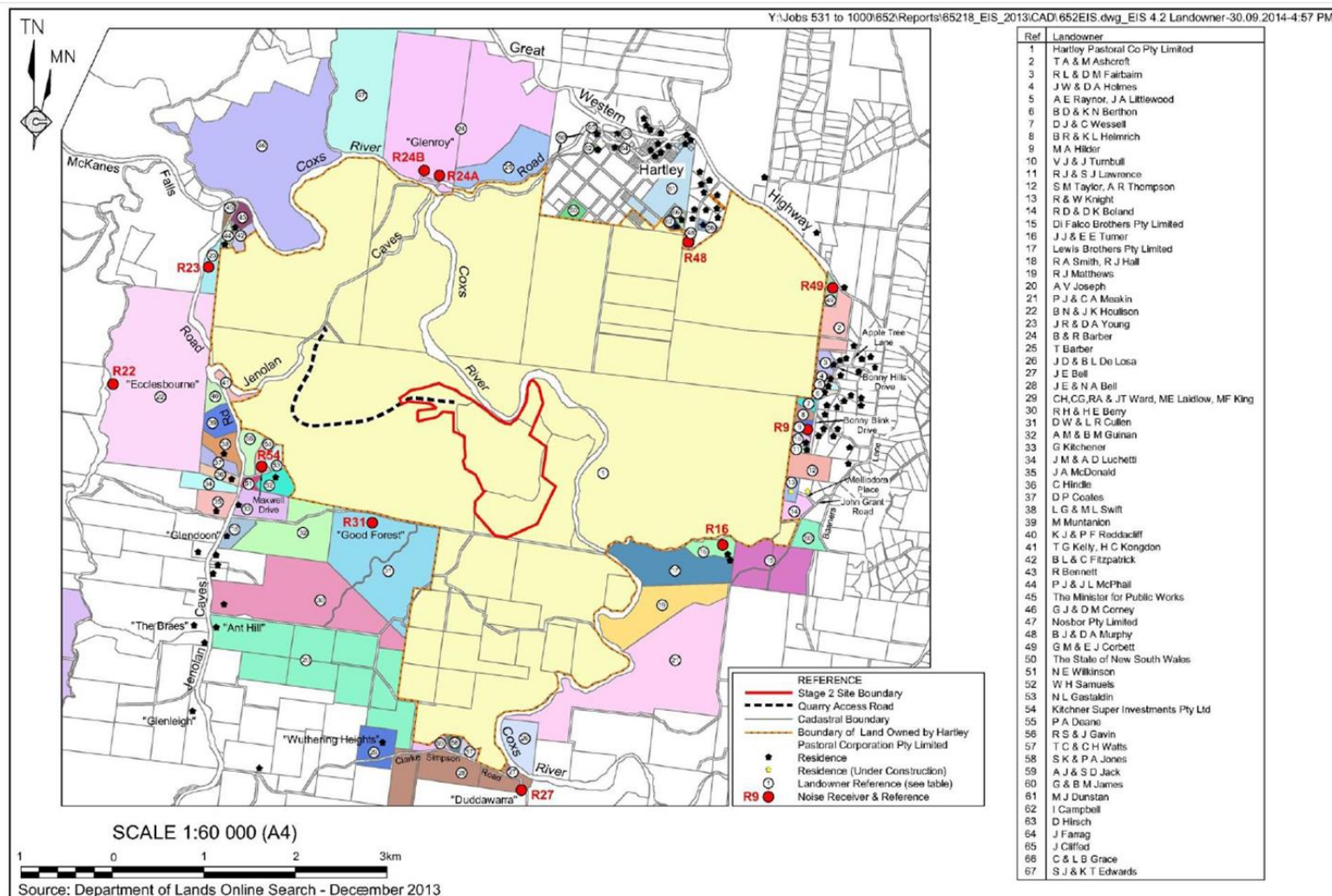
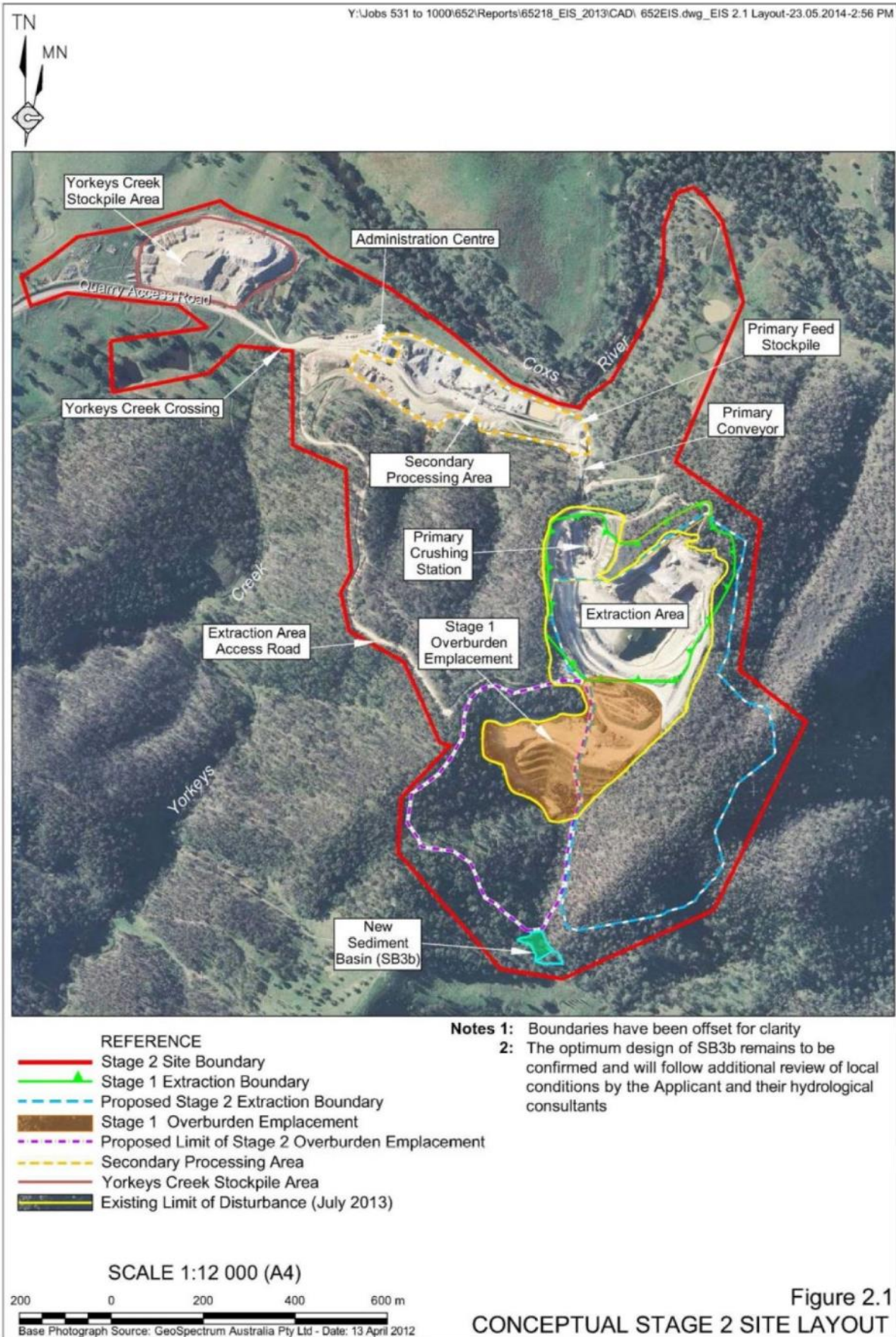


Figure 1: Development Area and nearby residences

APPENDIX 2 DEVELOPMENT LAYOUT



**APPENDIX 3
STATEMENT OF COMMITMENTS**

Desired Outcome	Action	Timing
1. Environmental Management		
Compliance with all conditional requirements in all approvals licences and leases.	1.1 Comply with commitments recorded in this table.	Continuous and as required.
	1.2 Comply with all conditional requirements included in the: <ul style="list-style-type: none"> • Development Consent; • Environment Protection Licence; • Approval under the EPBC Act; • Water Access Licence; and • any other approvals. 	Ongoing.
2. Waste Management		
Minimisation of general waste creation and maximisation of recycling, wherever possible.	2.1 Place all paper and general wastes originating from the site office, together with routine maintenance consumables from the daily servicing of equipment in waste skip bins located adjacent to the site office and workshop.	Ongoing.
	2.2 Segregate waste into recyclables and non-recyclable materials for removal by a licensed contractor.	Ongoing.
Minimisation of the potential risk of environmental impact due to waste creation, storage and/or disposal.	2.3 Ensure the appropriate storage and regular collection of industrial wastes including waste oils and scrap metal.	Monthly or on an as needs basis.
3. Rehabilitation and Biodiversity Offset Management		
The creation of a stable final landform, available for the proposed future use(s) of nature conservation and low intensity agriculture.	3.1 Retain all soil and suitable cleared vegetation resources for use in rehabilitation of the final landform.	Ongoing.
	3.2 Include <i>Eucalyptus pulverulenta</i> in the revegetation of the Stage 2 Site.	During rehabilitation activities.
	3.3 Re-instate the pre-disturbance soil and land capability in the area used for the secondary processing area and Yorkeys Creek stockpile area.	Ongoing and prior to quarry closure.
Establish and manage a Biodiversity Offset Area.	3.4 Mark, and where appropriate fence, boundaries relevant to the Biodiversity Offset Area.	Within 6 months of approval of the Biodiversity Offset Area.
4. Land Resources		
Ensure sections of the Site with higher land capability are returned to agricultural use.	4.1 Provide for rehabilitation of the secondary processing area and Yorkeys Creek stockpile area back to agricultural land.	Ongoing as available.
5. Traffic and Transport		
Transport operations are undertaken with minimal impact on	5.1 All transport contractors required to complete the Hy-Tec Chain of Responsibility: Driver Vehicle Check system.	Ongoing.
	5.2 Maintain a complaints management system to	Ongoing.

Desired Outcome	Action	Timing
other road users and residents.	appropriately respond to any complaints received through investigation and implementation of corrective treatments.	
	5.3 Monitor the delays for vehicles turning right onto the Great Western Highway at two-yearly intervals from 2022 onwards.	To begin in 2022.
6. Visibility		
Reduce the area of the Stage 2 Site exposed to surrounding vantage points.	6.1 Implement design and sequencing measures to minimise exposure of the Quarry, namely: <ul style="list-style-type: none"> a) undertake the extraction area and overburden emplacement extensions in accordance with the limits noted on Figure 2.4 of the EIS and sequence generally as presented on Figure 2.6 of the EIS; b) retain the primary crusher in its current location within the Stage 1 extraction area; c) retain the visual screen provided by the Northern Ridge; and d) restrict further extension of the secondary processing area and Yorkeys Creek stockpile area. 	Ongoing. Ongoing. Ongoing. Ongoing.
Reduce the impact of the areas of quarry disturbance visible from surrounding vantage points.	6.2 Implement management measures to limit impacts to visual amenity including the following. <ul style="list-style-type: none"> a) Complete a trial of short-term visual mitigation measures for the Yorkeys Creek stockpile area. b) Implement short-term visual mitigation measures for the Yorkeys Creek stockpile area. c) Progressive revegetation or rehabilitation of terminal faces of the extraction area and overburden emplacement and profiled slopes between the administration area and the extraction area. d) Maintain existing visual barriers including retained northern face of extraction area and tree-lined visual barriers. e) Apply a bituminous film to reduce the contrast between the pale rhyolite and darker background vegetation on completed western facing slopes where necessary. f) Minimise dust emissions through suppression measures such as regular watering of areas. g) Maintain the Site in a tidy and orderly manner. h) Minimise the impacts of lighting by directing lights away from critical receptors (to the south and east) and minimise the 'lume' created by the lights. <p>Note: If superseded by more effective measures, or no longer required due to progressive development of the Quarry Site, the above will cease to be implemented.</p>	Prior to November 2015. Prior to November 2016. Ongoing. Ongoing. Ongoing. Ongoing. Ongoing. Ongoing.
Monitor the progressive visual changes from nearby receptors.	6.3 Monitor the sequence of visual impacts using a series of annual photographs from vantage points surrounding the Quarry Site. These photos, along with a discussion as to compliance with the impact predicted, would be included in annual reporting.	Annually.
7. Surface Water		
Appropriately	7.1 Ensure any off-site discharge is monitored and reported	In the event of off-

Desired Outcome	Action	Timing
document water management measures including erosion and sediment control.	in accordance with EPL 12323.	site discharge.
Capture of sediment-laden water flows from Proposal-related disturbance.	7.2 Ensure the capacity of the various sediment basins and water storages of the Site provides the required water settlement and sediment storage volumes for a 5-day 95 th percentile rainfall event.	Ongoing.
Manage the discharge of water from the various sediment basins and storage dams.	7.3 Apply procedures established in the Water Management Plan for the appropriate treatment of water that is to be discharged to natural drainage.	In the event off-site discharge is required.
Prevention of hydrocarbon contamination of water on the Site.	7.4 Securely store all hydrocarbon products within designated and bunded areas.	Ongoing.
	7.5 Refuel and maintain all equipment within designated areas of the Site, i.e. workshop area.	Ongoing.
8. Groundwater		
Prevention of groundwater contamination.	8.1 Securely store all hydrocarbon products within designated and bunded areas.	Ongoing.
	8.2 Refuel and maintain all equipment within designated areas of the Site, i.e. workshop area.	Ongoing.
Appropriately license any removal of groundwater.	8.3 Obtain and maintain a Water Access Licence(s) for the volume of groundwater seepage into the extraction area annually.	Prior to commencement of development consent.
	8.4 Report annual and projected groundwater extraction to the NSW Office of Water.	Annual.
9. Terrestrial Ecology		
Avoid impacts on native flora and fauna.	9.1 Locate primary crushing station within extraction footprint.	Ongoing.
	9.2 Limit extent of extraction area as nominated in the development consent.	Ongoing.
Minimise or mitigate unavoidable impacts on native flora and fauna.	9.3 Operate a conveyor between the primary crushing station and secondary processing area to limit transportation of raw materials.	Ongoing.
	9.4 Maintain a 10m buffer and exclusion zone around the proposed area of disturbance.	Ongoing.
	9.5 Fence, as appropriate, sections of the Stage 2 Site not required for ongoing operations.	Ongoing as needed.
	9.6 Include the Silver-leafed mountain gum in progressive revegetation of the final landform.	Ongoing.
	9.7 Install appropriate erosion and sediment control measures prior to vegetation clearing activities (to reduce the potential for pollution of downstream riparian and aquatic habitat).	Ongoing.
	9.8 Limit vehicle speeds within the Site to limit the potential for vehicle trauma to wildlife.	Ongoing.
10. Aquatic Ecology		

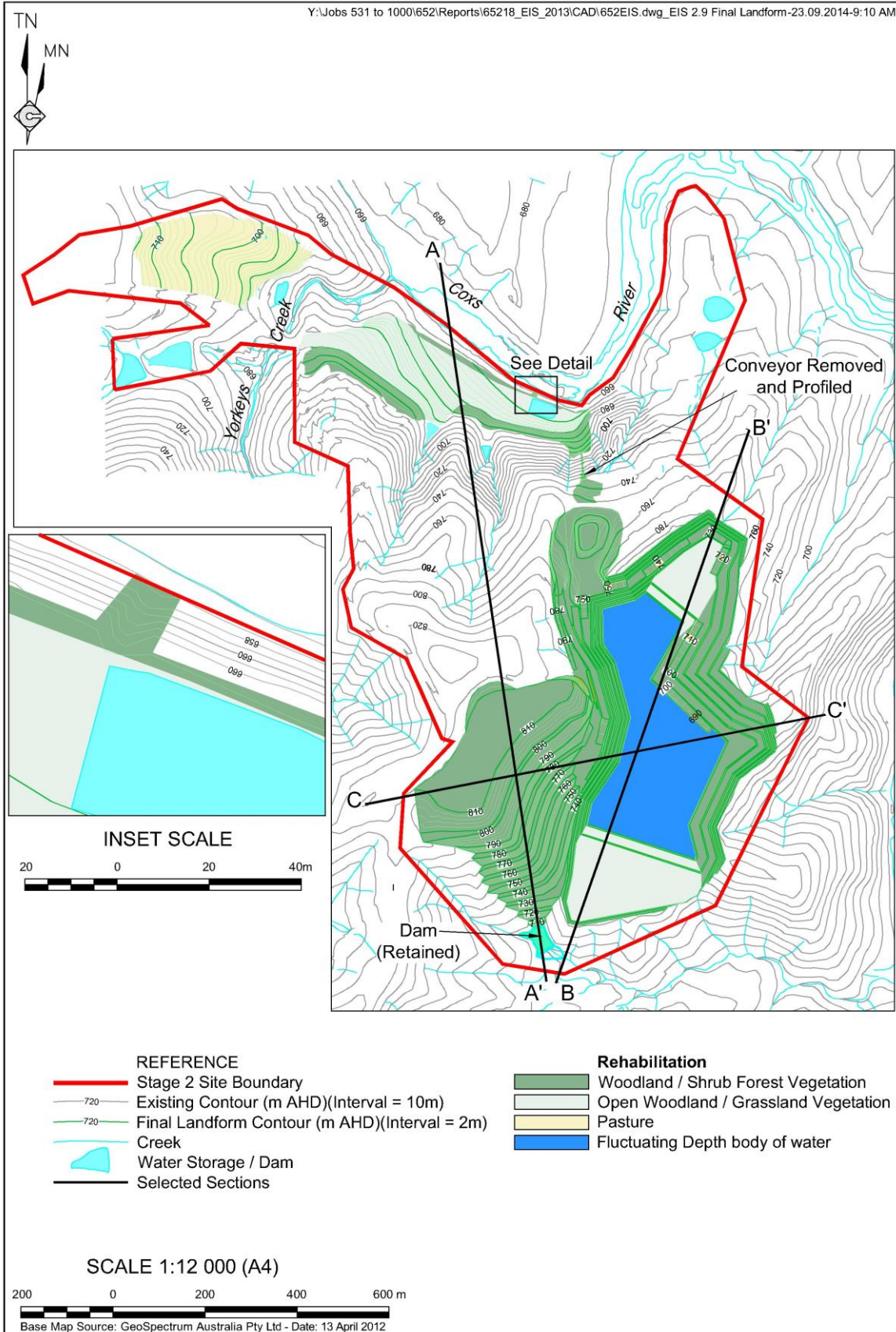
Desired Outcome	Action	Timing
Avoid, minimise or mitigate impacts as a result of operational activities on aquatic biota and habitats.	10.1 Design and construct any ancillary development works, e.g. access roads, in the vicinity of watercourses in accordance with the NSW DPI Policy and <i>Guidelines for Fish Habitat Conservation and Management</i>	As required.
	10.2 Minimise the occurrence of uncontrolled discharges of water by managing water in accordance with a Water Management Plan.	Ongoing.
	10.3 Maintain a bunded area for storage of fuels, oils, refuelling and appropriate maintenance of vehicles and mechanical plant.	Ongoing.
	10.4 Procedures would be implemented to manage handling of hazardous material and spill response protocols.	Ongoing.
	10.5 Install and maintain scour protection at pipe outlet points.	Ongoing.
11. Noise		
Noise emissions do not exceed intrusiveness criteria nor significantly impact on neighbouring landowners and/or residents.	11.1 Undertake processing operations with the current or equivalent crushing and screening plant.	Ongoing.
	11.2 Ensure all equipment on Site has sound power levels at or below that nominated for noise modelling purposes (see <i>Table 5-1</i> of Benbow, 2014a).	Ongoing.
	11.3 Limit transportation noise by ensuring: a) All trucks under control of Hy-Tec, or accredited contractors would comply at all times with RMS noise limits.	Ongoing.
	b) All truck drivers would be required to sign a Code of Conduct that includes noise limiting behaviour. c) Comply with conditional limits on truck movements. d) The internal road network would be graded, as required, to limit body noise from empty trucks	Ongoing. Ongoing. Ongoing.
	11.4 Maintenance work would be confined to standard daytime hours where practicable.	Ongoing.
12. Air Quality		
Site activities are undertaken without exceeding the nominated air quality criteria.	12.1 Undertake operations in accordance with an Air Quality Management Plan.	Ongoing.
Minimise greenhouse gas emissions from Site related activities.	12.2 Minimise the impacts of greenhouse gases relating to diesel consumption by: a) minimising use of haul trucks through use of an overland conveyor; b) minimising rehandling of overburden and products; c) maintaining and servicing equipment to ensure efficiency; d) minimising the quarry footprint to reduce land disturbance and travel distances; and e) optimising the design of the Processing Plant to f) maximise the use of gravity to move material throughout the plant and maximise energy efficient motors in major equipment.	Ongoing. Ongoing. Ongoing. Ongoing. Ongoing.
Record and monitor the local	12.3 Continue to monitor dust impacts through: a) the existing deposited dust gauges; and	Ongoing.

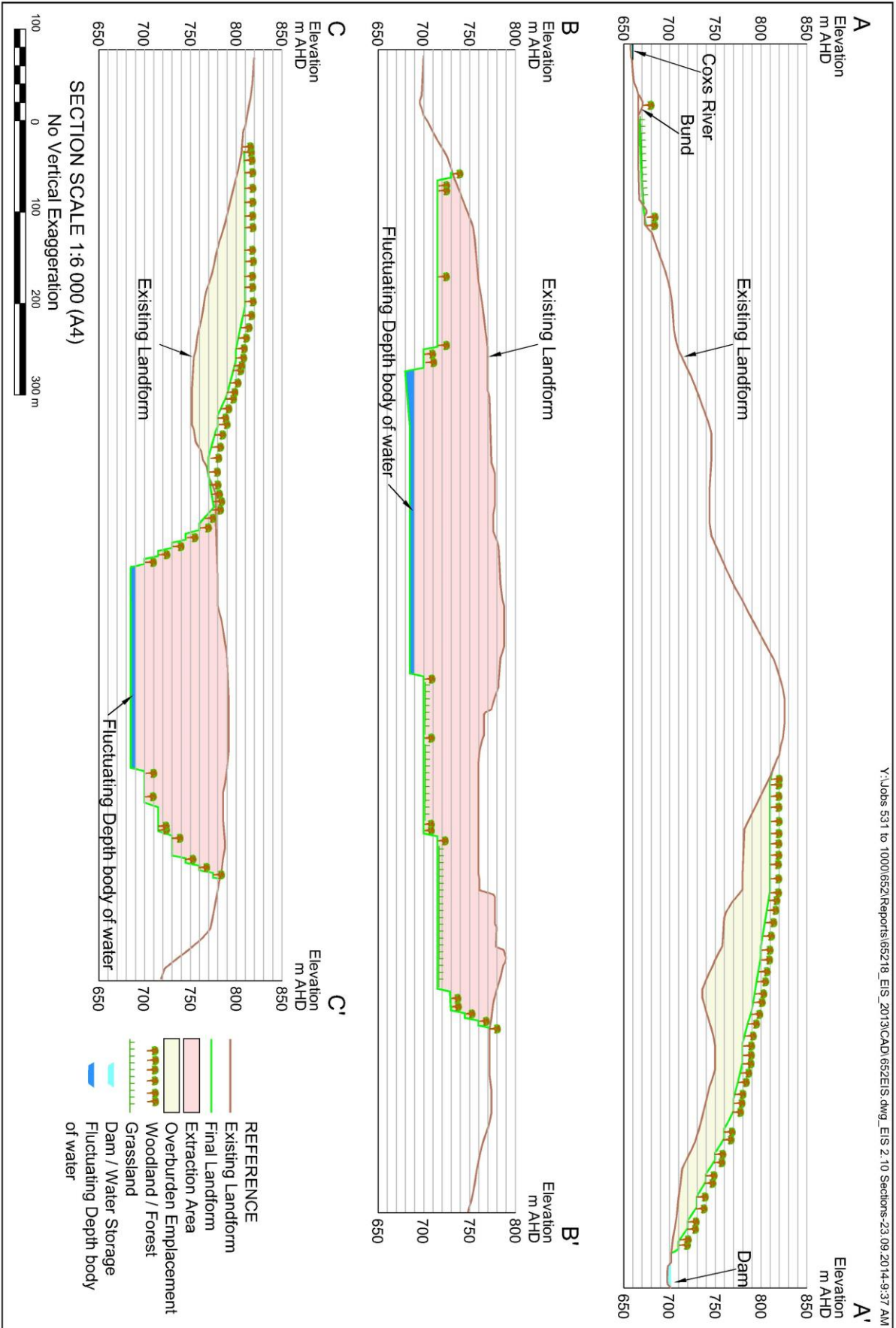
Desired Outcome	Action	Timing
environment regarding dust impacts.	b) on-site meteorological monitoring to record relevant parameters.	Ongoing.
13. Indigenous Heritage		
Minimise the potential for adverse Proposal-related impacts on indigenous heritage sites.	13.1 Include Indigenous heritage protocols and obligations within training and induction processes for the quarry.	Ongoing.
	13.2 Halt all works in the immediate area if cultural objects are found and contact a suitably qualified archaeologist and Aboriginal community representative.	Ongoing.
	13.3 Halt all works in the immediate area if human remains are found and contact NSW Police, Aboriginal community representative and OEH.	Ongoing.
	13.4 Maintain reasonable efforts to avoid impacts to Aboriginal cultural heritage values at all stages of the development works	Ongoing.
Maintain appropriate records of identified indigenous heritage sites.	13.5 Complete an Aboriginal Site Impact Recording Form and submit it to the Aboriginal Heritage Management Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through the proposed development.	Upon discovery of a site of heritage significance.
14. Historic Heritage		
Minimise the potential for adverse Proposal-related impacts on historic heritage sites.	14.1 Halt all works in the immediate area if cultural object(s) are found.	Ongoing.
	14.2 Secure the location, e.g. through the installation of protective fencing, flagging with high visibility tape.	
	14.3 Contact a suitably qualified archaeologist to determine the significance of the object(s).	
	14.4 Report discovery of relic (if advised of validity by archaeologist) in accordance within Section 146 of the <i>Heritage Act 1977</i> .	
	14.5 Do not recommence works within the secured area until advised by archaeologist.	
	14.6 Include the commitments of 14.1 to 14.4 within training and induction processes for the Site.	On induction of new personnel.
15. Hazards		
Manage bush fire risks on site to minimise the potential for property damage or personnel injury.	15.1 Ensure refuelling is undertaken within designated fuel bays and vehicles are turned off during refuelling.	Ongoing.
	15.2 Ensure no smoking policy is enforced in designated areas of the Site.	Ongoing.
	15.3 Ensure fire extinguishers are maintained within site vehicles and refuelling areas.	Ongoing.
	15.4 Ensure that a water cart is available to assist in extinguishing any fire ignited.	Ongoing.
	15.5 Establish and maintain an Outer Protection Area around the administration area.	Ongoing.
	15.6 Maintain the access road to the extraction area such that safe passage is guaranteed should an emergency evacuation be required.	Ongoing.
	15.7 Maintain access to water contained within SD1 to SD6,	Ongoing.

Desired Outcome	Action	Timing
	as well as SB1 for use in fighting ember attack.	
	15.8 Complete appropriate training with site personnel in relation to fire-fighting tasks and procedures.	Ongoing.
	15.9 Ensure access is provided for Rural Fire Service and its and other emergency services' authority is recognised and assistance offered in the event of a bush fire.	Ongoing.
Reduce risks of traffic accidents on roads used by Proposal-related traffic.	15.10 Ensure route selection for delivery of quarry products follows routes designated in the EIS for entry and exit to the Site, transportation through the Blue Mountains and local deliveries of products.	Ongoing.
	15.11 Operate a Traffic Management Plan for all trucks entering and exiting Austen Quarry.	Within 6 months of receipt of approval.
	15.12 Continue to implement the Chain of Responsibility – Driver Vehicle Check system for all transportation activities undertaken at the Site.	Ongoing.
All members of the public are safe when near the Austen Quarry.	15.13 Implement measures to ensure the safety of public including visitors, contractors and employees through recruitment, induction and training programs.	Ongoing.
Measures to be put in place to, where possible, restrict unauthorised entry and reduce the risk of accident to any trespasser on the Site.	15.14 Ensure gate at entrance on Jenolan Caves Road is locked outside standard operating hours.	Ongoing.
	15.15 Use of locks on equipment when site personnel are not working on or with this equipment or plant.	Ongoing.
	15.16 Installation and maintenance of safety signage around the Site and perimeter fencing, where necessary.	Ongoing.
	15.17 Instruct all visitors entering and departing the Site to visit either the Site office or weighbridge for registration including time of arrival and departure, and an induction, if required.	Ongoing.
	15.18 Install appropriate controls to ensure the stability of the open cut, overburden emplacement and stockpiles.	Ongoing.
16. Socio-economic Setting		
Continue to proactively consult with members of the community affected by the Proposal.	16.1 Maintain the existing 'open door' policy for community members to approach the management staff of the Austen Quarry.	Ongoing.
	16.2 Maintain the existing community complaints and response system.	Ongoing.
Consider local sources of service and supply contractors	16.3 Seek local supply and service contractors from within the Lithgow LGA where it is practicable to do so.	Ongoing.

APPENDIX 4 CONCEPTUAL FINAL LANDFORM

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APPENDIX 5 NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 2 are to apply under all meteorological conditions except the following:
 - a) wind speeds greater than 3 m/s at 10 m above ground level; or
 - b) temperature inversion conditions between 1.5°C and 3°C/100 m and wind speed greater than 2 m/s at 10 m above ground level; or
 - c) temperature inversion conditions greater than 3°C/100 m.

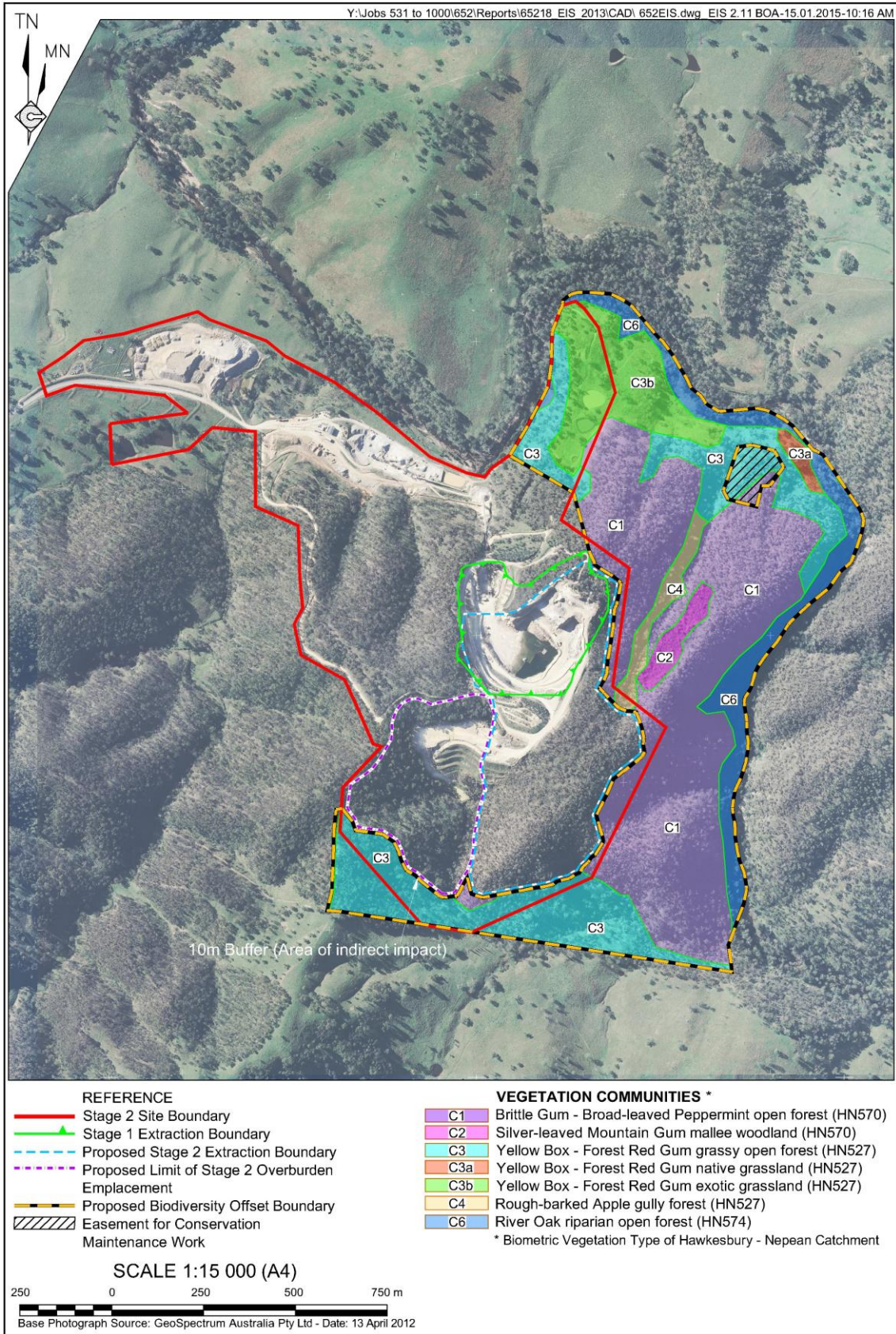
Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station required under condition 25 of Schedule 3.

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - a) monitoring locations for the collection of representative noise data;
 - b) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment;
 - c) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration; and
 - d) the use of an appropriate modifying factor for low frequency noise to be applied during compliance testing at any individual residence if low frequency noise is present (in accordance with the INP) and before comparison with the specified noise levels in the consent.

APPENDIX 6 BIODIVERSITY OFFSET STRATEGY



**APPENDIX 7
PLANNING AGREEMENT**

1. The Applicant shall pay Council \$0.025 per tonne of quarry product extracted and transported from the Stage 2 Extraction Area on a quarterly basis. Each payment shall be:
 - (a) based on weighbridge records of the quantity of extraction material transported from the site in the relevant quarter;
 - (b) paid within 21 days of the end of the relevant quarter;
 - (c) adjusted in line with the Consumer Price Index calculated from the date of approval and applied annually from the first day of operation.

Appendix C: Environmental Protection Licence

Environment Protection Licence



Licence - 12323

Licence Details

Number:	12323
Anniversary Date:	01-July

Licensee

AUS - 10 RHYOLITE PTY LIMITED

GPO BOX 2155

ADELAIDE SA 5001

Premises

AUS-10 QUARRY

391 JENOLAN CAVES ROAD

HARTLEY NSW 2790

Scheduled Activity

Extractive activities

Fee Based Activity

Scale

Land-based extractive activity

> 500000-2000000 T annual capacity
to extract, process or store

Region

South - Bathurst

Lvl 2, 203-209 Russell Street

BATHURST NSW 2795

Phone: (02) 6332 7600

Fax: (02) 6332 7630

PO Box 1388 BATHURST

NSW 2795

Environment Protection Licence



Licence - 12323

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Environment Protection Licence



Licence - 12323

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Environment Protection Licence

Licence - 12323



Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

Licence - 12323



The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

AUS - 10 RHYOLITE PTY LIMITED
GPO BOX 2155
ADELAIDE SA 5001

subject to the conditions which follow.

Environment Protection Licence

Licence - 12323



1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Extractive activities	Land-based extractive activity	> 500000 - 2000000 T annual capacity to extract, process or store

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
AUS-10 QUARRY
391 JENOLAN CAVES ROAD
HARTLEY
NSW 2790
LOT 1 DP 1005511, LOT 2 DP 1005511, LOT 31 DP 1009967

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

- a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

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P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

<i>Air</i>			
EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
4	Ambient air monitoring		Dust monitoring location identified as "AQD-1" on Figure 1 Environment Protection Licence Monitoring Points - provided to EPA on 19/09/11 (DOC11/40371).
5	Ambient air monitoring		Dust monitoring location identified as "AQD-2" on "Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371.
6	Ambient air monitoring		Dust monitoring location identified as "AQD-3" on "Figure 1 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371.
12	Weather Analysis		Weather monitoring location as identified on "Figure 2 Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371.

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

P1.3 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to Waters; Discharge Quality Monitoring	Discharge to Waters; Discharge Quality Monitoring	Location identified as "Dam 1" on "Figure 2 - Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371
2	Ambient water monitoring		Water monitoring location identified on Figure 6.1 of report entitled "Hartley Quarry - Annual Environmental Management Report" (2003), upstream of the processing area.
3	Ambient water monitoring		Water monitoring location identified on Figure 6.1 of report entitled "Hartley Quarry - Annual Environmental Management Report" (2003), downstream of the processing area.

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8	Discharge to waters; Discharge quality monitoring	Discharge to waters; Discharge quality monitoring	Location identified as "Dam 2" on "Figure 2 - Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371
9	Discharge to waters; Discharge quality monitoring	Discharge to waters; Discharge quality monitoring	Location identified as "Dam 3" on "Figure 2 - Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371
10	Discharge to waters; Discharge quality monitoring	Discharge to waters; Discharge quality monitoring	Location identified as "Dam 4" on "Figure 2 - Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371
11	Discharge to waters; Discharge quality monitoring	Discharge to waters; Discharge quality monitoring	Location identified as "Dam 5" on "Figure 2 - Environment Protection Licence Monitoring Points" - provided to EPA on 19/09/11 as part of DOC11/40371

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table.

L2.4 Water and/or Land Concentration Limits

POINT 1,8,9,10,11

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
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Oil and Grease	milligrams per litre	10
pH	pH	6.5 - 8.5
Total suspended solids	milligrams per litre	30

- L2.5 The concentration limits stipulated by condition L2.1/L2.4 for EPA Identification Points 1,8, 9, 10 and 11 are deemed not to apply when the discharge from the stormwater control structures (sediment basins) occurs solely as a result of rainfall measured at the premises which exceeds:
- a) a total of 44 millimetres of rainfall over any consecutive 5 day period.

Note: A 44mm rainfall event is defined by the EPA endorsed publication "Managing urban stormwater: soils and construction" (Landcom, 2004) as the rainfall depth in millimetres for a 95th percentile, 5 day rainfall event for the Central Tablelands which is also consistent with the storage capacity (recommended minimum design criteria) for Type D sediment basins for mines and quarries (see "Managing urban stormwater: soils and construction, Volume 2E, mines and quarries" (DECC, 2008)).

- L2.6 The concentration limit for Total Suspended Solids stipulated by condition L2.1/L2.4 for EPA Identification Points 1, 8, 9, 10 and 11 are deemed not to have been breached where:
- a) the water discharged is not covered by condition L2.5; and
- b) the water discharged complies with a turbidity limit of 25 nephelometric turbidity units at the time of the discharge; and
- c) the EPA is advised within 3 working days of the completion of the sample testing and analysis as required by condition M2.1/M2.2 of any results above the concentration limit.

Note: The purpose of this condition is to expedite the assessment and subsequent discharge of any clarified water from the stormwater control structures (sediment basins).

L3 Waste

- L3.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and meeting the definition, if any, in the column titled "Description" in the table below.

Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled "Activity" in the table below.

Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the table below.

This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	Cured concrete waste from a batch plant	Recycled concrete aggregate sourced from Hy-Tec Industries Pty	Resource recovery Waste processing (non-thermal)	5,000 tonnes per year

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		Limited's concrete batching plants	treatment) Waste storage	
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005	As specified in each particular resource recovery exemption	NA

L4 Noise limits

L4.1 Noise from the premises must not exceed 35 dB(A) L_{Aeq} (15 minute) at any time.

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.

L4.2 To determine compliance with condition(s) L4.1 noise must be measured at, or computed for, any affected noise sensitive locations (such as a residence, school or hospital). A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "Environmental Noise Management - NSW Industrial Noise Policy (January 2000)".

L4.3 The noise emission limits identified in this licence apply under all meteorological conditions except:
a) during rain and wind speeds (at 10m height) greater than 3m/s; and
b) under "non-significant weather conditions".

Note: Field meteorological indicators for non-significant weather conditions are described in the NSW Industrial Noise Policy, Chapter 5 and Appendix E in relation to wind and temperature inversions.

L5 Blasting

L5.1 Blasting in or on the premises must only be carried out between 1000 hours and 1500 hours Monday to Friday. Blasting in or on the premises must not take place on Saturdays, Sundays or Public Holidays without the prior approval of the EPA.

L5.2 The airblast overpressure level from blasting operations in or on the premises must not exceed:

- a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
- b) 120 dB (Lin Peak) at any time.

At the most affected noise-sensitive location not under the ownership or control of the licensee .

L5.3 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:

- a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and
- b) 10 mm/s at any time.

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At the most affected sensitive location not under the ownership or control of the licensee .

L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed 2 mm/s at the most sensitive location within Hartley Village.

L6 Hours of operation

L6.1 Activities covered by this licence must only be carried out between the hours of 06:00 to 22:00 hours Monday to Friday, and 06:00 to 15:00 hours Saturday, and at no time on Sundays and Public Holidays.

L6.2 The loading and dispatch of trucks at the Premises and transport to and from the Premises is permitted between 05:00 hours and 22:00 hours Monday to Friday and between 05:00 hours and 15:00 hours on Saturdays only.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:

- a) must be maintained in a proper and efficient condition; and
- b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O4 Other operating conditions

O4.1 The stormwater control structures (sediment basins) identified at EPA Identification Points 1, 8, 9, 10 and 11 must be drained or pumped out as necessary to maintain each basins design storage capacity within 5 days following rainfall.

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- O4.2 Water discharged to comply with condition O4.1 may only be discharged to waters from those stormwater control structures (sediment basins) identified at EPA Identification Points 1, 8, 9, 10 and 11 where the discharged water complies with the discharge limits stipulated at condition L2.1/L2.4 (and taking into consideration condition L2.6).
- O4.3 The licensee must undertake maintenance as necessary to desilt any stormwater control structures (sediment basins) identified at EPA Identification Points 1, 8, 9, 10 and 11 in order to retain each basins design storage capacity.

5 Monitoring and Recording Conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
- in a legible form, or in a form that can readily be reduced to a legible form;
 - kept for at least 4 years after the monitoring or event to which they relate took place; and
 - produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
- the date(s) on which the sample was taken;
 - the time(s) at which the sample was collected;
 - the point at which the sample was taken; and
 - the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

- M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:
- M2.2 Air Monitoring Requirements

POINT 4,5,6

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Continuous	AM-19

- M2.3 Water and/ or Land Monitoring Requirements

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POINT 1,8,9,10,11

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per litre	Daily during any discharge	Grab sample
pH	pH	Daily during any discharge	Grab sample
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

POINT 2,3

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

M2.4 For the purposes of the table(s) above Special Frequency 1 means the collection of samples monthly, with the exception of when a discharge is occurring from Point 1, where samples must be collected daily.

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:

- any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
- if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
- if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Recording of pollution complaints

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- M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M4.2 The record must include details of the following:
- the date and time of the complaint;
 - the method by which the complaint was made;
 - any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
 - the nature of the complaint;
 - the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
 - if no action was taken by the licensee, the reasons why no action was taken.
- M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

- M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M5.3 The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.

M6 Requirement to monitor volume or mass

- M6.1 For each discharge point or utilisation area specified below, the licensee must monitor:
- the volume of liquids discharged to water or applied to the area;
 - the mass of solids applied to the area;
 - the mass of pollutants emitted to the air;
- at the frequency and using the method and units of measure, specified below.

POINT 1,8,9,10,11

Frequency	Unit of Measure	Sampling Method
Daily during any discharge	kilolitres per day	Estimate

M7 Blasting

- M7.1 To determine compliance with condition(s) L5.2, L5.3 and L5.4

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- a) Airblast overpressure and ground vibration must be measured and electronically recorded at the nearest residence or sensitive receiver or as otherwise directed by an authorised officer of the EPA for all blasts carried out in or on the premises; and
- b) Instrumentation used to measure the airblast overpressure and ground vibration must meet the requirements of Australian Standard AS 2187.2-2006.

M8 Other monitoring and recording conditions

M8.1 Requirement to Monitor Weather

The applicant must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The applicant must use the sampling method, units of measure, averaging period and sample at the frequency specified opposite in the other columns unless otherwise approved by the EPA:

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Air temperature	oC	Continuous	1 hour	AM-4
Wind Direction	o	Continuous	15 minute	AM-2 &AM-4
Wind Speed	m/s	Continuous	15 minute	AM-2 & AM-4
Sigma theta	o	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm	Continuous	24 hour	AM-4

6 Reporting Conditions

R1 Annual return documents

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
1. a Statement of Compliance,
 2. a Monitoring and Complaints Summary,
 3. a Statement of Compliance - Licence Conditions,
 4. a Statement of Compliance - Load based Fee,
 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
 7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

- R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

- R1.3 Where this licence is transferred from the licensee to a new licensee:
- a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of

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the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and

b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:

- a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
- b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:

- a) the licence holder; or
- b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.8 The results of the blast monitoring required by condition M7.1 must be submitted to the EPA at the end of each reporting period.

R2 Notification of environmental harm

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:

- a) where this licence applies to premises, an event has occurred at the premises; or
- b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the

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harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
- a) the cause, time and duration of the event;
 - b) the type, volume and concentration of every pollutant discharged as a result of the event;
 - c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
 - d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
 - e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
 - f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
 - g) any other relevant matters.
- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

7 General Conditions

G1 Copy of licence kept at the premises or plant

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Contact number for incidents and responsible employees

- G2.1 The licensee must operate 24-hour telephone contact lines for the purpose of enabling the EPA to directly contact one or more representatives of the licensee who can:
- a) respond at all times to incidents relating to the premises; and
 - b) contact the licensee's senior employees or agents authorised at all times to:
 - i) speak on behalf of the licensee; and
 - ii) provide any information or document required under this licence.
- G2.2 The licensee is to inform the EPA of the representative or representatives and their telephone number within 3 months of the date of the issue of this licence. The EPA must be notified of the telephone number on commencement of its operation.

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G2.3 The licensee is to inform the EPA in writing of the appointment of any subsequent contact persons, or changes to the person's contact details as soon as practicable and in any event within fourteen days of the appointment or change.

G3 Signage

G3.1 The location of EPA point number(s) 1 to 7 inclusive must be clearly marked by signs that indicate the point identification number used in this licence and be located as close as practical to the point.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Darryl Clift

Environment Protection Authority

(By Delegation)

Date of this edition: 01-July-2005

End Notes

- 1 Licence varied by notice 1057904, issued on 03-Apr-2006, which came into effect on 28-Apr-2006.
- 2 Licence varied by notice 1060537, issued on 30-May-2006, which came into effect on 30-May-2006.
- 3 Licence varied by notice 1068992, issued on 18-Oct-2007, which came into effect on 18-Oct-2007.
- 4 Licence varied by notice 1085280, issued on 07-Jul-2008, which came into effect on 07-Jul-2008.
- 5 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
- 6 Licence varied by notice 1501563 issued on 26-Oct-2011
- 7 Licence varied by notice 1542576 issued on 17-Aug-2016
- 8 Licence varied by notice 1546618 issued on 12-Dec-2016

Appendix D: Water Licences

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

Water access licence (WAL) issued under the *Water Management Act 2000*

Water Access Licence (WAL) Number

WAL

A WAL number starts with the letters 'WAL' followed by several numbers

Can't find your WAL number? Do you have a reference number? A reference number starts with a two digit number, followed by 'AL' and then several numbers. Use the following tool to find your WAL by entering your reference number. [Enter the reference number to find the WAL number.](#)

Notes:

The search results will list the conditions imposed on the water access licence. Any approved water supply work/s nominated on the water access licence are identified by the approval number/s for the work/s.

The information about a water access licence provided in the search results is a summary and may not always be up to date. If you require full and up to date details about a particular water access licence (including current holders, share and extraction component details, encumbrances and notations) you should search the [Water Access Licence Register](#) administered by Land and Property Information.

- [Water Act 1912 Licences and Authorities](#)
- [Approval issued under the *Water Management Act 2000*](#)

Find out if a **Water Act 1912** licence has been converted

- [Water licence conversion status](#)

« Previous Search

Print Export

Search Results

Category [Subcategory]	Status	Water Source	Tenure Type	Management Zone	Share Components (units or ML)
---------------------------	--------	--------------	----------------	--------------------	--------------------------------------

Unregulated River	Current	Upper Nepean And Upstream Warragamba Water Source	Continuing	Dharabuladh Management Zone	20.00
-------------------	---------	---	------------	-----------------------------	-------

Extraction Times or Rates

Subject to conditions water may be taken at any time or rate

Nominated Work Approval(s)

10WA103330

- Conditions

Plan Conditions

Water sharing plan

Greater Metropolitan Region Unregulated River Water Sources

Take of water

- MW0112-00001 The maximum water allocation that may be carried over in the account for this access licence from one water year to the next water year is:
A. a volume equal to 100 % of the share component of the licence, or
B. 1 ML/unit share of the share component of the licence.
- MW0017-00023 From 1 July 2011, water must not be taken from the Dharabuladh Management Zone of the Upper Nepean and Upstream Warragamba Water Source when flows are in the Very Low Flow Class, which means that the flow at Coxs River at the Island Hill gauge [No. 212045] is:

A. equal to or less than 17 ML/day on a rising river,
or
B. equal to or less than 15 ML/day on a falling river.

This restriction does not apply if water is to be taken from a runoff harvesting dam or an in-river dam pool.
- MW0036-00002 The volume of water taken in any three (3) consecutive water years from 1 July 2012 must be recorded in the logbook at the end of those three water years. The maximum volume of water permitted to be taken in those years must also be recorded in the logbook.
- MW0605-00001 Water must be taken in compliance with the conditions of the approval for the nominated work on this access licence through which water is to be taken.
- MW0670-00001 Water must only be taken if there is visible flow in the water source at the location where water is to be taken.

This restriction does not apply if water is to be taken:
A. from an off-river pool, an in-river pool, a runoff harvesting dam or an in-river dam pool, or
B. from the following Weirs: Maldon, Douglas Park, Menangle, Camden, Sharpes, Cobbity, Mount Hunter Rivulet, Brownlow Hill, Theresa Park and Wallacia.
- MW0004-00002 From 1 July 2012, the total volume of water taken in any three (3) consecutive water years under this access licence must not exceed a volume which is equal to the lesser of either:
A. the sum of:
i. water in the account from the available water determinations in those 3 consecutive water years, plus
ii. water in the account carried over from the water year prior to those 3 consecutive water years, plus
iii. any net amount of water assigned to or from this account under a water allocation assignment in those 3 consecutive water years, plus
iv. any water re-credited by the Minister to the account in those 3 consecutive water years,

or

- B. the sum of:
- i. the share component of this licence at the beginning of the first year in those 3 consecutive water years, plus
 - ii. the share component of this licence at the beginning of the second year in those 3 consecutive water years, plus
 - iii. the share component of this licence at the beginning of the third year in those 3 consecutive water years, plus
 - iv. any net amount of water assigned to or from this account under a water allocation assignment in those 3 consecutive water years, plus
 - v. any water re-credited by the Minister to the account in those 3 consecutive water years.

Monitoring and recording

MW2337-00001

The following information must be recorded in the logbook for each period of time that water is taken:

- A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and
- B. the access licence number under which the water is taken, and
- C. the approval number under which the water is taken, and
- D. the volume of water taken for domestic consumption and/or stock watering.

MW2339-00001

A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by the relevant licensor.

Reporting

MW0051-00002

Once the licence holder becomes aware of a breach of any condition on this access licence, the licence holder must notify the Minister as soon as practicable. The Minister must be notified by:

- A. email: water.enquiries@dpi.nsw.gov.au,
or
- B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

Other Conditions

NIL

Disclaimer: The NSW Office of Water does not warrant the data is current nor does it warrant that the data or the data capturing processes are free from corruption or error.

Privacy: The information provided is limited to meet the requirements of section 57 of the *Privacy and Personal Information Act 1998*.

Exporting and printing: Search results show a maximum of 50 rows per page. Search results can only be printed page by page.

More information: Should you require further information or technical assistance, please submit your request to water.enquiries@dpi.nsw.gov.au or contact 1800 353 104.

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

- [Water access licence \(WAL\) issued under the *Water Management Act 2000*](#)
- [Water Act 1912 Licences and Authorities](#)

Approval issued under the *Water Management Act 2000*

Approval Number ▼ ▼

Notes: The search results will list the conditions imposed on the approval and also list the number/s of any water access licence/s that nominate the water supply works associated with the approval.

This search tool does not include information about [controlled activity approvals](#). Information publicly available from a register of controlled activity approvals is available at our [local offices](#).

Find out if a *Water Act 1912* licence has been converted

- [Water licence conversion status](#)

[<<Previous](#) [Search](#)

[Print](#) [Export](#)

Search Results

Kind of Approval	Issue Date	Expiry Date	Approval Number	Status	Water Source
Water Supply Works	01-JUL-2011	24-NOV-2025	10WA103330	Current	Upper Nepean And Upstream Warragamba Water Source

Work Type	Description	No of Works	Location (Lot/DP)
Diversion Works - Pumps	50mm Centrifugal Pump	1	Lot 31, DP 1009967

Water Access Licences nominating these works

Reference Number	WAL Number
10AL103329	25616

- Conditions

Plan Conditions

Water sharing plan

Greater Metropolitan Region Unregulated River Water Sources

Take of water

MW0655-00001 Any water supply work authorised by this approval must take water in compliance with the conditions of the access licence under which water is being taken.

Water management works

MW0491-00001 When a water supply work authorised by this approval is to be abandoned or replaced, the approval holder must contact the relevant licensor in writing to verify whether the work must be decommissioned.

The work is to be decommissioned, unless the approval holder receives notice from the Minister not to do so.

Within sixty (60) days of decommissioning, the approval holder must notify the relevant licensor in writing that the work has been decommissioned.

Monitoring and recording

MW0481-00001 A logbook must be kept and maintained at the authorised work site or on the property for each water supply work authorised by this approval, unless the work is metered and fitted with a data logger.

MW2338-00001 The completed logbook must be retained for five (5) years from the last date recorded in the logbook.

MW0482-00001 Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.

Reporting

MW0051-00001 Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the Minister as soon as practicable. The Minister must be notified by:
A. email: water.enquiries@dpi.nsw.gov.au,
or
B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

Other Conditions

Water management works

DK0888-00001 Any water supply work authorised by this approval used for the purpose of conveying, diverting or storing water must be constructed or installed to allow free passage of floodwaters flowing into or from a river or lake.

DK0878-00001 A. The construction, installation or use of the water supply work authorised by this approval must not cause or increase erosion to the channel or bank of the watercourse.
B. If erosion is observed, the area must be stabilised with grass cover, stone pitching or any other material that will prevent any further occurrence of erosion.

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Exporting and printing: Search results show a maximum of 50 rows per page. Search results can only be printed page by page.

More information: Should you require further information or technical assistance, please submit your request to water.enquiries@dpi.nsw.gov.au or contact 1800 353 104.

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

Water access licence (WAL) issued under the *Water Management Act 2000*

Water Access Licence (WAL) Number

WAL

A WAL number starts with the letters 'WAL' followed by several numbers

Can't find your WAL number? Do you have a reference number? A reference number starts with a two digit number, followed by 'AL' and then several numbers. Use the following tool to find your WAL by entering your reference number. [Enter the reference number to find the WAL number.](#)

Notes:

The search results will list the conditions imposed on the water access licence. Any approved water supply work/s nominated on the water access licence are identified by the approval number/s for the work/s.

The information about a water access licence provided in the search results is a summary and may not always be up to date. If you require full and up to date details about a particular water access licence (including current holders, share and extraction component details, encumbrances and notations) you should search the [Water Access Licence Register](#) administered by Land and Property Information.

Approval issued under the *Water Management Act 2000*

Find out if a *Water Act 1912* licence has been converted

Water licence conversion status

[<< Previous](#) [Search](#)

[Print](#) [Export](#)

Search Results

Category [Subcategory]	Status	Water Source	Tenure Type	Management Zone	Share Components (units or ML)
Aquifer	Current	Coxs River Fractured Rock Groundwater Source	Continuing		20.00

Extraction Times or Rates

Subject to conditions water may be taken at any time or rate

Nominated Work Approval(s)

10WA119180

- Conditions

Plan Conditions

Water sharing plan

Greater Metropolitan Region Groundwater Sources

Take of water

- MW0929-00001 From 1 July 2018, if the water supply work nominated on this access licence is located at or less than 40 m from the top of the high bank of a river then:
- A. water must not be taken in this groundwater source when flows are in the Very Low Flow Class for an unregulated river access licence in that river.
 - B. This restriction will only apply when the system that confirms when water can be taken is available on DPI Water website.
 - C. DPI Water will inform the licence holder in writing of the applicable restrictions and how to access the information on its website when this system becomes operative.
- MW0605-00001 Water must be taken in compliance with the conditions of the approval for the nominated work on this access licence through which water is to be taken.
- MW0919-00001 A maximum water allocation of 0.1 ML/unit share may be carried over in the account for this access licence from one water year to the next water year if a water meter is installed on each water supply work nominated on this licence and each meter is maintained in working order.
- MW0547-00001 The total volume of water taken under this licence in any water year must not exceed a volume equal to:
- A. the sum of water in the account from the available water determination for the current year, plus
 - B. the water carried over in the account from the previous water year, plus
 - C. the net amount of water assigned to or from the account under a water allocation assignment, plus
 - D. any water re-credited by the Minister to the account.
- ##### Monitoring and recording
- MW2338-00001 The completed logbook must be retained for five (5) years from the last date recorded in the logbook.
- MW2336-00001 The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.
- MW2337-00001 The following information must be recorded in the logbook for each period of time that water is taken:
- A. date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and
 - B. the access licence number under which the water is taken, and
 - C. the approval number under which the water is taken, and
 - D. the volume of water taken for domestic consumption and/or stock watering.
- MW2339-00001 A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by DPI Water.
- ##### Reporting
- MW0051- Once the licence holder becomes aware of a breach of any condition on this access licence, the

00002 licence holder must notify the Minister as soon as practicable. The Minister must be notified by:
A. email: water.enquiries@dpi.nsw.gov.au,
or
B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

Other Conditions

NIL

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More information: Should you require further information or technical assistance, please submit your request to water.enquiries@dpi.nsw.gov.au or contact 1800 353 104.

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Select the type of licence or approval and enter the licence or approval number:

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- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

- [Water access licence \(WAL\) issued under the *Water Management Act 2000*](#)
- [Water Act 1912 Licences and Authorities](#)

Approval issued under the *Water Management Act 2000*

Approval Number ▼ ▼

Notes: The search results will list the conditions imposed on the approval and also list the number/s of any water access licence/s that nominate the water supply works associated with the approval.

This search tool does not include information about [controlled activity approvals](#). Information publicly available from a register of controlled activity approvals is available at our [local offices](#).

Find out if a *Water Act 1912* licence has been converted

- [Water licence conversion status](#)

[<<Previous](#) [Search](#)

[Print](#) [Export](#)

Search Results

Kind of Approval	Issue Date	Expiry Date	Approval Number	Status	Water Source
Water Supply Works	25-MAR-2015	24-MAR-2025	10WA119180	Current	Coxs River Fractured Rock Groundwater Source

Work Type	Description	No of Works	Location (Lot/DP)
Extraction Works Gw	Excavation - Groundwater	1	Lot 1, DP 1005511 Lot 2, DP 1005511

Water Access Licences nominating these works

Reference Number **WAL Number**

- Conditions**Plan Conditions****Water sharing plan****Greater Metropolitan Region Groundwater Sources****Take of water**

MW0655-00001 Any water supply work authorised by this approval must take water in compliance with the conditions of the access licence under which water is being taken.

Water management works

MW0097-00001 If contaminated water is found above the production aquifer during the construction of the water supply work authorised by this approval, the licensed driller must:

- A. notify the relevant licensor in writing within 48 hours of becoming aware of the contaminated water, and
- B. adhere to the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time.

MW0487-00001 The water supply work authorised by this approval must be constructed within three (3) years from the date this approval is granted.

MW0044-00001 A. When a water supply work authorised by this approval is to be abandoned or replaced, the approval holder must contact the relevant licensor in writing to verify whether the work must be decommissioned.

B. The work is to be decommissioned, unless the approval holder receives notice from the Minister not to do so.

C. When decommissioning the work the approval holder must:

- i. comply with the minimum requirements for decommissioning bores prescribed in the Minimum Construction Requirements for Water Bores in Australia (2012), as amended or replaced from time to time, and
- ii. notify the relevant licensor in writing within sixty (60) days of decommissioning that the work has been decommissioned.

Monitoring and recording

MW0484-00001 Before water is taken through the water supply work authorised by this approval, confirmation must be recorded in the logbook that cease to take conditions do not apply and water may be taken.

The method of confirming that water may be taken, such as visual inspection, internet search, must also be recorded in the logbook.

If water may be taken, the:

- A. date, and
- B. time of the confirmation, and
- C. flow rate or water level at the reference point in the water source must be recorded in the logbook.

MW2338-00001 The completed logbook must be retained for five (5) years from the last date recorded in the logbook.

MW2336-00001 The purpose or purposes for which water is taken, as well as details of the type of crop, area cropped, and dates of planting and harvesting, must be recorded in the logbook each time water is taken.

MW2337-00001 The following information must be recorded in the logbook for each period of time that water is taken:

- A. date, volume of water, start and end time when water was taken as well as the pump capacity

- per unit of time, and
- B. the access licence number under which the water is taken, and
- C. the approval number under which the water is taken, and
- D. the volume of water taken for domestic consumption and/or stock watering.

MW0482-00001 Where a water meter is installed on a water supply work authorised by this approval, the meter reading must be recorded in the logbook before taking water. This reading must be recorded every time water is to be taken.

MW2339-00001 A logbook must be kept, unless the work is metered and fitted with a data logger. The logbook must be produced for inspection when requested by the relevant licensor.

Reporting

MW0051-00001 Once the approval holder becomes aware of a breach of any condition on this approval, the approval holder must notify the Minister as soon as practicable. The Minister must be notified by:
A. email: water.enquiries@dpi.nsw.gov.au,
or
B. telephone: 1800 353 104. Any notification by telephone must also be confirmed in writing within seven (7) business days of the telephone call.

MK0485-00001 Within sixty (60) days of completing construction of the water supply work authorised by this approval, the approval holder must provide a completed Form A for that work to the relevant licensor.

Other Conditions

Monitoring and recording

DS2431-00001 A. Within 6 months of granting this approval, a monitoring plan to measure the water table, groundwater and surface water quality must be submitted to, and approved by, the relevant licensor, Parramatta Office.

B. Then, the water table, groundwater and surface water quality must be measured according to the approved plan.

C. All monitoring records must be kept for 10 years and provided to the relevant licensor when requested.

Disclaimer: The NSW Office of Water does not warrant the data is current nor does it warrant that the data or the data capturing processes are free from corruption or error.

Privacy: The information provided is limited to meet the requirements of section 57 of the *Privacy and Personal Information Act 1998*.

Exporting and printing: Search results show a maximum of 50 rows per page. Search results can only be printed page by page.

More information: Should you require further information or technical assistance, please submit your request to water.enquiries@dpi.nsw.gov.au or contact 1800 353 104.

Appendix E: Extractive Materials Return



RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2017

Quote RIMS ID in all correspondence

Quarry Id: Rims ID: 400891

Operators Name: AUS-10 RHYOLITE PTY LTD
Address: PO BOX 6770
SILVERWATER
NSW 1811

Email: lee.attard@hy-tec.com.au

Quarry Name: AUSTEN QUARRY
Quarry Location: LIDDLETON

Inquiries please telephone:
(02) 4931 6435
Completed or Nil Returns
Fax - (02) 4931 6776
Email - mineral.royalty@industry.nsw.gov.au
Postal Address (see address below)

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

The return should be completed and forwarded to the **STATISTICAL OFFICER, ROYALTY & ADVISORY SERVICES, NSW PLANNING & ENVIRONMENT, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2017.** If completion of the return is unavoidably delayed, an application for extension of time should be requested before the due date. If no work was done during the year, a **NIL** return must be forwarded.

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

Zane West, Royalties and Advisory Services Manager

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

Typical Geology RHYOLITE

Nearest Town to Quarry HARTLEY

Local Council Name LITHGOW

Deposited Plan and Lot Number/s of Quarry LT1, DP 100 5511, LT 2 DP 100 5511, LT 31 DP 100 9967


Email Address of Operator AS ABOVE

Name of Owner or Licensee AS ABOVE

Postal Address of Licensee AS ABOVE

Licence/Lease Number/s (if any)
From Mineral Resources NSW (Industry & Investment NSW) N/A
From Department of Lands or other Department N/A

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

- To the best of my knowledge, the particulars which have been entered in this return are correct and no blank spaces have been left where figures should have been inserted.
- SIGNATURE of PROPRIETOR or MANAGER  DATE 27/9/2017
- PERSON to be contacted if queries arise regarding this return DARRYL THIEDEKE
- NAME (Block letters) DARRYL THIEDEKE Telephone 02 96472866

SALES During 2016-2017

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

Product	Description	Quantity Tonnes
Virgin Materials		
• Crushed Coarse Aggregates		
Over 75mm		3532
Over 30mm to 75mm		6,791
5mm to 30mm		684,956
Under 5mm		—
Natural Sand		—
Manufactured Sand		221,159
Prepared Road Base & Sub Base		126,930
Other Unprocessed Materials		15,195
Recycled Materials		
• Crushed Coarse Aggregates		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• River Gravel		
Over 30mm		
5mm to 30mm		
Under 5mm		
• Construction Sand	Excluding Industrial	
• Industrial Sand		
Foundry, Moulding		
Glass		
Other (Specify)		
• Dimension Stone	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
• Decorative Aggregate	Including Terrazzo	
• Loam	Soil for Topdressing, Garden soil, Horticultural purposes)	
• TOTAL SITE PRODUCTION		1,058,563
• Gross Value (\$) of all Sales	\$27MILL	
• Type of Material	CONCRETE AGGREGATES + ROADBASE MATERIALS	
• Number of Full-Time Equivalent	Employees: 20	Contractors 3

Appendix F: Noise Monitoring Report



ATTENDED AND UNATTENDED
COMPLIANCE NOISE MONITORING
AUSTEN QUARRY, HARTLEY NSW

Hy-Tec

30 August 2017

Job Number 16070588B

Prepared by

Todoroski Air Sciences Pty Ltd

Suite 2B, 14 Glen Street

Eastwood, NSW 2122

Phone: (02) 9874 2123

Fax: (02) 9874 2125

Email: info@airsciences.com.au

Attended and Unattended Compliance Noise Monitoring Austen Quarry, Hartley NSW

Author(s): Aleks Todoroski

Position: Director

DOCUMENT CONTROL

Report Version	Date	Prepared by	Reviewed by
DRAFT - 001	30/11/2016	A Todoroski	A Todoroski
FINAL	30/8/2017	A Todoroski	A Todoroski

This report has been prepared in accordance with the scope of works between Todoroski Air Sciences Pty Ltd (TAS) and the client. TAS relies on and presumes accurate the information (or lack thereof) made available to it to conduct the work. If this is not the case, the findings of the report may change. TAS has applied the usual care and diligence of the profession prevailing at the time of preparing this report and commensurate with the information available. No other warranty or guarantee is implied in regard to the content and findings of the report. The report has been prepared exclusively for the use of the client, for the stated purpose and must be read in full. No responsibility is accepted for the use of the report or part thereof in any other context or by any third party.

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Figure 5-1:	Site layout and operational areas.....	4

1 INTRODUCTION

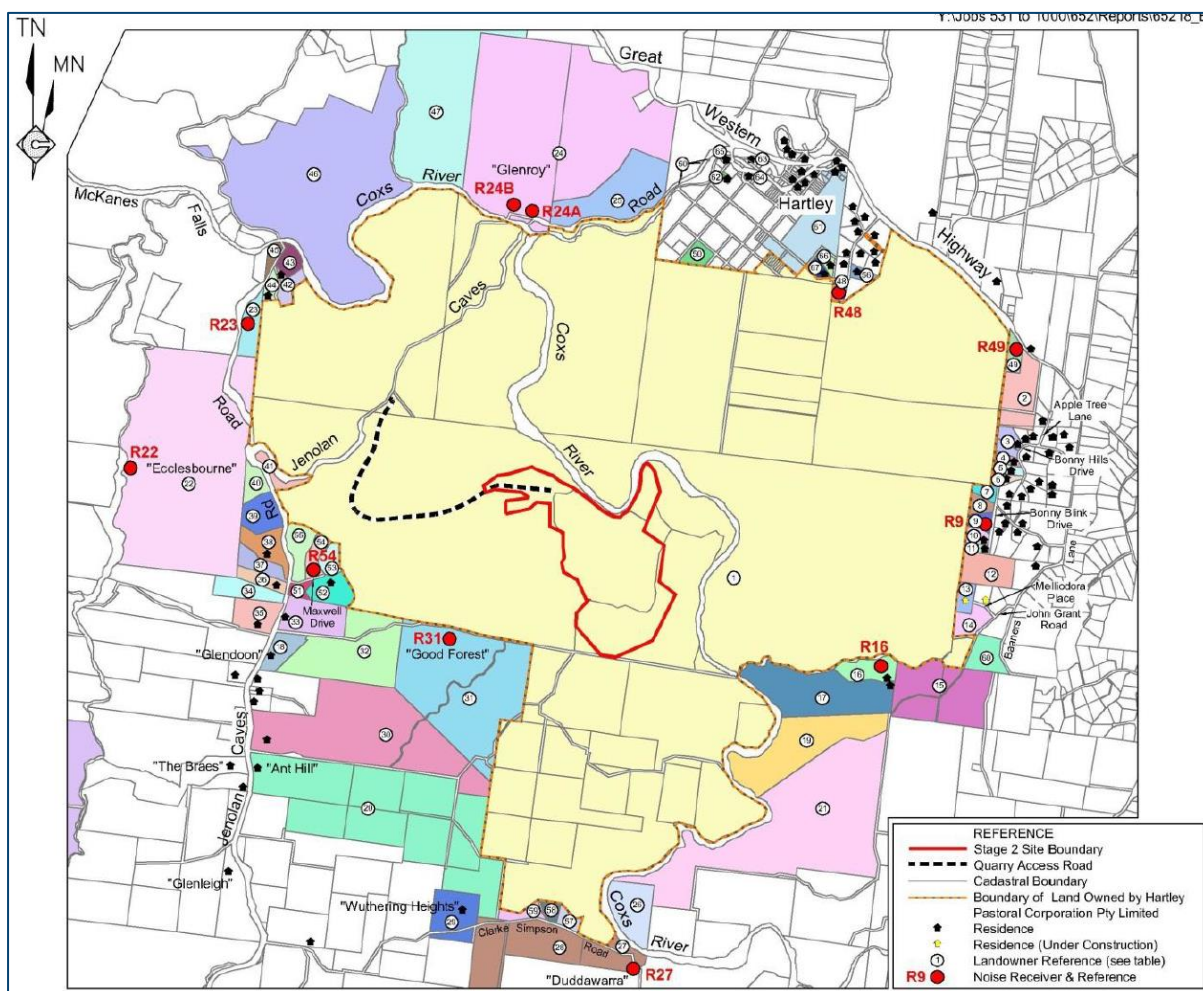
Todoroski Air Sciences have prepared this report on behalf of Hy-Tec Industries Pty Ltd (hereafter referred to as the Proponent). It presents the results of the attended and unattended noise monitoring campaign conducted in the vicinity of the Austen Quarry between 5 and 12 September 2016.

2 LOCAL SETTING

The Austen Quarry (see **Figure 2-1** Error! Reference source not found.) is located off Jenolan Caves Road, approximately 3.5 kilometres (km) south southwest of Hartley, New South Wales (NSW). The site is located in a valley near to the Cox's River, with the nearest receivers around the site ranging from approximately 1.7km to 3.1km away.

The local topography surrounding the Austen Quarry consists of rolling hills with the surrounding land use being predominantly rural agricultural with scattered residences.

The Austen Quarry development consent currently allows the extraction, screening and despatch of up to 1.1 million tonnes of rhyolite products per annum.



Source: Benbow Environmental (2014)

Figure 2-1: Austen Quarry location

3 NOISE MONITORING

Attended measurements were recorded on Wednesday, 5 September 2016 at the following receiver locations (shown in **Figure 2-1**):

- ✦ R31;
- ✦ R48; and,
- ✦ R24A.

Weather conditions on the day of attended monitoring were close to ideal with nearly calm winds for the majority of the day.

Unattended noise monitoring was undertaken at the nearest residential location R31 between Wednesday, 7 September 2016 and Monday, 12 September 2016.

The noise monitoring equipment used for these measurements consisted of environmental noise loggers set to A-weighted, fast response continuously monitoring over 15-minute sampling periods. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{A1} , L_{A10} , L_{A90} and L_{Aeq} levels of the existing noise environment. The L_{A1} , L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample time respectively. The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional pass-by of a heavy vehicle. The L_{A90} level is normally taken as the background noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and has the same sound energy average over the sampling period as the actual noise environment with its fluctuating sound levels.

All measured noise levels obtained from the unattended monitoring equipment are graphically summarised in **Appendix A**.



4 OPERATIONAL NOISE CRITERIA

The Development Consent (SSD-6084) and Environment Protection Licence (EPL 12323) for the Austen Quarry define the noise impact assessment criteria.

Table 4-1 summarises the applicable operational noise criteria.

Table 4-1: Operational noise criteria

Receiver	Day dB(A) _{L_{Aeq}(15min)}	Night dB(A) _{L_{Aeq}(15min)}	Morning Shoulder dB(A) _{L_{Aeq}(15min)}
All privately-owned residence	35	35	35

Table 4-2 outlines the permissible operating hours set out in the Development Consent (SSD-6084).

Table 4-2: Operating hours

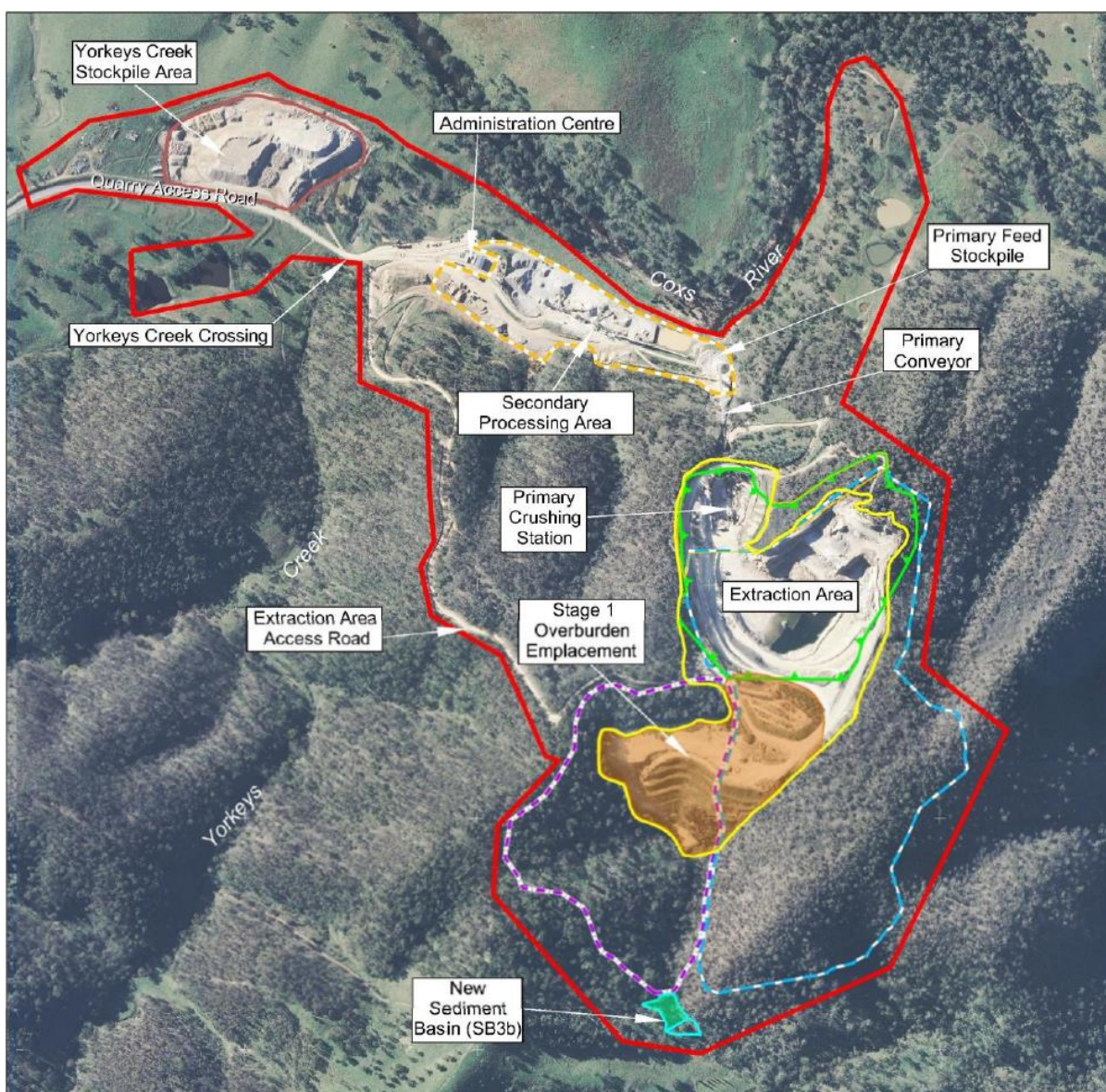
Activity	Permissible hours
Extraction operations Processing operations Overburden Management Stockpile Management	6am to 10pm Monday to Friday; 6am to 3pm Saturday; At no time on Sundays or public holidays.
Blasting	10am to 3pm Monday to Friday (except public holidays)
Loading and dispatch	5am to 10pm Monday to Friday; 5am to 3pm Saturdays; and At no time on Sundays or public holidays.
Maintenance	Anytime.

5 DESCRIPTION OF SITE OPERATIONS

Figure 5-1 presents the site layout and operational areas of the Austen Quarry.

During the time of the survey, the site was operating normally as confirmed through discussions with staff, and observations made when on-site.

When on-site, all equipment was observed to be operating normally, including the crushers, screens, excavators, trucks etc. From location R48, trucks could be seen entering and departing along the access road to the site during attended monitoring. Trucks hauling rejects up and over the rise were visually observed from location R31 during attended monitoring. Site activities could not be observed from the monitoring location R24A, but quarry trucks passed by along the public road adjacent to the site.



Source: Benbow Environmental (2014)

Figure 5-1: Site layout and operational areas

6 ASSESSMENT OF NOISE LEVELS

6.1 Attended Noise Monitoring

Based on site observations, weather conditions were suitable for conducting environmental noise measurements during the day of survey. The weather conditions were essentially calm or very light, intermittent winds from varying directions

Table 6-1 summarises the measurement results for the quarry noise and compares them against the relevant daytime noise criteria.

Table 6-1: Attended noise measurement results (5 September 2016)

Location	Time	$L_{Aeq,15min}$ due to Quarry Operations (dBA)	Criteria $L_{Aeq,15min}$ (dBA)	Comment
R48	5:47am to 6:02am	Inaudible	35	Highway traffic and individual vehicles could be distinctly heard along the Great Western Highway and Jenolan Caves Road. Birdsong and highway traffic dominate noise levels, 47.1dB(A), $L_{Aeq,15min}$. Engine braking on highway is clearly discernible.
R48	6:03am to 6:18am	Inaudible	35	As above, birdsong and highway traffic dominate noise levels, 45.8 dB(A), $L_{Aeq,15min}$. Trucks entering and leaving via the site access road were visually observed, but inaudible at all times. Fast moving vehicles on the public road near the quarry were visible and audible. Engine braking on highway is clearly discernible.
R24A	6:26am to 6:41am	Inaudible	35	Noise levels dominated by the rushing water of the river, Birdsong and highway traffic dominated noise levels, 64.7dB(A), $L_{Aeq,15min}$, and passing vehicles. Engine braking is clearly discernible, along with vehicle noise on the wooden bridge nearby.
R31	6:57am to 7:12am	Inaudible	35	Measurement at the nearest and potentially most impacted receptor indicate no audible noise from the site. Bird noise dominates the soundscape 44.9 dB(A), $L_{Aeq,15min}$
R31	7:17am to 7:32am	<31*	35	As above, 44.4 dB(A), $L_{Aeq,15min}$ except that a haul truck carting rejects up and over a ridge was visually observed, and was barely audible for approx. 4secs, when meter readings were approx. 34 dB(A). Return trip was not audible.
R31	15:02pm to 15:17pm	Inaudible	35	Bird noise dominates the soundscape, 37.3 dB(A), $L_{Aeq,15min}$.
R24A	15:30pm to 15:45pm	Inaudible	35	Noise levels dominated by the rushing water of the river, 64.9 $L_{Aeq,15min}$, and passing vehicles. Engine braking is clearly discernible, as is vehicle noise on the wooden bridge nearby.
R48	15:53pm to 16:08pm	Inaudible	35	Highway noise audible and constant, engine braking noise less dominant than in the morning, Bird call a significant source also, and some buzzing insects, 49.7 dB(A), $L_{Aeq,15min}$

* Estimated based on observed meter readings at the time and barely audible noise from the source.

The results of the attended measurements indicated that noise emissions from the Austen Quarry are within the applicable limits at all identified receivers.

6.1.1 Other anthropogenic noise sources

Whilst undertaking the attended noise monitoring, noteworthy various other man made sources of noise were apparent. Truck engine brake noise on public roads was evident at two locations, and is commented on in this section.

At location R48, truck engine brake noise along the Great Western Highway was significant. Individual vehicles up to approximately 2.4km away could be seen (headlights and truck body lights) and heard on their downhill eastbound paths, and trucks approximately 1km away were not visible, but could be heard on their downhill westbound paths. A few of the trucks were much louder than others in this regard, possibly due to ineffective mufflers or exhaust design.

Engine braking noise was also evident along the Jenolan Caves Road on the downhill approaches both northbound and southbound towards the bridge near R24A. Loud rattling of the wooden bridge planks was also noticeable.

The observations made at R24A included a count of vehicles. Trucks made up a significant portion of the traffic, however most of the trucks were not associated with the operation. Whilst the count was only made over a limited 15-minute period, 23 of the 78 vehicles observed were trucks of various sizes, and two trucks were from the site. Other quarry trucks were observed, but carried the brand of other quarries and it was confirmed with the site that these other branded trucks are not associated with the site.

The observed engine braking noise was not associated with the site trucks that passed by, nor with some modern taut-liner trucks and B-doubles which also passed by. Engine braking noise was most apparent for older trucks with large bore twin exhaust pipes.

6.2 Unattended Noise Monitoring

Table 6-2 provides a summary of the noise results as $L_{Aeq,15min}$ levels recorded at R31 for the day, evening and night periods during operating hours. The complete results are plotted in **Appendix A**.

Table 6-2: Unattended noise measurement results during operating hours

Location	Measured ambient level during operating hours $L_{Aeq,15min}$ (dB(A))		
	Day (7 am-6pm Mon-Fri & 7am-3pm Sat)	Evening (6pm-10pm Mon-Fri)	Night (5am-7am Mon-Sat)
R31	48.6	38.3	48.5

The L_{90} levels shown in **Appendix A** indicate that generally low background levels prevail. Noting that the dominant noise sources on the site (crushers and screens) operate continuously from 7 am to 5pm, the data suggest that the site has no adverse effect on the local noise amenity as there is no discernible change in the noise levels recorded when the main noise sources either start or cease operating.

The L_1 and L_{eq} daytime levels shown in **Appendix A** indicate the potential effect of short, loud noises such as a barking dog or birdcalls made near to the monitor.

The results are consistent with the site observations which indicate that there is significant birdsong in the morning, and that the unattended monitoring location experiences noise from sources nearby such as vehicles, heavy plant and trucks, barking dogs and also natural noise associated with birds, wind in trees, insects and frogs. The residence at R31 is owned by a truck/ plant operator thus heavy vehicles are present at the location, with the driveway encircling the dwelling.



7 DISCUSSION AND CONCLUSIONS

A compliance noise monitoring survey was conducted between Monday 5 September 2016 and Monday, 12 September 2016 and included both attended and unattended measurements.

The attended measurements were conducted under conditions of likely noise enhancement (in the early morning). No audible noise from the site could be detected at any nearby residential location, except for a brief period (approx. 4 seconds) of barely detectable noise from a single truck movement up and over a ridge which was estimated to be below the applicable criteria of 35dB(A) (for approx. 4 seconds). The hauling of rejects up and over the ridge is an infrequent activity and is normally confined to a few movements during daytime hours. Discussions with the residents at R31 suggest that they have never heard noise from the site.

Traffic noise from individual, observable vehicles (not associated with the quarry) on the public road near the quarry could be heard at R48. The indication is that there was significant noise enhancement between the site and monitoring location, but this was insufficient to make the site activity audible, including truck movement on the site access road. It should be noted that trucks move relatively slowly on the site access road, and that the noisiest activities at the site (crushers, etc.) are situated low down in the terrain whereas the public road is elevated and carries traffic at higher speeds.

It was also observed that approximately one in three trucks observed on Jenolan Caves Road were using their engine brakes despite road signs to limit engine braking. It is noted that greater engine braking noise was associated with the Great Western Highway.

None of the trucks associated with the site were observed to generate engine braking noise.

It is concluded that the measurements and observations indicate that noise emissions from the Austen Quarry were within the limits set in the Development Consent and EPL at all of the assessed nearby receivers.



8 REFERENCES

Benbow Environmental (2014)

“Austen Quarry Stage 2 Extension Project Noise and Vibration Impact Assessment”, prepared for Hy-Tec Industries by Benbow Environmental, September 2014.



Appendix A

Unattended Noise Measurement Results



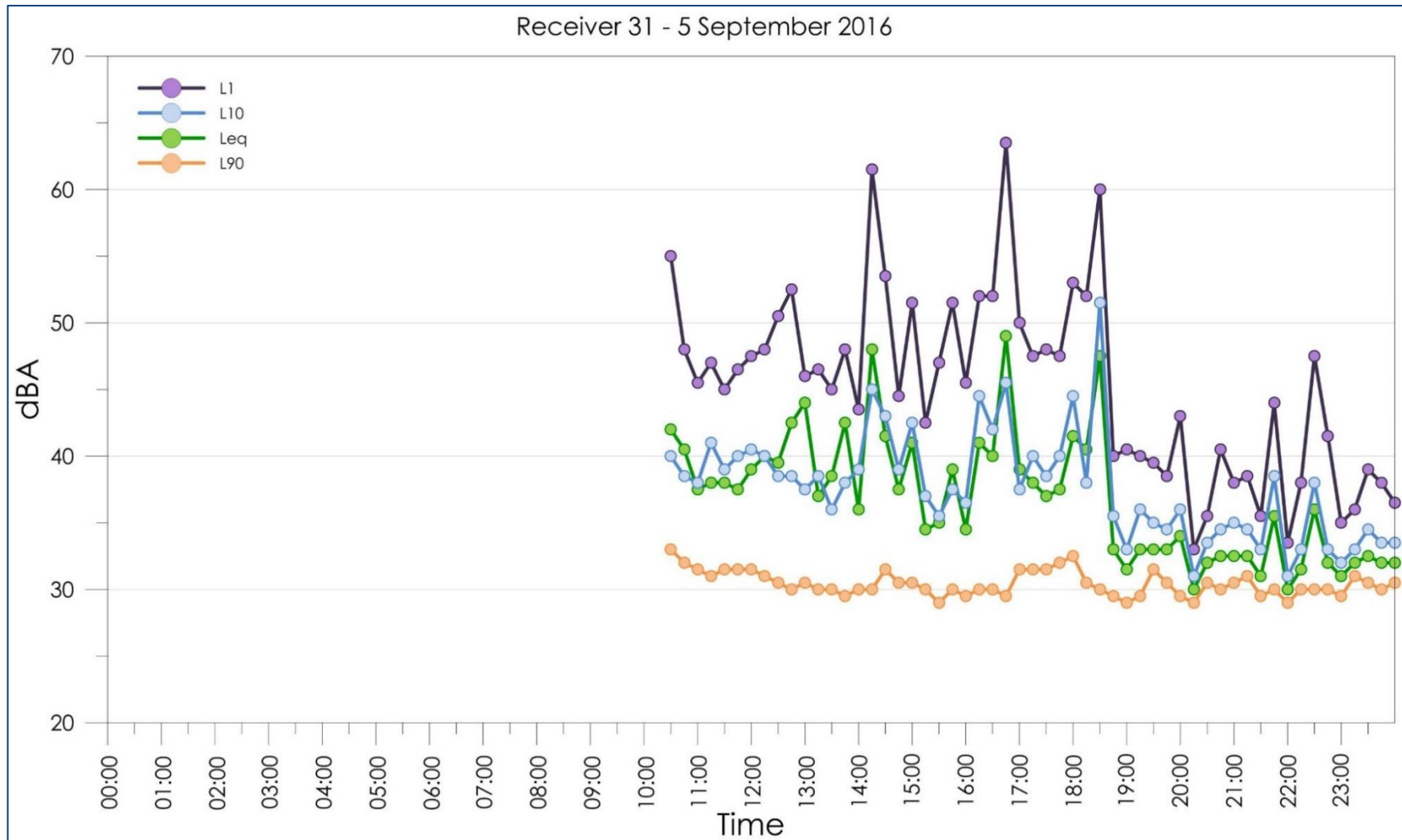


Figure A-1: Unattended noise monitoring results at R31 – 5 September 2016

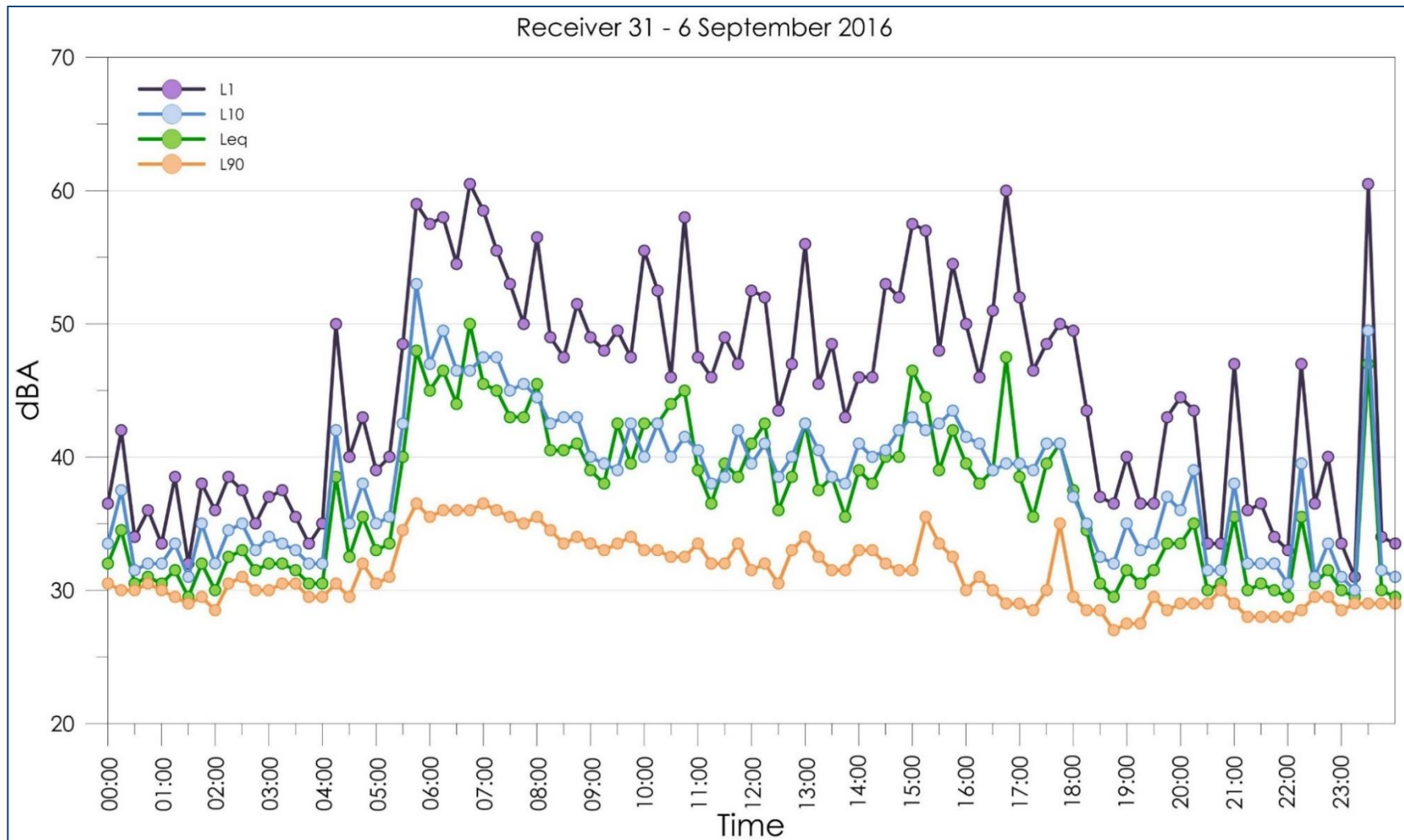


Figure A-2: Unattended noise monitoring results at R31 – 6 September 2016

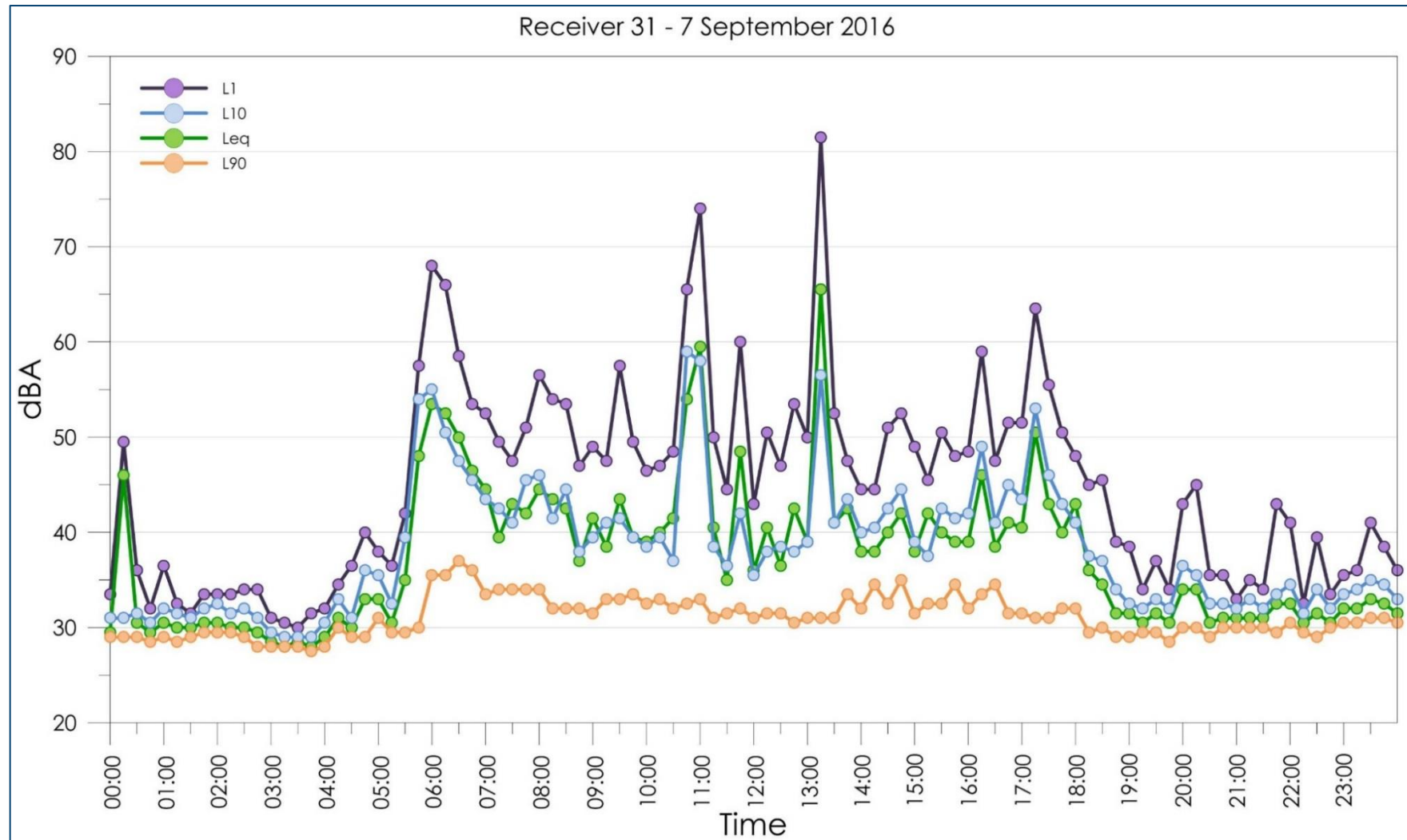


Figure A-3: Unattended noise monitoring results at R31 – 7 September 2016

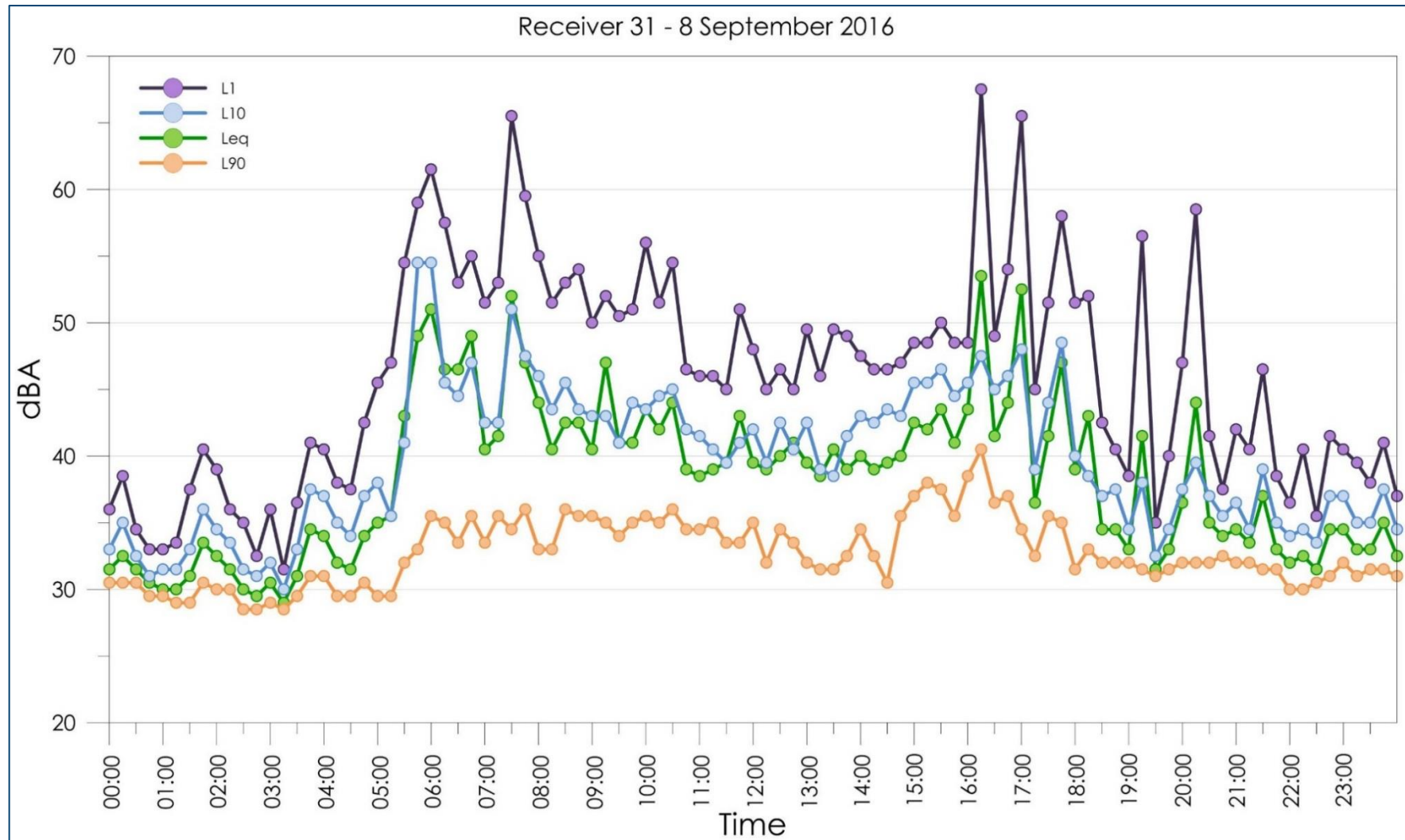


Figure A-4: Unattended noise monitoring results at R31 – 8 September 2016

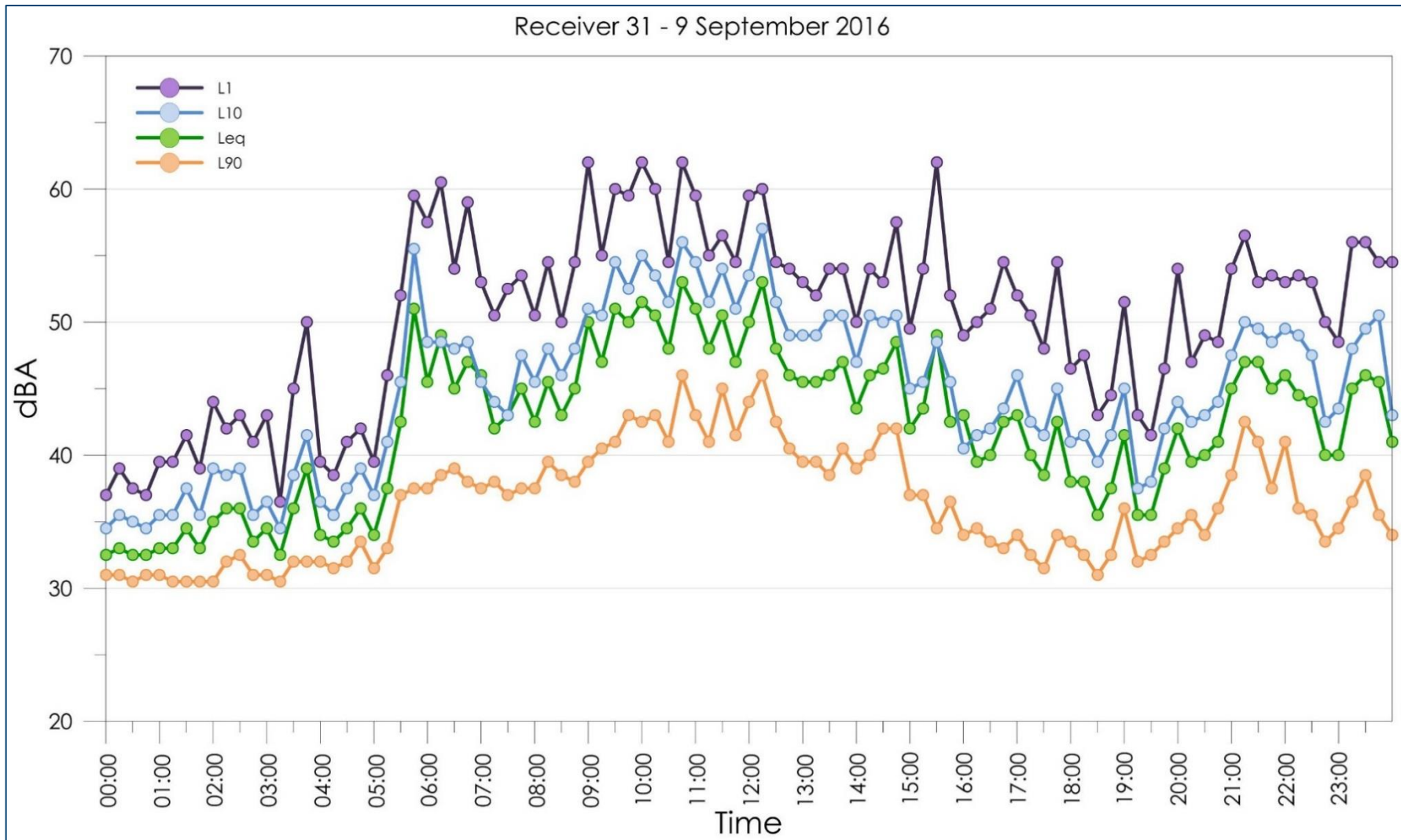


Figure A-5: Unattended noise monitoring results at R31 – 9 September 2016

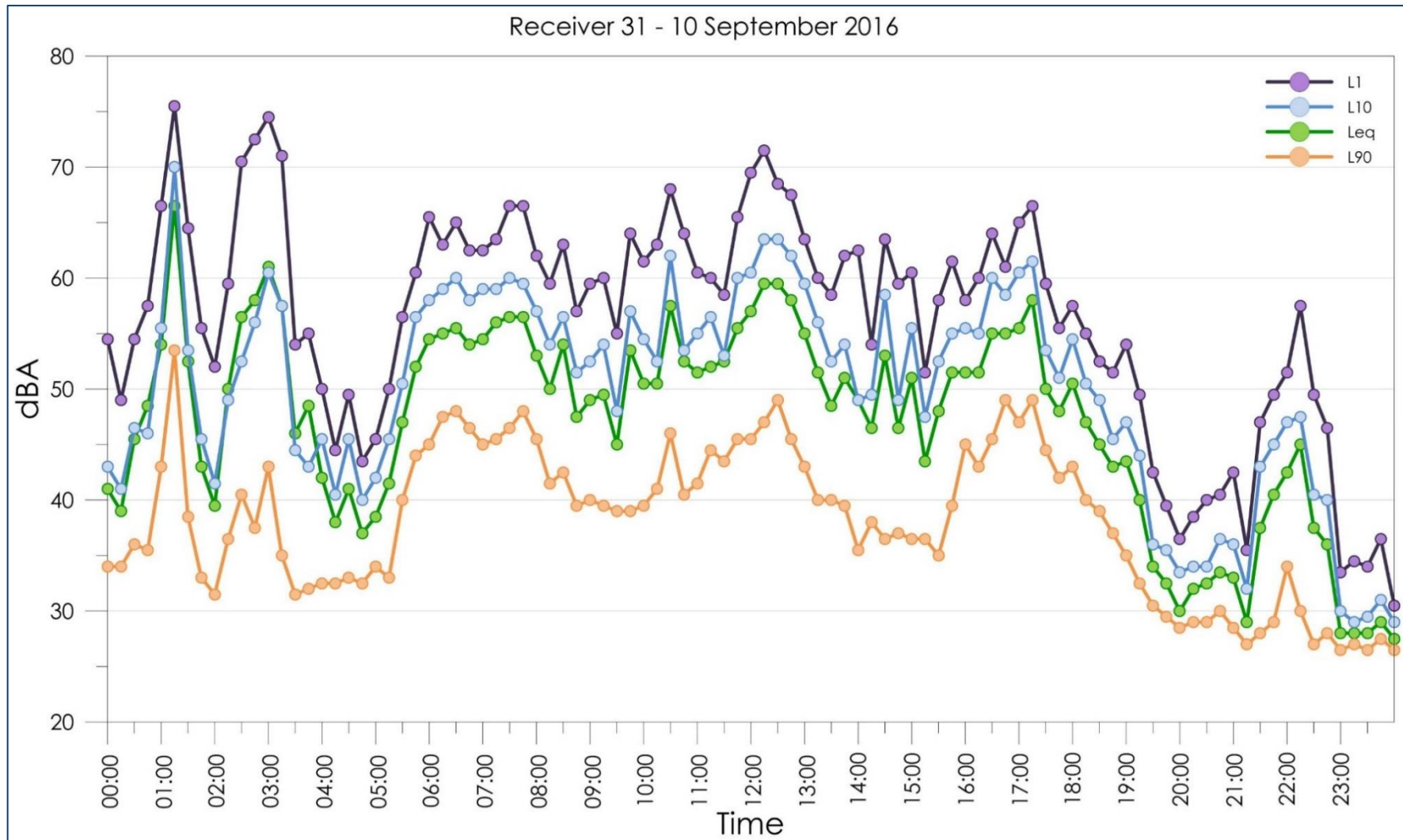


Figure A-6: Unattended noise monitoring results at R31 – 10 September 2016

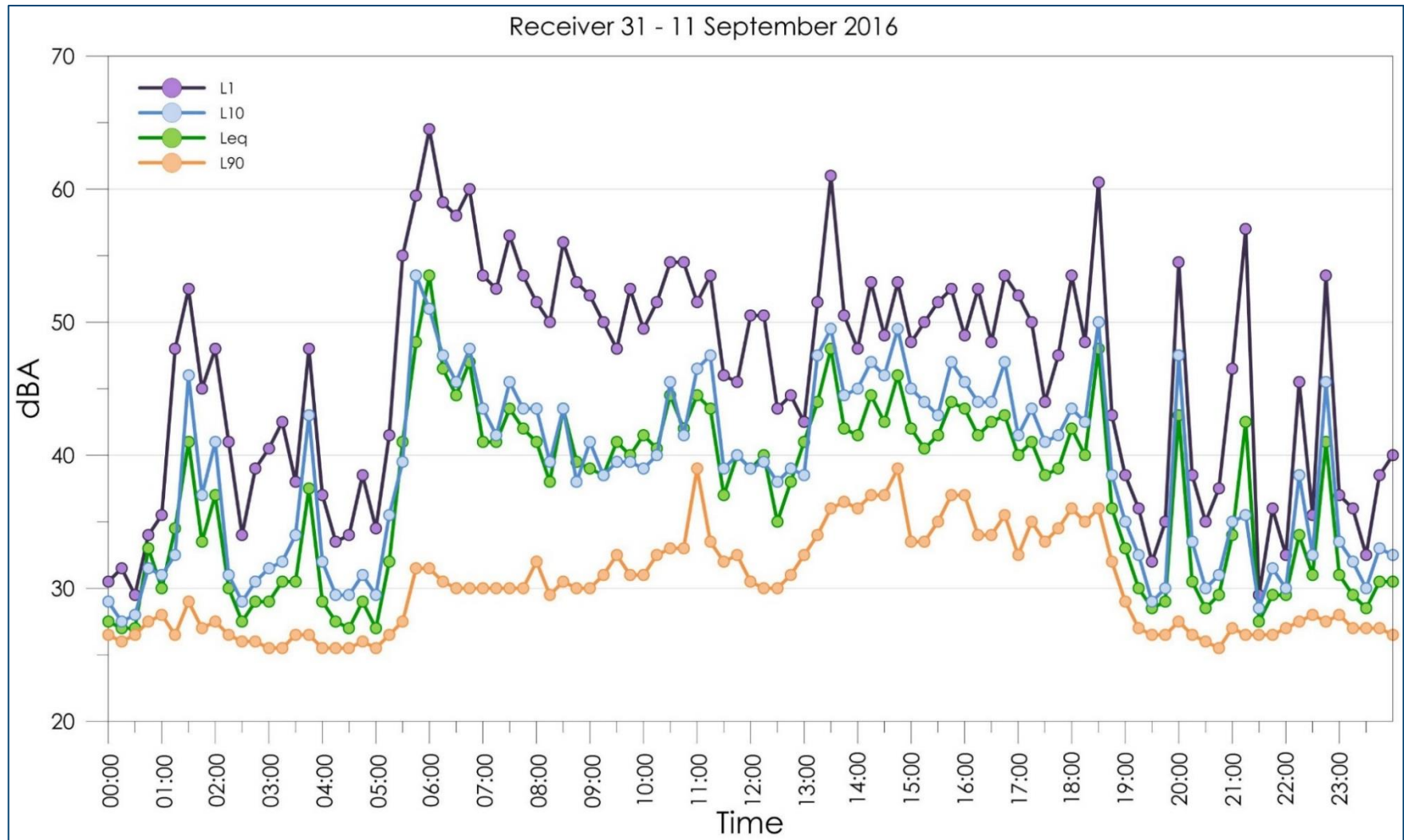


Figure A-7: Unattended noise monitoring results at R31 – 11 September 2016

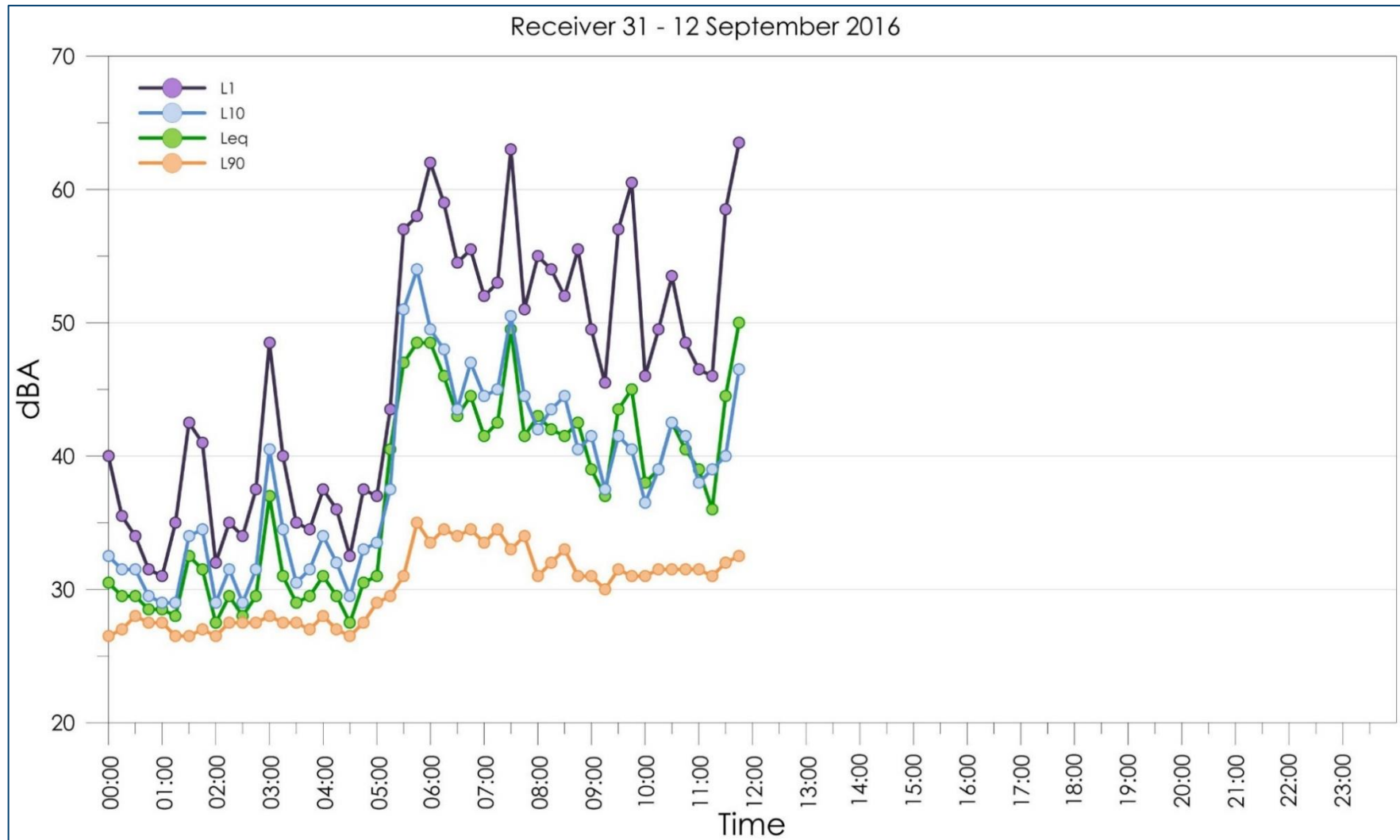


Figure A-8: Unattended noise monitoring results at R31 – 12 September 2016

Appendix G: Air Quality Monitoring Report



Hy-Tec Industries Pty Limited

ABN: 90 070 100 702

Austen Quarry

Particulate Matter Monitoring Report

March to June 2017

Prepared for:

Hy-Tec Industries Pty Limited
ABN: 90 070 100 702
Unit 4 Gateway Business Park
63-79 Parramatta Road
SILVERWATER NSW 2128

Telephone: (02) 9647 2866
Fax: (02) 9647 2924
Email: darryl.thiedeke@hy-tec.com.au

Prepared by:

R.W. Corkery & Co. Pty. Limited
Geological & Environmental Consultants
ABN: 31 002 033 712

Brooklyn Office:

1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Telephone: (02) 9985 8511
Facsimile: (02) 6361 3622
Email: brooklyn@rwcorkery.com

Orange Office:

62 Hill Street
ORANGE NSW 2800

Telephone: (02) 6362 5411
Facsimile: (02) 6361 3622
Email: orange@rwcorkery.com

Brisbane Office:

Suite 5, Building 3
Pine Rivers Office Park
205 Leitchs Road
BRENDALE QLD 4500

Telephone: (07) 3205 5400
Facsimile: (02) 6361 3622
Email: brisbane@rwcorkery.com

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1.1 REVIEW OF PARTICULATE MATTER (PM₁₀) MONITORING

Hy-Tec Industries Pty Ltd installed a continuous particulate matter monitor in March 2017 in accordance with the approved Air Quality Management Plan and in order to demonstrate compliance with the air quality assessment criteria contained in Condition 10 of Schedule 3 of Development Consent SSD 6084 (“SSD 6084”). The first available data were recorded on 14 March 2017 following calibration of the equipment. The location of the particulate matter monitor is displayed in **Attachment 1** and the data recorded for 24-Hour PM₁₀ for the period from 14 March 2017 to 30 June 2017 presented in **Appendix 1**. PM₁₀ is recorded continuously by the monitor and a daily 24-hour total considered as a rolling total for each day.

Table 1 presents the assessment criteria described in Condition 10 of Schedule 3 of SSD 6084 relevant to particulate matter and reflected in the approved Air Quality Management Plan.

Table 1
Assessment Criteria

Pollutant	Averaging Period	Criterion (µg/m ³)
Particulate Matter (PM ₁₀)	24hr Maximum	50
Particulate Matter (PM ₁₀)	Annual Average	30
Total suspended particulates (TSP)	Annual Average	90

The Austen Quarry is located in a rural area with limited dust sources. Local agricultural activities such as cattle grazing or cultivation would generate dust, however, these activities would not be expected to result in levels that exceed criteria levels. Possible sources of particulate matter other than extractive activities that may cause elevated results include bush fires, wood smoke and localised works including road works and agricultural activities in the vicinity of the monitor. In addition, it should be noted that the particulate matter monitor is located in an easement for a powerline and local maintenance activities may result in elevated particulate matter results.

Figure 2 displays monitoring results for 24hr PM₁₀ for the period from 14 March 2017 to 30 June 2017. All monitoring during the reporting period returned results within the 24-hour PM₁₀ criterion.

12 months of monitoring data are not yet available to consider annual average PM₁₀ levels, however the average of data recorded during the period from 14 March 2017 to 30 June 2017 indicates an average of approximately 6.0µg/m³, well below the criterion of 30µg/m³.

In accordance with the approved Air Quality Management Plan, compliance with criteria for total suspended particulates (TSP) is to be considered through monitored PM₁₀, recognising that PM₁₀ constitutes approximately 40% of TSP. As 12 months of monitoring data are not available, it is not possible to review annual average levels at this time. However, based on the data available, average TSP levels are estimated to be approximately 15.0µg/m³, which is well below the criterion of 90µg/m³.

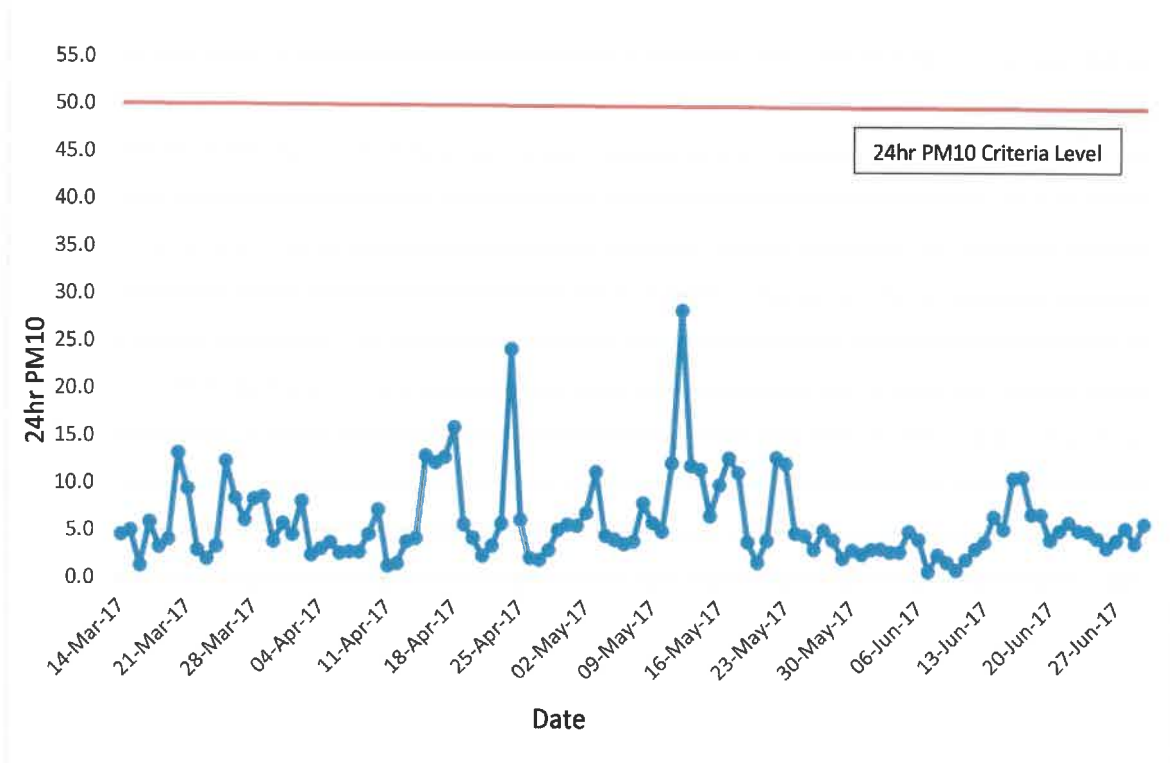


Figure 1 24-hour PM₁₀ Monitoring (14 March 2017 to 30 June 2017)

1.2 COMPARISON OF RESULTS WITH HISTORIC TRENDS AND PREVIOUS PREDICTIONS

The particulate matter monitor has been positioned relative to Residence 31 as the air quality assessment for the Stage 2 development of the Austen Quarry (Benbow, 2014) predicted highest particulate matter levels would be recorded at this location, albeit within criteria levels. The worst-case scenario predictions at Residence 31 are presented in Table 2 and compared to the results of monitoring to date.

Table 2
Comparison of Predicted Particulate Matter Levels at R31 and Monitoring Results

Pollutant	Criterion (µg/m ³)	R31 Predicted Maximum (µg/m ³)	Monitoring Results (µg/m ³)
24hr Maximum PM ₁₀	50	48.4	28.4*
Annual Average PM ₁₀	30	8.6	6.0*
Annual Average TSP	90	8.6	15.0*

*Based on approximately 3.5 months of data

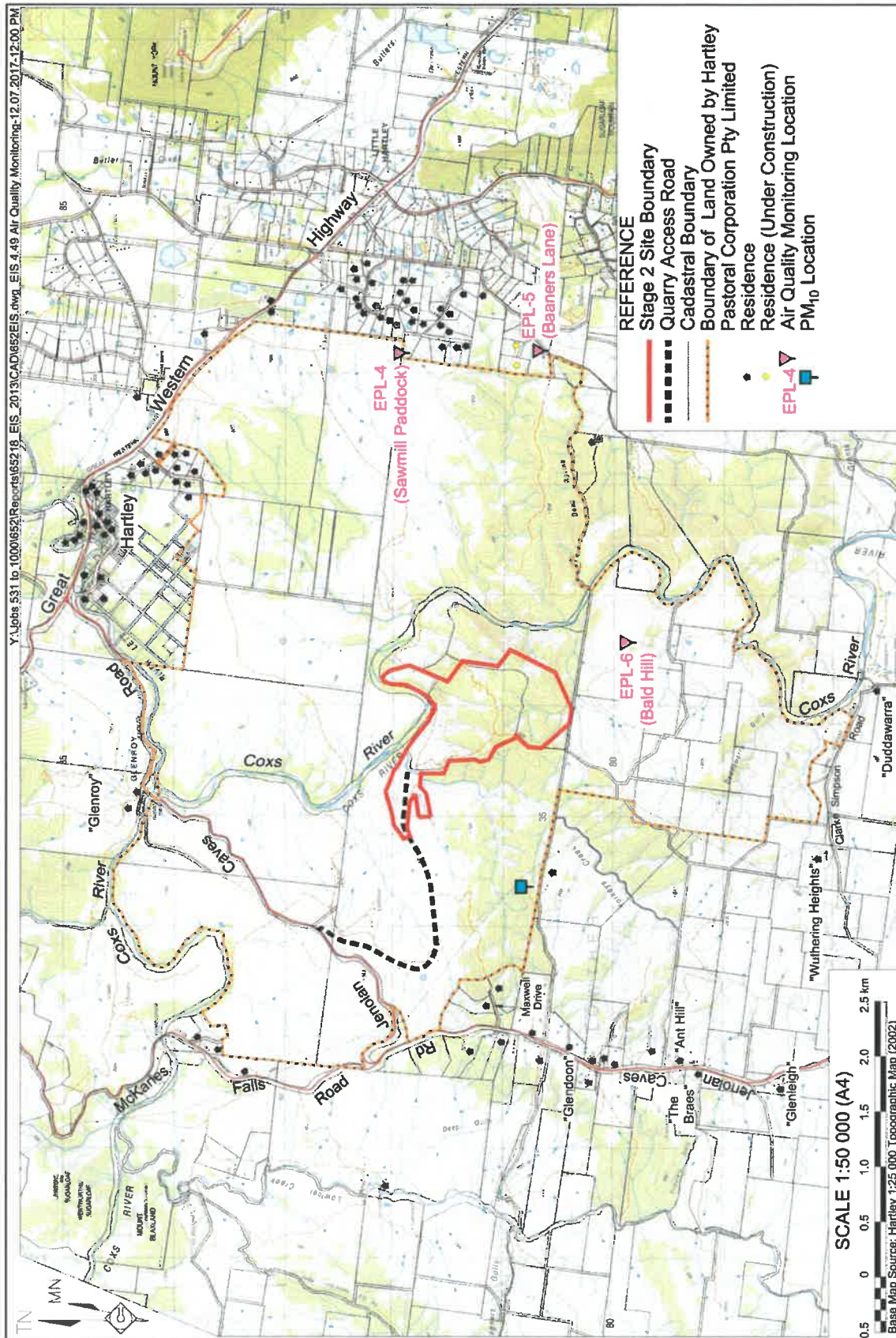
The results for 24-hour PM₁₀ are consistent with the predictions at Residence 31 (excluding the two recorded exceedances discussed above). It should also be noted that the 90th percentile 24-hour PM₁₀ record for the monitoring period was 12.2µg/m³, and the median value was 4.6µg/m³. Annual average TSP is higher than that predicted in the air quality assessment, albeit within criteria levels.

1.3 MANAGEMENT ACTIONS

No further management measures were required to address air quality during the reporting period. Monitoring will continue to be conducted in accordance with the approved Air Quality Management Plan.



ATTACHMENT 1



APPENDIX 1 - PARTICULATE MATTER MONITORING RESULTS

14 March 2017 to 30 June 2017

Date	24-Hr PM10 (µg/m)
Tuesday, 14 March 2017	4.5
Wednesday, 15 March 2017	5.0
Thursday, 16 March 2017	1.3
Friday, 17 March 2017	5.9
Saturday, 18 March 2017	3.2
Sunday, 19 March 2017	4.1
Monday, 20 March 2017	13.2
Tuesday, 21 March 2017	9.4
Wednesday, 22 March 2017	2.9
Thursday, 23 March 2017	2.0
Friday, 24 March 2017	3.3
Saturday, 25 March 2017	12.3
Sunday, 26 March 2017	8.4
Monday, 27 March 2017	6.1
Tuesday, 28 March 2017	8.3
Wednesday, 29 March 2017	8.6
Thursday, 30 March 2017	3.8
Friday, 31 March 2017	5.8
Saturday, 1 April 2017	4.6
Sunday, 2 April 2017	8.1
Monday, 3 April 2017	2.4
Tuesday, 4 April 2017	3.1
Wednesday, 5 April 2017	3.8
Thursday, 6 April 2017	5.8
Friday, 7 April 2017	2.8
Saturday, 8 April 2017	2.8
Sunday, 9 April 2017	4.6
Monday, 10 April 2017	7.2
Tuesday, 11 April 2017	1.3
Wednesday, 12 April 2017	1.5
Thursday, 13 April 2017	3.9
Friday, 14 April 2017	4.2
Saturday, 15 April 2017	13.0
Sunday, 16 April 2017	12.2
Monday, 17 April 2017	12.8
Tuesday, 18 April 2017	16.0
Wednesday, 19 April 2017	5.7

Date	24-Hr PM10 (µg/m)
Thursday, 20 April 2017	4.3
Friday, 21 April 2017	2.4
Saturday, 22 April 2017	3.5
Sunday, 23 April 2017	5.8
Monday, 24 April 2017	24.2
Tuesday, 25 April 2017	6.2
Wednesday, 26 April 2017	2.2
Thursday, 27 April 2017	2.0
Friday, 28 April 2017	3.0
Saturday, 29 April 2017	5.2
Sunday, 30 April 2017	5.7
Monday, 1 May 2017	5.6
Tuesday, 2 May 2017	6.9
Wednesday, 3 May 2017	11.3
Thursday, 4 May 2017	4.6
Friday, 5 May 2017	4.1
Saturday, 6 May 2017	3.7
Sunday, 7 May 2017	3.9
Monday, 8 May 2017	8.0
Tuesday, 9 May 2017	5.9
Wednesday, 10 May 2017	5.0
Thursday, 11 May 2017	12.2
Friday, 12 May 2017	28.4
Saturday, 13 May 2017	11.9
Sunday, 14 May 2017	11.6
Monday, 15 May 2017	6.7
Tuesday, 16 May 2017	9.9
Wednesday, 17 May 2017	12.8
Thursday, 18 May 2017	11.2
Friday, 19 May 2017	3.9
Saturday, 20 May 2017	1.7
Sunday, 21 May 2017	4.1
Monday, 22 May 2017	12.8
Tuesday, 23 May 2017	12.2
Wednesday, 24 May 2017	4.8
Thursday, 25 May 2017	4.6
Friday, 26 May 2017	3.1



Date	24-Hr PM10 (µg/m)
Saturday, 27 May 2017	5.2
Sunday, 28 May 2017	4.1
Monday, 29 May 2017	2.2
Tuesday, 30 May 2017	3.1
Wednesday, 31 May 2017	2.6
Thursday, 1 June 2017	3.2
Friday, 2 June 2017	3.2
Saturday, 3 June 2017	2.9
Sunday, 4 June 2017	2.9
Monday, 5 June 2017	5.1
Tuesday, 6 June 2017	4.2
Wednesday, 7 June 2017	0.9
Thursday, 8 June 2017	2.6
Friday, 9 June 2017	1.8
Saturday, 10 June 2017	1.0
Sunday, 11 June 2017	2.1
Monday, 12 June 2017	3.2
Tuesday, 13 June 2017	4.0
Wednesday, 14 June 2017	6.7
Thursday, 15 June 2017	5.3
Friday, 16 June 2017	10.7
Saturday, 17 June 2017	10.9
Sunday, 18 June 2017	6.9
Monday, 19 June 2017	6.9
Tuesday, 20 June 2017	4.2
Wednesday, 21 June 2017	5.2
Thursday, 22 June 2017	6.1
Friday, 23 June 2017	5.2
Saturday, 24 June 2017	5.1
Sunday, 25 June 2017	4.4
Monday, 26 June 2017	3.4
Tuesday, 27 June 2017	4.1
Wednesday, 28 June 2017	5.4
Thursday, 29 June 2017	3.8
Friday, 30 June 2017	5.9
Average	6.0
Maximum	28.4
90th Percentile	12.2
Median	4.6
Minimum	0.9

Appendix H: Terrestrial Ecology Monitoring Report and Pre-clearing Surveys



**Aus-10 Rhyolite Pty
Ltd**

**Ecological
Monitoring Report
November 2016
Aus-10 Quarry,
Hartley**

J061_RPT8_V1_Aus-10 Quarry Eco Mon
Report Nov 2016

November 2016

Document Control

File name	J061_RPT8_V1_Aus-10 Quarry Eco Mon Report Nov 2016		
Report name	Ecological Monitoring Report November 2016 - Aus-10 Quarry, Hartley		
Document Version	1		
Prepared by:	Callan Douchkov	Date:	1/7/2017
Authorised by:	David Bone	Date:	2/8/2017

Disclaimer

This report has been prepared by Onsite Environmental Management Pty Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. We disclaim any responsibility to the client and others in respect of any matters outside the agreed scope of work. This report is confidential to the client and we accept no responsibility whatsoever for third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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Appendices

Appendix A Survey Species List

Appendix B Noxious Weed Information Sheets

Appendix C Threatened Species Database Searches

1. Introduction

1.1 Introduction

The objective of this assessment is to:

-) Undertake an ecological sampling program to provide the data required to assess whether the quarry is compliant with the consent conditions under which it operates;
-) Sample flora and fauna species at representative sites;
-) Conduct flora and fauna surveys across all parts of the quarry lease area to assess areas to be impacted during the upcoming seasons;
-) Identify any threatened species or communities occurring in the vicinity of the quarry which have been newly listed since the previous survey;
-) Analyse the data and determine if the quarry site is having any indirect impacts on the ecology of the surrounding area; and,
-) Provide management recommendations to preserve significant ecology that may be present on the project site and minimise negative impacts to the local ecology in general.

1.2 Site Visit

Flora and Fauna surveys were conducted by David Bone and Callan Douchkov over a three day and two night period between the 22nd of November 2016 and the 24th of November 2016. Weather conditions during the survey were mild mornings and warm throughout the day, ranging between 5.2 – 27.6 degrees. Average wind speeds were calm to moderate, not exceeding 15 km/h from the North-North West, with no rainfall during the survey period.

2. Background Information

2.1 Existing Site Description

The project site comprises the mining lease area which contains an active mining area, processing and workshop areas, material stockpiles, and steep rocky woodland areas. The site is approximately 12.9 hectares (ha). To the immediate north of the site is the Cox's River. The river is sparsely vegetated close to the quarry areas as a result of past grazing activities. The river currently has a thin strip of vegetation along the banks of the creek (20m to 50m) and is then open grazing land.

To the east of the quarry area is naturally vegetated steep and rocky ridgelines. To the south and west of the site the steep naturally vegetated ridgelines continue with some cleared section

at the bases of the ridges used for grazing. These cleared areas are over two kilometres from the quarry to the south. The project site can be seen in Figures 1 and 2.

The site is located approximately 3.5km south of the village of Hartley which is to the west of the Blue Mountains Escarpment. The elevation of the site varies from approximately 650 to 750 metres (m) above sea level. Yorkey's Creek, a tributary of the Cox's River enters from the south near the processing area.



061-2006

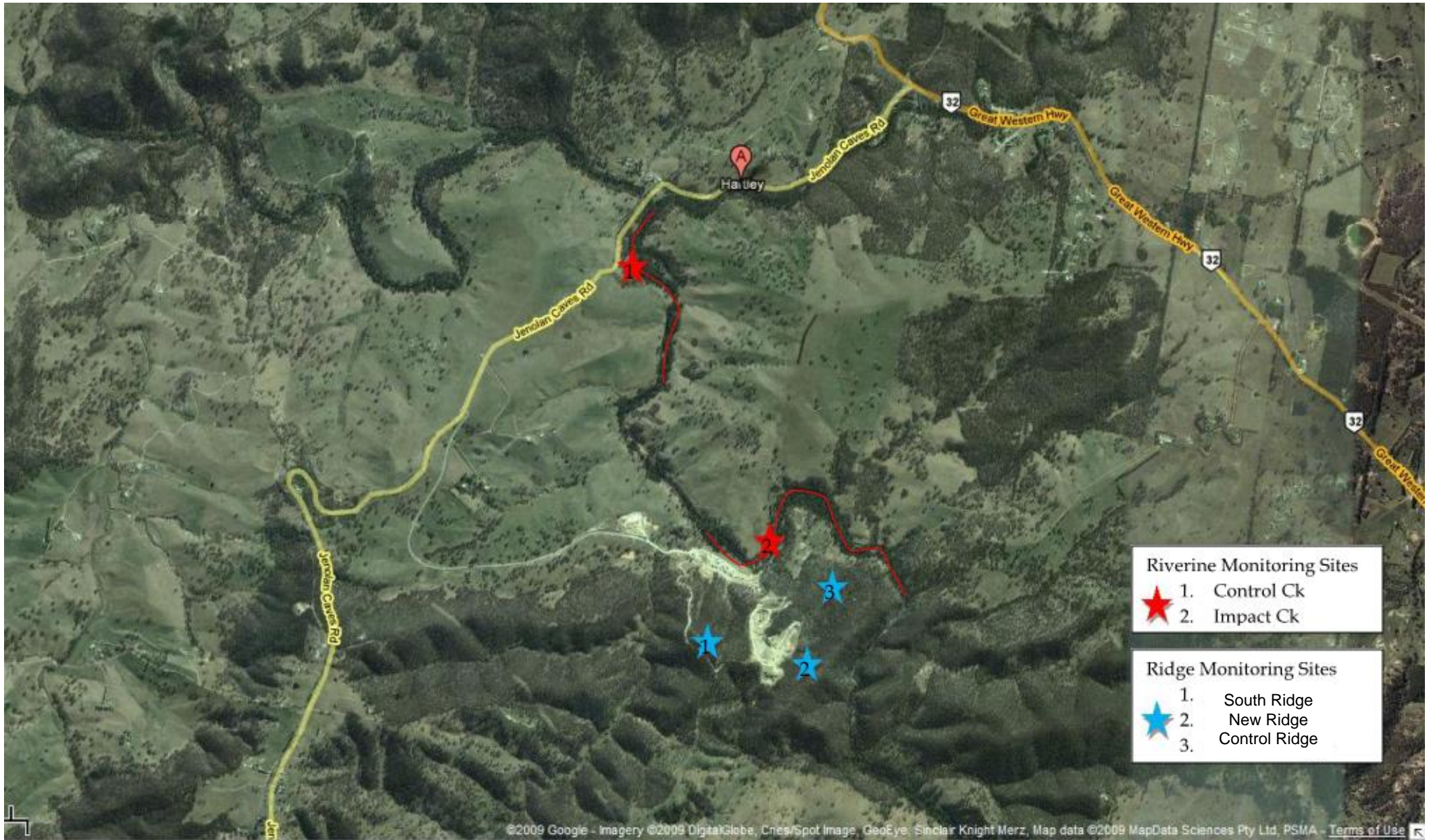


Source: Google Maps Imagery 2015

Aus-10 Quarry Ecological Monitoring 2016

**Aerial Photograph of Project Sites
Aus-10 Rhyolite Pty Ltd, Hartley**

Figure 1



©2009 Google - Imagery ©2009 DigitalGlobe, Cnes/Spot Image, GeoEye, Sinclair Knight Merz, Map data ©2009 MapData Sciences Pty Ltd, PSMA - Terms of Use



Source: Google Maps Imagery 2009

Survey Site Locations

2.2 History of Monitoring Programs

Development for the quarry was granted by Lithgow City Council in 1995 (DA 104/93). Flora and fauna issues are dealt with in section 7. In particular, condition 7a requires that the developer undertake:

“a program of annual monitoring of fauna and fauna habitats in the vicinity of the quarry and stockpile areas, to monitor any indirect impacts from the operation”

This report has been prepared to satisfy this condition. OSEM understands that surveys of fauna have been undertaken since 2003 with flora species added to the surveys in 2006.

The approach undertaken by OSEM for this survey has been to survey the site utilising the sites used during the 2006 monitoring and to focus on flora and fauna habitat quality as required by the consent.

To assess the indirect impact of quarry activities on fauna and their habitats as required by condition 7(a), the following approach was taken.

Fauna species were surveyed across a range of habitats present on the site in both disturbed and undisturbed (by quarry activities) sites. The species identified were analysed against previous years data to assess if species were present or absent during that time of year. The single survey season is only able to detect species active during that season; however the purpose of the assessment is to check on the indirect impacts of the quarry around the operation and not to compile a complete species inventory for the site. The spring/summer season was chosen to coincide with the higher levels of faunal activity usually present at this time of the year in this area as compared with the autumn/winter period which is often subject to very cold and wet conditions including snow.

Flora species were surveyed for in the same areas as fauna species with the analysis focussing on the abundance of weed species present in each area.

2.3 Threatened Species

A search of the NSW Bionet Atlas of Australian Wildlife and the Federal EPBC Protected Matters Search Tool databases, determined threatened species potentially present within a 10 kilometre radius of the project site. No new plant species, were listed within this radius from the previous 2015 monitoring period. The threatened species list can be found in Appendix C.

3. Survey Methodology

3.1 Survey Timing

The ecological survey was conducted during the middle of November 2015 over a three day and two night period. This time period was proposed as the latest acceptable time of the year to conduct a comprehensive flora and fauna survey. This was based on the weather conditions being suitable for a majority of flora species to be in flower or above ground and the foraging resources to be at a peak for fauna species.

Reasonable weather conditions prevailed, with warm days and clear nights with no rain recorded. Temperatures ranged from 5.2 – 27.6 degrees Celsius at Lithgow Bureau of Meteorology Site 063226.

3.2 Fauna Survey Techniques

Fauna surveys were conducted using point census methods for diurnal species and spotlight transects for nocturnal species.

Diurnal fauna survey included:

-) 20 minute bird census periods at discrete points along flora transects.
-) 20 minute reptile searches beneath logs and rocks at bird census points.
-) Bird call taping at dusk and dawn for 1 hour periods at impact and control locations.
-) Opportunistic survey along flora transects.

Nocturnal fauna survey included:

-) Spotlight transects in all vegetation communities over one night.
-) Call playback and listening for threatened fauna species from elevated positions at dusk.
-) Amphibian call recording for 2 hour at dusk and spotlight searches where calls were detected.
-) Echolocation call recording for 2 x 2hour periods at impact and control sites.
-) Infrared camera bait station recording at two locations.

3.3 Flora Survey Techniques

Flora surveys were conducted using 2 x 50m transects within each vegetation community survey location. Surveys of rehabilitated areas at the active quarry (ridge area) are also undertaken, which are displayed in Figure 5 below.

Within each survey location two 50m line transects were set up and the presence of vegetation (weeds and natives), bare areas, rock and leaf litter was recorded at 1m intervals along the transect to provide 100 survey points. In addition to this, all plant species present were recorded using two 20 x 20m plots located at each end of the transects. This method has been adapted from OEH *Biometric 3.1 (OEH 2011)* used for the rapid survey and assessment of clearing and impacts from proposals under the Native Vegetation Conservation Act 2003. This rapid technique allows for the determination of abundance of species, weeds, or other variables. When a point is reached along the line transect the presence of weeds, natives, bare ground, rock or leaf litter is recorded. The scores from each line transect in each survey area are then averaged and an average score is recorded.

The 20m x 20m quadrats located at the ends of the line transect also record the relative abundance of each species identified. This data is used to prepare the cumulative data analysis from previous years of survey.

The majority of plant species were identified in the field with the aid of field keys and from experience.



Source: Google Maps Imagery 2009

Flora Survey Transects (2009 Imagery)

Transect Detail
2016



Source: Google Maps Imagery 2014



Flora Survey Transects (2014 Imagery) and new quarry operations



4. Results

4.1 Flora Communities

There are two distinct vegetation communities present on the lease:

-) Riparian forest along the Cox's River.
-) Dry Schlerophyll Open Woodland on the ridges around the quarry.

The flora species present along the Cox's River lie generally to the north of the site. Two areas are examined to determine the degree of impact of the quarry operations, upstream of the quarry (to the north-west) and downstream of the quarry (to the north and north-east).

The ridge sites lie to the east, west and south of the active mining area. Impact sites are to the west of the operations and between the quarry area and the access road to the quarry. The eastern site is only accessible by foot, and the southern site is accessed off the emplacement area road to the south of the quarry.

The focus of the survey work is to examine the impact of quarry operations on fauna habitats and the extent of exotic or weed species present in these areas as indicators of habitat health where the quarry only has an indirect impact. Rehabilitation progress and health is also surveyed to provide data on the success of the quarry rehabilitation and to record fauna and flora species recolonising these areas.

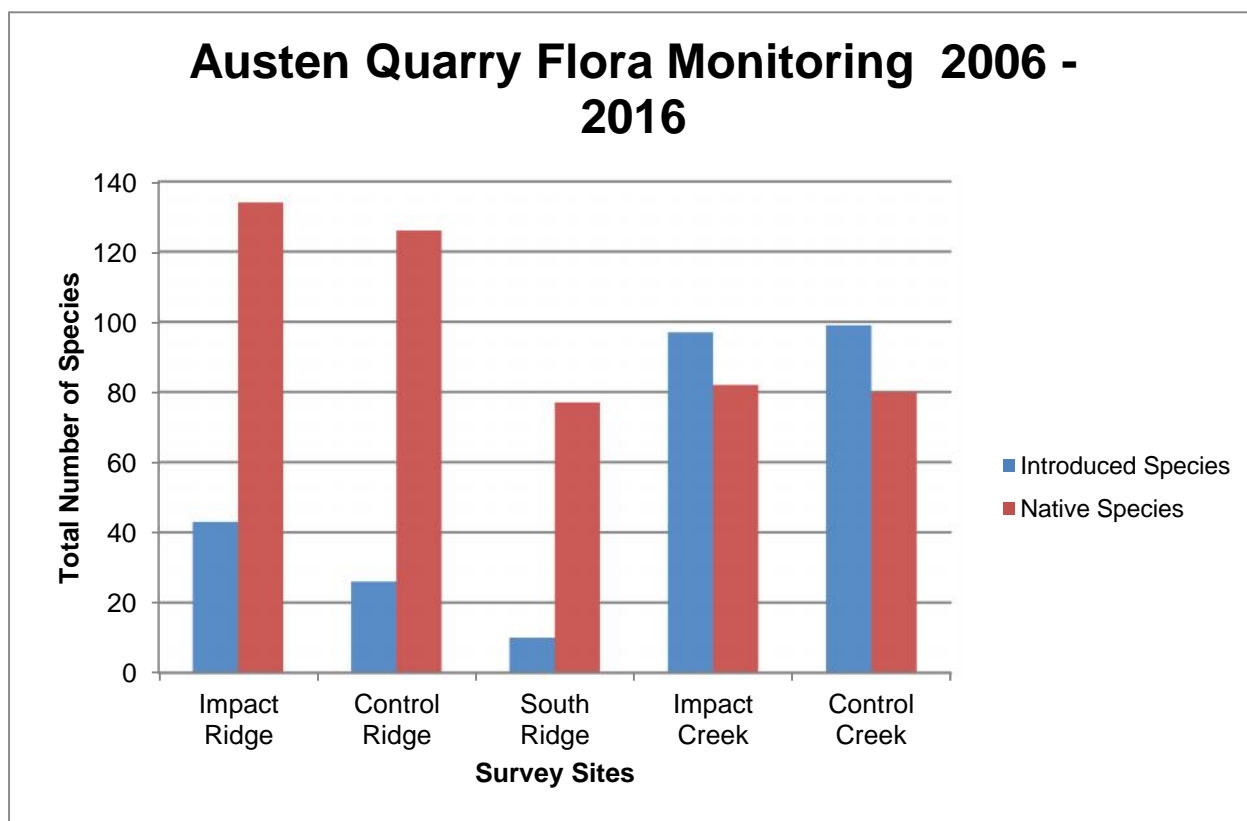


Chart 1: Cumulative Flora Survey data 2006 – 2016.

Austen Quarry Flora Monitoring November 2016

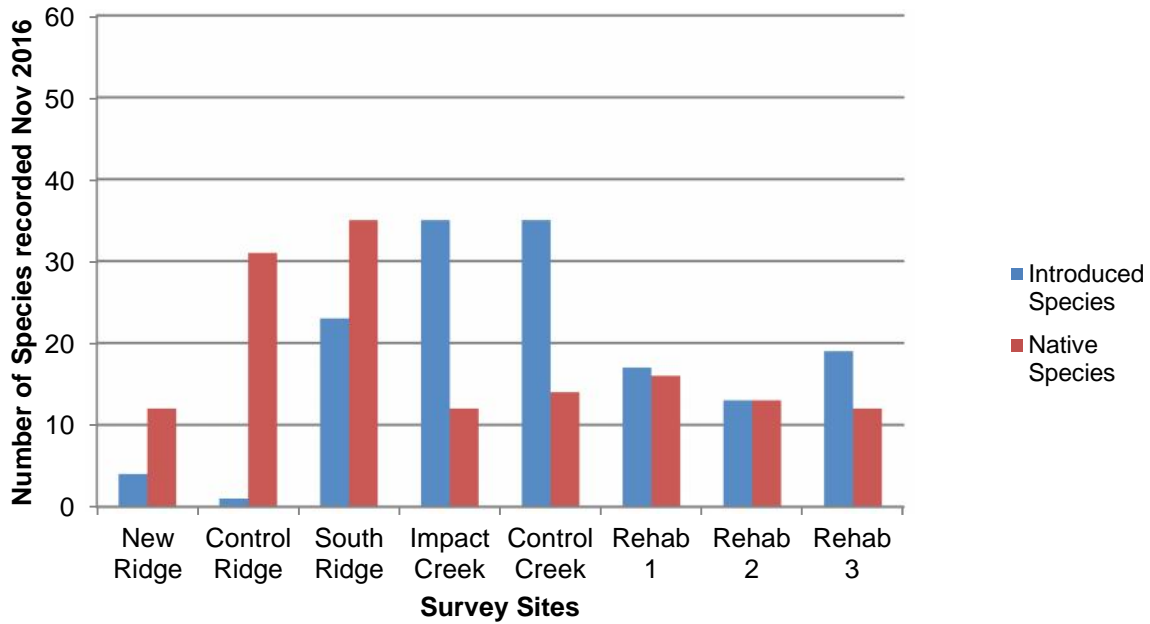


Chart 2: November 2016 Flora Survey data.

Austen Quarry Flora Monitoring November 2016

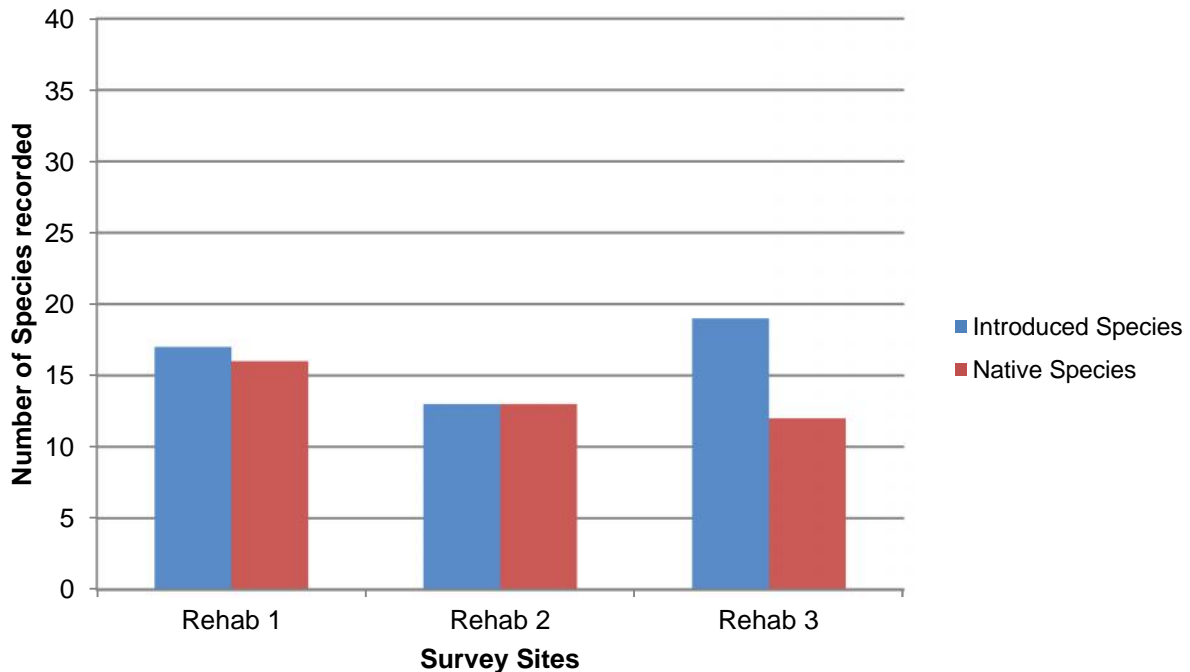


Chart 3: November 2016 Rehabilitation Sites Survey Data

Similar to the previous 2014 monitoring results, Chart 2 shows that the ridge sites continue to display low levels of weed species in both impact and control sites, with the presence of

introduced species being significantly lower than that of native species. During the survey it was observed that quarry operations are expanding into or in close vicinity to Impact Ridge and South Ridge sites, the higher level of weeds noted here is likely to be due to the increased disturbance edge. For example the overburden emplacement area has enlarged from 2015 adjacent to the South Ridge. A new transect (New Ridge) was created to replace the former Impact ridge transect site.

The river sites continue to show a trend of higher weed concentrations, with the presence of introduced species being far higher than that of native species. Little native groundcovers exist in these areas to suppress the spread of weed species, which dominate the ground layers; however the large, established canopy trees are mostly native. No noticeable difference in native species numbers from the 2015 monitoring period was recorded at both riverine sites. There was no indication that quarry operations were having any impacts on species diversity in this area.

In general a higher concentration of weed species was noted along the river sites both on the upstream (control) site and the downstream (impact) sites.

Changes between the 2015 and 2016 monitoring period was noted from the monitoring results as seen in Charts 2 including a:

-) Increase in weed species recorded at South Ridge.

Two new native species and no new introduced species were identified during the survey period. No new threatened species or noxious weeds were recorded.

Newly recorded native species-

-) Parsons Bands Orchid - *Eriochilus cucllatus*
-) Tiny Greenhood Orchid - *Pterostylis parviflora*

Monitoring of rehabilitated areas continued this period, with two sites adjacent to the quarry pit operations known as Rehab 1, Rehab 2 and Rehab 3, shown in Figure 5.

Site 1 has been revegetated since 2010, Site 2 was revegetated in 2012, and Site 3 was revegetated in 2013. The results of the rehabilitation flora survey can be seen in Chart 3, with an overview of each site below.

Rehab 1 - Rehabilitation in this area has been complete for some time, with planted species now providing good canopy cover, reaching up to 5 – 6m in height. Weeds are present in the ground layers and native regeneration of groundcovers and shrubs is occurring from seed recruitment from adjacent bushland. Topsoil cover was observed to be sparse to not existing in this area.



Plate 1: Rehabilitation Area 1

Rehab 2 – This area has been planted with tree and shrub species, and also sown with a grass cover crop of Couch. Growth of planted species was observed to be progressing well with most plants observed to be healthy. However the couch cover crop dominates the ground cover, which has restricted natural germination and recruitment of native ground covers and shrubs, but has also reduced annual weed species growth. Some regeneration was recorded from planted Acacias self-seeding and germinating outside of growth tube protection.



Plate 2: Rehabilitation Area 2

Rehab 3 – This area has been treated with a topsoil and cover crop treatment. The grass and weed growth through this area was noted to be heavy in previous years however the 2016 data shows that natives now exceed weeds species throughout the transect, with the area now considered to be stable and planted species growing well.



Plate 3: Rehabilitation Area 3

Noxious weeds are also being closely monitored, with an assessment undertaken of their presence and abundance over all monitoring sites. This is displayed in Table 1 below, which shows at which sites each noxious weed species was recorded, and provides an abundance rating based on the criteria below and averaged across 2 transects:

-) 1-Less than 5% cover <3 Individuals
-) 2-Less than 5% cover ≤ 10 individuals
-) 3- 5% – 25%
-) 4 - 25%-50%
-) 5- 50% - 75%
-) 6 - >75%

From Table 1 it is clear that African Lovegrass and Serrated Tussock are the most abundant noxious weeds throughout the site, occurring at 5 of the 8 sites. St. Johns Wort is the next most

prevalent species at the quarry occurring at 4 of the 8 sites. Table 1 provides the averaged data taken from the two 20x20m quadrats undertaken at the ends of each 50m line transects as described in section 3.

Blackberry was previously confined to the riverine sites however has been located on the south and impact ridge sites. Serrated Tussock, African Lovegrass and St. John's Wort continue to be the greatest management issue in terms of weed control at the site, which can be seen from consistently high abundance ratings.

All of these species display the potential for further invasion throughout the site as they are found in high numbers on both ridge and riverine sites, and have also been observed within Rehab sites. They are easily transported by seed attached to livestock, fauna, personnel, or vehicles / machinery and require management to prevent and control their spread.

In general, no significant increases in the abundance of weeds on site were recorded during the 2015 monitoring period. This chart displays the averaged data from the line transect method used. The numbers displayed are the average of the two 50m transects undertaken and show the average number of times the species was recorded in the survey area.

Scientific Name	Common Name	New Ridge	Control Ridge	South Ridge	Impact Creek	Control Creek	Rehab 1	Rehab 2	Rehab 3
<i>Cytisus scoparius</i>	Scotch Broom					1			
<i>Eragrostis curvula</i>	African Love grass	2.5			2.5	3	1		2
<i>Lycium ferocissimum</i>	African Boxthorn				0.5				
<i>Nassella trichotoma</i>	Serrated Tussock	2.5			2		1	1	1
<i>Orobanche sp.</i>	Broomrape								
<i>Rubus fruticosus</i>	Blackberry			1	2.5	1.5			
<i>Salix sp.</i>	White/ Weeping Willow				1				
<i>Senecio madagascarinensis</i>	Fireweed						1		
<i>Hypericum perforatum</i>	St. Johns Wort	2		2.5	3				1

Table 1 – Declared Weeds Relative Abundance 2016

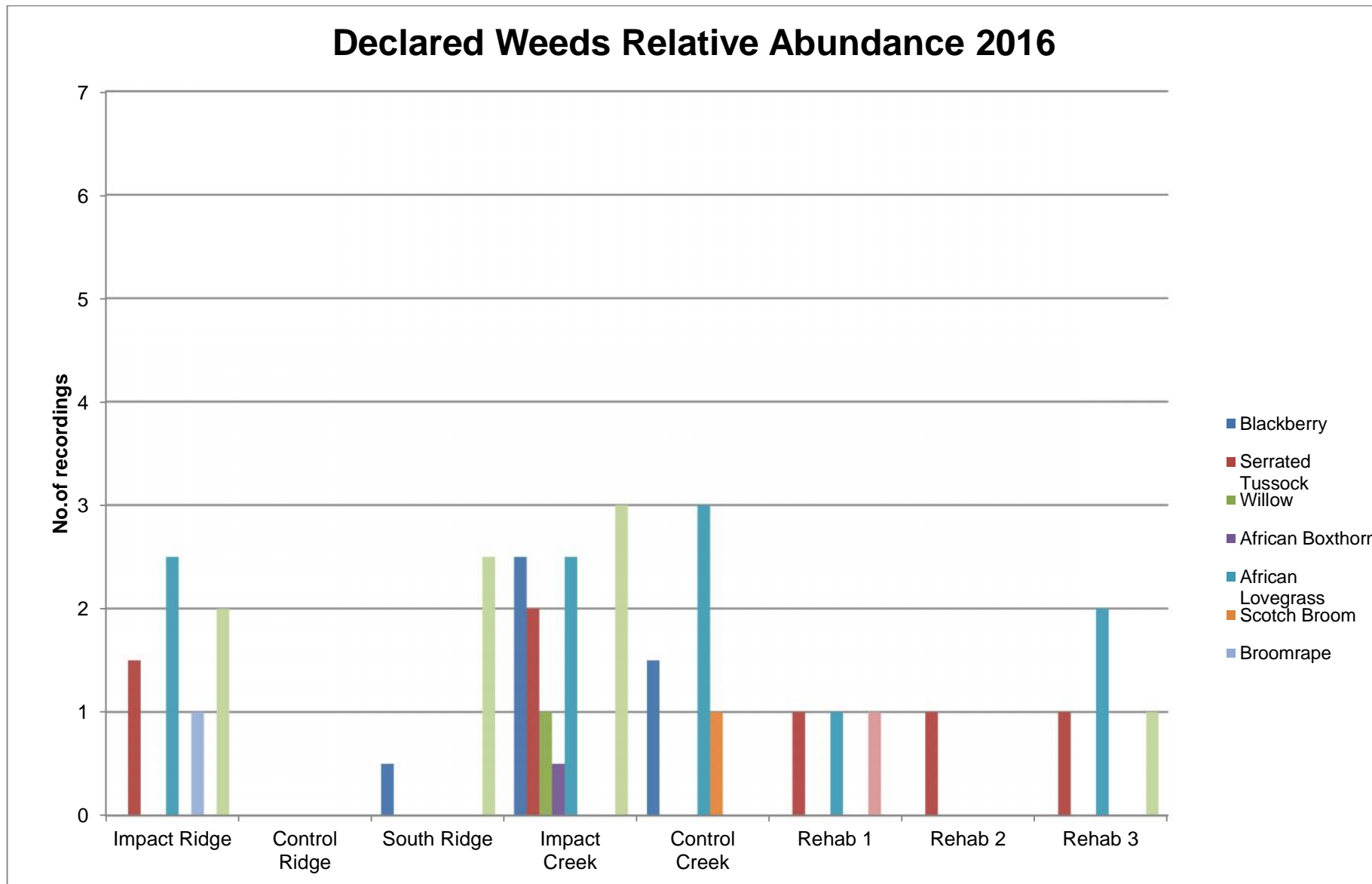


Chart 5: Declared Weed Abundance Scores 2016.

4.2 Fauna Survey Results

The results presented in charts 6 to 16 have been broken up into the following groups or assemblages:

-) Amphibians.
-) Reptiles.
-) Mammals.
-) Total Birds.
-) Birds of Prey (including magpies, crows etc.).
-) Nocturnal birds.
-) Riverine birds (ducks, coots, moorhens, egrets etc.).
-) Parrots.
-) Forest woodland species (Whipbirds, kingfishers, pigeons and doves, pipits and song larks, quails, starlings and myna's).
-) Robins, wrens and finches.
-) Honeyeaters.

No new birds, were identified during this monitoring period.

Most groups have recorded similar numbers during this monitoring period compared to previous year's results, with more mammals recorded across the site.

The reptile fauna categories have recorded the highest number of observations since 2005.

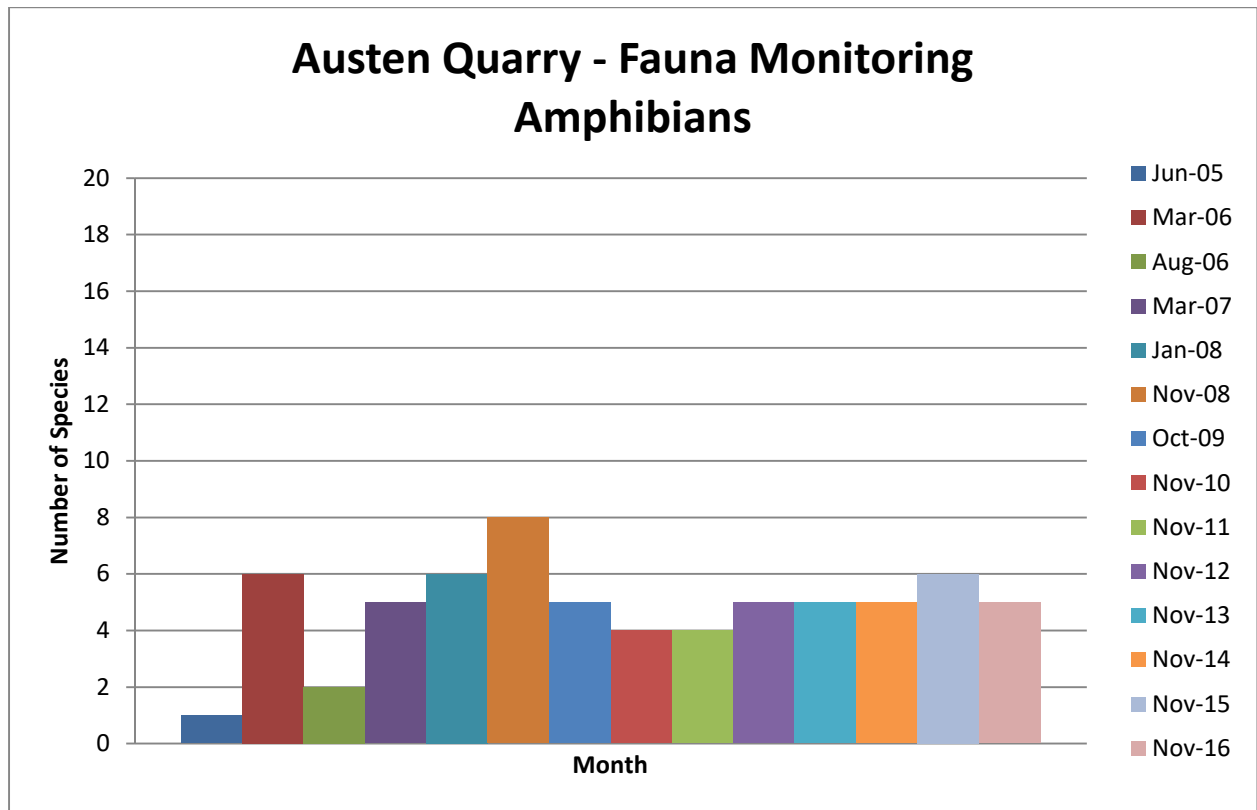


Chart 6: Amphibian results.

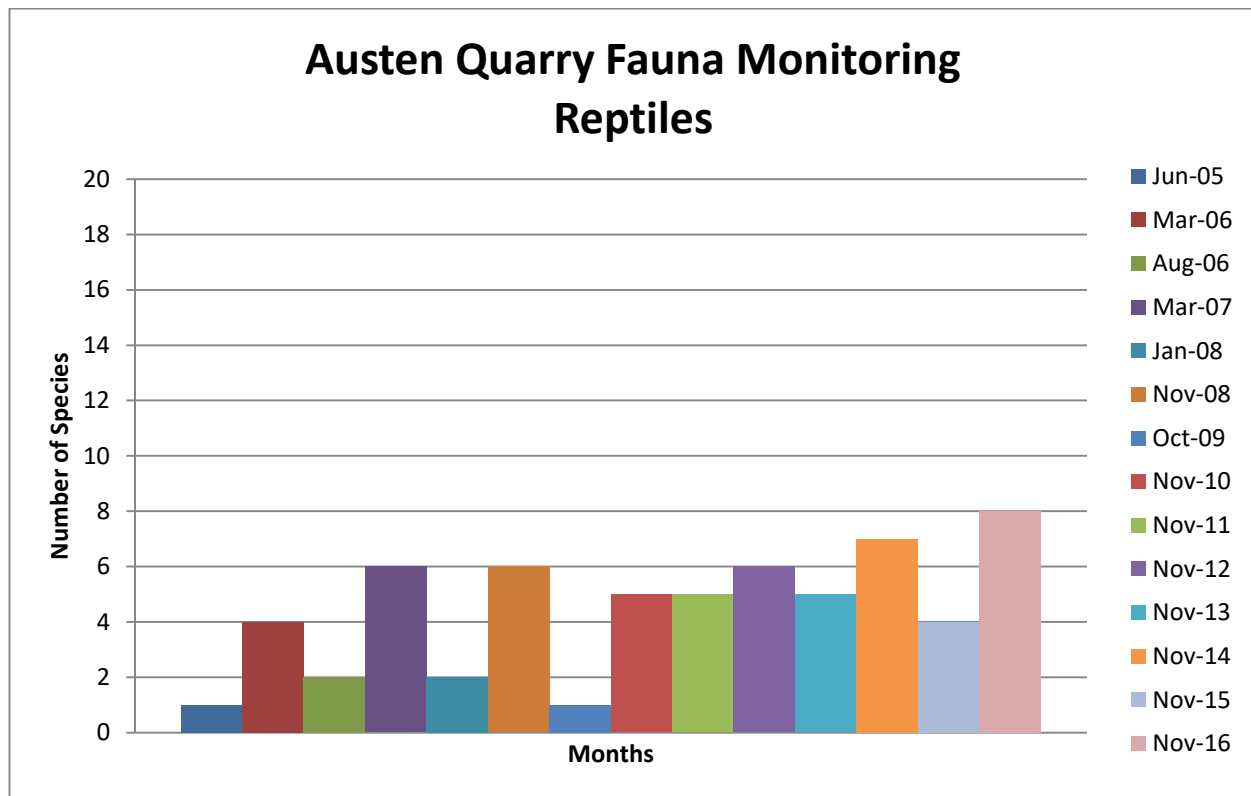


Chart 7: Reptile results.

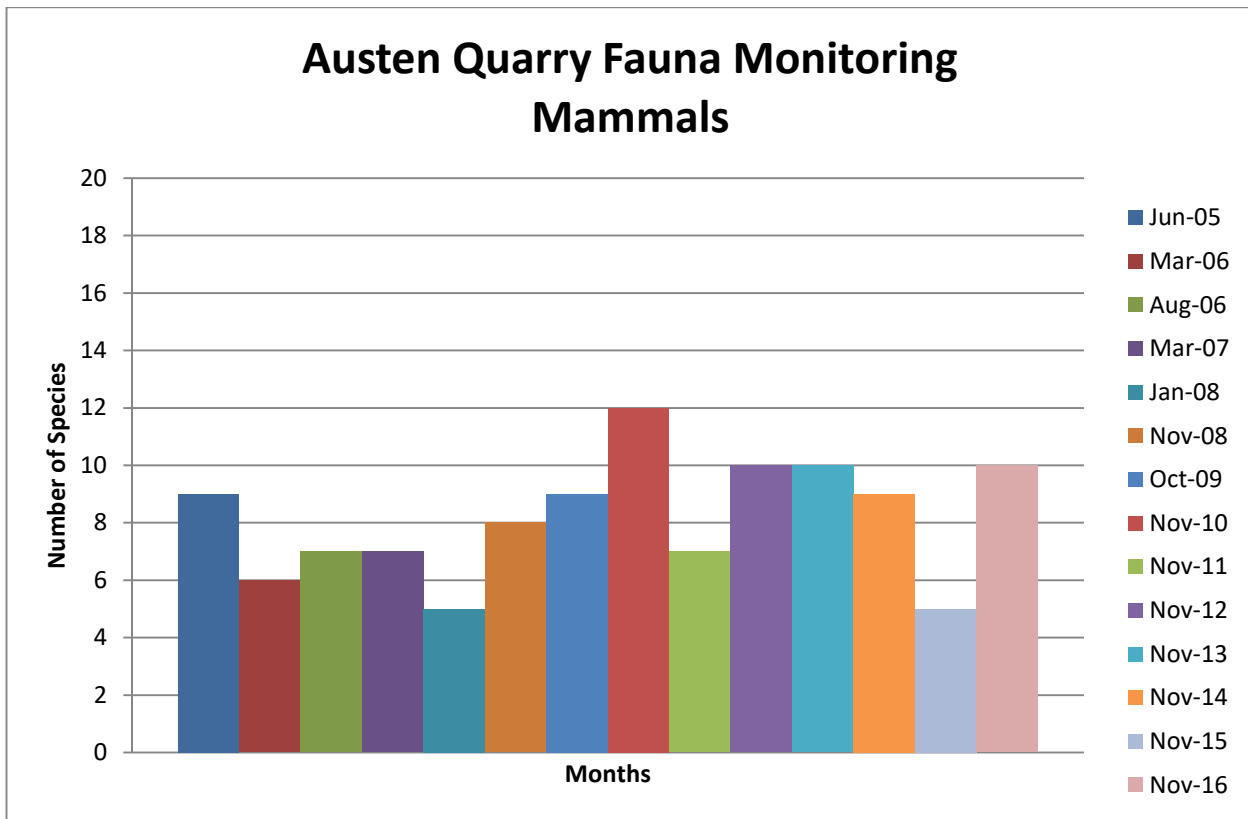


Chart 8: Mammal results.

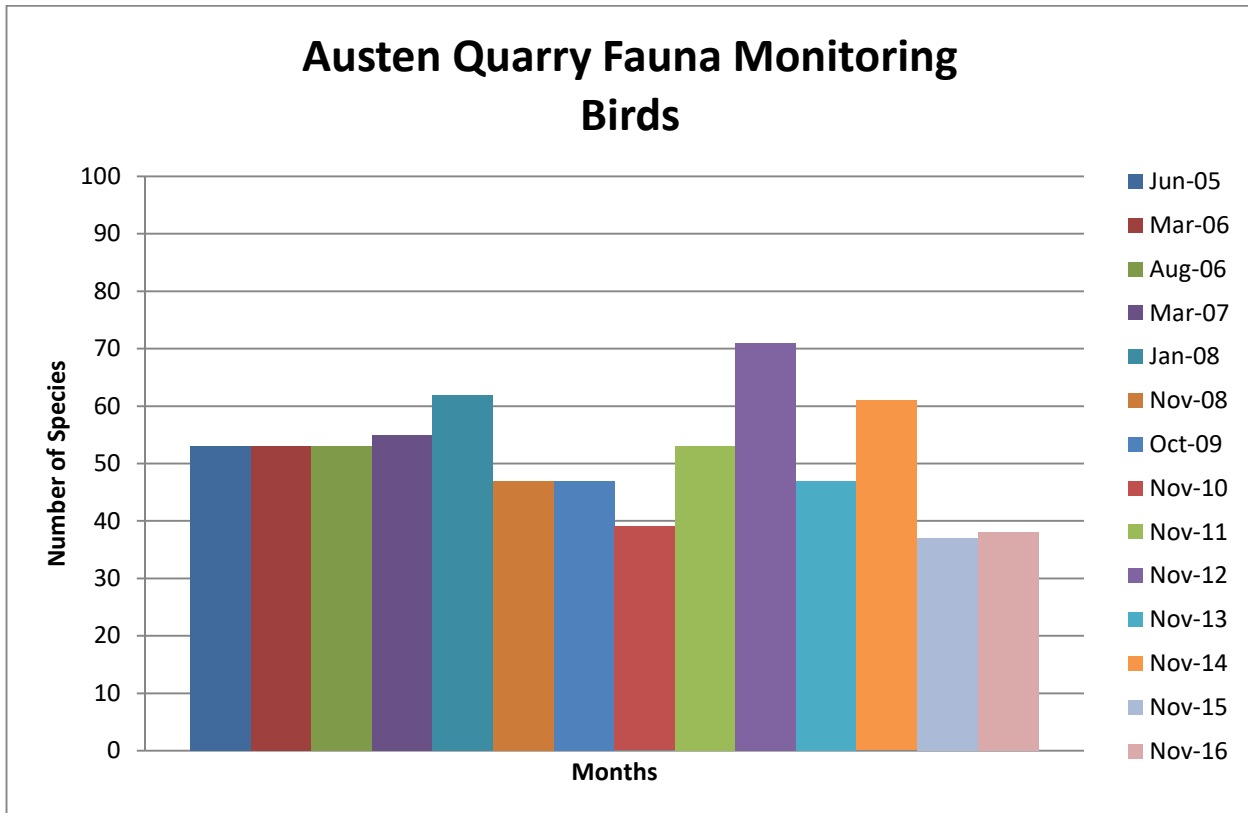


Chart 9: Total Bird results.

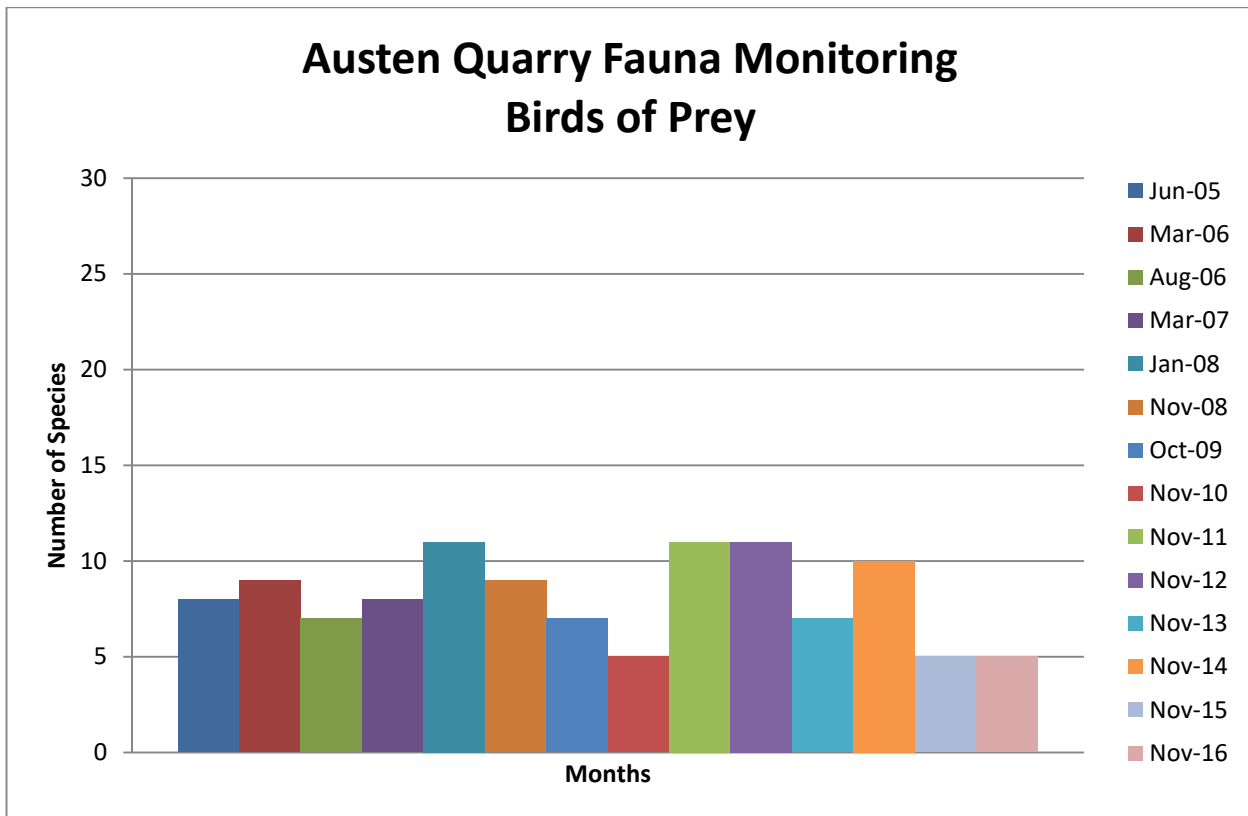


Chart 10: Birds of Prey results.

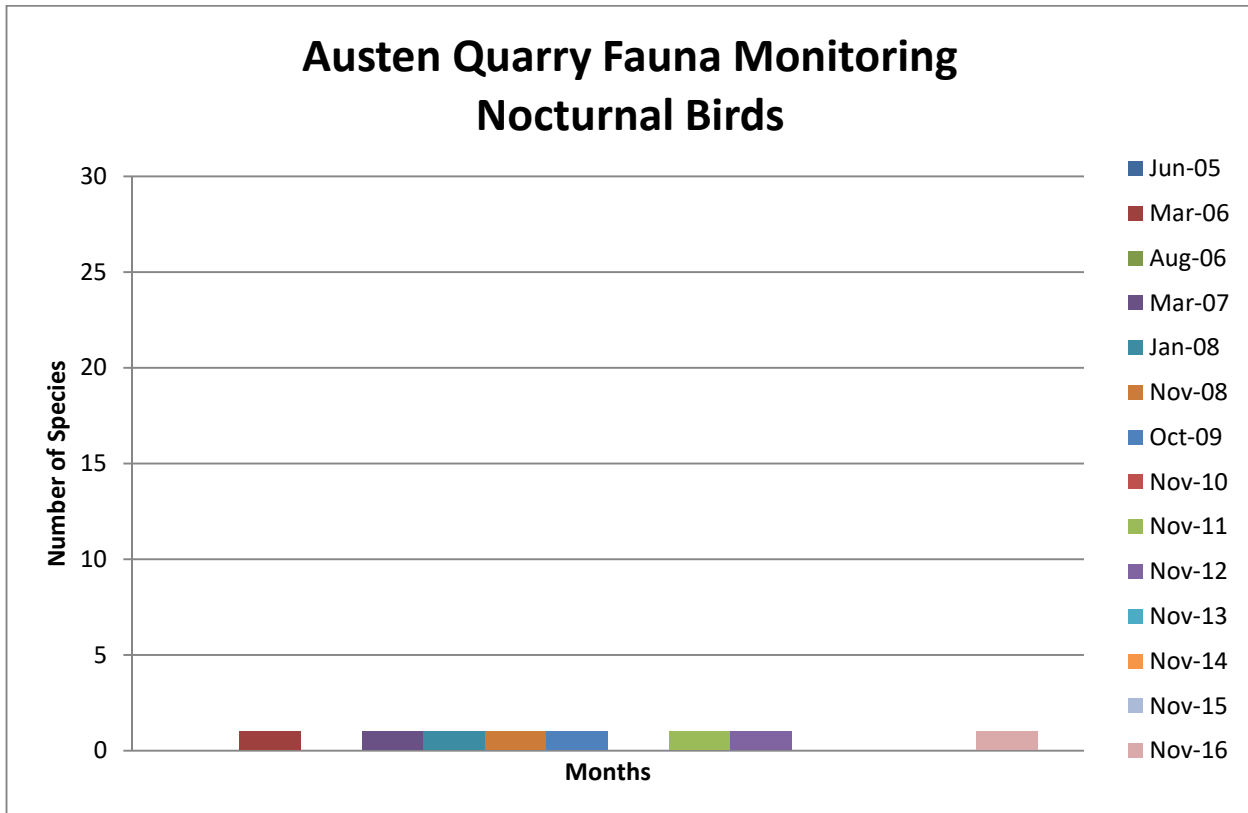


Chart 11: Nocturnal Birds results.

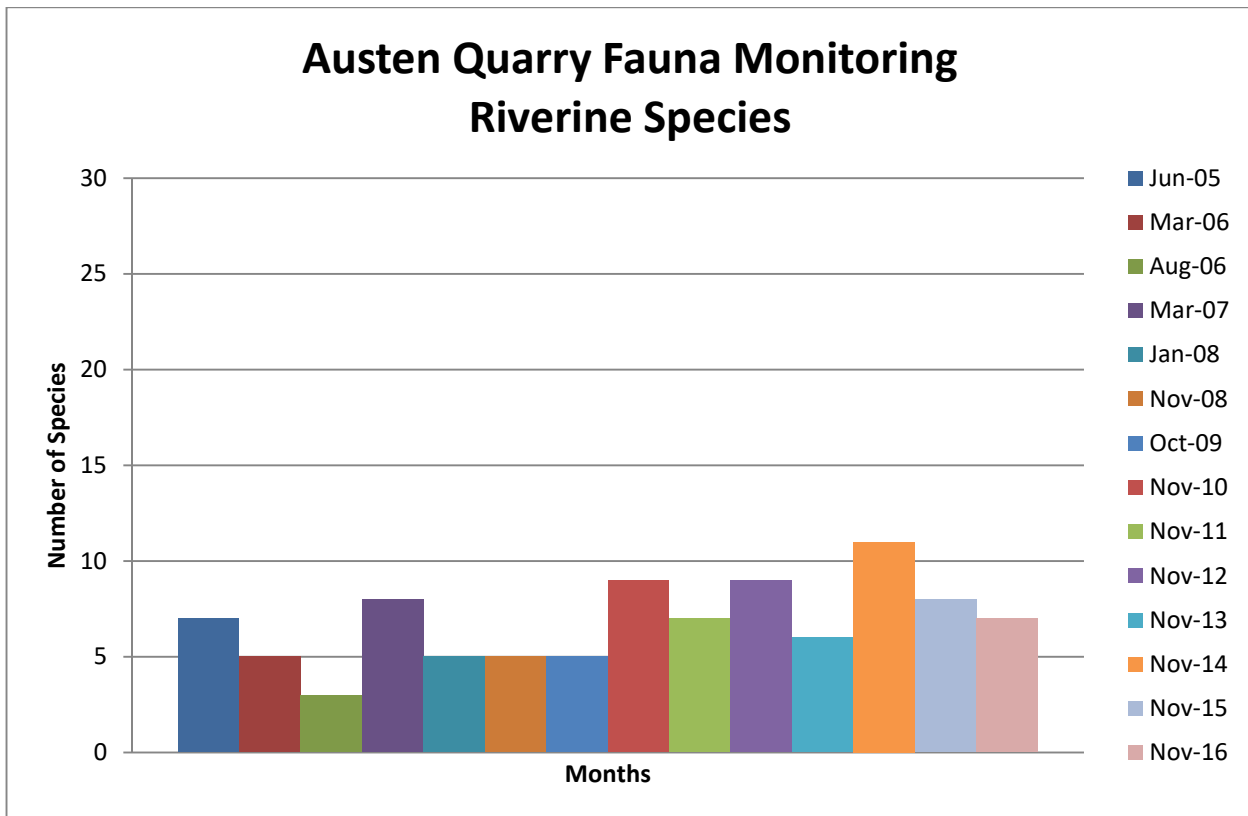


Chart 12: Riverine Bird species results.

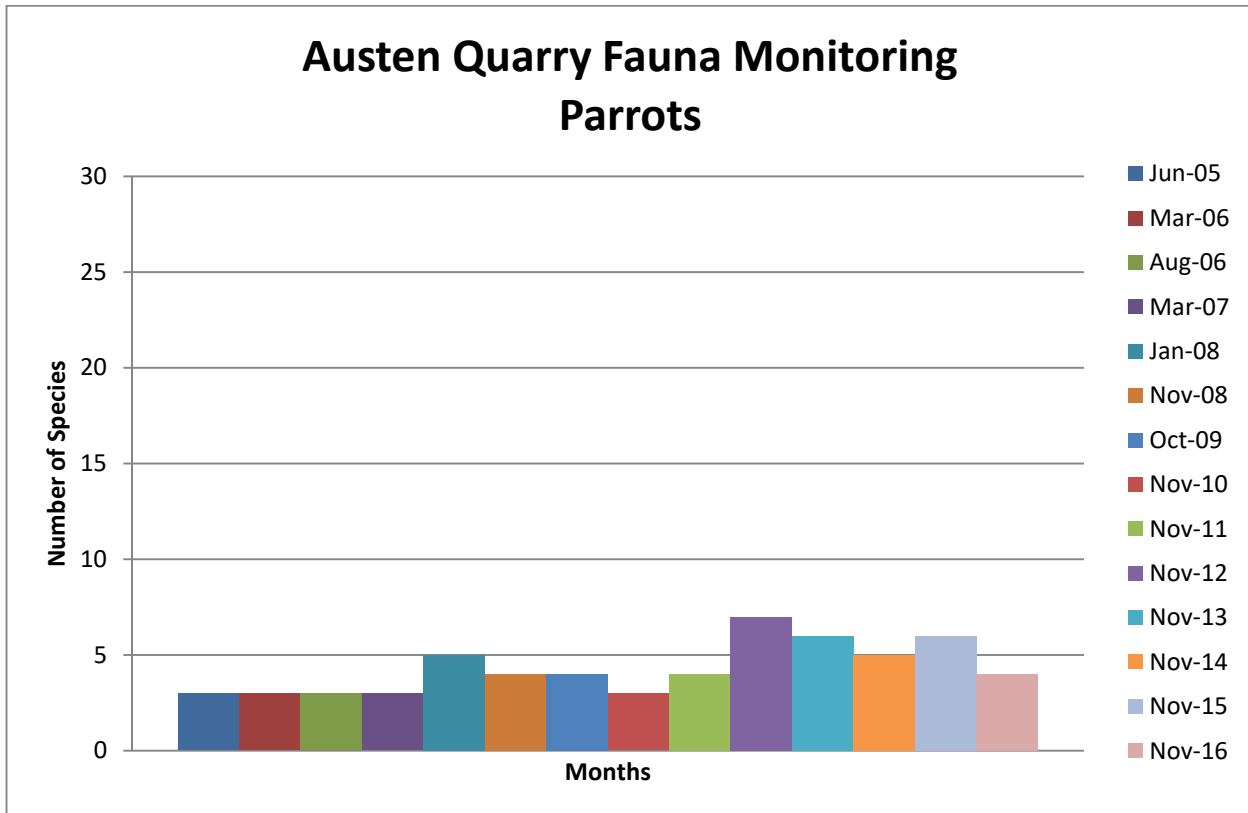


Chart 13: Parrot species results.

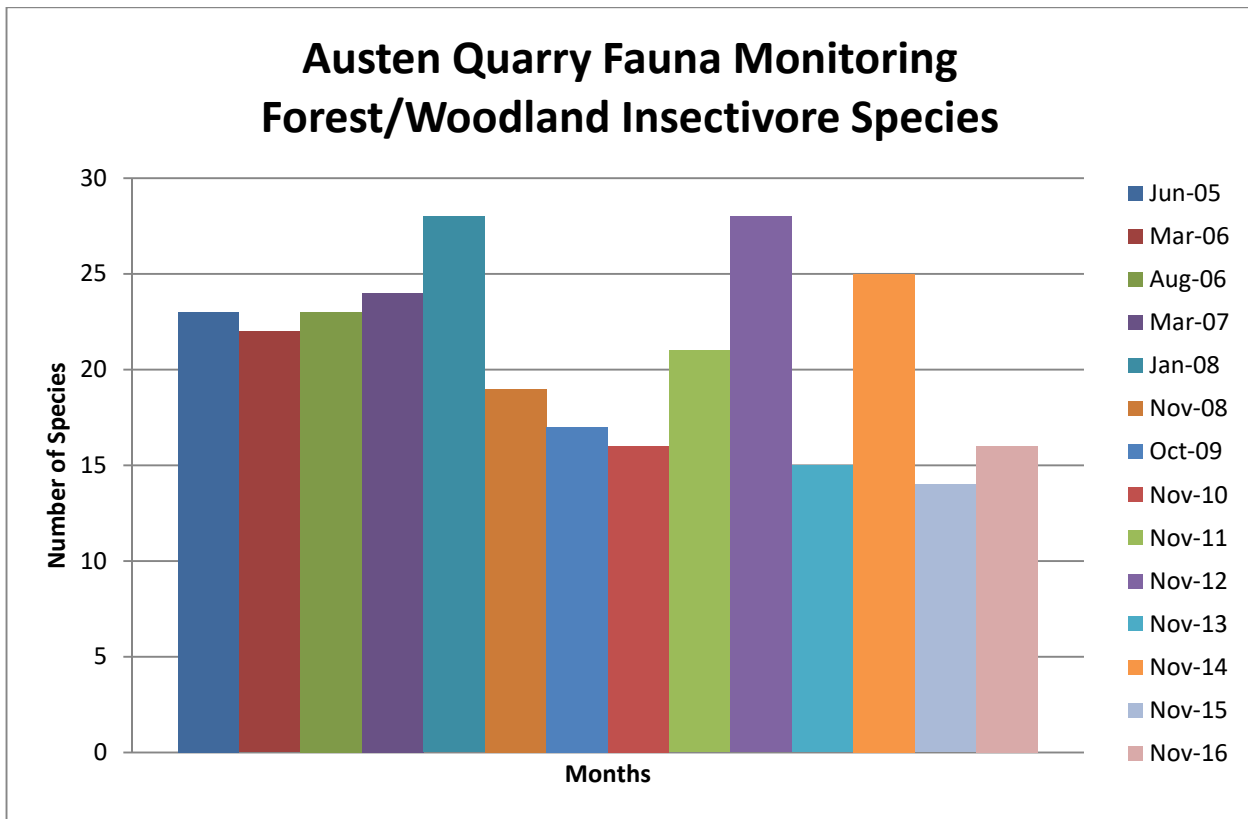


Chart 14: Forest and Woodland Bird Insectivore species results.

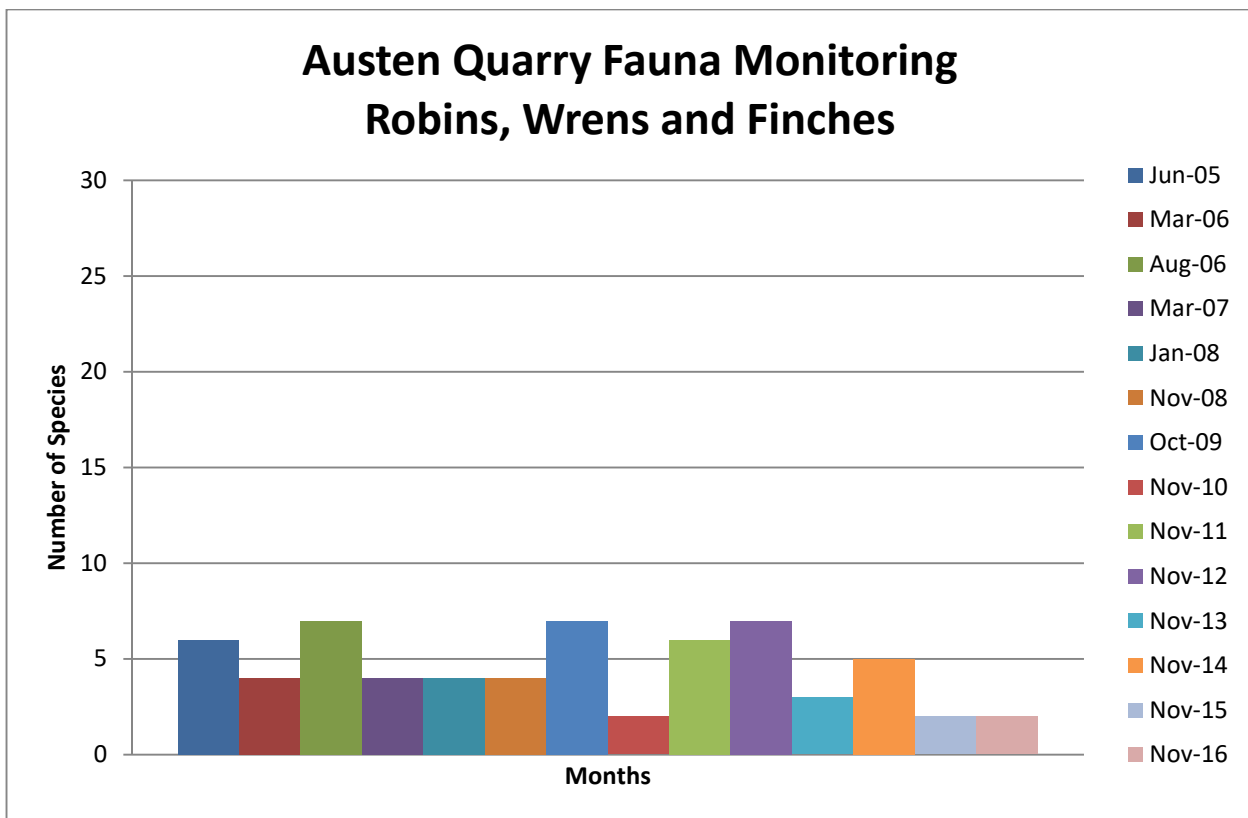


Chart 15: Robins, Wrens and Finch results.

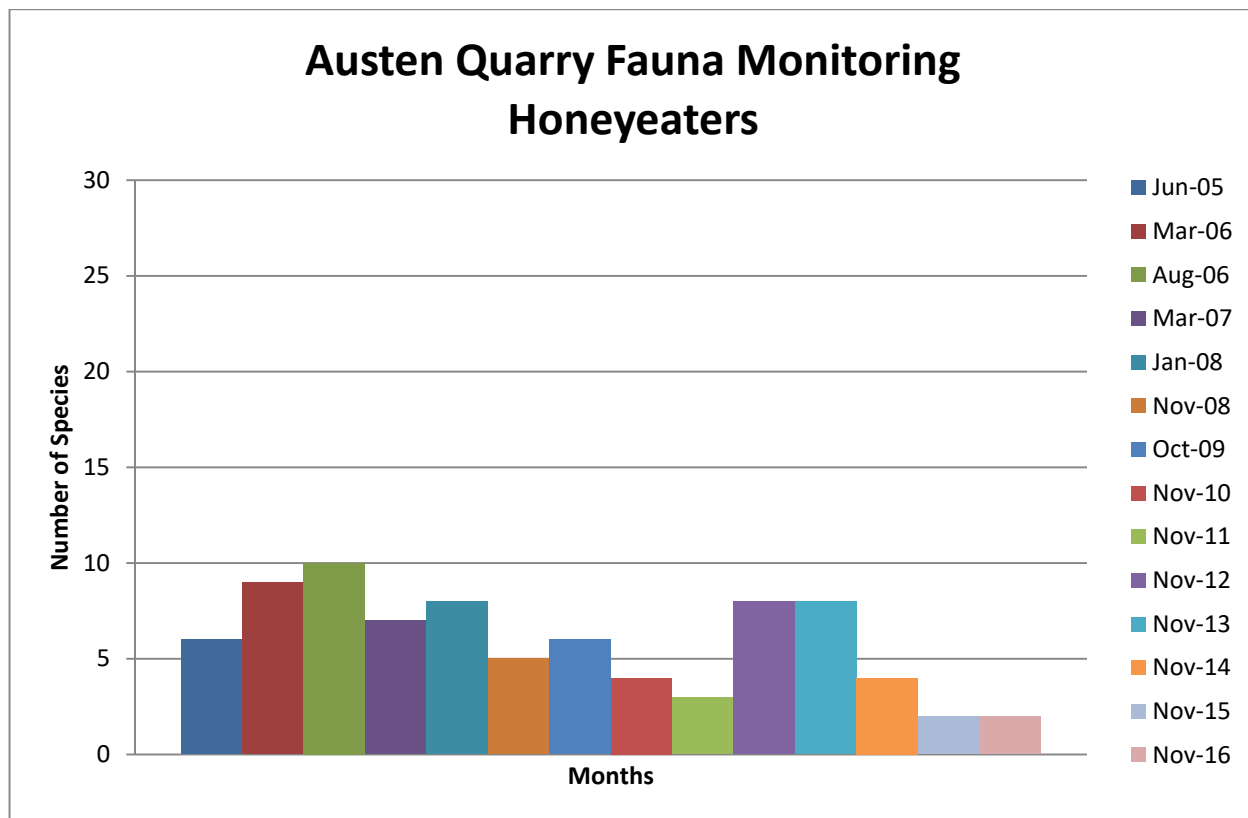


Chart 16: Honeyeaters results.

4.3 Threatened Species

No new plant species, were listed within the area from the previous 2015 monitoring period. The threatened species list and database searches can be found in Appendix C.

No other new threatened species have been observed during the 2016 monitoring period.

5. Discussion

The requirement of the condition of approval that the indirect impacts of the quarrying operations on fauna and fauna habitats being monitored was undertaken in November 2016.

The results show that no significant changes have occurred to flora and fauna communities in particular there was no significant changes in species numbers recorded during the surveys.

Bird species numbers are similar to the last monitoring period, most likely due windy weather during the survey. No notable declines from last monitoring period were recorded. Overall the number of bird species recorded across each group has remained relatively consistent throughout the monitoring program.

Amphibian numbers are steady and reptile and mammal numbers have increased in relation to previous years, with reptile numbers being the highest recorded across the site since monitoring began.

Wombat activity was noted to be high with four active burrows noted and two burrows captured on camera with activity.

Overall fluctuations in species numbers within each fauna type have been small over the entire monitoring program, with no significant decline in species number of each fauna type.

Records of feral animal increased, with fox activity recorded on night 1. Numerous active rabbit burrows were also observed on site. Given this increase in numbers, a control program for foxes and rabbits should be implemented to ensure that species number do not increase further.

There has been no significant change in the pattern and distribution of native flora species at each site. November 2016 monitoring results show a very similar pattern among the cumulative flora monitoring data, in terms of the relationship between weeds and natives for each site.

No new weed species were recorded during this monitoring period (see section 4.1). The majority of weed species recorded on site are concentrated along the edges of the Cox's River; see Table 1 and Chart 5. This is largely due to the spread of weeds along the watercourse from upstream outside the mining lease. Impact Creek and Control Creek recorded the highest number of weeds (35). Due to the expansion of the quarry area and emplacement area on the ridge monitoring sites, increased weed growth has been observed across this area in 2016.

No direct impacts from quarry operations were noted in relation to the distribution and abundance of weeds within the lease area. However it is the responsibility of the quarry to manage the spread of weeds within the lease area, in particular noxious species, as part of their operations.

It was noted that Serrated Tussock is still prevalent throughout the site. This noxious weed remains one of the most abundant, next to African Love Grass, and has the highest potential to be further spread throughout the site, which is highlighted by its presence within newly rehabilitated areas. Therefore it is recommended that additional weed control measures (spraying) are undertaken on Serrated Tussock Grass at the riverine sites, and ridge sites in 2017.

The purpose of the monitoring is to assess the indirect impacts of the quarry on fauna and fauna habitats adjacent to the quarry. No significant changes to species composition have occurred to date throughout the monitoring program. The active quarry operations show that the controls employed at the quarry are effective in controlling weeds which are a major cause of habitat degradation.

Surveys of rehabilitated areas determined that three different revegetation methodologies have been utilised at the site, with differing results.

Site 1 is the oldest site and contained moderately good rehabilitation, showing good planting densities, canopy cover, and evidence of natural regeneration from planted species and recruitment from adjacent bushland.

Planting density and canopy cover was sparser at Site 2 and in addition regeneration was limited due to a dense groundcover of Couch, which was added to the site as a cover crop. Two declared weed species were noted on the edges of area 2, Serrated Tussock and African Lovegrass. These species should be manually removed prior to further flowering and seed set to prevent spreading to other areas.

Site 3 was planted in 2014 with additional areas planted in 2014. The area planted in 2014 contained strong signs of natural regeneration and germination from the topsoil. Planted stock was also observed to be growing strongly.

Greater consistency is needed when applying restoration techniques to ensure unknown variations (ie: from topsoil sourced from agricultural areas) do not compromise success. The use of topsoil as a growth medium has proved to enhance growth however will require continued maintenance at least in the short to medium term to control issues such as weed growth.

6. Recommendations

The current management tasks at the quarry should continue as they appear to be effective in controlling impacts to adjacent areas and show continued good environmental management of the adjacent environment:

The following tasks are recommended for the 2017 period:

-) Ongoing management of the noxious weed infestations of Serrated Tussock at the riverine sites and Impact Ridge site is required by herbicide spraying, to prevent further spread of these weeds into good quality vegetation surrounding the quarry. Care should be taken with vehicle movements around the dam areas and with the reuse of soil materials within areas containing these species, such as around the office and stockpile areas.
-) A control program for feral animals should be undertaken to ensure fox, rabbit and cat numbers do not increase at the site.

Appendix A – Survey Species List

Appendix A2

			New species recorded													
Family	common name	scientific name	65	71	64	75	77	71	62	60	70	93	67	82	52	62
			Jun-05	Mar-06	Aug-06	Mar-07	Jan-08	Nov-08	Oct-09	Nov-10	Nov-11	Nov-12	Nov-13	Nov-14	Nov-15	Nov-16
Amphibians			1	6	2	5	6	8	5	4	4	5	5	5	6	5
Hylidae	Brown Tree Frog	<i>Litoria ewingii</i>		1	1		1									
	Lesueur's Frog	<i>Litoria lesueuri</i>		1		1	1									
	Peron's Tree Frog	<i>Litoria peronii</i>		1				1		1	1	1	1	1	1	1
	Leaf-green Tree Frog	<i>Litoria phyllochroa</i>					1									
	Verreaux's Tree Frog	<i>Litoria verreauxii</i>						1								
	Keferstein's Tree Frog	<i>Litoria dentata</i>						1		1	1	1	1	1	1	1
	Dwarf Green Tree Frog	<i>Litoria fallax</i>											1			
Myobatrachidae	Common Eastern Froglet	<i>Crinia signifera</i>	1	1	1	1	1	1		1	1	1	1	1	1	1
	Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>		1		1		1		1	1				1	1
	Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>		1		1	1	1				1				
	Striped Marsh Frog	<i>Limnodynastes peronii</i>				1	1	1					1	1	1	1
	Keferstein Smooth Toadlet	<i>Uperioia laevigata</i>						1		1	1	1		1	1	
Reptiles			1	4	2	6	2	6	1	5	5	6	5	7	4	8
Agamidae	Eastern Water Dragon	<i>Physignathus iesueurii</i>		1		1	1			1	1	1		1	1	1
	Jacky Lizard	<i>Amphibolurus muricatus</i>				1						1	1	1		
	Goanna	<i>Varanus varius</i>						1				1				1
Chelidae	Eastern Long-necked Turtle	<i>Chelodina longicollis</i>				1				1				1	1	1
Elapidae	Eastern Brown Snake	<i>Pseudonaja textilis</i>				1										1
	Red-Bellied Black Snake	<i>Pseudechis porphyriacus</i>							1		1				1	1
Scincidae	Copper-tailed Skink	<i>Ctenotus taeniolatus</i>		1	1	1		1		1		1				1
	Eastern Water Skink	<i>Eulamprus quoyii</i>		1			1	1		1	1	1	1	1	1	1
	Delicate Skink	<i>Lampropholis delicata</i>	1	1		1		1		1	1	1	1	1		
	Grass Skink	<i>Lampropholis guichenoti</i>						1				1	1	1	1	1
	Blue Tongue Lizard	<i>Tiliqua scincoides</i>						1			1			1		
Typhlopidae	Blind Snake	<i>Ramphotyphlops</i> sp.			1											
Birds																
Accipitridae	Black-shouldered Kite	<i>Elanus axillaris</i>	1	1		1	1	1			1			1		
	Brown Goshawk	<i>Accipiter fasciatus</i>				1	1									1
	Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>					1							1		
	Nankeen Kestrel	<i>Falco cenchroides</i>			1		1	1			1	1		1	1	
	Wedge-tailed Eagle	<i>Aquila audax</i>	1	1		1		1			1	1		1		
	White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>					1	1								
Aegothelidae	Australian Owllet-nightjar	<i>Aegotheles cristatus</i>		1			1									1
	Tawny Frogmouth	<i>Podargus strigoides</i>						1			1	1				
Alcedinidae	Azure Kingfisher	<i>Alcedo azurea</i>	1			1				1		1				
Anatidae	Australian Wood Duck	<i>Chenonetta jubata</i>	1	1	1	1	1	1		1	1	1	1	1	1	1
	Chestnut Teal	<i>Anas castanea</i>	1									1		1		1
	Grey Teal	<i>Anas gracilis</i>				1									1	
	Hardhead	<i>Aythya australis</i>				1					1				1	
	Pacific Black Duck	<i>Anas superciliosa</i>	1	1	1	1	1	1		1	1	1	1	1	1	1
Ardeidae	White-faced Heron	<i>Egretta novaehollandiae</i>	1	1		1				1		1	1	1		
Artamidae	Australian Magpie	<i>Gymnorhina tibicen</i>	1	1	1	1	1	1		1	1	1	1	1	1	1
	Dusky Woodswallow	<i>Artamus cyanopterus</i>			1	1	1	1		1	1	1	1	1		1
	White-browed Woodswallow	<i>Artamus superciliosus</i>													1	
	Grey Butcherbird	<i>Cracticus torquatus</i>	1	1	1	1	1				1	1	1	1		
	Pied Butcherbird	<i>Cracticus nigrogularis</i>									1	1	1	1		
	Magpie-lark	<i>Grallina cyanoleuca</i>	1	1	1	1	1	1		1	1	1	1	1	1	
	Pied Currawong	<i>Strepera graculina</i>	1	1	1	1	1	1		1	1	1	1	1	1	1
Cacatuidae	Galah	<i>Cacatua roseicapilla</i>	1	1	1	1	1	1				1	1		1	

Flora Detected within Survey sites 2016		New Ridge	Control Ridge	South Ridge	Impact Creek	Control Creek	Rehab 1	Rehab 2	Rehab 3
Native Species		12	31	35	12	14	16	13	12
Scientific	Common								
Acacia buxifolia	Box-leaf Wattle								2
Acacia clandestina	Gold-dust Wattle						2		
Acacia dealbata	Silver Wattle				1		3	3	
Acacia falciformis	Hickory Wattle						3	3	
Acacia implexa	Hickory Wattle			1					
Acaena ovina	Sheeps Burr				3			4	4
Allocasuarina distyla	Scrub She-oak						2	2	
Angophora floribunda	Rough-barked Apple								2
Aristida vagans	Threeawn Speargrass		5						
Austroanthonia spp.	Wallaby Grass	3	3.5	3.5			3	3	1
Austrostipa scabra ssp.scabra	Speargrass			3.5			4		
Brachyloma daphnoides ssp.daphnoides	Daphne Heath	2	1						
Bulbine bulbosa	Native Leek			1					
Callistemon sp.	Bottle Brush						1	2	1
Calytrix tetragona	Fringe Myrtle		2				2		
Carex appressa	Tall Sedge				1.5				
Carex fascicularis	Tassel Sedge				1.5				
Casuarina cunninghamiana ssp.cunninghamiana	River Oak				3				
Cheilanthes distans	Rock Fern	2	3	3					
Cheilanthes sieberi ssp.sieberi	Rock Fern		3	3					
Chloris truncata	Windmill Grass								1
Craspedia variabilis	Billy-buttons							1	
Cryptandra amara	Bitter Cryptandra		2						
Dianella revoluta var. revoluta	Flax Lily			3					
Dichelachne micrantha	Plumegrass		2						
Dichondra repens	Kidney Weed			4.5					
Digitaria brownii	Cotton Panic Grass		4						
Dillwynia phyllicoides				1					
Echinopogon caespitosus var. caespitosus	Hedgehog Grass		2						
Einadia nutans ssp.nutans	Saltbush			2			3		
Eucalyptus dives	Broad-leaved Peppermint								1
Eucalyptus oblonga	Sandstone Stringybark		2	1.5					
Eucalyptus mannifera	Brittle Gum		1	2	2				
Eucalyptus praecox	Brittle Gum	4	4.5	2					
Eucalyptus pulverulenta	Silver-leaved Mountain Gum		1						1
Eucalyptus viminalis	Ribbon Gum							2	
Geranium solanderi var. solanderi	Geranium			2					
Glycine clandestina	Glycine			1					
Gonocarpus tetragynus	Raspwort		3						
Gonocarpus teuricoides	Raspwort		2						
Goodenia bellidifolia		3	2	5					
Goodenia hederacea ssp.hederacea	Goodenia	3	4	2					
Hibbertia aspera	Hairy Guinea Flower		3	3					
Hibbertia cistiflora				1			1		
Hydrocotyle laxiflora	Pennywort			3					

Flora Detected within Survey sites 2016		New Ridge	Control Ridge	South Ridge	Impact Creek	Control Creek	Rehab 1	Rehab 2	Rehab 3
Hydrocotyle tripartita	Pennywort		2	3.5					
Isolepis inundata	Club-sedge				2		1	1	1
Joycea pallida	Red-anther Wallaby Grass						2	5	
Lepidosperma laterale			6					1	
Lepidosperma viscidum			3						
Leptospermum parvifolium			2						
Leptospermum polygalifolium ssp. <i>polygalifolium</i>							1		3
Leucopogon ericoides	Pink Beard-heath			3					
Lissanthe strigosa ssp. <i>strigosa</i>	Peach Heath	2		3.5					
Lomandra filiformis ssp. <i>coriacea</i>	Wattle Matt-rush			3					
Lomandra filiformis ssp. <i>filiformis</i>	Wattle Matt-rush		3						
Lomandra glauca	Pale Matt-rush		2.5						
Lomandra longifolia	Spiny Matt-rush	1	5	3	2				3
Oplismenus aemulus	Basket Grass		1						
Panicum simile	Two-colour Panic		2						
Persicaria decipiens	Knotweed				2				
Phyllanthus hirtellus	Thyme Spurge		2						
Platysace ericoides		2	3						
Poa labillardierei var. <i>labillardierei</i>	Tussock Grass			3					
Pomax umbellata		4	5						
Pteridium esculentum	Bracken				3.5				
Senecio diaschides	Fireweed			1					
Senecio hispidulus	Fireweed	2							
Senecio hispidulus var. <i>hispidulus</i>	Fireweed			2					
Senecio quadridentatus	Fireweed				2		3	3	4
Solanum prinophyllum	Forest Nightshade			1					
Stellaria pungens	Prickly Starwort			1					
Themeda australis	Kangaroo Grass			3					
Typha domingensis	Cumbungi				2				
Urtica incisa	Stinging Nettle						1		
Wahlenbergia planiflora	Bluebell			1			4		
Wahlenbergia spp.				1					
Wahlenbergia stricta ssp. <i>stricta</i>	Bluebell	2		3				3	
Wahlenbergia victoriensis	Bluebell			1					

Flora Detected within Survey sites 2016		New Ridge	Control Ridge	South Ridge	Impact Creek	Control Creek	Rehab 1	Rehab 2	Rehab 3
* <i>Acetosella vulgaris</i>	Sheep Sorrel	1					3	3	3
* <i>Anagallis arvensis</i>	Scarlet Pimpernel			2			2		
* <i>Anthoxanthum odoratum</i>	Sweet Vernal Grass			4	5.5		1	2	2
* <i>Briza maxima</i>	Blowfly Grass				4				
* <i>Bromus catharticus</i>	Prairie Grass				3.5				
* <i>Bromus diandrus</i>	Great Brome	1			2				
* <i>Bromus hordeaceus</i>	Soft Brome	1			3.5				
* <i>Chenopodium pumilio</i>	Small Crumbweed			2			2	3	5
* <i>Chondrilla juncea</i>	Skeleton Weed				3		3		1
* <i>Cirsium vulgare</i>	Spear Thistle			2	1.5		2		3
* <i>Conium maculatum</i>	Hemlock				4				
* <i>Conyza bonariensis</i>	Fleabane			2	2.5		1	2	2
* <i>Crataegus monoguna</i>	Hawthorn				1				
* <i>Cynodon dactylon</i>	Couch				6				
* <i>Cyperus eragrostis</i>	Cyperus			1				2	
* <i>Echium plantagineum</i>	Pattersons Curse			2					
* <i>Echium vulgare</i>	Vipers Bugloss			5	1		1		1
* <i>Eleusine indica</i>	Crowsfoot Grass						1	2	
* <i>Eragrostis curvula</i>	African Love Grass				4		1		2
* <i>Erodium cicutarium</i>	Storksbill			3					4
* <i>Euphorbia lathyris</i>	Caper Spurge				4				
* <i>Euphorbia peplus</i>	Petty Spurge				2.5				
* <i>Galium tricomutum</i>	Galium			5					4
* <i>Gnaphalium sp.</i>	Cudweed			1			5		
* <i>Holcus lanatus</i>	Yorkshire Fog				3.5				
* <i>Hypericum perforatum</i>	St. Johns Wort			5	3				1
* <i>Hypochaeris radicata</i>	Flatweed		4	2.5	3		3	6	3
* <i>Lactuca serriola</i>	Prickly Lettuce			1	1.5				
* <i>Lolium perenne</i>	Perennial Ryegrass				4				
* <i>Lythrum hyssopifolia</i>	Hyssop Loosestrife						3	3	5
* <i>Malva parviflora</i>	Small-flowered Mallow			3					
* <i>Medicago satavia</i>	Lucerne			2	2		1		
* <i>Myosotis spp.</i>	Forget-me-not			4					
* <i>Nassella trichotoma</i>	Serrated Tussock				4				
* <i>Oenothera mollissima</i>	Evening Primrose				2				
* <i>Petrorhagia nanteuilii</i>	Childing Pink			4			3	2	2
* <i>Plantago lanceolata</i>	Plantain				3			4	
* <i>Rosa sp.</i>	Rose				1				
* <i>Rubus fruticosus</i>	Blackberry				2.5				
* <i>Rumex crispus</i>	Curled Dock				2				
* <i>Rumex spp.</i>	Dock				2				
* <i>Salix sp.</i>	Willow				1				
* <i>Senecio madagascariensis</i>	Fireweed						1		
* <i>Silene gallica</i>	Silene				1			1	1
* <i>Solanum chenopodioides</i>	Whitetip Nightshade	1		2	1				1
* <i>Solanum linnaeanum</i>	Apple of Sodom			2					
* <i>Sonchus oleraceus</i>	Sowthistle				3				
* <i>Tagetes minuta</i>	Stinking Roger			2					
* <i>Trifolium angustifolium</i>	Narrow Leaved Clover							3	6
* <i>Trifolium arvense</i>	Haresfoot Clover			2			5	5	3
* <i>Trifolium repens</i>	White Clover				3				
* <i>Urtica urens</i>	Stinging Nettle			4					
* <i>Verbena bonariensis</i>	Purpletop				2				1
* <i>Vicia satavia</i>	Vetch				3				

Appendix B – Declared weeds of Central Tablelands

Priority weeds for the Central Tablelands

Note: this region includes the local council areas of Bathurst Regional, Blayney, Cabonne, Cowra, Lithgow, Mid-Western Regional, Oberon, Orange

[Select another region](#)

Weed

All plants

[African boxthorn](#)

Lycium ferocissimum

[African boxthorn](#)

Lycium ferocissimum

[African olive](#)

Olea europaea subsp. *cuspidata*

[Alligator weed](#)

Alternanthera philoxeroides

Duty

General Biosecurity Duty

All plants are regulated with a **general biosecurity duty** to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Mandatory Measure

Must not be imported into the State or sold

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect primary production lands that are free of African boxthorn

Regional Recommended Measure

Exclusion zone: whole region except the core infestation area of the Cowra Council area

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Mandatory Measure

Must not be imported into the State or sold

Alligator weed

Alternanthera philoxeroides

Biosecurity Zone

The Alligator Weed Biosecurity Zone is established for all land within the state except land in the following regions: Greater Sydney; Hunter (but only in the local government areas of City of Lake Macquarie, City of Maitland, City of Newcastle or Port Stephens).

Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone

Anchored water hyacinth

Eichhornia azurea

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Athel pine

Tamarix aphylla

Mandatory Measure

Must not be imported into the State or sold

Bellyache bush

Jatropha gossypifolia

Mandatory Measure

Must not be imported into the State or sold

Bitou bush

Chrysanthemoides monilifera subsp.
rotundata

Mandatory Measure

Must not be imported into the State or sold

Bitou bush

Chrysanthemoides monilifera subsp.
rotundata

Biosecurity Zone

The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south.

Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone

Black knapweed
Centaurea X moncktonii

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Black willow
Salix nigra

Mandatory Measure

Must not be imported into the State or sold

Blackberry
Rubus fruticosus species aggregate

Mandatory Measure

Must not be imported into the State or sold

All species in the *Rubus fruticosus* species aggregate have this requirement, except for the varieties Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree

Blackberry
Rubus fruticosus species aggregate

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect conservation areas, natural environments and primary production lands that are free of blackberry

Boneseed
Chrysanthemoides monilifera subsp.
monilifera

Mandatory Measure

Must not be imported into the State or sold

Boneseed
Chrysanthemoides monilifera subsp.
monilifera

Control Order

Bonseed Control Zone: Whole of NSW

Boneseed Control Zone (Whole of NSW): Owners and occupiers of land on which there is boneseed must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of boneseed must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.

Boxing glove cactus
Cylindropuntia fulgida var. *mamillata*

Mandatory Measure

Must not be imported into the State or sold

Bridal creeper
Asparagus asparagoides

Mandatory Measure

Must not be imported into the State or sold

***this requirement also applies to the Western Cape form of bridal creeper**

Bridal creeper
Asparagus asparagoides

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect conservation areas and natural environments that are free of bridal creeper

Bridal veil creeper
Asparagus declinatus

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Broomrapes
Orobanche species

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species of *Orobanche* are Prohibited Matter in NSW, except the natives *Orobanche cernua* var. *australiana* and *Orobanche minor*

Burr ragweed
Ambrosia confertiflora

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Cabomba
Cabomba caroliniana

Mandatory Measure

Must not be imported into the State or sold

Cane cactus
Austrocylindropuntia cylindrica

Mandatory Measure

Must not be imported into the State or sold

All species in the *Austrocylindropuntia* genus have this requirement

Cape broom
Genista monspessulana

Mandatory Measure
Must not be imported into the State or sold

Cape broom
Genista monspessulana

Regional Recommended Measure
Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect conservation areas and natural environments that are free of Cape broom

Cat's claw creeper
Dolichandra unguis-cati

Mandatory Measure
Must not be imported into the State or sold

Chilean needle grass
Nassella neesiana

Mandatory Measure
Must not be imported into the State or sold

Chilean needle grass
Nassella neesiana

Regional Recommended Measure
Exclusion zone: whole region except for the core infestation area of Bathurst Council, Blayney Council, Lithgow Council, Oberon Council, Cabonne Council and Cowra Council
Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Climbing asparagus
Asparagus africanus

Mandatory Measure
Must not be imported into the State or sold

Climbing asparagus fern
Asparagus plumosus

Mandatory Measure
Must not be imported into the State or sold

Common pear
Opuntia stricta

Mandatory Measure
Must not be imported into the State or sold

Coolatai grass
Hyparrhenia hirta

Regional Recommended Measure
Exclusion zone: whole region except for the core infestation areas of Lithgow Council and Mid-Western Regional Council areas
Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Eurasian water milfoil
Myriophyllum spicatum

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Fireweed
Senecio madagascariensis

Mandatory Measure

Must not be imported into the State or sold

Fireweed
Senecio madagascariensis

Regional Recommended Measure

Exclusion zone: Whole region except for the core infestation area of Bylong Valley and Kanimbla Valley (lower Cox River Catchment)

Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land.

Core infestation area: Land managers should mitigate spread from their land.

Flax-leaf broom
Genista linifolia

Mandatory Measure

Must not be imported into the State or sold

Frogbit
Limnobium laevigatum

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species of *Limnobium* are Prohibited Matter

Gamba grass
Andropogon gayanus

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Giant Parramatta grass
Sporobolus fertilis

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Giant reed
Arundo donax

Regional Recommended Measure

Exclusion zone: whole region except for the core infestation area of Bathurst Council, Cabonne Council and Cowra Council areas

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Gorse
Ulex europaeus

Mandatory Measure

Must not be imported into the State or sold

Gorse
Ulex europaeus

Regional Recommended Measure

Exclusion zone: whole region except for the core infestation area of Bathurst Council, Blayney Council, Lithgow Council and Oberon Council

Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land.

Core infestation area: Land managers should mitigate spread from their land.

Green cestrum
Cestrum parqui

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.

Contain within riparian areas to protect grazing land that is free of green cestrum

Grey sallow
Salix cinerea

Mandatory Measure

Must not be imported into the State or sold

Ground asparagus
Asparagus aethiopicus

Mandatory Measure

Must not be imported into the State or sold

Harrisia cactus

Harrisia species

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

This Regional Recommended Measure does not apply to cultivated plants.

Hawkweeds

Hieracium species

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species in the genus *Hieracium* are Prohibited Matter

Honey locust

Gleditsia triacanthos

Regional Recommended Measure

Exclusion zone: whole region except for the core infestation area of the Capertree Valley and Orange urban areas

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Horsetails

Equisetum species

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Hudson pear

Cylindropuntia rosea

Mandatory Measure

Must not be imported into the State or sold

Hudson pear

Cylindropuntia rosea

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

This Regional Recommended Measure applies to all species of *Cylindropuntia*.

Hydrocotyl

Hydrocotyle ranunculoides

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Hygrophila

Hygrophila costata

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Hymenachne

Hymenachne amplexicaulis and hybrids

Mandatory Measure

Must not be imported into the State or sold

Karoo thorn

Vachellia karroo

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Kochia

Bassia scoparia

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Excluding the subspecies *trichophylla*

Koster's curse

Clidemia hirta

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Lagarosiphon

Lagarosiphon major

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Lantana

Lantana camara

Mandatory Measure

Must not be imported into the State or sold

Long-leaf willow primrose

Ludwigia longifolia

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Ludwigia

Ludwigia peruviana

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Madeira vine

Anredera cordifolia

Mandatory Measure

Must not be imported into the State or sold

Mesquite

Prosopis species

Mandatory Measure

Must not be imported into the State or sold

All species in the genus *Prosopis* have this requirement

Mexican feather grass

Nassella tenuissima

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Miconia

Miconia species

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species of *Miconia* are Prohibited Matter in NSW

Mikania vine

Mikania micrantha

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

***all species in the genus *Mikania* are Prohibited Matter in NSW**

Mimosa

Mimosa pigra

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Mother-of-millions

Bryophyllum species

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.

Protect conservation areas, natural environments and grazing land that is free of mother-of-millions

Ox-eye daisy

Leucanthemum vulgare

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.

Protect conservation areas, natural environments and primary production lands that are free of ox-eye daisy

Parkinsonia

Parkinsonia aculeata

Mandatory Measure

Must not be imported into the State or sold

Parkinsonia

Parkinsonia aculeata

Control Order

Parkinsonia Control Zone: Whole of NSW
Parkinsonia Control Zone (Whole of NSW): Owners and occupiers of land on which there is parkinsonia must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of parkinsonia must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.

Parthenium weed

Parthenium hysterophorus

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Parthenium weed

Parthenium hysterophorus

Mandatory Measure

The following equipment must not be imported into NSW from Queensland: grain harvesters (including the comb or front), comb trailers (including the comb or front), bins used for holding grain during harvest operations, augers or similar for moving grain, vehicles used to transport grain harvesters, support vehicles driven in paddocks during harvest operations, mineral exploration drilling rigs and vehicles used to transport those rigs, unless set out as an exception in Division 5, Part 2 of the Biosecurity Order (Permitted Activities) 2017

Pond apple

Annona glabra

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Prickly acacia

Vachellia nilotica

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Prickly pears - Austrocyliindropuntias

Austrocyliindropuntia species

Mandatory Measure

Must not be imported into the State or sold

All species in the *Austrocyliindropuntia* genus have this requirement

Prickly pears - Cyliindropuntias

Cyliindropuntia species

Mandatory Measure

Must not be imported into the State or sold

All species in the *Cyliindropuntia* genus have this requirement

Prickly pears - Cyllindropuntias

Cylindropuntia species

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. Notify local control authority if found.

This Regional Recommended Measure does not apply to cultivated plants

Prickly pears - Opuntias

Opuntia species

Mandatory Measure

Must not be imported into the State or sold

Except for *Opuntia ficus-indica* (Indian fig)

Privet - broad-leaf

Ligustrum lucidum

Regional Recommended Measure

Exclusion zone: urban areas of Bathurst Council, Blayney Council, Lithgow Council, Oberon Council, and Orange City Council

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant is prevented from flowering and fruiting. Land managers should mitigate spread from their land. Land managers should mitigate the risk of the plant being introduced to their land.

Privet - European

Ligustrum vulgare

Regional Recommended Measure

Exclusion zone: urban areas of Bathurst Council, Blayney Council, Lithgow Council, Oberon Council, and Orange City Council

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant is prevented from flowering and fruiting. Land managers should mitigate spread from their land. Land managers should mitigate the risk of the plant being introduced to their land.

Privet - narrow-leaf

Ligustrum sinense

Regional Recommended Measure

Exclusion zone: urban areas of Bathurst Council, Blayney Council, Lithgow Council, Oberon Council, and Orange City Council

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant is prevented from flowering and fruiting. Land managers should mitigate spread from their land. Land managers should mitigate the risk of the plant being introduced to their land.

Rope pear
Cylindropuntia imbricata

Mandatory Measure

Must not be imported into the State or sold

All species in the *Cylindropuntia* genus have this requirement

Rope pear
Cylindropuntia imbricata

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

This Regional Recommended Measure applies to all species of *Cylindropuntia*

Rubber vine
Cryptostegia grandiflora

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Sagittaria
Sagittaria platyphylla

Mandatory Measure

Must not be imported into the State or sold

Sagittaria
Sagittaria platyphylla

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. Notify local control authority if found.

Salvinia
Salvinia molesta

Mandatory Measure

Must not be imported into the State or sold

Scotch broom
Cytisus scoparius subsp. *scoparius*

Mandatory Measure

Must not be imported into the State or sold

Scotch broom
Cytisus scoparius subsp. *scoparius*

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect conservation and natural environments that are free of Scotch broom

Serrated tussock
Nassella trichotoma

Mandatory Measure

Must not be imported into the State or sold

Serrated tussock
Nassella trichotoma

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect conservation areas, natural environments and primary production lands that are free of serrated tussock

Siam weed
Chromolaena odorata

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Silverleaf nightshade
Solanum elaeagnifolium

Mandatory Measure

Must not be imported into the State or sold

Silverleaf nightshade
Solanum elaeagnifolium

Regional Recommended Measure

Exclusion zone: whole region except the core infestation area of Cowra Council, Cabonne Council and Mid-Western Regional Council

Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land.

Core infestation area: Land managers should mitigate spread from their land.

Smooth tree pear
Opuntia monacantha

Mandatory Measure

Must not be imported into the State or sold

Snakefeather
Asparagus scandens

Mandatory Measure

Must not be imported into the State or sold

Spanish heath
Erica lusitanica

Regional Recommended Measure

Exclusion zone: whole region except for the core infestation area of Lithgow Council

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Spiny burrgrass - longispinus

Cenchrus longispinus

Regional Recommended Measure

Exclusion zone: whole region except the core infestation area of Mid-Western Regional Council, Bathurst Council, Cabonne Council and Cowra Council areas

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Spiny burrgrass - spinifex

Cenchrus spinifex

Regional Recommended Measure

Exclusion zone: whole region except the core infestation area of Mid-Western Regional Council, Bathurst Council, Cabonne Council and Cowra Council areas

Whole region: The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Land managers should mitigate the risk of the plant being introduced to their land. Core infestation area: Land managers should mitigate spread from their land.

Spongeplant

Limnobium spongia

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species of *Limnobium* are Prohibited Matter

Spotted knapweed

Centaurea stoebe subsp. *micranthos*

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

St. John's wort

Hypericum perforatum

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.

Protect grazing land that is free of St. John's wort

Tiger pear

Opuntia aurantiaca

Mandatory Measure

Must not be imported into the State or sold

Tiger pear

Opuntia aurantiaca

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land.

Protect unimproved grazing lands that are free of tiger pear

Tropical soda apple

Solanum viarum

Control Order

Tropical Soda Apple Control Zone: Whole of NSW

Tropical Soda Apple Control Zone (Whole of NSW): Owners and occupiers of land on which there is tropical soda apple must notify the local control authority of new infestations; destroy the plants including the fruit; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of tropical soda apple must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on the land, or on or in a carrier.

Tutsan

Hypericum androsaemum

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. The plant should not be bought, sold, grown, carried or released into the environment.

Protect conservation areas, natural environments and primary production land that is free of tutsan

Velvety tree pear

Opuntia tomentosa

Mandatory Measure

Must not be imported into the State or sold

Water caltrop

Trapa species

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species in the *Trapa* genus are Prohibited Matter in NSW

Water hyacinth

Eichhornia crassipes

Mandatory Measure

Must not be imported into the State or sold

Water hyacinth

Eichhornia crassipes

Biosecurity Zone

The Water Hyacinth Biosecurity Zone applies to all land within the State, except for the following regions: Greater Sydney or North Coast, North West (but only the local government area of Moree Plains), Hunter (but only in the local government areas of City of Cessnock, City of Lake Macquarie, MidCoast, City of Maitland, City of Newcastle or Port Stephens), South East (but only in the local government areas of Eurobodalla, Kiama, City of Shellharbour, City of Shoalhaven or City of Wollongong).

Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone

Water hyacinth

Eichhornia crassipes

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. Notify local control authority if found.

Water soldier

Stratiotes aloides

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Willows

Salix species

Mandatory Measure

Must not be imported into the State or sold

All species in the *Salix* genus have this requirement, except *Salix babylonica* (weeping willows), *Salix x calodendron* (pussy willow) and *Salix x reichardtii* (sterile pussy willow)

Witchweeds

Striga species

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

All species in the *Striga* genus are Prohibited Matter in NSW, except the native *Striga parviflora*

Yellow burrhead

Limnocharis flava

Prohibited Matter

A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

The content provided here is for information purposes only and is taken from the *Biosecurity Act 2015* and its subordinate legislation, and the Regional Strategic Weed Management Plans (published by each Local Land Services region in NSW). It describes the state and regional priorities for weeds in New South Wales, Australia.



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Appendix C – Threatened Species Database Searches

Scientific Name	Exotic	Common Name	NSW status	Comm. status
<i>Eulamprus leuraensis</i>		Blue Mountains Water skink	E1,P	E
<i>^Hoplocephalus bungaroides</i>		Broad-headed Snake	E1,P,2	V
<i>Oxyura australis</i>		Blue-billed Duck	V,P	
<i>^^Callocephalon fimbriatum</i>		Gang-gang Cockatoo	V,P,3	
<i>^Calyptorhynchus lathami</i>		Glossy Black-Cockatoo	V,P,2	
<i>Glossopsitta pusilla</i>		Little Lorikeet	V,P	
<i>^^Ninox connivens</i>		Barking Owl	V,P,3	
<i>^^Ninox strenua</i>		Powerful Owl	V,P,3	
<i>Chthonicola sagittata</i>		Speckled Warbler	V,P	
<i>Daphoenositta chrysoptera</i>		Varied Sittella	V,P	
<i>Artamus cyanopterus cyanopterus</i>		Dusky Woodswallow	V,P	
<i>Petroica boodang</i>		Scarlet Robin	V,P	
<i>Petroica phoenicea</i>		Flame Robin	V,P	
<i>Dasyurus maculatus</i>		Spotted-tailed Quoll	V,P	E
<i>Phascolarctos cinereus</i>		Koala	V,P	V
<i>Petaurus australis</i>		Yellow-bellied Glider	V,P	
<i>Petaurus norfolcensis</i>		Squirrel Glider	V,P	
<i>Petauroides volans</i>		Greater Glider	P	V
<i>Bettongia gaimardi</i>		Tasmanian Bettong	E4,P	X
<i>Saccolaimus flaviventris</i>		Yellow-bellied Sheath-tail-bat	V,P	
<i>Mormopterus norfolkensis</i>		Eastern Freetail-bat	V,P	
<i>Falsistrellus tasmaniensis</i>		Eastern False Pipistrelle	V,P	
<i>Miniopterus australis</i>		Little Bentwing-bat	V,P	
<i>Miniopterus schreibersii oceanensis</i>		Eastern Bentwing-bat	V,P	
<i>Myotis macropus</i>		Southern Myotis	V,P	
<i>Scoteanax rueppellii</i>		Greater Broad-nosed Bat	V,P	
<i>Paralucia spinifera</i>		Purple Copper Butterfly, Bathurst Copper Butterfly	E1	V
<i>Petalura gigantea</i>		Giant Dragonfly	E1	

Scientific Name	Common Name	NSW status	Comm. status
<i>Pultenaea glabra</i>	Smooth Bush-Pea	V,P	V
<i>Acacia bynoeana</i>	Bynoe's Wattle	E1,P	V
<i>Acacia flocktoniae</i>	Flockton Wattle	V,P	V
<i>Acacia meiantha</i>		E1,P	
<i>Velleia perfoliata</i>		V,P	V
<i>Eucalyptus aggregata</i>	Black Gum	V,P	
<i>Eucalyptus pulverulenta</i>	Silver-leafed Gum	V,P	V
[^] <i>Diuris aequalis</i>	Buttercup Doubletail	E1,P,2	V
[^] <i>Prasophyllum fuscum</i>	Slaty Leek Orchid	E4A,P,2	V
<i>Persoonia acerosa</i>	Needle Geebung	V,P	V
<i>Persoonia hindii</i>		E1,P	
<i>Persoonia marginata</i>	Clandulla Geebung	V,P	V
<i>Asterolasia buxifolia</i>		E1,P	
<i>Boronia deanei</i>	Deane's Boronia	V,P	V
<i>Leionema lachnaeoides</i>		E1,P	E
<i>Derwentia blakelyi</i>		V,P	

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Endangered Ecological Communities			
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	No scientific name	Dominated by White Box Yellow Box or Blakely's Red Gum where a tree canopy still exists. Must be greater than 0.1 hectares in size where these canopy species dominate.	EPBC Act 2000 Critically Endangered
Temperate Highland Peat Swamps on Sandstone	No scientific name	The Temperate Highland Peat Swamps all occur on sandstone and share similar vegetation. Sphagnum bogs and fens occupy the wetter parts while sedge and shrub associations occur in the drier parts of the swamps. Some, like the Blue Mountains Swamps, are hanging swamps that are prominent on steep valley sides, where water exits the ground between sandstone and clay stone layers of rock. A variety of native plants and animals make their homes in the Temperate Highland Peat Swamps. These include the nationally endangered Blue Mountains Water Skink, Giant Burrowing Frog and Wingecarribee Leek Orchid. The Giant Dragonfly, which is threatened in NSW, also occurs in this ecological community.	EPBC Act 2000 Endangered
Upland Basalt Eucalypt Forest of the Sydney Basin Bioregion	No scientific name	Tall open eucalypt forests found on igneous rock (predominately Tertiary basalt and microsyenite) in, or adjacent to, the Sydney Basin Bioregion. The ecological community occurs in areas of high rainfall, generally ranging from 950 to 1600 mm/year. The ecological community typically occurs at elevations between 650 and 1050 m above sea level although it has been recorded at elevations as low as 350 m at the back of the Illawarra Escarpment in the Upper Nepean Sydney Catchment Authority (SCA) lands where proximity to the coast provides higher rainfall at lower elevations. The ecological community may occur at elevations of 1200 m or more within its range, such as on the Boyd Plateau in the western Blue Mountains.	EPBC Act 2000 Endangered
Flora			
Bynoe's Wattle	Acacia bynoeana	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leafed Apple.	TSC Act 1995 Endangered EPBC Act 2000 Vulnerable
Flockton Wattle	Acacia flocktoniae	The Flockton Wattle is found only in the Southern Blue Mountains (at Mt Victoria, Megalong Valley and Yerranderie) and grows in dry sclerophyll forest on sandstone.	TSC Act 1995 Vulnerable EPBC Act 2000 Vulnerable
	Acacia meiantha	Acacia meiantha is endemic to New South Wales. Three disjunct populations within the Central Tablelands occur within 100 km of each other. The Clarence population covers approx. 1 ha between Lithgow and Bell on Crown and Railway Corridor land. This is the main population and is on the east of the Great Dividing Range (GDR) in a headwater catchment of	TSC Act 1995 Endangered

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
		the Coxs River. The Mullions Range population is west of the GDR, approx. 20 km northwest of Orange. A survey of this population has found that it consists of many widely distributed and disjunct stands covering ca. 5 ha with no stands known to occur on conservation land. The Aarons Pass population is west of the GDR in the Macquarie River catchment. This population is primarily confined to approx. 2.5 km of road easements.	
	<i>Asterolasia buxifolia</i>	Known from a single site at a granite outcrop in the riparian zone of the Lett River. Apparently restricted to dense riparian scrub along rocky watercourses with a granitic substrate. Rediscovered in 2000, little is known about the species. The growth rate appears to be very slow, and the flowering season short.	TSC Act 1995 Endangered
	<i>Asterolasia elegans</i>	Found in sheltered forests on mid- to lower slopes and valleys (on Hawkesbury sandstone) in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (<i>Syncarpia glomulifera</i> subsp. <i>glomulifera</i>), Smooth-barked Apple (<i>Angophora costata</i>), Sydney Peppermint (<i>Eucalyptus piperita</i>), Forest Oak (<i>Allocasuarina torulosa</i>) and Christmas Bush (<i>Ceratopetalum gummiferum</i>).	EPBC 2000 Endangered
Deane's Boronia	<i>Boronia deanei</i>	There are scattered populations of Deane's Boronia between the far south-east of NSW and the Blue Mountains (including the upper Kangaroo River near Carrington Falls, the Endrick River near Nerriga and Nalbaugh Plateau), mainly in conservation reserves. Grows in wet heath, often at the margins of open forest adjoining swamps or along streams.	TSC Act 1995 Vulnerable EPBC Act 2000 Vulnerable
Thick Lip Spider Orchid	<i>Caladenia tessellata</i>	A terrestrial orchid generally found in grassy sclerophyll woodland on clay loam or sandy soils	EPBC Act 2000 Vulnerable
Leafless Tongue-orchid	<i>Cryptostylis hunteriana</i>	Populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black Sheoak (<i>Allocasuarina littoralis</i>).	EPBC Act 2000 Vulnerable
A shrub	<i>Derwentia blakelyi</i>	<i>Derwentia blakelyi</i> is restricted to the western Blue Mountains, near Clarence, near Mt Horrible, Nullo Mountain and the Coricudgy Range. It grows in eucalypt forest often in moist areas. The species is currently known from less than 20 locations none of which is in a conservation reserve. Known locations all have small population sizes. It is a small glabrous and glaucous shrub or woody herb to 50 cm high, with one to several erect softly woody stems from a narrow rootstock; stems mostly unbranched below inflorescence and dying back after fruiting, internodes 1.5-6 cm long. Leaves usually recurved, V-shaped in cross section, ovate to lanceolate, mostly 2.5-5.5 cm long, 10-20 mm wide, apex more or less acute, base cordate or truncate or cuneate, margins with 8-18 pairs of shallow teeth; sessile. Racemes mostly 8-40 cm long, 15-35 flowered. Calyx lobes 3-5.5 mm long and 0.7-1.3 mm wide in fruit. Corolla 6-7 mm long, bright blue-violet. Capsule broad-ovate, 4-6.5 mm long, 3-3.5 mm wide, truncate or emarginate, glabrous, glaucous. Flowers summer.	TSC Act 1995 Vulnerable
Buttercup Doubletail	<i>Diuris aequalis</i>	Grows among grass in sclerophyll forest, mainly in the ranges and tablelands; chiefly from Braidwood to Kanangra and Liverpool.	TSC Act 1995 Endangered

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Black Gum	<i>Eucalyptus aggregata</i>	Grows on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts, such as Snow Gum or White Sallee (<i>Eucalyptus pauciflora</i>), Manna or Ribbon Gum (<i>E. viminalis</i>), Candlebark (<i>E. rubida</i>), Black Sallee (<i>E. stellulata</i>) and Swamp Gum (<i>E. ovata</i>). Black Gum usually occurs in an open woodland formation with a grassy groundlayer dominated either by River Tussock (<i>Poa labillardierei</i>) or Kangaroo Grass (<i>Themeda australis</i>), but with few shrubs. Also occurs as isolated paddock trees in modified native or exotic pastures. Many populations occur on travelling stock reserves, though stands and isolated individuals also occur on private land. There are very few stands in conservation reserves.	TSC 1995 Vulnerable
Silver-leaved Mountain Gum, Silver-leaved Gum	<i>Eucalyptus pulverulenta</i>	The Silver-leaved Gum is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo and Bombala areas). Grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (<i>Eucalyptus mannifera</i>), Red Stringybark (<i>E. macrorhynca</i>), Broad-leaved Peppermint (<i>E. dives</i>), Silvertop Ash (<i>E. sieberi</i>) and Apple Box (<i>E. bridgesiana</i>).	TSC 1995 Vulnerable EPBC Act 2000 Vulnerable
A Herb	<i>Euphrasia arguta</i>	Its previous habitat consists of grassy areas near rivers in elevations until 700 m asl with an annual rainfall of 600 mm. The flowering period is from October to January.	EPBC Act 2000 Critically Endangered
Wingless Raspwort, Square Raspwort	<i>Haloragis exalata</i> subsp <i>exalata</i>	Square Raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW.	EPBC Act 2000 Vulnerable
Not available	<i>Leionema lachnaeoides</i>	Formerly known as <i>Phebalium lachnaeoides</i> . Populations occur on exposed sandstone cliff tops and terraces, at 960 - 1000m altitude and with aspects from south-east to south-west. Habitat vegetation is montane heath and commonly includes <i>Eucalyptus stricta</i> , <i>Allocasuarina nana</i> , <i>Dillwynia retorta</i> , <i>Epacris microphylla</i> and <i>Caustis flexuosa</i> . Has a life span greater than 10 years. Flowering occurs in winter to late spring. The age when plants first flower is not known. Pollination is thought to occur by insects.	TSC Act 1995 Endangered
Peppergrass	<i>Lepidium hyssopifolium</i>	Grows in open, bare ground with limited competition from other plants. Recently recorded localities have predominantly been in weed-infested areas of heavy modification, high degradation and high soil disturbance.	EPBC Act 2000 Endangered
Hoary Sunray	<i>Leucochrysum albicans</i> var. <i>tricolor</i>	In NSW and ACT, Hoary Sunray occurs in grasslands, grassy areas in woodlands and dry open forests, and modified habitats, on a variety of soil types including clays, clay loams, stony and gravelly soil (Sinclair 2010).	EPBC Act 2000 Endangered
Omeo Stork's-bill	<i>Pelargonium</i> sp. <i>Striatellum</i> (G.W.Carr 10345)	Narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. Known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst.	EPBC 2000 Endangered
Needle	<i>Persoonia</i>	The Needle Geebung has been recorded only on the central coast and in the Blue Mountains, from Mt Tomah in the north to as far south as Hill Top	TSC Act 1995

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Geebung	acerosa	where it is now believed to be extinct. Mainly in the Katoomba, Wentworth Falls, Springwood area. The Needle Geebung occurs in dry sclerophyll forest, scrubby low-woodland and heath on low fertility soils. Plants are likely to be killed by fire and recruitment is solely from seed. This species seems to benefit from the reduced competition and increased light available on disturbance margins including roadsides.	Vulnerable EPBC Act 2000 Vulnerable
	Persoonia hindii	Occurs in dry sclerophyll forests and woodlands on sandy soils. Stoloniferous (has underground horizontal stems) and is thought to be clonal. Hence, each location may comprise only one to a few individuals. Flowers January to March, possibly with sporadic flowering in other months.	TSC Act 1995 Endangered
Hairy Geebung	Persoonia hirsuta	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations. It is probably killed by fire (as other Persoonia species are) but will regenerate from seed.	EPBC Act 2000 Endangered
Clandulla Geebung	Persoonia Marginata	P. marginata is found in dry woodland communities associated with Shoalhaven. Group sediments. Soils are shallow hardsetting sandy loams, generally with gravel or rocks, and the topography is flat. The vegetation is part of the Tablelands Grassy Woodland Complex vegetation	TSC Act 1995 Vulnerable
Slaty Leek Orchid	Prasophyllum fuscum	The total population, based on a single observation in 2007, is estimated to be approximately 25 mature individuals. Grows in moist heath, often along seepage lines. The known population grows in moist sandy soil over sandstone amongst sedges and grasses in an area that appears to be regularly slashed by the local council. Flowering does not necessarily occur every year, often skipping years. Although successful flowering and reproduction is likely to be dependent on favourable weather and habitat conditions. Dies back after the flowering and fruiting phases and exist only as a dormant tuber for much of the year. Like most terrestrial orchids, the species is believed to be semi or fully dependent on a mycorrhizal symbiont. Dormant over summer and leaves emerge around April and flowering occurs from September to December. It has also been confused with P. pallens which can be distinguished by its paler-coloured flowers with a musty smell.	TSC 1995 Critically Endangered EPBC Act 2000 Vulnerable
Tarengo Leek Orchid	Prasophyllum petilum	Occurs on relatively fertile soils in grassy woodland or natural grassland.	
	Prasophyllum s p. Wybong (C.Phelps ORG 5269)	Occurs on relatively fertile soils in grassy woodland or natural grassland.	EPBC Act 2000 Critically Endangered
Smooth Bush-pea, Swamp Bush-pea	Pultenaea glabra	Grows in swamp margins, hillslopes, gullies and creekbanks and occurs within dry sclerophyll forest and tall damp heath on sandstone. Flowers September to November, fruit matures October to December. Fire sensitive, with adults killed by fire and recruitment occurring from a persistent soil stored seed bank. Seed germination will not occur in the	TSC Act 1995 Vulnerable EPBC Act 2000 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
		absence of fire as the hard-coated seed requires heat to break seed dormancy, as is typical of species within Fabaceae.	
Eastern Underground Orchid	Rhizanthella slateri	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers October to November.	EPBC Act 2000 Endangered
Austral Toadflax, Toadflax	Thesium australe	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (<i>Themeda australis</i>). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	EPBC Act 2000 Vulnerable
	Velleia perfoliata	Only known from the Hawkesbury district and upper Hunter Valley. Grows in heath and open forest over sandstone. Associated species include <i>Angophora bakeri</i> , <i>Corymbia eximia</i> , <i>Backhousia myrtifolia</i> , <i>Eucalyptus sparsifolia</i> , <i>E. crebra</i> , <i>E. notabilis</i> , <i>Allocasuarina torulosa</i> , and <i>Leptospermum attenuatum</i> . Found in shallow depressions on Hawkesbury sandstone shelves, on rocky hill sides, under cliffs or on rocky/sandy soils along tracks and trails. Occurs on fairly shallow soils of sandy loam texture. Often found growing on moss and lichen mats formed on rock.	TSC 1995 Vulnerable
Fauna			
Amphibians			
Giant Burrowing Frog	Heleioporus australiacus	Breeding habitat is generally soaks or pools within first or second order streams. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	EPBC Act 2000 Vulnerable
Booroolong Frog	Litoria booroolongensis	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge. Sometimes bask in the sun on exposed rocks near flowing water during summer. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.	EPBC Act 2000 Endangered
Littlejohn's Tree Frog, Heath	Litoria littlejohni	This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground. Breeding is triggered by heavy rain and can potentially occur all year, but is usually from late summer to early spring when conditions are favourable. Males call from low vegetation close to slow flowing pools. Eggs are laid in loose gelatinous masses attached to small submerged twigs. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools.	EPBC Act 2000 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Insects			
Bathurst Copper Butterfly	<i>Paralucia spinifera</i>	Occurs on the Central Tablelands of NSW in an area approximately bounded by Oberon, Hartley and Bathurst. The butterfly is found at 35 locations, all within the Greater Lithgow, Bathurst Regional and Oberon local government areas. It is possible that additional locations will be identified, and these may lie outside the currently known distribution.	TSC Act 1995 Endangered EPBC Act 2000 Vulnerable
Giant Dragonfly	<i>Petalura gigantea</i>	Live in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence. Adults spend most of their time settled on low vegetation on or adjacent to the swamp. They hunt for flying insects over the swamp and along its margins. Adults fly over the swamp and along its margins hunting for flying insects. Females lay eggs into moss, under other soft ground layer vegetation, and into moist litter and humic soils, often associated with groundwater seepage areas within appropriate swamp and bog habitats. The species does not utilise areas of standing water wetland, although it may utilise suitable boggy areas adjacent to open water wetlands. Larvae dig long branching burrows under the swamp. Larvae are slow growing and the larval stage may last 10 years or more.	TSC 1995 Endangered
Birds			
Regent Honeyeater	<i>Anthochaera phrygia</i>	Regent Honeyeaters occur mainly in box-ironbark open-forests and riparian stands of Casuarina on the inland slopes of the Great Dividing Range. At times significant numbers also occur in coastal forests in NSW and eastern Victoria. Particularly when breeding, Regent Honeyeaters require access to nectar or another form of sugary plant exudate such as lerps or honeydew. A few species of Eucalyptus and mistletoe (<i>Amyema cambagei</i>) seem to be important in providing reliable and relatively predictable nectar flows. Lack of access to these dependable nectar flows at critical times, due to clearance of the most fertile stands, the poor health of many remnants, and competition for nectar from other honeyeaters, may be a major cause of the decline of this species.	EPBC 2000 Critically Endangered
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. May also occur in sub-alpine Snow Gum Eucalyptus pauciflora woodland and occasionally in temperate rainforests. Move to lower altitudes in winter, preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting.	TSC 1995 Vulnerable
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur. Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites.	TSC 1995 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Varied Sittella	Daphoenositta chrysoptera	Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	TSC 1995 Vulnerable
Little Lorikeet	Glossopsitta pusilla	The distribution of the Little Lorikeet extends from just north of Cairns, around the east coast of Australia, to Adelaide. In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Little Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes. On the western slopes and tablelands White Box Eucalyptus albens and Yellow Box E. meliodora are particularly important food sources for pollen and nectar respectively. They are also reported as feeding on fruits, particularly those of mistletoes.	TSC 1995 Vulnerable
Painted Honeyeater	Grantiella picta	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	EPBC 2000 Vulnerable
Swift Parrot	Lathamus discolor	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia. In NSW mostly occurs on the coast and south west slopes between March and October. Favoured feed trees include winter flowering species such as Swamp Mahogany Spotted Gum, Red Bloodwood, E. sideroxylon and White Box. Commonly used lerp infested trees include E. microcarpa, Grey Box and Blackbutt.	EPBC 2000 Endangered
Barking Owl	Ninox connivens	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Roosts in shaded portions of tree canopies. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but also takes birds, invertebrates and rodents and rabbits. Requires very large permanent territories in most habitats due to sparse prey densities. Eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used.	TSC 1995 Vulnerable
Powerful Owl	Ninox strenua	In NSW, widely distributed throughout the eastern forests from the coast inland to tablelands. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. They nest in large tree hollows (at least 0.5 m	TSC 1995 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
		deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	
Blue-billed Duck	<i>Oxyura australis</i>	<p>The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.</p> <p>Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer.</p>	TSC 1995 Vulnerable
Scarlet Robin	<i>Petroica boodang</i>	The Scarlet Robin breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. It forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris. The robin builds an open cup nest of plant fibres and cobwebs, sited in the fork of tree (often a dead branch in a live tree, or in a dead tree or shrub) which is usually more than 2 m above the ground.	TSC 1995 Vulnerable
Flame Robin	<i>Petroica phoenicea</i>	The Flame Robin is found in south-eastern Australia (Queensland border to Tasmania, western Victoria and south-east South Australia). In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. There may be two disjunct breeding populations in NSW on the Northern Tablelands and the Central–Southern Tablelands. The Flame Robin forages from low perches, feeding on invertebrates taken from the ground, tree trunks, logs and other coarse woody debris. The robin builds an open cup nest of plant fibres and cobweb, which is often near the ground in a sheltered niche, ledge or shallow cavity in a tree, stump or bank. Generation length has been estimated as 5 years.	TSC 1995 Vulnerable
Australian Painted Snipe	<i>Rostratula australis</i>	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	EPBC Act 2000 Endangered
Mammals			

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Large-eared Pied Bat, Large Pied Bat	Chalinolobus dwyeri	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Hirundo ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	TSC 1995 Vulnerable EPBC Act 2000 Vulnerable
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and may raid possum and glider dens and prey on roosting birds.	TSC Act 1995 Vulnerable EPBC Act 2000 Endangered
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	TSC Act 1995 Vulnerable
Southern Brown Bandicoot (eastern)	<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a healthy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees <i>Xanthorrhoea</i> sp., blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest.	EPBC Act 2000 Endangered
Little Bentwing-bat	<i>Miniopterus australis</i>	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats	TSC 1995 Vulnerable
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	Highly mobile species requiring either hollows, decorticating bark or cave structures for shelter. All forage over wide areas on insects.	TSC 1995 Vulnerable
Eastern Freetail-bat	<i>Mormopterus norfolkensis</i>	Highly mobile species requiring either hollows, decorticating bark or cave structures for shelter. All forage over wide areas on insects.	TSC 1995 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Southern Myotis	Myotis macropus	Highly mobile species requiring either hollows, decorticating bark or cave structures for shelter. All forage over wide areas on insects.	TSC 1995 Vulnerable
Yellow-bellied Glider	Petaurus australis	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar.	TSC 1995 Vulnerable
Squirrel Glider	Petaurus norfolcensis	Inhabits mature or old growth Box, Box- Ironbark woodlands and Blackbutt-Bloodwood forest with heath understorey in Coastal areas. Prefers mixed species stands with a shrub or Acacia mid-storey. Requires abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	TSC 1995 Vulnerable
Brush-tailed Rock-wallaby	Petrogale penicillata	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Live in family groups of 2 to 5 adults and usually one or two juvenile and sub-adult individuals. Dominant males associate and breed with up to four females.	TSC 1995 Vulnerable EPBC Act 2000 Vulnerable
Koala	Phascolarctos cinereus	Inhabits eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spends most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	EPBC Act 2000 Vulnerable TSC 1995 Vulnerable
New Holland Mouse	Pseudomys novaehollandiae	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44 ha to 1.4 ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi, and is therefore likely to play an important role in seed dispersal and fungal spore dispersal.	EPBC Act 2000 Vulnerable
Grey-headed Flying-fox	Pteropus poliocephalus	Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Travels up to 50 km to forage on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of	TSC 1995 Vulnerable EPBC Act 2000 Vulnerable

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
		rainforest trees and vines.	
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	TSC 1995 Vulnerable
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	Highly mobile species requiring either hollows, decorticating bark or cave structures for shelter. All forage over wide areas on insects.	TSC 1995 Vulnerable
Reptiles			
Blue Mountains Water Skink	<i>Eulamprus leuraensis</i>	The Blue Mountains Water Skink occurs at high elevations between 560 m and 1060 m. Recent genetic research indicates that individual populations are genetically distinct especially between Newnes Plateau and Blue Mountains populations. It is restricted to an isolated and naturally fragmented habitat of sedge and shrub swamps that have boggy soils and appear to be permanently wet. The vegetation in these swamps typically takes the form of a sedgeland interspersed with shrubs, but may occur as a dense shrub thicket. The biology and ecology is poorly understood. Dispersal appears to be male biased, however gene flow between populations is so low that recolonisation after disturbance is likely to be low or non-existent. The Blue mountains Water Skink is semi-aquatic and is active on warm, sunny days from September until late April. It feeds on grasshoppers, flies, moths, weevils and wasps. A small fruit with a seed was found in a lizard dropping at Leura. When disturbed, this species has been observed to flee to shelter in dense grass tussocks or down holes.	EPBC Act 2000 Endangered
Broad-headed Snake	<i>Hoplocephalus bungaroides</i>	Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer. Feeds mostly on geckos and small skinks; will also eat frogs and small mammals occasionally. Females produce four to 12 live young from January to March, which is a relatively low level of fecundity.	TSC Act 1995 Endangered EPBC Act 2000 Vulnerable
Fish			
Macquarie Perch	<i>Macquaria australasica</i>	Originally widespread through the more midland–upland streams and rivers in the south-east corner of the Murray–Darling Basin (New South Wales, Victoria and the Australian Capital Territory), the distribution of this fish is now greatly reduced and patchy. In addition to inland populations, the Macquarie perch is also found in the Hawkesbury and Shoalhaven coastal catchments. While there are clear visual/ physical differences between these coastal and western populations, they are currently still considered to be the same species. Habitat for the Macquarie perch is bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.	EPBC Act 2000 Endangered

Common Name	Scientific Name	Habitat Requirements	Listing
			New listings since last monitoring period
Australian Grayling	Prototroctes maraena	This species spends only part of its lifecycle in freshwater, where running ripe specimens have been captured. The Tambo R. population inhabits a clear, gravel-bottomed stream with alternating pools and riffles, and granite outcrops. It has also been associated with clear, gravel-bottomed habitats in the Mitchell & Wonnangatta Rivers (Vic.) but was present in a muddy-bottomed, heavily silted habitat in the Tarwin R. (Vic.). Grayling migrate between freshwater streams and the ocean and as such it is generally accepted to be a diadromous (migratory between fresh and salt waters) species.	EPBC Act 2000 Vulnerable



Onsite Environmental Management Pty Ltd

Unit 3, 2 Saltspray Cl,
Redhead, NSW 2290
ACN 107 764 312
Ph: 02 4935 2300
F: 02 4944 9492
Mobile: 0407461092
Email: david.bone@osem.com.au

2 December 2016

Rod Welsh
Austen Quarry
C/o Austen Quarry Site Office

OSEM Reference: J061_RPT1_Pre-clearing survey Stage 2 2017_v1.0

Dear Rod

Re: Pre-Clearance Survey at Austen Quarry Stage 2 development – 2017 Clearing

Introduction

Onsite Environmental Management (OSEM) Environmental Scientist - Mr Callan Douchkov and Principal Ecologist Mr David Bone conducted a pre-clearance survey on 23/11/2016 for the Stage 2 clearing area proposed to be cleared in 2017.

The purpose of the survey was to ground truth the vegetation proposed to be cleared and to determine if the vegetation contained any fauna habitat, such as hollows or logs and to map these features and identify any appropriate mitigation measures to be implemented prior to and during vegetation clearing works.

Methodology

The survey involved an assessment and mapping of existing vegetation in the clearing area and the identification of any EEC, threatened species, habitat trees and noxious weeds in the area.

Trees identified as containing hollows or other habitat elements were marked with a number and the location was recorded on GPS to allow the trees to be relocated during clearing.

Results

Fauna habitat features such as nests, scratchings or hollows were observed in 56 trees across the area proposed to be cleared. Three (3) records of a threatened species was recorded in the proposed clearing area, three *Eucalyptus pulverulenta* were identified on the edge of the clearing area.

The plants details are:

***E. pulverulenta* 1**

-) 2.5m height
-) Fruits present 23/11/16
-) New growth present
-) Mistletoe present

***E. pulverulenta* 2**

-) 1m High
-) No fruits 23/11/16
-) New growth present

***E. pulverulenta* 3**

-) 2.0m high
-) No fruits 23/11/16
-) New growth present

The updated habitat tree register is contained in Appendix A. Figures 1 and 2 show the location of the habitat trees mapped and the locations of the *E. pulverulenta* identified.



Figure 1 – Mapped Habitat Trees Southern Section



Figure 2 – Mapped Habitat Trees Northern Section

Conclusion

Where required to be removed, the habitat trees should only be removed in the presence of a licensed ecologist or wildlife rescuer.

The process for tree removal is to be as follows:

-) Inspect tree for signs of potential fauna habitation, hollow presence, scratch marks, droppings, whitewash, fur, feathers etc.
-) Mark the tree and add to the habitat register, recording the hollow height, location, size and tree type
-) Clear the area around the habitat trees knocking the habitat tree without felling the tree.
-) Wait 24 hours
-) Knock the habitat tree and wait 1 minute for any fauna to leave the tree
-) Fell the tree as gently as possible
-) Inspect the tree for fauna presence
-) Where present capture and hold fauna for release or where injured, relocation to a wildlife carer or vet.
-) Record the outcome of tree felling

Management of clearing is to be undertaken in accordance with the Flora and Fauna Management Plan.

Yours faithfully

David Bone
Principal Ecologist
Onsite Environmental Management Pty Ltd

Appendix A – Habitat Tree Register

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
1	SP	Stage 2 Year 1 (23/11/16)	A	3	B	70	Nil			
2	BG	Stage 2 Year 1 (23/11/16)	A	2 3	T T	70 70	Nil			
3	BG	Stage 2 Year 1 (23/11/16)	A	3 4	T T	80 80	Nil			
4	SP	Stage 2 Year 1 (23/11/16)	A	7	B	70, 50, 50	Nil			
5	BG	Stage 2 Year 1 (23/11/16)	A	4	T	80 slit	Nil			
6	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100 slit	Scratch Marks			
7	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil			
8	BG	Stage 2 Year 1 (23/11/16)	A	4	B T	50 70	Nil			
9	BG	Stage 2 Year 1 (23/11/16)	A	10	T	100 pipe	Nil			
10	BG	Stage 2 Year 1 (23/11/16)	A	4 6	T B	150 100	Nil			
11	Stag	Stage 2 Year 1 (23/11/16)	D	3.5	T Base	200	Nil			
12	BG	Stage 2 Year 1 (23/11/16)	A	4 5 1	T T T	70 100 150	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
13	BG	Stage 2 Year 1 (23/11/16)	A	5 6 8	T T T	100 100 150	Nil			
14	BG	Stage 2 Year 1 (23/11/16)	A	5	T, slit	250	Nil			
15	BG	Stage 2 Year 1 (23/11/16)	A	4	T, pipe	150	Nil			
16	BG	Stage 2 Year 1 (23/11/16)	A	1 4	T B	120 100	Nil			
17	BG	Stage 2 Year 1 (23/11/16)	A	4	T	150	Scratches			
18	BG	Stage 2 Year 1 (23/11/16)	A	2 3 5	T T B	150 150 100	Scratches			
19	BG	Stage 2 Year 1 (23/11/16)	A	4 7	B B	100 70	Scratches			
20	BG	Stage 2 Year 1 (23/11/16)	A	4 5 10	T T B	100 100 3 x 50	Eastern Rosella observed in vicinity			
21	BG	Stage 2 Year 1 (23/11/16)	A	6	B, slit	100	Nil			
22	BG	Stage 2 Year 1 (23/11/16)	A	6	T	100	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
23	BG	Stage 2 Year 1 (23/11/16)	A	6 8	B B	200 100	Nil			
24	BG	Stage 2 Year 1 (23/11/16)	A	2	T slit	2000	Nil			
25	BG	Stage 2 Year 1 (23/11/16)	A	2.5 4	T B	250 100	Nil			
26	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil			
27	BG	Stage 2 Year 1 (23/11/16)	A	8 10	T B	80 100	Nil			
28	BG	Stage 2 Year 1 (23/11/16)	A	6 10	B B	60 100	Nil			
29	BG	Stage 2 Year 1 (23/11/16)	A	3	B	80	Nil			
30	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Scratches			
31	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 Slit	Scratches			
32	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 pipe	Nil			
33	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
34	BG	Stage 2 Year 1 (23/11/16)	A	5 10 11 12	T B B B	150 100 100 100	Nil			
35	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	200 pipe	Scratches			
36	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	100	Nil			
37	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil			
38	BG	Stage 2 Year 1 (23/11/16)	A	5	T	150	Nil			
39	BG	Stage 2 Year 1 (23/11/16)	A	2 7	T T	100 100	Nil			
40	BG	Stage 2 Year 1 (23/11/16)	A	7	B	100	Nil			
41	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil			
42	BG	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil			
43	Stag	Stage 2 Year 1 (23/11/16)	D	3	T	50	Nil			
44	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
45	BG	Stage 2 Year 1 (23/11/16)	A	3	T	150	Nil			
46	BG	Stage 2 Year 1 (23/11/16)	A	4	B	150	Nil			
47	SP	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil			
48	BG	Stage 2 Year 1 (23/11/16)	A	3 7	T B	150 100	Nil			
49	BG	Stage 2 Year 1 (23/11/16)	A	5	B	150	Nil			
50	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil			
51	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil			
52	BG	Stage 2 Year 1 (23/11/16)	A	8	B	70	Nil			
53	SP	Stage 2 Year 1 (23/11/16)	A	6	T	400 slit	Nil			
54	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil			
55	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil			
56	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil			



Legend

B = Branch

T = Trunk

Stag = Dead tree

SP = Sydney Peppermint

BG = Brittle Gum



Onsite Environmental Management Pty Ltd

Unit 3, 2 Saltspray Cl,
Redhead, NSW 2290
ACN 107 764 312
Ph: 02 4935 2300
F: 02 4944 9492
Mobile: 0407461092

Email: david.bone@osem.com.au

7 April 2017

Rod Welsh
Austen Quarry
C/o Austen Quarry Site Office

OSEM Reference: J061_RPT2_Clearing Report Area 1 Stage 2 2017_v1.0

Dear Rod

Re: Clearing Survey at Austen Quarry Stage 2 development – Strip 1, 2017

Introduction

Onsite Environmental Management (OSEM) Principal Ecologist Mr David Bone was present during the clearing of 56 habitat trees marked in November 2016 in strip 1. The clearing was undertaken over a two day period of April 6th and 7th 2017..

The purpose of the survey was to ensure that during clearing of identified potential habitat trees each tree was examined for the presence of fauna.

Methodology

The marked trees were located and the area around the trees was cleared or tracked through, during this process the tree was knocked and bumped to disturb any fauna present. The tree was then left alone overnight and the following morning the tree was again bumped and knocked followed by a one (1) minute waiting period. Any fauna leaving the tree during this period was watched to ensure it had left the are or located another hollow or roost.

The tree was then gently felled and the hollow sections of the tree were examined for the presence of fauna. Any fauna still within the hollow or captured from the felling process was captured, bagged and placed in a cool quite place away from the clearing operation.

Captured fauna were released on site in the evening or taken to a vet for care where injured or lethargic prior to release.

Results

Fauna habitat features such as hollows were observed in 56 trees across the area proposed to be cleared. Of these trees, fauna were observed in five (5) of the trees. Two (2) animals were captured and released with three (3) other animals observed leaving the trees prior to felling or after felling.

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
11	Stag	Stage 2 Year 1 (23/11/16)	D	3.5	T Base	200	Nil	6/4/17	1 x Greater Broad-nosed Bat	Released alive 6/4/17
12	BG	Stage 2 Year 1 (23/11/16)	A	4 5 1	T T T	70 100 150	Nil	6/4/17	1 x Peron's Tree Frog	Released alive 6/4/17
18	BG	Stage 2 Year 1 (23/11/16)	A	2 3 5	T T B	150 150 100	Scratches	6/4/17	1 x Owlet Nightjar	Flew away prior to tree felling
20	BG	Stage 2 Year 1 (23/11/16)	A	4 5 10	T T B	100 100 3 x 50	Eastern Rosella observed in vicinity	6/4/17	1 x micro bat	Flew away prior to tree felling
32	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 pipe	Nil	6/4/17	1 x Lace Monitor	Uninjured, left area after tree felled.

Table 1 – Fauna Observed During Clearing Operations

The details of animals observed are contained in Table 1.

The updated habitat tree register is contained in Appendix A. Photograph 1 and 2 show the clearing process undertaken.

Photograph 1 – Mapped habitat tree being bumped prior to felling



Photograph 2 – Tree felled following bumping



Conclusion

The clearing of the stage 2 strip 1 area was undertaken in accordance with the approved Flora and Fauna Management Plan and no fauna was injured as a result of the works.

Yours faithfully

A handwritten signature in black ink, appearing to read 'David Bone'.

David Bone
Principal Ecologist - Onsite Environmental Management Pty Ltd

Appendix A – Updated Habitat Tree Register

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
1	SP	Stage 2 Year 1 (23/11/16)	A	3	B	70	Nil	6/4/17	Nil	Nil
2	BG	Stage 2 Year 1 (23/11/16)	A	2 3	T T	70 70	Nil	6/4/17	Nil	Nil
3	BG	Stage 2 Year 1 (23/11/16)	A	3 4	T T	80 80	Nil	6/4/17	Nil	Nil
4	SP	Stage 2 Year 1 (23/11/16)	A	7	B	70, 50, 50	Nil	6/4/17	Nil	Nil
5	BG	Stage 2 Year 1 (23/11/16)	A	4	T	80 slit	Nil	6/4/17	Nil	Nil
6	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100 slit	Scratch Marks	6/4/17	Nil	Nil
7	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil	6/4/17	Nil	Nil
8	BG	Stage 2 Year 1 (23/11/16)	A	4	B T	50 70	Nil	6/4/17	Nil	Nil
9	BG	Stage 2 Year 1 (23/11/16)	A	10	T	100 pipe	Nil	6/4/17	Nil	Nil
10	BG	Stage 2 Year 1 (23/11/16)	A	4 6	T B	150 100	Nil	6/4/17	Nil	Nil
11	Stag	Stage 2 Year 1 (23/11/16)	D	3.5	T Base	200	Nil	6/4/17	1 x Greater Broad-nosed Bat	Released alive 6/4/17

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
12	BG	Stage 2 Year 1 (23/11/16)	A	4 5 1	T T T	70 100 150	Nil	6/4/17	1 x Peron's Tree Frog	Released alive 6/4/17
13	BG	Stage 2 Year 1 (23/11/16)	A	5 6 8	T T T	100 100 150	Nil	6/4/17	Nil	Nil
14	BG	Stage 2 Year 1 (23/11/16)	A	5	T, slit	250	Nil	6/4/17	Nil	Nil
15	BG	Stage 2 Year 1 (23/11/16)	A	4	T, pipe	150	Nil	6/4/17	Nil	Nil
16	BG	Stage 2 Year 1 (23/11/16)	A	1 4	T B	120 100	Nil	6/4/17	Nil	Nil
17	BG	Stage 2 Year 1 (23/11/16)	A	4	T	150	Scratches	6/4/17	Nil	Nil
18	BG	Stage 2 Year 1 (23/11/16)	A	2 3 5	T T B	150 150 100	Scratches	6/4/17	1 x Owlet Nightjar	Flew away prior to tree felling
19	BG	Stage 2 Year 1 (23/11/16)	A	4 7	B B	100 70	Scratches	6/4/17	Nil	Nil
20	BG	Stage 2 Year 1 (23/11/16)	A	4 5 10	T T B	100 100 3 x 50	Eastern Rosella observed in vicinity	6/4/17	1 x micro bat	Flew away prior to tree felling
21	BG	Stage 2 Year 1 (23/11/16)	A	6	B, slit	100	Nil	6/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
22	BG	Stage 2 Year 1 (23/11/16)	A	6	T	100	Nil	6/4/17	Nil	Nil
23	BG	Stage 2 Year 1 (23/11/16)	A	6 8	B B	200 100	Nil	6/4/17	Nil	Nil
24	BG	Stage 2 Year 1 (23/11/16)	A	2	T slit	2000	Nil	6/4/17	Nil	Nil
25	BG	Stage 2 Year 1 (23/11/16)	A	2.5 4	T B	250 100	Nil	6/4/17	Nil	Nil
26	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil	6/4/17	Nil	Nil
27	BG	Stage 2 Year 1 (23/11/16)	A	8 10	T B	80 100	Nil	6/4/17	Nil	Nil
28	BG	Stage 2 Year 1 (23/11/16)	A	6 10	B B	60 100	Nil	6/4/17	Nil	Nil
29	BG	Stage 2 Year 1 (23/11/16)	A	3	B	80	Nil	6/4/17	Nil	Nil
30	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Scratches	6/4/17	Nil 2 x Scarlet Robin observed in cleared area	Nil.
31	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 Slit	Scratches	6/4/17	Nil	Nil
32	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 pipe	Nil	6/4/17	1 x Lace Monitor	Uninjured, left area after tree felled.

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
33	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil	6/4/17	Nil 1 x Coppertail Skink on ground near tree	Nil.
34	BG	Stage 2 Year 1 (23/11/16)	A	5 10 11 12	T B B B	150 100 100 100	Nil	6/4/17	Nil	Nil
35	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	200 pipe	Scratches	6/4/17	Nil	Nil
36	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	100	Nil	6/4/17	Nil	Nil
37	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	6/4/17	Nil 12 x Gang Gang Cockatoo adjacent to tree	Nil Group flew away to nearby tree outside of clearing area
38	BG	Stage 2 Year 1 (23/11/16)	A	5	T	150	Nil	7/4/17	Nil	Nil
39	BG	Stage 2 Year 1 (23/11/16)	A	2 7	T T	100 100	Nil	7/4/17	Nil	Nil
40	BG	Stage 2 Year 1 (23/11/16)	A	7	B	100	Nil	7/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
41	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil	7/4/17	Nil	Nil
42	BG	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil	7/4/17	Nil	Nil
43	Stag	Stage 2 Year 1 (23/11/16)	D	3	T	50	Nil	7/4/17	Nil	Nil
44	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil	7/4/17	Nil	Nil
45	BG	Stage 2 Year 1 (23/11/16)	A	3	T	150	Nil	7/4/17	Nil	Nil
46	BG	Stage 2 Year 1 (23/11/16)	A	4	B	150	Nil	7/4/17	Nil	Nil
47	SP	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil	7/4/17	Nil	Nil
48	BG	Stage 2 Year 1 (23/11/16)	A	3 7	T B	150 100	Nil	7/4/17	Nil	Nil
49	BG	Stage 2 Year 1 (23/11/16)	A	5	B	150	Nil	7/4/17	Nil	Nil
50	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil	7/4/17	Nil	Nil
51	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	7/4/17	Nil	Nil
52	BG	Stage 2 Year 1 (23/11/16)	A	8	B	70	Nil	7/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
53	SP	Stage 2 Year 1 (23/11/16)	A	6	T	400 slit	Nil	7/4/17	Nil	Nil
54	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil	7/4/17	Nil	Nil
55	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil	7/4/17	Nil	Nil
56	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	7/4/17	Nil	Nil

Legend

B = Branch

T = Trunk

Stag = Dead tree

SP = Sydney Peppermint

BG = Brittle Gum



Onsite Environmental Management Pty Ltd

Unit 3, 2 Saltspray Cl,
Redhead, NSW 2290
ACN 107 764 312
Ph: 02 4935 2300
F: 02 4944 9492
Mobile: 0407461092

Email: david.bone@osem.com.au

17 April 2017

Rod Welsh
Austen Quarry
C/o Austen Quarry Site Office

OSEM Reference: J061_RPT3_Pre-clearing survey Stage 2 Spoil Dump 2017_v1.0

Dear Rod

Re: Pre-Clearance Survey at Austen Quarry Stage 2 development – Spoil Dump Upper Slopes

Introduction

Onsite Environmental Management (OSEM) Principal Ecologist Mr David Bone conducted a pre-clearance survey on 7/4/2017 for the Stage 2 clearing area proposed to be cleared in 2017 for the upper level of the overburden emplacement area. The area surveyed covers the upper slopes of the hillside between 'The Lookout' and 'Top Bend' and down the track from the top bend to the end of the existing upper bench area.

The purpose of the survey was to ground truth the vegetation proposed to be cleared and to determine if the vegetation contained any fauna habitat, such as hollows or logs and to map these features and identify any appropriate mitigation measures to be implemented prior to and during vegetation clearing works.

Methodology

The survey involved an assessment and mapping of existing vegetation in the clearing area and the identification of any EEC, threatened species, habitat trees and noxious weeds in the area.

Trees identified as containing hollows or other habitat elements were marked with a number and the location was recorded on GPS to allow the trees to be relocated during clearing.

Results

Fauna habitat features such as nests, scratchings or hollows were observed in 31 trees across the area proposed to be cleared. No records of a threatened species were recorded in the proposed clearing area.

Scattered plants of St. Johns Wort (*Hypericum perforatum*), and Serrated Tussock (*Nassella trichotoma*) on the upper sections nearest to the haul road and track from the top bend, these plants are listed as Class 4 locally controlled weeds in the Upper Macquarie County Council Authority Area. This area contains the boundaries of the Lithgow Council area. The listing requires:

The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

Topsoil from this area is likely to contain these species and it's use should be restricted. Where it is required to be used as a resource, further treatment of the soil and weed management of propagules will be required.

The updated habitat tree register is contained in Appendix A. Figures 1 and 2 show the location of the habitat trees mapped.

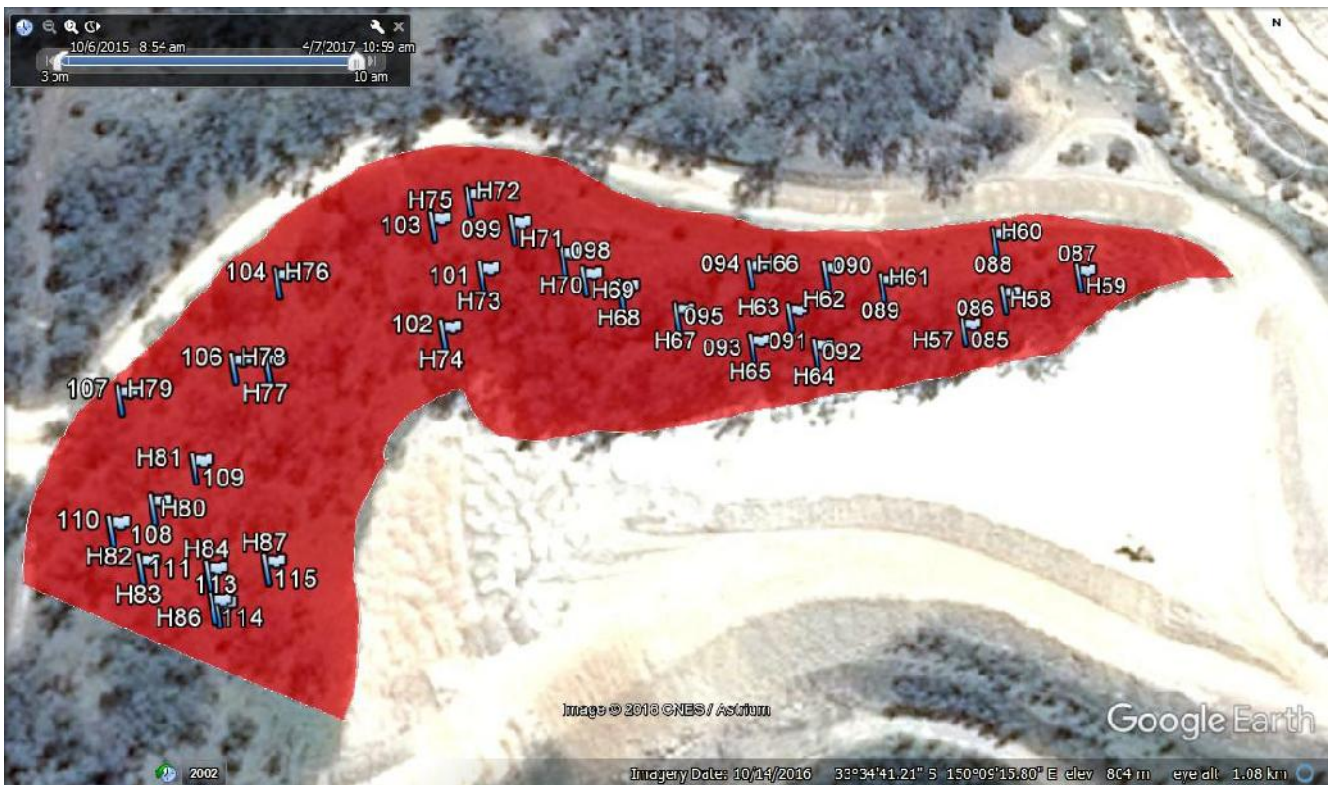


Figure 1 – Mapped Habitat Trees



Figure 2 – Total Area Surveyed at 7/4/17

Conclusion

Where required to be removed, the habitat trees should only be removed in the presence of a licensed ecologist or wildlife rescuer.

The process for tree removal is to be as follows:

-) Inspect tree for signs of potential fauna habitation, hollow presence, scratch marks, droppings, whitewash, fur, feathers etc.
-) Mark the tree and add to the habitat register, recording the hollow height, location, size and tree type
-) Clear the area around the habitat trees knocking the habitat tree without felling the tree.
-) Wait 24 hours
-) Knock the habitat tree and wait 1 minute for any fauna to leave the tree
-) Fell the tree as gently as possible
-) Inspect the tree for fauna presence
-) Where present capture and hold fauna for release or where injured, relocation to a wildlife carer or vet.
-) Record the outcome of tree felling

Management of clearing is to be undertaken in accordance with the Flora and Fauna Management Plan.

Yours faithfully

David Bone
Principal Ecologist - Onsite Environmental Management Pty Ltd

Appendix A – Habitat Tree Register

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
1	BLP	Stage 2 Year 1 (23/11/16)	A	3	B	70	Nil	6/4/17	Nil	Nil
2	BG	Stage 2 Year 1 (23/11/16)	A	2 3	T T	70 70	Nil	6/4/17	Nil	Nil
3	BG	Stage 2 Year 1 (23/11/16)	A	3 4	T T	80 80	Nil	6/4/17	Nil	Nil
4	BLP	Stage 2 Year 1 (23/11/16)	A	7	B	70, 50, 50	Nil	6/4/17	Nil	Nil
5	BG	Stage 2 Year 1 (23/11/16)	A	4	T	80 slit	Nil	6/4/17	Nil	Nil
6	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100 slit	Scratch Marks	6/4/17	Nil	Nil
7	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil	6/4/17	Nil	Nil
8	BG	Stage 2 Year 1 (23/11/16)	A	4	B T	50 70	Nil	6/4/17	Nil	Nil
9	BG	Stage 2 Year 1 (23/11/16)	A	10	T	100 pipe	Nil	6/4/17	Nil	Nil
10	BG	Stage 2 Year 1 (23/11/16)	A	4 6	T B	150 100	Nil	6/4/17	Nil	Nil
11	Stag	Stage 2 Year 1 (23/11/16)	D	3.5	T Base	200	Nil	6/4/17	1 x Greater Broad-nosed Bat	Released alive 6/4/17
12	BG	Stage 2 Year 1 (23/11/16)	A	4 5 1	T T T	70 100 150	Nil	6/4/17	1 x Peron's Tree Frog	Released alive 6/4/17

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
13	BG	Stage 2 Year 1 (23/11/16)	A	5 6 8	T T T	100 100 150	Nil	6/4/17	Nil	Nil
14	BG	Stage 2 Year 1 (23/11/16)	A	5	T, slit	250	Nil	6/4/17	Nil	Nil
15	BG	Stage 2 Year 1 (23/11/16)	A	4	T, pipe	150	Nil	6/4/17	Nil	Nil
16	BG	Stage 2 Year 1 (23/11/16)	A	1 4	T B	120 100	Nil	6/4/17	Nil	Nil
17	BG	Stage 2 Year 1 (23/11/16)	A	4	T	150	Scratches	6/4/17	Nil	Nil
18	BG	Stage 2 Year 1 (23/11/16)	A	2 3 5	T T B	150 150 100	Scratches	6/4/17	1 x Owlet Nightjar	Flew away prior to tree felling
19	BG	Stage 2 Year 1 (23/11/16)	A	4 7	B B	100 70	Scratches	6/4/17	Nil	Nil
20	BG	Stage 2 Year 1 (23/11/16)	A	4 5 10	T T B	100 100 3 x 50	Eastern Rosella observed in vicinity	6/4/17	1 x micro bat	Flew away prior to tree felling
21	BG	Stage 2 Year 1 (23/11/16)	A	6	B, slit	100	Nil	6/4/17	Nil	Nil
22	BG	Stage 2 Year 1 (23/11/16)	A	6	T	100	Nil	6/4/17	Nil	Nil
23	BG	Stage 2 Year 1 (23/11/16)	A	6 8	B B	200 100	Nil	6/4/17	Nil	Nil
24	BG	Stage 2 Year 1 (23/11/16)	A	2	T slit	2000	Nil	6/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
25	BG	Stage 2 Year 1 (23/11/16)	A	2.5 4	T B	250 100	Nil	6/4/17	Nil	Nil
26	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil	6/4/17	Nil	Nil
27	BG	Stage 2 Year 1 (23/11/16)	A	8 10	T B	80 100	Nil	6/4/17	Nil	Nil
28	BG	Stage 2 Year 1 (23/11/16)	A	6 10	B B	60 100	Nil	6/4/17	Nil	Nil
29	BG	Stage 2 Year 1 (23/11/16)	A	3	B	80	Nil	6/4/17	Nil	Nil
30	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Scratches	6/4/17	Nil 2 x Scarlet Robin observed in cleared area	Nil.
31	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 Slit	Scratches	6/4/17	Nil	Nil
32	BG	Stage 2 Year 1 (23/11/16)	A	3	T	200 pipe	Nil	6/4/17	1 x Lace Monitor	Uninjured, left area after tree felled.
33	BG	Stage 2 Year 1 (23/11/16)	A	3	T	100 pipe	Nil	6/4/17	Nil 1 x Coppertail Skink on ground near tree	Nil.
34	BG	Stage 2 Year 1 (23/11/16)	A	5 10 11 12	T B B B	150 100 100 100	Nil	6/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
35	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	200 pipe	Scratches	6/4/17	Nil	Nil
36	Stag	Stage 2 Year 1 (23/11/16)	D	4	T pipe	100	Nil	6/4/17	Nil	Nil
37	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	6/4/17	Nil 12 x Gang Gang Cockatoo adjacent to tree	Nil Group flew away to nearby tree outside of clearing area
38	BG	Stage 2 Year 1 (23/11/16)	A	5	T	150	Nil	7/4/17	Nil	Nil
39	BG	Stage 2 Year 1 (23/11/16)	A	2 7	T T	100 100	Nil	7/4/17	Nil	Nil
40	BG	Stage 2 Year 1 (23/11/16)	A	7	B	100	Nil	7/4/17	Nil	Nil
41	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil	7/4/17	Nil	Nil
42	BG	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil	7/4/17	Nil	Nil
43	Stag	Stage 2 Year 1 (23/11/16)	D	3	T	50	Nil	7/4/17	Nil	Nil
44	BG	Stage 2 Year 1 (23/11/16)	A	5	B	100	Nil	7/4/17	Nil	Nil
45	BG	Stage 2 Year 1 (23/11/16)	A	3	T	150	Nil	7/4/17	Nil	Nil
46	BG	Stage 2 Year 1 (23/11/16)	A	4	B	150	Nil	7/4/17	Nil	Nil

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
47	BLP	Stage 2 Year 1 (23/11/16)	A	3	T	50	Nil	7/4/17	Nil	Nil
48	BG	Stage 2 Year 1 (23/11/16)	A	3 7	T B	150 100	Nil	7/4/17	Nil	Nil
49	BG	Stage 2 Year 1 (23/11/16)	A	5	B	150	Nil	7/4/17	Nil	Nil
50	BG	Stage 2 Year 1 (23/11/16)	A	4	T	100	Nil	7/4/17	Nil	Nil
51	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	7/4/17	Nil	Nil
52	BG	Stage 2 Year 1 (23/11/16)	A	8	B	70	Nil	7/4/17	Nil	Nil
53	BLP	Stage 2 Year 1 (23/11/16)	A	6	T	400 slit	Nil	7/4/17	Nil	Nil
54	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil	7/4/17	Nil	Nil
55	BG	Stage 2 Year 1 (23/11/16)	A	6	T	70	Nil	7/4/17	Nil	Nil
56	BG	Stage 2 Year 1 (23/11/16)	A	6	B	100	Nil	7/4/17	Nil	Nil
57	BLP	Stage 2 Spoil Dump (7/4/17)	A	5 6	B B	100 100	Nil Nil			
58	BLP	Stage 2 Spoil Dump (7/4/17)	A	7	B	50	Nil			
59	SB	Stage 2 Spoil Dump (7/4/17)	A	5	T	300 slit	Nil			
60	BLP	Stage 2 Spoil Dump (7/4/17)	A	1 5	T B	100 50	Nil Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
61	SB	Stage 2 Spoil Dump (7/4/17)	A	8	T	1000 slit	Nil			
62	SB	Stage 2 Spoil Dump (7/4/17)	A	8	B	70	Nil			
63	BLP	Stage 2 Spoil Dump (7/4/17)	A	6	T	70	Nil			
64	SB	Stage 2 Spoil Dump (7/4/17)	A	5 8	T T	100 50	Nil Nil			
65	SB	Stage 2 Spoil Dump (7/4/17)	A	10 10	B B	70 70	Nil Nil			
66	SB	Stage 2 Spoil Dump (7/4/17)	A	12	B	70	Nil			
67	SB	Stage 2 Spoil Dump (7/4/17)	A	10 12	T T	100 70	Nil Nil			
68	SB	Stage 2 Spoil Dump (7/4/17)	A	6	B	50 slit	Nil			
69	SB	Stage 2 Spoil Dump (7/4/17)	A	10	T	100	Nil			
70	SB	Stage 2 Spoil Dump (7/4/17)	A	8	T	500 pipe	Nil			
71	SB	Stage 2 Spoil Dump (7/4/17)	A	5	T	300 pipe	Nil			
72	Stag	Stage 2 Spoil Dump (7/4/17)	D	12	T	70	Scratches			
73	Stag	Stage 2 Spoil Dump (7/4/17)	D	6	B	200 pipe	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
74	SB	Stage 2 Spoil Dump (7/4/17)	A	12	B	50	Nil			
75	SB	Stage 2 Spoil Dump (7/4/17)	A	10	T	50	Nil			
76	Stag	Stage 2 Spoil Dump (7/4/17)	D	6	T	50	Nil			
77	Stag	Stage 2 Spoil Dump (7/4/17)	D	10	T	100	Nil			
78	BG	Stage 2 Spoil Dump (7/4/17)	A	8	T	50	Nil			
79	BG	Stage 2 Spoil Dump (7/4/17)	A	8	B	50	Nil			
80	Stag	Stage 2 Spoil Dump (7/4/17)	D	8	T	70	Nil			
81	SB	Stage 2 Spoil Dump (7/4/17)	A	8	T	50	Nil			
82	SB	Stage 2 Spoil Dump (7/4/17)	A	8	B	50	Nil			
83	SB	Stage 2 Spoil Dump (7/4/17)	A	6	T	50	Nil			
84	SB	Stage 2 Spoil Dump (7/4/17)	A	6	B	50	Nil			
85	SB	Stage 2 Spoil Dump (7/4/17)	A	8	T	100	Nil			
86	Stag	Stage 2 Spoil Dump (7/4/17)	D	8	T	50	Nil			

HBT - Hollow Bearing Trees		Location	Alive / Dead	Height of Hollow above ground (m)	Location of Hollow	Approx. Size of Hollow(s) >50mm (mm)	Fauna Notes (Scratches/Scats/Species)	Cleared	Fauna Presence	Actions Taken
87	BG	Stage 2 Spoil Dump (7/4/17)	A	6	B	50	Nil			

Legend

B = Branch, T = Trunk, Stag = Dead tree,

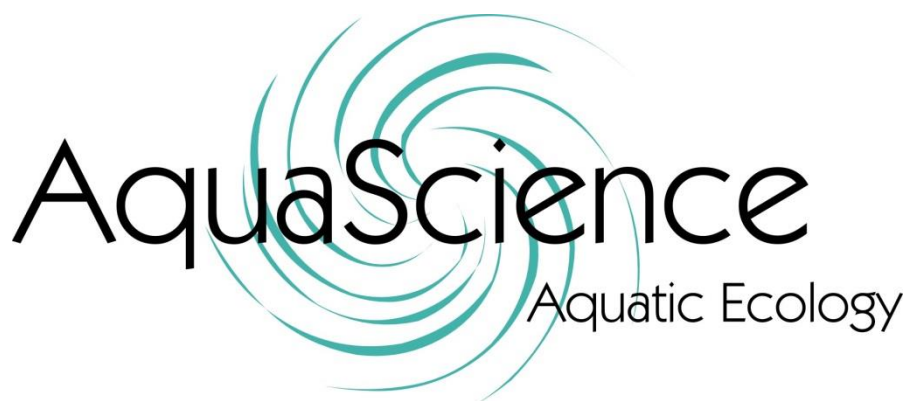
BLP = Broad Leaved Peppermint, BG = Brittle Gum, SB = Stringybark

Appendix I: Aquatic Ecology Monitoring Report

Austen Quarry
Aquatic
Ecology
Monitoring

Spring 2016

Prepared for Hy-Tec



Document Information

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Contact Information

AquaScience
Dr Brendan Alderson
8 Tuross Close
Lake Haven NSW 2263

Phone: 0439 456 429

Email: brendanalderson@aquascience.net.au

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Executive Summary

Hy-Tec Industries Pty Ltd (Hy-Tec) commissioned AquaScience to undertake the Spring 2016 aquatic ecology survey at Austen Quarry near Hartley, NSW as part of an ongoing monitoring program. The program examines the ecological health, via the use of the AUSRIVAS sampling protocol, of the Coxs River to assess whether quarry operations are impacting on the river ecosystem. The aims of the study were to:

- > Examine the quality of aquatic habitats and physico-chemical water quality at each monitoring site;
- > Collect macroinvertebrate samples consistent with previous sampling and AUSRIVAS Spring sampling protocol; and
- > Examine the spatial and temporal patterns in macroinvertebrate assemblage structure and AUSRIVAS indices consistent with previous monitoring to ascertain whether quarry operations are impacting on the ecological health of the river.

Edge and riffle habitat was sampled at six sites for aquatic macroinvertebrates during November 2016 as part of the Spring sampling period within the AUSRIVAS protocol and consistent with previous monitoring. In addition, various habitat descriptors and water quality data were also collected during field work. The data collected was analysed using both univariate and multivariate statistical techniques to examine the spatial and temporal variability within aquatic macroinvertebrate assemblage structure to ascertain whether quarry operations have had an effect on river health.

Results suggest that aquatic macroinvertebrate assemblages associated with edge and riffle habitat within the vicinity of Austen Quarry were generally assessed as equivalent to the AUSRIVAS reference condition. In addition, the sites that represented areas of the river under the potential influence of quarry operations were similar to other areas of the river that could be considered not to be affected by the quarry.

There was significant spatial and temporal variability in macroinvertebrate assemblage structure as well as AUSRIVAS indices, however, this variability could not be conclusively attributed to quarry operations. Many of the differences detected were most likely a result of inherent natural variability which is common in aquatic environments, and other influences such as surrounding land use practices and spatial differences in hydrological regimes are most likely influencing ecological patterns within the Coxs River.

Previous monitoring surveys (e.g. Cardno 2011, Cardno 2014, AquaScience 2016) have reported similar results to those presented here and it appears that the addition of the 2016 data has not shown any great differences in the spatial and temporal patterns observed throughout the monitoring program to date. In general, similar variability has been shown for all ecological variables examined throughout the entire monitoring program and it appears that very little of the variability detected could be considered to be as a direct result of quarry operations. Therefore, it appears that the environmental management practices used at the quarry are providing adequate protection to the aquatic environment of the Coxs River.

In conclusion, there were no distinct patterns of variability in the aquatic macroinvertebrate fauna observed at the Quarry processing plant location compared to either of the Control locations that could be attributed to the activities of the Quarry. Results suggest that, at present, the ecological health of the river (as measured through aquatic macroinvertebrate assemblages) within the vicinity of Austen Quarry is no different, or sometimes better, than other areas of the river not influenced by quarry operations.

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1 Introduction

1.1 Background

Hy-Tec Industries Pty Ltd (Hy-Tec) commissioned AquaScience to undertake the Spring 2016 aquatic ecology survey at Austen Quarry near Hartley, NSW as part of an ongoing monitoring program that examines the ecological health of the Coxs River. Field sampling for the monitoring program is undertaken throughout the Spring AUSRIVAS sampling period (15 September to 15 December) and has been conducted on an annual basis since 2005.

Austen Quarry extracts rhyolite, a durable igneous rock, which is used for a variety of applications including concrete aggregates, asphalt aggregates, road base materials, rail infrastructure, landscaping and ceramic and glass products. As part of the quarry operations, various water management practices are utilised across the site and include the collection of water runoff for environmental control and for use in a variety of quarry processes and dust suppression. Water from the site is sometimes discharged into the nearby Coxs River (i.e. during significant wet weather events and controlled releases) via a number of Licensed Discharge Points (LDPs) to maintain water storage capacity within the various dams located onsite. As such, the discharge of water from the site must comply with the water quality criteria set out in Environment Protection Licence (EPL) 12323 and S.120 of the Protection of the Environment Operations Act 1997, which prohibits the pollution of surface waters unless expressly authorised by the EPL. To ensure water pollution is minimised prior to any releases, various processes, such as the addition of flocculants and other dam management practices, are utilised.

In previous years (prior to 2016), as part of the conditions of Development Consent issued by Lithgow Council for the quarry (DA 103/94), Hy-Tec monitored impacts on the aquatic environment by assessing macroinvertebrate assemblages within the Coxs River upstream and downstream of the quarry. As such, monitoring of aquatic macroinvertebrates was undertaken (since 2005) to determine whether the occasional discharge of water from the quarry site, or the operation of the quarry in general, has had any detectable impact on the ecology of the river. To date, no apparent impact from quarry operations on the aquatic macroinvertebrates within Coxs River has been detected throughout the monitoring program.

An Environmental Impact Statement (EIS) was prepared and submitted in 2014 for the 'Stage 2' extension of quarry operations (i.e. extension of the extraction area, overburden emplacement and water management systems) (R.W. Corkery 2014) and has since been approved. As part of current environmental management of the quarry, Hy-Tec commissioned further monitoring of aquatic macroinvertebrates for the 2016 sampling season.

It should be noted the monitoring program was temporarily put on hold in 2012 and re-established again in 2014 to allow for studies to be completed as part of the EIS preparation. The data collected during the EIS preparation is therefore, not examined during this report, as the objectives and sampling methodologies used throughout the EIS were not always consistent with that of the original monitoring program. It is emphasized though that there did not appear to be any discernible change in aquatic environment during the EIS period when data was qualitatively compared with previous data collected during the actual monitoring program.

1.2 Aims and Objectives

The aims and objectives of the current survey were to provide a continuation of the current aquatic ecological monitoring program already in place for Austen Quarry and to fulfil the

conditions of the current environmental management of the quarry. More specifically, the study would;

- > Examine the quality of aquatic habitats and physico-chemical water quality at each monitoring site;
- > Collect macroinvertebrate samples consistent with previous sampling and AUSRIVAS Spring sampling protocol; and
- > Examine the spatial and temporal patterns in macroinvertebrate assemblage structure and AUSRIVAS indices consistent with previous monitoring to ascertain whether quarry operations are impacting on the ecological health of the river.

It should be noted that only 2011, 2014 and 2015 data of previous monitoring was included here as other monitoring data was not available during the preparation of this report. A qualitative comparison has been made, however, to other previous reports to aid in the interpretation of results.

2 Methodology

2.1 Study Area

A total of six sites were sampled during the current survey (**Figure 2-1**). These sites are consistent with those sampled in previous monitoring and allows for a valid comparison of collected data over time.

Sites are grouped into three pairs to allow for spatial replication, with each group representing a particular treatment:

- > Quarry Treatment (Sites 1 and 2);
- > Quarry Control (Sites 7 and 8); and
- > Upstream Control (Sites 4 and 5).

The Quarry Treatment sites are used to represent parts of the river potentially affected by quarry operations, whilst the Quarry Control and Upstream Control are used to represent areas unaffected by quarry operations. These control groups are used as a comparison for data collected at the Quarry Treatment group and allows for a valid experimental design to be employed throughout the monitoring program.

GPS coordinates of each site are shown in **Appendix A**.

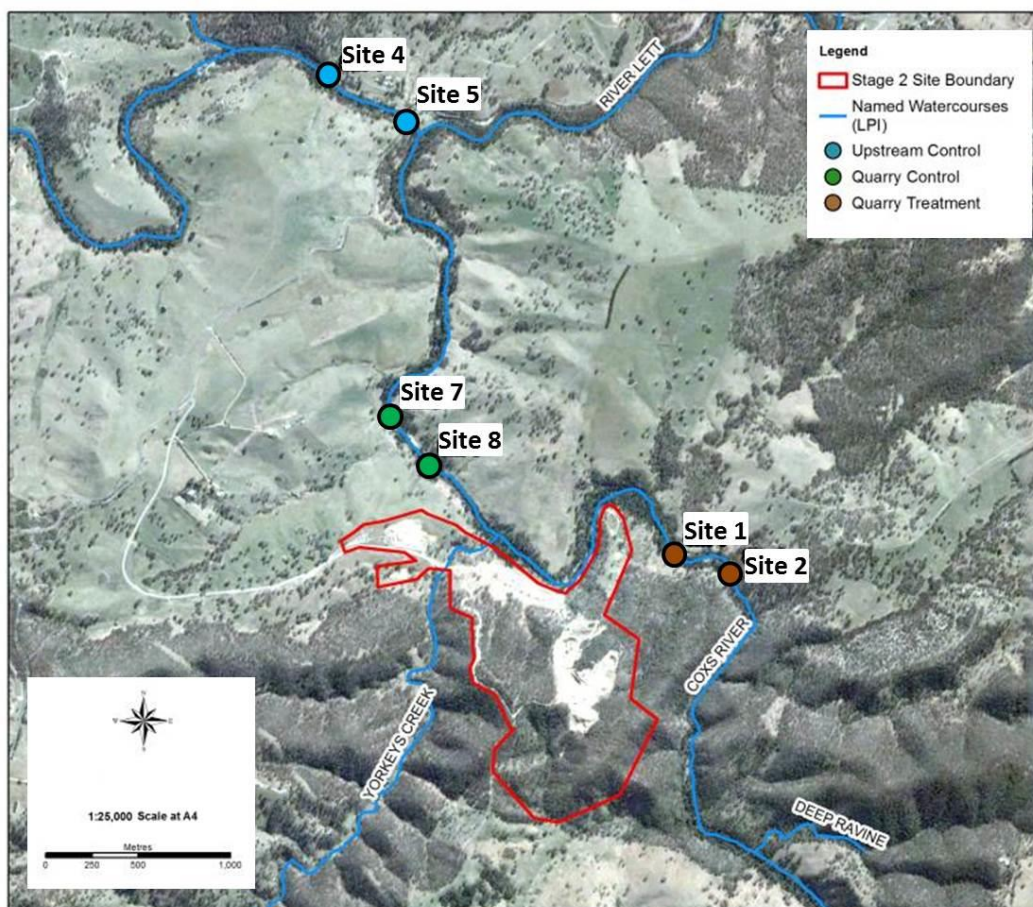


Figure 2-1 Map of the six sites sampled on the Coxs River during the monitoring program. Map is taken and modified from Cardno (2015).

2.2 Sampling Times

Sampling for the current survey was undertaken on 10 – 11 October 2016, within the designated AUSRIVAS Spring sampling season (15 September to 15 December).

Other sampling times throughout the entire monitoring program to date are shown in **Table 2-1**.

Table 2-1 Dates of sampling undertaken throughout the aquatic ecology monitoring program

Sampling Event	Sampling Dates	Comments
1	21 – 25 Nov 2005	Autumn sampling also completed 27-29 Apr
2	31 Oct – 1 Dec 2006	Autumn sampling also completed 17-31 Mar
3	15 – 17 Nov 2007	Spring sampling done mid-season
4	26 Sep – 1 Oct 2008	Spring sampling done early in season
5	19 – 22 Oct 2009	Spring sampling done mid-season
6	16 – 17 Sep 2010	Spring sampling done early in season
7	29 – 30 Sep 2011	Spring sampling done early in season
8	3 – 4 Dec 2014	Spring sampling done late in season
9	10 – 11 Nov 2015	Spring sampling done mid-season
10	10 – 11 Oct 2016	Spring sampling done early in season

2.3 Field Sampling Methods

2.3.1 Water Quality Sampling

A YSI Pro DSS Handheld Water Quality Meter was used to measure in-situ water quality at each site. Parameters recorded included:

- > Temperature (°C);
- > Electrical conductivity (EC) (ms/cm);
- > pH (pH units); and
- > Dissolved oxygen (DO) (% saturation and mg/L); and
- > Turbidity (NTU)

Two replicates were measured for all above parameters at each site.

A single replicate reading of total alkalinity (mg/L CaCO₃) was also measured and recorded using a CHEMetrics titration kit at each site for use in the AUSRIVAS analysis.

2.3.2 Macroinvertebrate Sampling

Aquatic macroinvertebrates were collected using the NSW AUSRIVAS sampling protocol developed by Turak *et al.* (2004). One macroinvertebrate sample was collected from both ‘edge’

and ‘riffle’ habitat at each site using a 250µm mesh dip net. Each sample was collected over a period of 3 – 5 minutes from a total length of 10 m within each habitat type.

Following sample collection, a ‘live’ pick was conducted on site (using forceps and pipettes) to remove as many macroinvertebrates as possible from each sample. Picking from each sample was undertaken for a minimum of 40 minutes, up to a maximum of 60 minutes, dependent upon the discovery of new taxa within the final 20-minute period. Macroinvertebrates collected during the picking period were placed into a labelled jar containing 70% ethanol for taxonomic identification.

2.4 Laboratory Methods

Macroinvertebrate samples collected in the field were sorted and animals were identified to family level (where applicable) in accordance with NSW AUSRIVAS protocol (Turak *et al.* 2004). All organisms were identified using the standard taxonomic keys for aquatic macroinvertebrates. Following enumeration of data, samples were transferred to 70% ethanol for long-term archiving.

2.5 Data Analyses

2.5.1 Water Quality

Water quality data collected from each site was tabulated and where possible, compared to the ANZECC/ARMCANZ (2000) default trigger values (DTVs) for slightly disturbed upland rivers. These guideline values are shown in **Table 2-2** for reference.

Table 2-2 ANZECC/ARMCANZ (2000) default trigger values for south-east Australian upland rivers

Parameter	Default Trigger Value (DTV)	Comment
DO	90 – 110%	Daytime measurement
pH	6.5 – 8.0	
EC	350 mS/cm	High values in NSW
Turbidity	25 NTU	Higher in high flow

2.5.2 Macroinvertebrates

SIGNAL2

The revised SIGNAL2 biotic index (Stream Invertebrate Grade Number Average Level) developed by Chessman (2003) was used to determine the “environmental quality” of sites on the basis of the presence or absence of families of macroinvertebrates. This method assigns grade numbers to each macroinvertebrate family or taxa found for a particular site, based on their responses to chemical pollutants.

The sum of all grade numbers for a particular habitat (i.e. edge or riffle) within a site was divided by the total number of families recorded for that habitat to calculate the SIGNAL2 index for that site. The SIGNAL2 index therefore uses the average sensitivity of macroinvertebrate families to indicate potential water pollution issues at each site.

There is no universally recognised reference point or value for assigning environmental health based on SIGNAL2 scores, as these values can vary across geographic location and habitat. They can be used, however, to compare different sites with one another over time.

AUSRIVAS

Macroinvertebrate data were examined using the AUSRIVAS predictive models for the NSW spring sampling season (Coysh et al. 2000). A number of key indices are generated from the model and are used to determine the level of impairment of a macroinvertebrate assemblage for a particular site compared with assemblages expected to occur at sites with similar habitat and physical characteristics. These key indices include:

- > OE50Taxa – ratio of the number of macroinvertebrate families observed at a site (that have a probability of occurrence greater than or equal to 50%) to the number of families expected to occur at a site (that have a probability of occurrence greater than or equal to 50%); and
- > Overall Bands – a measure of biological condition or level of impairment of a particular site and is based on OE50Taxa scores. The bands allocated for Spring Edge and Spring Riffle are shown in **Table 2.3**.

Table 2-3 AUSRIVAS OE50Taxa band limits for NSW Spring Edge and Spring Riffle models

Band	Description	Spring Edge	Spring Riffle
X	Richer than reference	Greater than 1.16	Greater than 1.18
A	Reference condition	0.84 to 1.16	0.81 to 1.18
B	Significantly impaired	0.52 to 0.83	0.44 to 0.80
C	Severely impaired	0.20 to 0.51	0.07 to 0.43
D	Extremely impaired	Equal to or below 0.19	Equal to or below 0.06

Other useful indices are also produced by the AUSRIVAS model and are used within univariate analyses (see below) to provide an additional comparison of macroinvertebrate assemblages among sampled sites over time. These include:

- > OE50Signal – This is the ratio of the observed to expected SIGNAL score per site for taxa that have a probability of occurrence of more than 50%;
- > OOSignal – This is the observed SIGNAL score for taxa that have a probability of occurrence of more than 0%. This is equivalent to the ‘raw’ SIGNAL score.

2.5.3 PERMANOVA

The statistical procedure, Permutational Analysis of Variance (PERMANOVA), was used to examine the spatial and temporal changes in macroinvertebrate data collected throughout the study. PERMANOVA is a permutational approach to analysis of variance (ANOVA) that has a number of advantages of traditional statistical methods. These are detailed in Anderson *et al.* (2008).

Both multivariate (many variables) and univariate (single variable) analyses can be undertaken using PERMANOVA. In both cases, the significance level of each statistical test was set at $p < 0.05$ for all tests undertaken for this report. In the case where the number of unique permutations for a particular test was less than 100, Monte Carlo probability values were used to

assess the significance of the test as outlined in Anderson *et al.* (2008). As with previous surveys within the monitoring program, analyses were undertaken using the software package Primer v6 with the PERMANOVA+ add on.

In order to examine the spatial and temporal differences in macroinvertebrate data, two factors were analysed. These included:

- > Year (4 levels: 2011, 2014, 2015 and 2016); and
- > Location (3 levels: Quarry Treatment, Quarry Control and Upstream Control).

Both factors were considered as fixed and orthogonal factors for the purposes of the statistical analyses. Sites were treated as replicates within each Location to provide replication at the Location level (i.e. $n = 2$). This experimental design was used in both multivariate and univariate style analyses.

Multivariate Analyses

Spatial and temporal variability in macroinvertebrate assemblages, for both edge and riffle habitat, were examined using the Bray-Curtis similarity measure on assemblage data transformed to presence/absence. This transformation was undertaken as per previous analyses, as the AUSRIVAS sampling and processing protocol does not generate reliable abundance data, however, is suitable for transforming to presence/absence for statistical analyses. Any significant tests were further analysed using pairwise comparisons to further investigate spatial and temporal variability and pin point which pairs of locations/surveys were different.

Non-metric Multi-Dimensional Scaling (nMDS) (Clarke 1993) was used to provide a graphical representation of the spatial and temporal patterns in macroinvertebrate assemblages. In nMDS, samples with similar groups of organisms generally cluster closer together than samples containing different groups of organisms, and thus provides a visualisation of any differences in assemblage structure that may be detected with PERMANOVA. A “stress” value for each plot is also provided, which indicates how well the data fits the two dimensional representation of the plot. The smaller the stress value, the better the representation, and values less than 0.2 are considered acceptable (Clarke & Warwick 2001). Plots with stress levels greater than 0.2 are still valid, although any interpretations made from these plots should be treated with caution.

The SIMPER (Similarity Percentages) routine was used to identify the macroinvertebrate taxa primarily responsible for the differences in assemblages between Years and Locations identified as significant by PERMANOVA. SIMPER estimates the percentage contribution of each taxon to the dissimilarity between assemblages and computes them in decreasing order of importance (Clarke 1993; Clarke and Gorley 2006).

Univariate Analyses

The spatial and temporal variability in the total number of macroinvertebrate taxa and SIGNAL2 score, and the AUSRIVAS indices, OE50Taxa, OE50Signal and OOSignal, was examined using the Euclidean distance measure on untransformed data. As with the multivariate analyses, any significant tests were further analysed using pairwise comparisons to examine which pairs of locations/surveys were different.

3 Results

3.1 Spring 2015

3.1.1 Water Quality

Mean electrical conductivity and mean pH levels at each site exceeded the recommended DTVs for slightly disturbed upland rivers in south-east Australia as set out in the ANZECC/ARMCANZ (2000) guidelines (**Table 3-1**). Mean dissolved oxygen levels recorded at all sites were within the recommended guideline values, with the exception of Site 4 (Upstream Control), which was slightly lower than the guideline value for this parameter. Turbidity levels at the Quarry treatment sites (Sites 1 and 2) were within then recommended guideline values, although Site 4 (Upstream Control) and Sites 7 and 8 (Quarry Control) were slightly lower than the recommended DTVs (**Table 3-1**).

Spatially, most water parameters were similar across each site; although electrical conductivity recorded at sites within the Upstream Control treatment (Site 4 and Site 5) were slightly greater than those recorded at other sites during the 2016 survey (**Table 3-1**). In addition, pH values tended to be greater at the Quarry Control sites (Sites 7 and 8) compared to the other sites sampled. ORP levels were quite variable among and within treatments, with ORP generally greater at Quarry Control sites (Sites 7 and 8) compared to those sites within the Quarry Treatment and Upstream Control groups.

Table 3-1 Water quality data collected during the 2016 Spring sampling survey. Bold values indicate values are outside ANZECC/ARMCANZ (2000) Default Trigger Values (DTVs). SE = standard error.

Parameter	Location	Quarry Treatment		Upstream Control		Quarry Control		ANZECC/ARMCANZ (2000) DTVs
		1	2	4	5	7	8	
Temperature (°C)	Mean	15.75	14.55	12.60	12.70	17.00	16.70	-
	SE	0.05	0.05	0.00	0.00	0.00	0.00	
EC (mS/cm)	Mean	369.05	368.70	387.15	386.15	370.35	368.20	30 - 350
	SE	0.45	0.10	0.05	0.05	0.05	0.10	
pH	Mean	8.46	8.17	8.45	8.37	8.79	8.66	6.5 - 8.0
	SE	0.02	0.00	0.04	0.02	0.05	0.01	
ORP (mV)	Mean	93.85	78.75	61.45	81.85	105.30	154.35	-
	SE	21.55	2.65	8.15	0.35	2.40	3.85	
DO (% sat.)	Mean	103.05	96.75	89.75	95.85	100.05	108.40	90 - 110
	SE	0.15	0.25	0.35	0.35	0.45	1.50	
DO (mg/L)	Mean	10.20	9.85	9.55	10.16	9.67	10.55	-
	SE	0.04	0.01	0.03	0.03	0.04	0.15	
Turbidity (NTU)	Mean	4.30	2.45	1.30	2.65	1.75	1.80	2 - 25
	SE	2.50	0.25	0.00	1.05	0.25	0.00	

3.1.2 Aquatic Macroinvertebrates

Edge Habitat

A total of 43 taxa were collected from edge habitat during the 2016 survey. Edge samples were dominated numerically by Caenidae (square-gill mayflies), Corixidae (water boatmen),

Leptoceridae (stick caddisflies) and Leptophlebiidae (prong-gilled mayflies), which together, made up just over 36% of the total number of macroinvertebrates collected during the survey within edge habitat (**Appendix B**).

Edge habitat macroinvertebrate assemblages at each site were all equivalent to (Sites 1, 4, 5, 7 and 8), or more taxonomically richer (Sites 2), compared to the AUSRIVAS reference condition (**Table 3-2**). OE50Taxa scores were above 1.00 at Site 2 and 8, which indicated more taxa were sampled at these sites during the survey than expected by the AUSRIVAS model. In comparison, OE50Taxa scores at Sites 1, 4, 5 and 7 were slightly below 1.00, which indicated fewer taxa were collected at these sites than expected by the model.

SIGNAL2 and OOSignal scores at each site ranged between 3.35 (Site 5) and 4.95 (Site 8), which suggested the macroinvertebrate assemblages residing at these sites consisted of taxa able to withstand moderate levels of pollution (**Table 3-2**).

Table 3-2 AUSRIVAS scores for edge habitat sampled during the 2016 survey.

Habitat	Parameter	Quarry Treatment		Upstream Control		Quarry Control	
		1	2	4	5	7	8
Edge Habitat	Total No. Taxa	24	23	25	21	20	20
	SIGNAL2	4.57	4.38	3.70	3.35	4.58	4.95
	OOSignal	4.67	4.48	3.82	3.45	4.45	4.55
	OE50Signal	1.16	1.04	1.02	0.99	1.09	0.97
	OE50Taxa	0.88	1.17	0.84	0.98	0.87	1.12
	AUSRIVAS Bands	A	X	A	A	A	A

Riffle Habitat

A total of 35 taxa were collected from riffle habitat during the 2016 survey. Riffle samples were dominated numerically by Chironomidae/Orthocladiinae (non-biting midges), Gripopterygidae (stoneflies), Oligochaeta (worms), Chironomidae/Diamesinae (non-biting midges) and Baetidae (minnow mayflies), which together, made up just over 50% of the total number of macroinvertebrates collected during the survey within riffle habitat (**Appendix B**).

Macroinvertebrate assemblages within riffle habitat at each site were all equivalent to the AUSRIVAS reference condition (Band A) (**Table 3-3**). OE50Taxa scores for all sites were all below 1.00 (except for Site 2), which indicated that up to 20% of taxa expected to occur at these sites were not present.

SIGNAL2 and OOSignal scores ranged between 5.10 (Site 5) and 6.29 (Site 8), which as for edge habitat, indicated the macroinvertebrate assemblages residing at these sites consisted of taxa able to withstand moderate levels of pollution (**Table 3-3**).

Table 3-3 AUSRIVAS scores for riffle habitat sampled during the 2016 survey

Habitat	Parameter	Quarry Treatment		Upstream Control		Quarry Control	
		1	2	4	5	7	8
Riffle Habitat	Total No. Taxa	18	25	21	21	15	16
	SIGNAL2	5.69	6.04	5.89	5.47	5.86	6.29
	OOSignal	5.50	5.68	5.33	5.10	5.60	5.69
	OE50Signal	0.98	1.01	0.99	1.00	0.99	1.03
	OE50Taxa	0.97	1.05	0.97	0.89	0.81	0.89
	AUSRIVAS Bands	A	A	A	A	A	A

3.2 Trends in Macroinvertebrate Assemblages over Time

3.2.1 Edge Habitat

AUSRIVAS Indices

A summary of the spatial and temporal patterns of the key AUSRIVAS indices (number of taxa, OOSignal, OE50Signal and OE50Taxa) and SIGNAL2 for edge habitat throughout 2011, 2014, 2015 and 2016 is given below:

- > The number of edge taxa was not significantly different between 2015 and 2016, although edge taxa was significantly greater in 2014 compared to 2011 and 2016 (**Figure 3-1**). In terms of spatial variability, no significant differences in the number of edge taxa among Location groups (i.e. Quarry Treatment, Quarry Control and Upstream Control) were apparent and this pattern was consistent for each sampling year (**Appendix C-1**),
- > A significant Year x Location interaction occurred for edge habitat SIGNAL2 scores, with scores at Quarry Treatment and Quarry Control sites significantly greater than scores calculated for sites at the Upstream Control group (**Appendix C-1**). **Figure 3-2** also suggested that edge habitat SIGNAL 2 scores at the Quarry Treatment sites are generally similar to, or greater than, scores at sites within the two control groups (Quarry Control and Upstream Control) through time.
- > Significant differences in edge OOSignal scores were detected among Location groups, however, these spatial differences were inconsistent through time (**Appendix C-1**). Likewise, temporal differences in OOSignal scores were apparent, however, these were dependant on the Location group. In general, OOSignal scores at the sites within the Quarry Treatment were comparable, or greater than those calculated at the two Control groups over time (**Figure 3-3**) and indicates that the edge habitat of the river within the vicinity of the quarry is in better environmental condition than either of the reaches near the control sites.
- > Significant differences in edge OE50Signal scores were detected among Years, and these differences were consistent for each Location group (**Appendix C-1**). Pairwise tests revealed that edge OE50Signal scores were significantly lower in 2014 compared to those in 2016 (**Figure 3-4**),
- > As for OE50Signal scores, OE50Taxa scores were significantly different among years, and these differences were consistent for each Location group. Pairwise tests revealed that OE50Taxa scores were significantly lower in 2011 compared to 2014 and 2015 (**Appendix C-1**). This pattern can be seen in **Figure 3-5**.

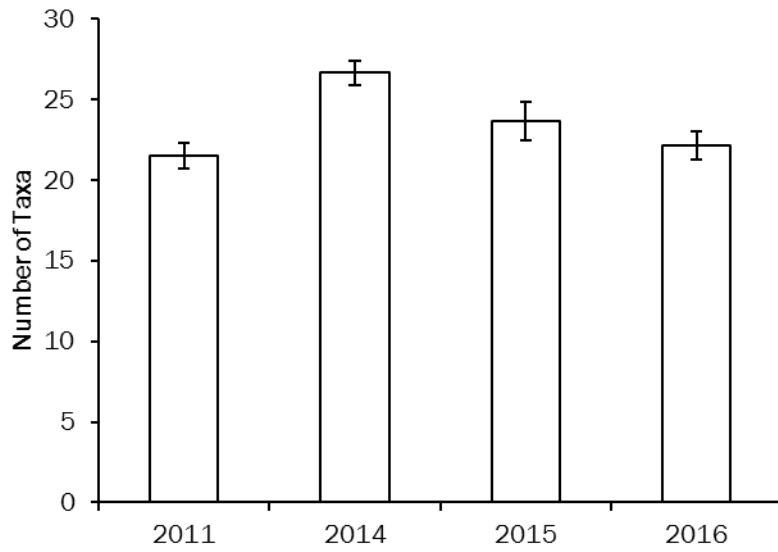


Figure 3-1 Mean (±SE) number of taxa within edge habitat for each year averaged across Location groups.

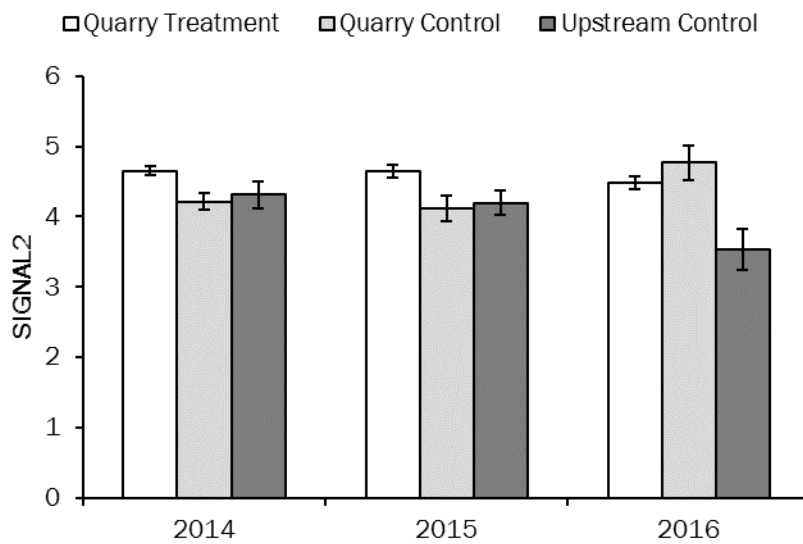


Figure 3-2 Mean (±SE) SIGNAL2 scores within edge habitat at each Location group for 2014, 2015, and 2016.

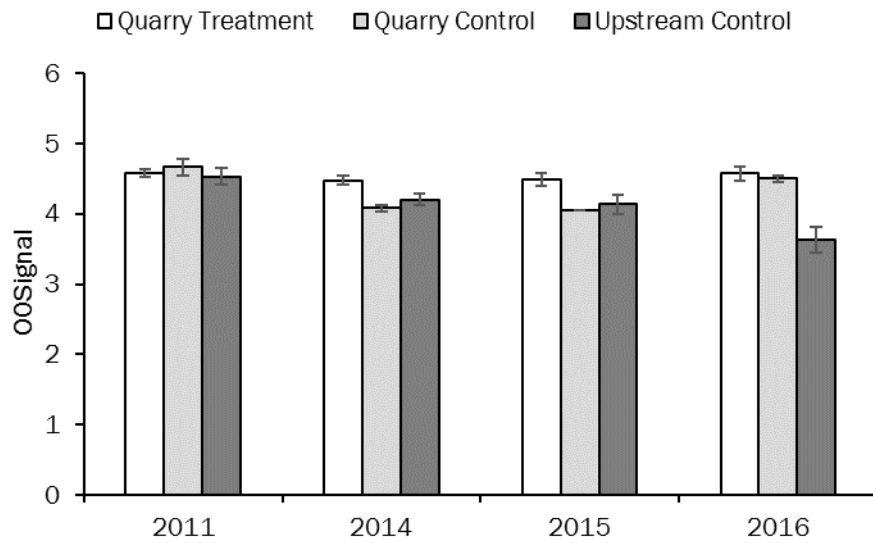


Figure 3-3 Mean (\pm SE) OOSignal scores within edge habitat at each Location group for 2011, 2014, 2015 and 2016.

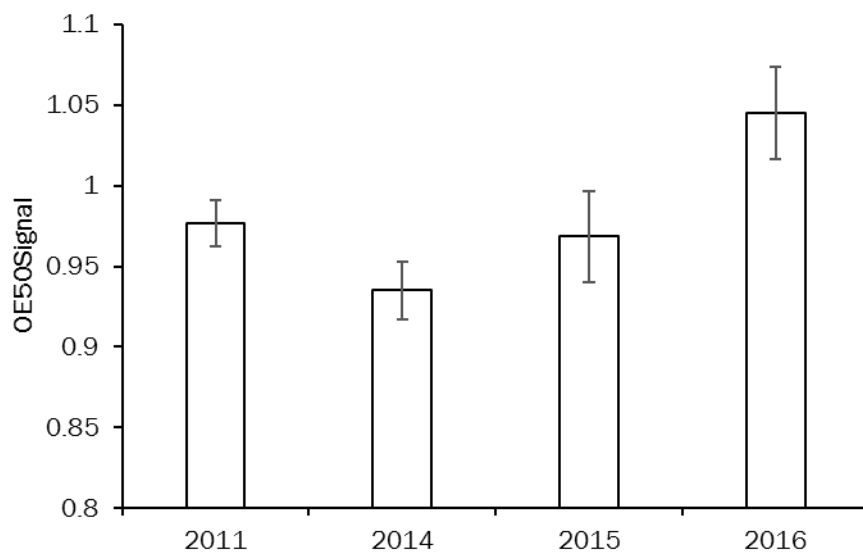


Figure 3-4 Mean (\pm SE) OE50Signal scores within edge habitat for each year averaged across Location group.

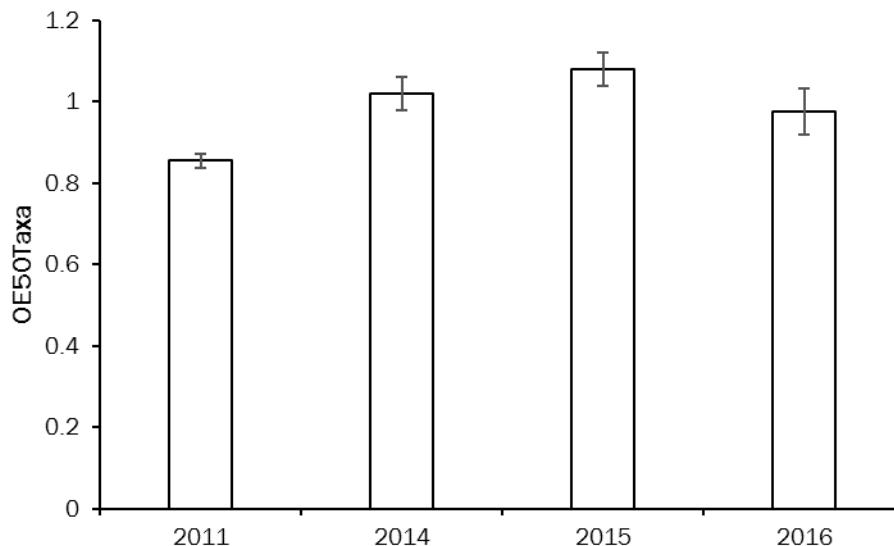


Figure 3-5 Mean (\pm SE) OE50Taxa scores within edge habitat for each year averaged across Location group.

Assemblage Structure

A summary of the spatial and temporal patterns for macroinvertebrate assemblage structure within edge habitat throughout 2011, 2014, 2015 and 2016 is given below:

- > A significant interaction between Year and Location was detected for macroinvertebrate assemblage structure within edge habitat, however, pairwise tests were unable to detect which Years and/or Locations were significantly different from one another (**Appendix C-2**).
- > The nMDS plot indicated that assemblages sampled at each Location group were somewhat different between years, and there was some separation among Location groups within each sampling year which indicated differences at this level (**Figure 3-3**), however, none of the patterns observed indicated that the assemblages at the Quarry Treatment group were markedly different from assemblages sampled at the two Control groups over time.
- > As pairwise tests were unable to resolve where differences occurred among Locations and/or Years, SIMPER analysis was not undertaken for edge habitat taxa.

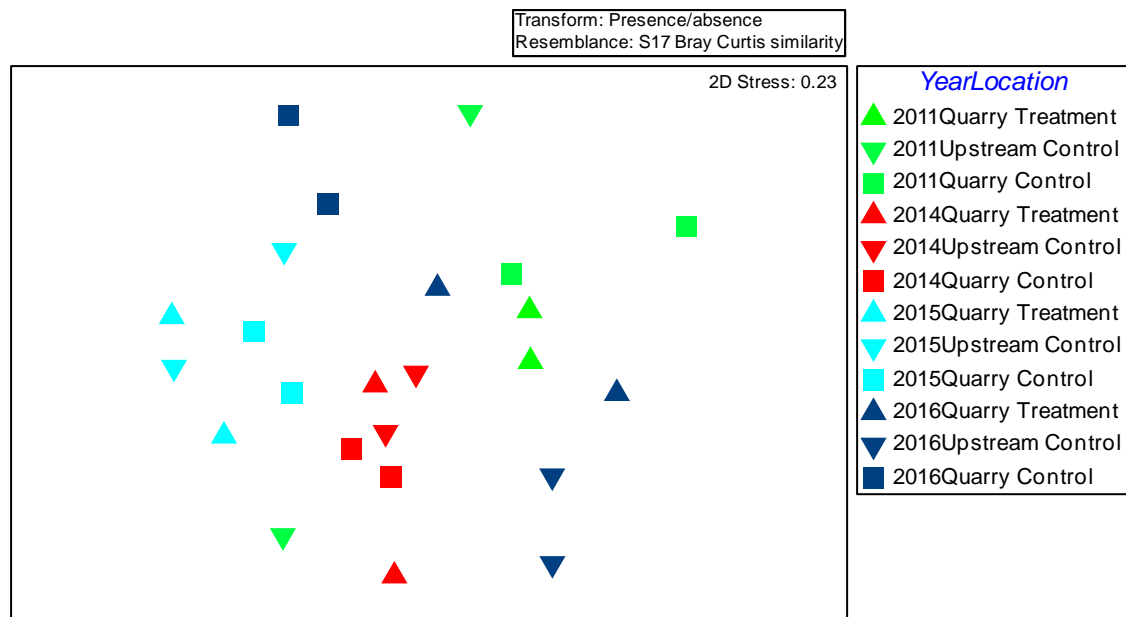


Figure 3-6 nMDS plot comparing macroinvertebrate assemblage structure within edge habitat sampled at each Location group during 2011, 2014, 2015 and 2016.

3.2.2 Riffle Habitat

AUSRIVAS Indices

A summary of the spatial and temporal patterns of the key AUSRIVAS indices (number of taxa, 00Signal, OE50Signal and OE50Taxa) and SIGNAL2 for riffle habitat throughout 2011, 2014, 2015 and 2016 is given below:

- > A significant difference was detected in the number of riffle taxa between years and the difference was consistent among Locations groups (**Appendix D-1**). Significantly more taxa were sampled in 2014 compared to 2011, 2015 and 2016 across all Location groups (**Figure 3-7**),
- > Upstream Control sites had significantly lower SIGNAL2 scores compared to Quarry Treatment and Quarry Control sites, which was consistent for each year sampled (**Appendix D-1; Figure 3-8**). In addition, SIGNAL 2 scores were significantly greater in 2015 and 2016 compared to 2014, and this difference was similar for each Location group (**Appendix D-1; Figure 3-9**).
- > Patterns in 00Signal scores were very similar to those observed for SIGNAL2 as described above and can be seen in **Appendix D-1** and **Figure 3-10** and **Figure 3-11**.
- > No significant spatial or temporal differences in riffle OE50Signal scores and OE50Taxa scores were detected during the analysis (**Appendix D-1**).

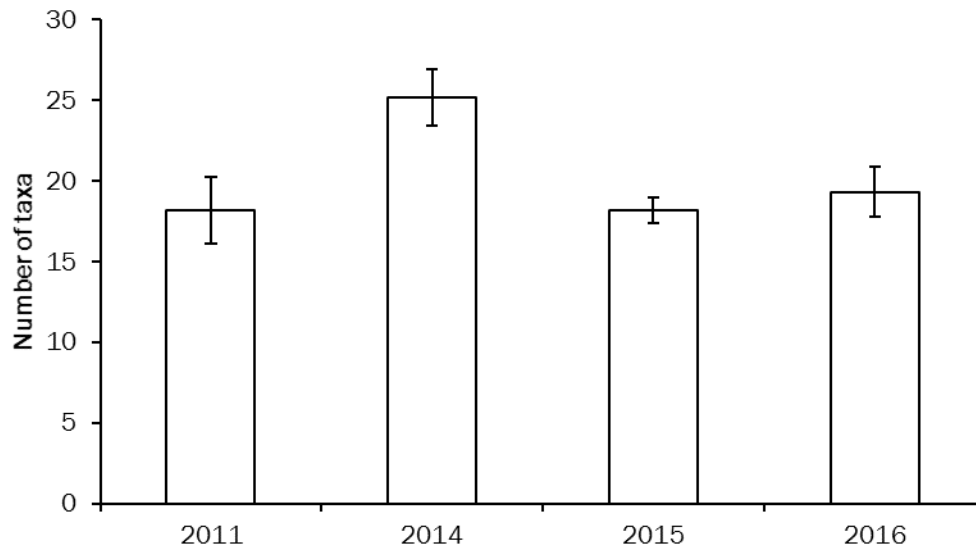


Figure 3-7 Mean (\pm SE) number of taxa within riffle habitat sampled in 2011, 2014, 2015 and 2016 averaged across Location groups.

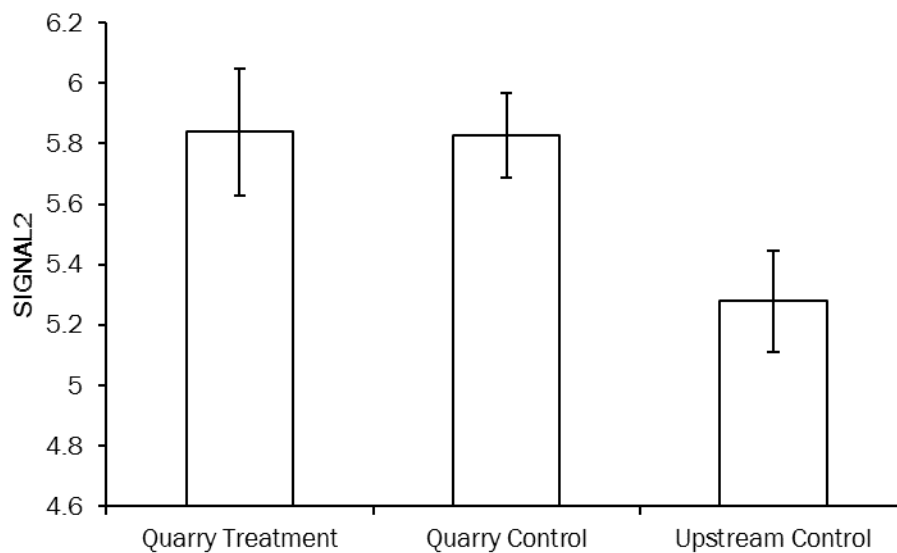


Figure 3-8 Mean (\pm SE) SIGNAL2 scores within riffle habitat at each Location group averaged across year.

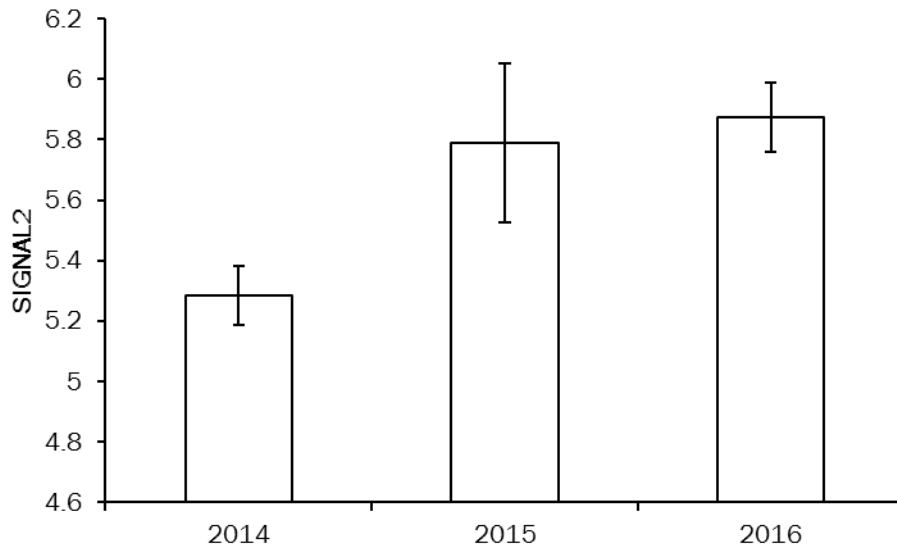


Figure 3-9 Mean (±SE) SIGNAL2 scores within riffle habitat sampled in 2014, 2015 and 2016 averaged across Location groups.

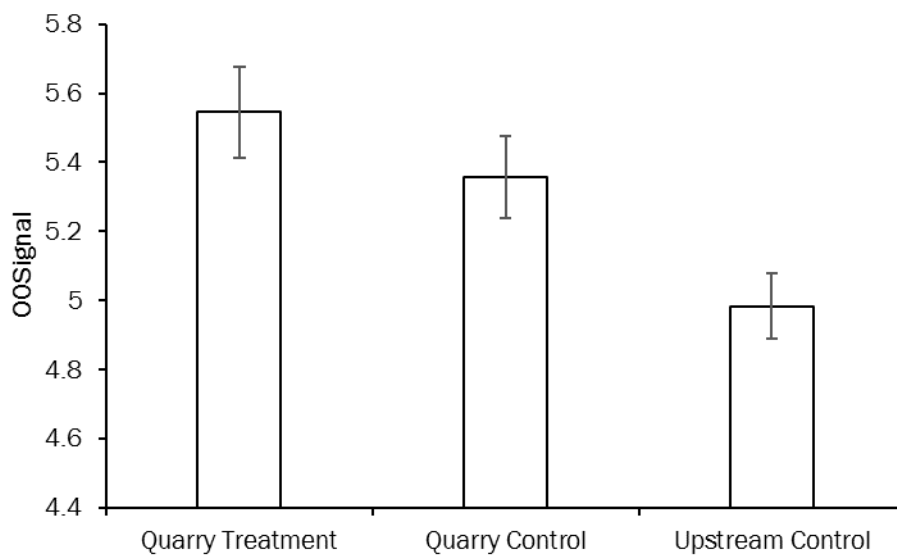


Figure 3-10 Mean (±SE) OOSignal scores within riffle habitat at each Location group averaged across year.

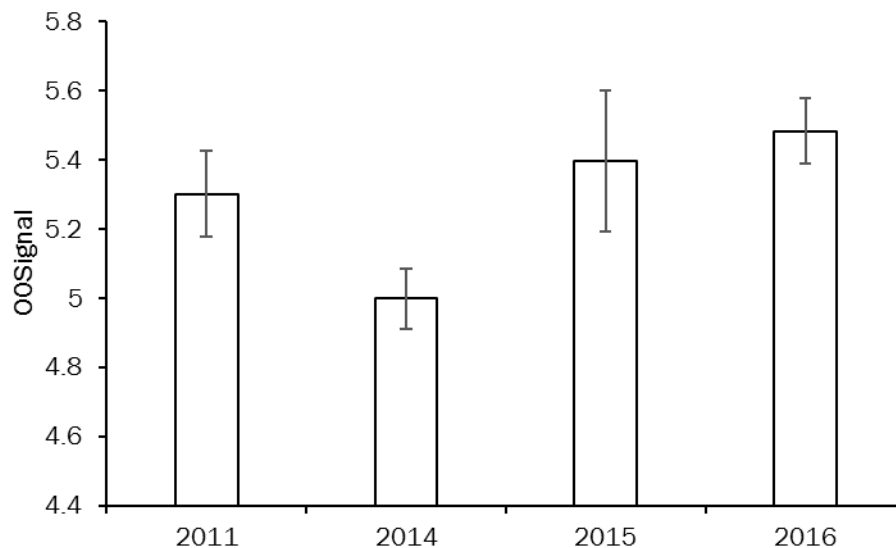


Figure 3-11 Mean (\pm SE) OOSignal scores within riffle habitat sampled in 2011, 2014, 2015 and 2016 averaged across Location groups.

Assemblage Structure

A summary of the spatial and temporal patterns for macroinvertebrate assemblage structure within riffle habitat throughout 2011, 2014, 2015 and 2016 is given below:

- > A significant difference in macroinvertebrate assemblage structure was detected between Years, which was consistent for all three Location groups (Quarry Treatment, Quarry Control and Upstream Control) (**Appendix D-2**). Pairwise comparisons revealed that riffle assemblages sampled for each year were all different from one another. This temporal pattern was also highlighted within the nMDS plot, which showed a clear separation between samples collected during each year (**Figure 3-12**).
- > Significant differences were also detected among Location groups, with assemblages collected from the Quarry Treatment group different from those collected at the Upstream Control group (**Appendix D-2**). This pattern was consistent for each year. nMDS plots revealed this to be the case, with assemblages sampled at the Quarry Treatment separated from those sampled at the Upstream Control group for each of the four years analysed (**Figure 3.12**)
- > Simper analysis revealed that the best discriminating taxa between Years were Chironomidae/Diamesinae, Oligochaeta and Conoesucidae, with each featuring within the 6 best discriminators between each yearly SIMPER tests for most comparisons (**Appendix D-2**). The best discriminating riffle taxa between the Quarry Treatment group and the Upstream Control group were Ecnomidae, Corixidae, Glossosomatidae and Corydalidae. These four taxa accounted for approximately 15% of the dissimilarity between these two Location groups.

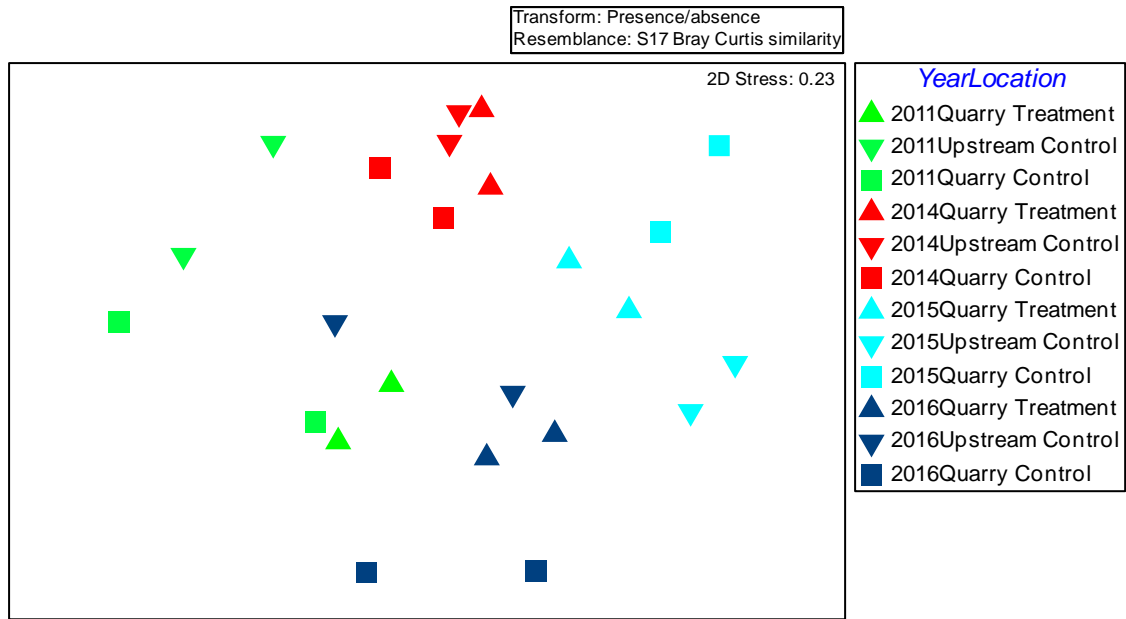


Figure 3-12 nMDS plot comparing macroinvertebrate assemblage structure within riffle habitat sampled at each Location group during 2011, 2014, 2015 and 2016.

4 Discussion

Key Findings

- > At the time of the 2016 survey, the environmental quality of the river near the quarry discharge point was in the same condition, or for some variables in better condition, compared with reaches of the river which are not under the influence of the quarry
- > Similar patterns and variability have been displayed by all ecological variables examined throughout the entire monitoring program to date (i.e. 2005 to 2016) and it appears that very little of the variability detected is as a direct result of quarry operations

4.1 2016 Survey

Data collected during the 2016 survey suggested that the aquatic macroinvertebrate assemblages within both edge and riffle habitat at Quarry Treatment sites were equivalent, or as was the case for Quarry Treatment Site 2, better than the AUSRIVAS reference condition. Likewise, macroinvertebrate assemblages at sites within both Control Treatment groups (Upstream Control and Quarry Control) for edge and riffle habitat were also equivalent to the AUSRIVAS reference condition, all falling within the AUSRIVAS Band A category. This suggests that Quarry operations have had little impact on the aquatic macroinvertebrate assemblages within the Coxs River prior to the most recent survey.

Further evidence of this was also seen with the other variables analysed such as SIGNAL2 and OOSignal scores, with Quarry Treatment sites similar to, or in many cases better than sites in either of the Control groups. For example, SIGNAL2 scores at the Quarry Treatment sites were often similar to, or greater than those sites sampled in the Upstream Control group. This result suggested that fewer pollution tolerant taxa were present within sites from the Quarry Treatment group, which may be as a result of better water quality at these sites compared to areas upstream of the Quarry.

In situ water quality measurements indicated that values were similar among all sites for most variables, including dissolved oxygen pH and electrical conductivity, regardless of what treatment group they were associated with, which indicates that Quarry operations are having little effect on these water quality variables. Turbidity was slightly elevated at Site 1 within the Quarry Treatment compared to sites within both Control groups, however, turbidity values measured during the 2016 survey at the Quarry Treatment sites were within ANZECC/ARMCANZ (2000) guideline values.

4.2 Spatial and Temporal Trends over Time

In conjunction with previous surveys, significant spatial and temporal variability in macroinvertebrate assemblage structure, as well as AUSRIVAS indices, was found to be present. This variability, however, could not be conclusively attributed to current quarry operations.

Quarry Treatment sites often had comparable, and in many cases better results, in terms of the indices measured compared to either of the Control groupings of sites throughout time. For example, SIGNAL2 and OOSignal scores (in particular for edge habitat) were often greater at sites within the Quarry Treatment group in comparison to the sites belonging to the two Control groupings. In addition, these favourable patterns were generally consistent over time. This suggests that the Quarry Treatment sites had a greater number of pollution sensitive taxa than

what was recorded at either of the Control groups, which in turn indicated better water quality and more favourable conditions for aquatic macroinvertebrates within the vicinity of the quarry.

Temporal patterns were also favourable, with many indices increasing in value over the last few years of the monitoring program across the entire study location. Likewise for spatial patterns, variables such as SIGNAL2 and OOSignal have showed improvement over time with many sites recording increased scores over the last few years. This may indicate that aquatic macroinvertebrate assemblages have responded favourably to better water quality across the study area over time.

Many of the spatial and temporal differences detected were most likely a result of inherent natural variability which is common in aquatic environments. It appears that other influences such as surrounding land use practices, spatial differences in hydrological regimes and upstream processes and activities are most likely influencing ecological patterns within the Coxs River within the vicinity of the study area.

Previous monitoring surveys (e.g. Cardno 2011, Cardno 2015, AquaScience 2016) have reported similar results to those presented here and it appears that the addition of the 2016 data has not shown any great differences in the spatial and temporal patterns observed throughout the monitoring program to date. In general, similar variability has been shown for all ecological variables examined throughout the entire monitoring program and it appears that very little of the variability detected is as a direct result of quarry operations. Therefore, it appears that the environmental management practices used at the quarry are providing suitable protection to the aquatic environment of the Coxs River.

4.3 Conclusion

In conclusion, there were no distinct negative patterns of variability in the aquatic macroinvertebrate fauna observed at the Quarry Treatment location compared to either of the Control locations that could be attributed to the activities of the Quarry. Results suggest that, at present, the ecological health of the river (as measured through aquatic macroinvertebrate assemblages) within the vicinity of Austen Quarry is no different, or sometimes better, than other areas of the river not influenced by quarry operations. Any impacts on aquatic macroinvertebrates from quarry discharges are most likely to be short term in duration due to the transient nature of the discharge and the various management practices of the quarry to manage pollution events (e.g. addition of flocculent).

As discussed in previous reports (e.g. Cardno 2011, Cardno 2015, AquaScience 2016), the AUSRIVAS sampling protocol is designed for use in rapid assessment of river health and therefore, is useful in detecting larger scale, more persistent changes in macroinvertebrate assemblage structure and ultimately the condition of the aquatic environment. Impacts on aquatic macroinvertebrates from smaller magnitude, episodic discharge events would most likely not be detected by the sampling protocols adopted within the current monitoring program. In addition, upstream activities are most likely confounding any patterns observed at the current monitoring sites.

5 References

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6 Plates



Plate 1. Site 1 (Quarry Treatment) looking upstream at edge habitat



Plate 2. Site 1 (Quarry Treatment) looking downstream at riffle habitat



Plate 3. Site 2 (Quarry Treatment) looking upstream at edge habitat.



Plate 4. Site 2 (Quarry Treatment) looking upstream at riffle habitat.



Plate 5. Site 4 (Upstream Control) looking downstream at edge habitat



Plate 6. Site 4 (Upstream Control) looking upstream at riffle habitat



Plate 7. Site 5 (Upstream Control) looking downstream at edge habitat



Plate 8. Site 5 (Upstream Control) looking upstream at riffle habitat



Plate 9. Site 7 (Quarry Control) looking upstream at edge habitat



Plate 10. Site 7 (Quarry Control) looking upstream at riffle habitat



Plate 11. Site 8 (Quarry Control) looking downstream at edge habitat

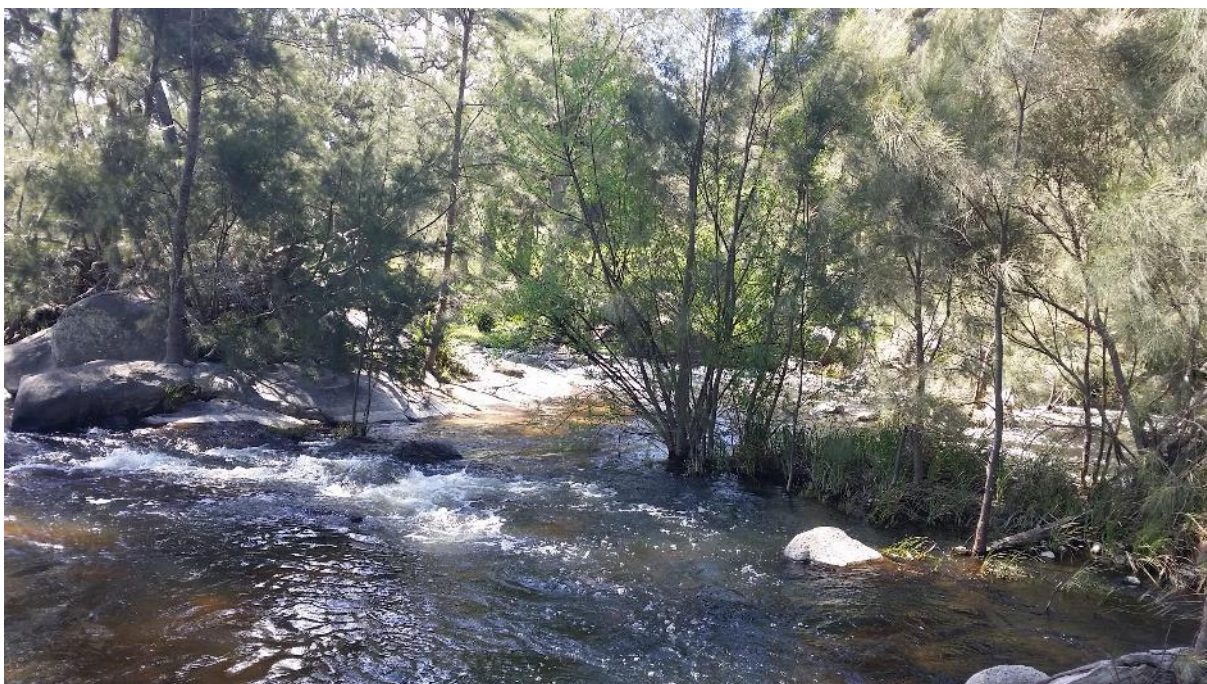


Plate 12. Site 8 (Quarry Control) looking downstream at riffle habitat

Appendix A – GPS Coordinates

Appendix A-1 GPS coordinates of sampling sites (WGS84 Zone56)

Location	Site	Easting	Northing
Quarry Treatment	1	236564	6281888
	2	236938	6281730
Upstream Control	4	234808	6284343
	5	235178	6284196
Quarry Control	7	235058	6282700
	8	235262	6282308

Appendix B – Macroinvertebrate Taxa Collected in 2016

Appendix B-1. Aquatic macroinvertebrate counts from edge habitat collected in Spring 2016

Location Site	Quarry Treatment		Upstream Control		Quarry Control	
	1	2	4	5	7	8
Atyidae	2	10	5	4	3	9
Baetidae	1	6	7	6	5	10
Caenidae	10	10	10	10	10	4
Calamoceratidae	0	0	0	0	1	0
Chironomidae/Chironominae	3	1	3	3	4	1
Chironomidae/Diamesinae	0	0	0	0	1	0
Chironomidae/Orthoclaadiinae	0	1	0	0	2	1
Chironomidae/Tanypodinae	1	3	0	7	0	1
Cladocera	1	4	0	0	0	0
Coenagrionidae	1	2	6	2	3	5
Copepoda	1	1	3	1	0	0
Corbiculidae/ Sphaeriidae	5	1	0	1	0	0
Corixidae	0	10	10	10	7	10
Dixidae	0	0	0	0	0	1
Dytiscidae	1	1	0	0	2	1
Ecnomidae	1	0	1	1	0	0
Gerridae	1	0	1	0	0	1
Gomphidae	2	2	1	0	0	0
Gripopterygidae	5	7	0	0	8	9
Hydracarina	0	0	2	0	0	0
Hydridae	0	0	1	10	1	0
Hydrobiosidae	1	0	0	0	0	0
Hydrophilidae	0	1	0	2	0	1
Leptoceridae	5	10	10	10	5	1
Leptophlebiidae	3	10	10	1	10	4
Lestidae	1	1	2	1	0	0
Megapodagrionidae	0	1	0	0	0	0
Nematoda	0	0	1	1	0	0
Notonectidae	0	0	1	2	0	0
Oligochaeta	0	0	10	10	4	5
Oniscigastridae	1	7	0	0	3	4
Ostracoda	1	0	1	2	0	0
Parastacidae	0	0	0	0	1	0
Philorheithridae	1	1	0	0	0	0
Physidae	3	5	4	10	4	0
Planorbidae	2	0	1	0	0	0
Psephenidae	0	0	1	0	0	0
Pyalidae	0	0	1	0	0	0
Scirtidae	1	0	0	0	0	1
Sialidae	0	0	2	10	0	0
Synlestidae	0	4	1	0	2	1
Telephlebiidae (=Aeshnidae)	0	0	0	0	0	1
Tipulidae	0	0	0	0	1	0

Appendix B-2. Aquatic macroinvertebrate counts from riffle habitat collected in Spring 2016

Location Site	Quarry Treatment		Upstream Control		Quarry Control	
	1	2	4	5	7	8
Baetidae	10	7	9	9	6	1
Caenidae	0	0	0	4	2	1
Calamoceratidae	0	1	0	0	0	0
Chironomidae/Chironominae	2	0	1	0	0	0
Chironomidae/Diamesinae	10	10	10	1	3	10
Chironomidae/Orthocladiinae	10	10	10	10	10	10
Chironomidae/Tanytopodinae	0	1	0	0	0	0
Conoesucidae	7	1	2	10	3	3
Corbiculidae/ Sphaeriidae	2	9	0	2	0	0
Corixidae	1	0	3	4	2	0
Corydalidae	0	1	0	0	0	1
Dugesiiidae	0	0	0	0	0	1
Dytiscidae	0	1	0	0	0	0
Ecnomidae	0	0	1	0	0	0
Elmidae	0	0	1	0	0	0
Glossosomatidae	1	3	0	0	0	1
Gomphidae	2	2	2	4	0	0
Gripopterygiidae	10	10	10	10	10	10
Hydracarina	1	1	0	1	0	1
Hydridae	0	0	0	1	0	0
Hydrobiosidae	3	3	1	8	1	2
Hydrophilidae	0	1	0	0	0	0
Hydropsychidae	7	4	10	10	1	1
Leptoceridae	0	1	1	2	3	0
Leptophlebiidae	10	8	6	8	5	1
Nematode	0	0	1	0	0	0
Oligochaeta	10	10	10	10	3	2
Oniscigastridae	0	1	0	0	1	0
Philopotamidae	0	2	1	2	0	0
Physidae	0	0	0	2	0	0
Psephenidae	1	4	0	1	0	0
Scirtidae	0	0	1	0	0	0
Simuliidae	10	10	1	1	5	0
Telephlebiidae (=Aeshnidae)	0	1	1	1	0	1
Tipulidae	1	6	2	0	1	1

Appendix C – Statistical Analyses of Edge Habitat Data

Appendix C-1. Univariate analyses of edge habitat macroinvertebrate data collected in 2011, 2014, 2015 and 2016.

a) Number of taxa

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	95.000	31.667	7.755	0.004	5976	0.0048
Location	2	23.250	11.625	2.847	0.098	4435	0.0995
YexLo	6	28.750	4.792	1.174	0.377	8839	0.3828
Residual	12	49.000	4.083				

PAIR-WISE TESTS					
Term 'Ye'					
Groups	t	P(perm)	U. perms	P(MC)	
2011, 2014	3.845	0.012	1487	0.009	
2011, 2015	1.983	0.100	567	0.096	
2011, 2016	0.603	0.561	440	0.570	
2014, 2015	2.450	0.055	426	0.049	
2014, 2016	3.641	0.013	931	0.012	
2015, 2016	1.567	0.168	311	0.168	

b) SIGNAL2

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	2	0.055	0.028	0.807	0.481	9961	0.4769
Location	2	1.023	0.511	14.953	0.001	9967	0.0025
YexLo	4	1.188	0.297	8.683	0.003	9960	0.0035
Residual	9	0.308	0.034				

PAIR-WISE TESTS					
Term 'Ye x Lo' 'Year'					
Groups	t	P(perm)	U. perms	P(MC)	
2014, 2015	0.068	1.000	3	0.951	
2014, 2016	1.185	0.666	3	0.359	
2015, 2016	1.482	0.334	3	0.271	

Term 'Ye x Lo' 'Location'					
Groups	t	P(perm)	U. perms	P(MC)	
Quarry Treatment, Upstream Control	2.383	0.338	3	0.143	
Quarry Treatment, Quarry Control	3.170	0.330	3	0.088	
Upstream Control, Quarry Control	0.877	0.671	3	0.480	

c) 00Signal

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.563	0.188	9.473	0.003	9945	0.0022
Location	2	0.648	0.324	16.368	0.000	9950	0.0006
YexLo	6	0.838	0.140	7.055	0.002	9951	0.0031
Residual	12	0.238	0.020				

PAIR-WISE TESTS					
Term 'Ye x Lo' 'Year'					
Groups	t	P(perm)	U. perms	P(MC)	
2011, 2014	1.067	0.664	3	0.399	
2011, 2015	0.745	0.664	3	0.531	
2011, 2016	Negative				
2014, 2015	0.082	1.000	3	0.941	
2014, 2016	0.805	0.664	3	0.497	
2015, 2016	0.616	0.668	3	0.600	

Term 'Ye x Lo' 'Location'					
Groups	t	P(perm)	U. perms	P(MC)	
Quarry Treatment, Upstream Control	0.314	1.000	3	0.783	
Quarry Treatment, Quarry Control	0.720	0.674	3	0.547	
Upstream Control, Quarry Control	0.812	0.662	3	0.499	

(cont.)

d) OE50Signal

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.038	0.013	5.226	0.015	9826	0.0171
Location	2	0.014	0.007	2.898	0.097	9426	0.0939
YexLo	6	0.020	0.003	1.390	0.291	9904	0.3036
Residual	12	0.029	0.002				

PAIR-WISE TESTS

Term 'Ye'

Groups	t	P(perm)	U. perms	P(MC)
2011, 2014	1.738	0.131	3107	0.138
2011, 2015	0.307	0.763	3801	0.765
2011, 2016	1.873	0.111	5336	0.107
2014, 2015	1.925	0.103	1539	0.103
2014, 2016	3.678	0.010	3899	0.014
2015, 2016	2.360	0.050	4720	0.053

e) OE50Taxa

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.163	0.054	4.219	0.029	9945	0.0280
Location	2	0.025	0.012	0.962	0.414	9935	0.4155
YexLo	6	0.029	0.005	0.379	0.875	9956	0.8818
Residual	12	0.155	0.013				

PAIR-WISE TESTS

Term 'Ye'

Groups	t	P(perm)	U. perms	P(MC)
2011, 2014	3.451	0.016	2944	0.015
2011, 2015	3.673	0.010	8317	0.010
2011, 2016	1.489	0.196	7345	0.191
2014, 2015	1.369	0.254	2382	0.214
2014, 2016	0.623	0.567	4983	0.551
2015, 2016	1.301	0.233	8322	0.239

Appendix C-2. Multivariate analyses of edge habitat macroinvertebrate data collected in 2011, 2014, 2015 and 2016.

Source	df	SS	MS	Pseudo-F	P(perm)	perms	P(MC)
Year	3	5502.200	1834.100	4.408	0.000	9922	0.0001
Location	2	1921.900	960.960	2.309	0.011	9941	0.0239
YexLo	6	5800.100	966.680	2.323	0.000	9870	0.0011
Residual	12	4993.300	416.110				

PAIR-WISE TESTS

Term 'YexLo' for pairs of levels of factor 'Year'

Within level 'Quarry Treatment' of factor 'Location'

Groups	t	P(perm)	U. perms	P(MC)
2011, 2014	1.4892	0.3349	3	0.206
2011, 2015	1.8058	0.3379	3	0.122
2011, 2016	1.5643	0.335	3	0.175
2014, 2015	1.6903	0.3276	3	0.144
2014, 2016	1.9901	0.3364	3	0.104

Within level 'Upstream Control' of factor 'Location'

Groups	t	P(perm)	U. perms	P(MC)
2011, 2014	1.4605	0.3369	3	0.226
2011, 2015	1.5606	0.3358	3	0.189
2011, 2016	1.7663	0.3351	3	0.139
2014, 2015	1.8296	0.3374	3	0.143
2014, 2016	2.4412	0.3244	3	0.068
2015, 2016	2.0257	0.331	3	0.098

Within level 'Quarry Control' of factor 'Location'

Groups	t	P(perm)	U. perms	P(MC)
2011, 2014	1.6799	0.3289	3	0.168
2011, 2015	1.581	0.3283	2	0.173
2011, 2016	1.4439	0.3359	3	0.226
2014, 2015	1.6003	0.3371	3	0.182
2014, 2016	2.5048	0.337	3	0.066
2015, 2016	1.43	0.3352	3	0.22

(Cont.)

Term 'YexLo' for pairs of levels of factor 'Location'

Within level '2011' of factor 'Year'

Groups	t	P(perm)	U. perms	P(MC)
Quarry Treatment, Upstream Control	1.620	0.334	3	0.162
Quarry Treatment, Quarry Control	0.871	1.000	3	0.533
Upstream Control, Quarry Control	1.315	0.328	3	0.256

Within level '2014' of factor 'Year'

Groups	t	P(perm)	U. perms	P(MC)
Quarry Treatment, Upstream Control	1.310	0.338	3	0.271
Quarry Treatment, Quarry Control	1.776	0.330	3	0.130
Upstream Control, Quarry Control	1.237	0.339	3	0.307

Within level '2015' of factor 'Year'

Groups	t	P(perm)	U. perms	P(MC)
Quarry Treatment, Upstream Control	1.332	0.334	3	0.258
Quarry Treatment, Quarry Control	1.312	0.336	3	0.269
Upstream Control, Quarry Control	1.137	0.329	2	0.366

Within level '2016' of factor 'Year'

Groups	t	P(perm)	U. perms	P(MC)
Quarry Treatment, Upstream Control	2.286	0.336	3	0.077
Quarry Treatment, Quarry Control	1.832	0.334	3	0.139
Upstream Control, Quarry Control	2.370	0.335	3	0.070

Appendix D – Statistical Analyses of Riffle Habitat Data

Appendix D-1. Univariate analyses of riffle habitat macroinvertebrate data collected in 2011, 2014, 2015 and 2016.

a) Number of taxa

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	202.130	67.375	5.967	0.011	9379	0.0098
Location	2	55.083	27.542	2.439	0.129	8931	0.1237
YexLo	6	115.250	19.208	1.701	0.210	9806	0.2076
Residual	12	135.500	11.292				

PAIR-WISE TESTS					
Term 'Ye'					
Groups	t	P(perm)	U. perms	P(MC)	
2011, 2014	3.000	0.026	3280	0.024	
2011, 2015	Negative				
2011, 2016	0.653	0.517	2051	0.540	
2014, 2015	3.363	0.014	2459	0.017	
2014, 2016	2.602	0.038	2688	0.042	
2015, 2016	0.808	0.449	689	0.453	

b) SIGNAL2

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	2	1.222	0.611	7.713	0.014	9955	0.0114
Location	2	1.228	0.614	7.748	0.011	9943	0.0092
YexLo	4	0.817	0.204	2.577	0.113	9954	0.1142
Residual	9	0.713	0.079				

PAIR-WISE TESTS					
Term 'Ye'					
Groups	t	P(perm)	U. perms	P(MC)	
2014, 2015	3.130	0.024	8883	0.019	
2014, 2016	3.917	0.007	8942	0.007	
2015, 2016	0.487	0.653	9412	0.650	

Term 'Lo'					
Groups	t	P(perm)	U. perms	P(MC)	
Quarry Treatment, Upstream Control	3.161	0.022	9399	0.020	
Quarry Treatment, Quarry Control	0.074	0.942	8997	0.943	
Upstream Control, Quarry Control	3.284	0.016	9352	0.017	

c) 00Signal

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.805	0.268	7.888	0.005	9953	0.0040
Location	2	1.318	0.659	19.359	0.001	9953	0.0002
YexLo	6	0.480	0.080	2.350	0.101	9956	0.0980
Residual	12	0.408	0.034				

PAIR-WISE TESTS					
Term 'Ye'					
Groups	t	P(perm)	U. perms	P(MC)	
2011, 2014	3.172	0.024	9191	0.019	
2011, 2015	0.851	0.424	9169	0.432	
2011, 2016	2.697	0.045	9184	0.035	
2014, 2015	2.969	0.028	9341	0.026	
2014, 2016	4.900	0.007	9159	0.003	
2015, 2016	0.730	0.501	9258	0.493	

Term 'Lo'					
Groups	t	P(perm)	U. perms	P(MC)	
Quarry Treatment, Upstream Control	5.826	0.001	9788	0.000	
Quarry Treatment, Quarry Control	2.123	0.067	9778	0.068	
Upstream Control, Quarry Control	4.128	0.003	9698	0.004	

(cont.)

d) OE50Signal

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.001	0.000	0.806	0.508	6108	0.5045
Location	2	0.003	0.001	2.419	0.129	4157	0.1303
YexLo	6	0.009	0.001	2.807	0.061	8620	0.0616
Residual	12	0.006	0.001				

e) OE50Taxa

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Year	3	0.106	0.035	3.247	0.059	6453	0.0631
Location	2	0.020	0.010	0.929	0.422	4467	0.4240
YexLo	6	0.016	0.003	0.239	0.956	9394	0.9578
Residual	12	0.130	0.011				

Appendix D-2. Multivariate analyses of riffle habitat macroinvertebrate data collected in 2014 and 2015.

Source	df	SS	MS	Pseudo-F	P(perm)	perms	P(MC)
Year	3	8603.500	2867.800	7.094	0.000	9903	0.0001
Location	2	1753.800	876.920	2.169	0.031	9923	0.0442
YexLo	6	3430.100	571.690	1.414	0.113	9896	0.1284
Residual	12	4851.500	404.290				

PAIR-WISE TESTS					
Term 'Ye'					
Groups	t	P(perm)	U. perms	P(MC)	
2011, 2014	2.516	0.002	9446	0.005	
2011, 2015	2.536	0.002	9435	0.007	
2011, 2016	2.371	0.004	9439	0.010	
2014, 2015	2.867	0.002	9423	0.003	
2014, 2016	2.982	0.003	9449	0.002	
2015, 2016	2.843	0.003	9431	0.003	

Term 'Lo'					
Groups	t	P(perm)	U. perms	P(MC)	
Quarry Treatment, Upstream Control	1.875	0.031	9930	0.033	
Quarry Treatment, Quarry Control	1.260	0.198	9936	0.218	
Upstream Control, Quarry Control	1.344	0.151	9922	0.159	

(cont.)

Groups 2011 & 2014

Average dissimilarity = 41.10

Species	Group 2011		Group 2014		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Physidae	0.00	0.83	1.97	2.08	4.79	4.79
Dugesiiidae	0.00	0.83	1.94	2.08	4.73	9.52
Corydalidae	0.17	1.00	1.92	2.09	4.68	14.20
Conoesucidae	0.00	0.83	1.90	2.12	4.62	18.81
Telephlebiidae (=Aeshnidae)	0.33	1.00	1.66	1.37	4.04	22.85
Caenidae	0.33	1.00	1.65	1.37	4.01	26.86
Leptoceridae	0.33	1.00	1.60	1.35	3.89	30.75
Hydracarina	0.00	0.67	1.49	1.37	3.62	34.37
Chironomidae/Orthocladiinae	0.83	0.33	1.46	1.20	3.54	37.91
Chironomidae/Tanypodinae	0.17	0.67	1.40	1.21	3.40	41.32
Veliidae	0.17	0.67	1.40	1.21	3.40	44.71
Corbiculidae/ Sphaeriidae	0.33	0.83	1.39	1.21	3.38	48.09
Ecnomidae	0.50	0.83	1.25	0.97	3.03	51.12
Simuliidae	0.83	0.50	1.21	0.97	2.95	54.07
Corixidae	0.33	0.50	1.21	0.96	2.94	57.01
Parastacidae	0.50	0.67	1.19	0.97	2.90	59.91
Acarina	0.50	0.00	1.18	0.97	2.88	62.79
Diphlebiidae (=Amphipterygidae)	0.17	0.50	1.12	0.98	2.73	65.51
Copepoda	0.50	0.00	1.07	0.97	2.61	68.13
Ceratopogonidae	0.33	0.33	1.01	0.87	2.45	70.58
Baetidae	0.67	0.83	0.92	0.78	2.25	72.82
Dytiscidae	0.17	0.33	0.90	0.77	2.19	75.01
Ostracoda	0.17	0.33	0.87	0.78	2.13	77.14
Psephenidae	0.17	0.33	0.84	0.78	2.04	79.18
Elmidae	0.67	1.00	0.80	0.69	1.94	81.12
Gripopterygidae	1.00	0.67	0.79	0.69	1.92	83.04
Cladocera	0.33	0.00	0.75	0.69	1.83	84.87
Philopotamidae	0.67	1.00	0.75	0.69	1.83	86.70
Gomphidae	0.83	0.83	0.72	0.61	1.74	88.44
Hydridae	0.17	0.17	0.56	0.61	1.37	89.81
Hydroptilidae	0.17	0.17	0.56	0.61	1.37	91.18

Groups 2011 & 2015

Average dissimilarity = 45.08

Species	Group 2011		Group 2015		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Oligochaeta	1.00	0.00	2.94	7.32	6.52	6.52
Glossosomatidae	0.00	0.83	2.45	2.09	5.42	11.95
Psephenidae	0.17	0.83	2.17	1.56	4.80	16.75
Simuliidae	0.83	0.17	2.15	1.53	4.78	21.53
Corbiculidae/ Sphaeriidae	0.33	1.00	1.84	1.36	4.09	25.62
Corydalidae	0.17	0.67	1.80	1.21	4.00	29.62
Leptoceridae	0.33	0.67	1.65	1.08	3.65	33.27
Physidae	0.00	0.50	1.49	0.97	3.31	36.58
Elmidae	0.67	0.50	1.49	0.97	3.31	39.89
Acarina	0.50	0.00	1.48	0.98	3.28	43.16
Chironomidae/Orthocladiinae	0.83	0.50	1.47	0.97	3.27	46.43
Caenidae	0.33	0.50	1.47	0.97	3.27	49.70
Philopotamidae	0.67	0.50	1.47	0.97	3.26	52.96
Telephlebiidae (=Aeshnidae)	0.33	0.50	1.45	0.97	3.21	56.16
Ecnomidae	0.50	0.17	1.37	0.96	3.05	59.21
Parastacidae	0.50	0.00	1.37	0.97	3.05	62.26
Copepoda	0.50	0.00	1.31	0.98	2.91	65.17
Ceratopogonidae	0.33	0.17	1.04	0.78	2.30	67.47
Baetidae	0.67	1.00	1.01	0.69	2.23	69.70
Chironomidae/Chironominae	1.00	0.67	0.98	0.69	2.17	71.87
Dixidae	0.00	0.33	0.94	0.69	2.08	73.96
Cladocera	0.33	0.00	0.93	0.70	2.06	76.02
Dytiscidae	0.17	0.17	0.85	0.61	1.88	77.90
Veliidae	0.17	0.17	0.85	0.61	1.88	79.78
Corixidae	0.33	0.00	0.84	0.69	1.87	81.65
Chironomidae/Tanypodinae	0.17	0.17	0.81	0.61	1.79	83.44
Hydridae	0.17	0.17	0.75	0.60	1.67	85.10
Gomphidae	0.83	1.00	0.55	0.44	1.22	86.32
Hydrobiosidae	1.00	0.83	0.53	0.44	1.17	87.49
Empididae	0.00	0.17	0.50	0.44	1.10	88.59
Tipulidae	1.00	0.83	0.50	0.44	1.10	89.69
Atyidae	0.17	0.00	0.47	0.44	1.04	90.74

Groups 2014 & 2015

Average dissimilarity = 39.48

Species	Group 2014		Group 2015		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
DugesIIDae	0.83	0.00	2.00	2.13	5.07	5.07
Oligochaeta	0.83	0.00	2.00	2.13	5.07	10.15
Glossosomatidae	0.17	0.83	1.75	1.55	4.43	14.58
Ecnomidae	0.83	0.17	1.74	1.56	4.41	19.00
Conoesucidae	0.83	0.17	1.73	1.57	4.37	23.37
Parastacidae	0.67	0.00	1.56	1.38	3.96	27.33
Hydracarina	0.67	0.00	1.53	1.38	3.88	31.21
Psephenidae	0.33	0.83	1.52	1.22	3.85	35.06
Velliidae	0.67	0.17	1.45	1.22	3.66	38.72
Chironomidae/Tanypodinae	0.67	0.17	1.44	1.22	3.64	42.36
Corixidae	0.50	0.00	1.29	0.98	3.26	45.62
Elmidae	1.00	0.50	1.26	0.98	3.18	48.81
Telephlebiidae (=Aeshnidae)	1.00	0.50	1.25	0.98	3.16	51.96
Chironomidae/Orthoclaadiinae	0.33	0.50	1.21	0.97	3.07	55.03
Caenidae	1.00	0.50	1.21	0.97	3.06	58.10
Philopotamidae	1.00	0.50	1.21	0.97	3.06	61.16
Physidae	0.83	0.50	1.20	0.98	3.05	64.21
Simuliidae	0.50	0.17	1.18	0.98	2.98	67.19
Diphlebiidae (=Amphipterygidae)	0.50	0.00	1.14	0.98	2.89	70.08
Dytiscidae	0.33	0.17	0.92	0.78	2.32	72.40
Ceratopogonidae	0.33	0.17	0.92	0.78	2.32	74.72
Leptoceridae	1.00	0.67	0.82	0.69	2.07	76.79
Gripopterygiidae	0.67	1.00	0.82	0.70	2.07	78.86
Chironomidae/Chironominae	1.00	0.67	0.81	0.69	2.05	80.90
Ostracoda	0.33	0.00	0.79	0.70	1.99	82.89
Corydalidae	1.00	0.67	0.78	0.69	1.98	84.87
Dixidae	0.00	0.33	0.78	0.69	1.98	86.85
Empididae	0.17	0.17	0.64	0.61	1.61	88.46
Hydridae	0.17	0.17	0.64	0.61	1.61	90.07

Groups 2011 & 2016

Average dissimilarity = 42.51

Species	Group 2011		Group 2016		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Chironomidae/Diamesinae	0.00	1.00	2.73	6.69	6.42	6.42
Conoesucidae	0.00	1.00	2.73	6.69	6.42	12.83
Chironomidae/Chironominae	1.00	0.33	1.83	1.34	4.30	17.13
Hydracarina	0.00	0.67	1.78	1.35	4.20	21.33
Elmidae	0.67	0.17	1.66	1.20	3.91	25.24
Corixidae	0.33	0.67	1.57	1.08	3.68	28.92
Telephlebiidae (=Aeshnidae)	0.33	0.67	1.52	1.09	3.58	32.50
Leptoceridae	0.33	0.67	1.51	1.08	3.55	36.05
Philopotamidae	0.67	0.50	1.41	0.96	3.31	39.36
Caenidae	0.33	0.50	1.40	0.96	3.29	42.65
Acarina	0.50	0.00	1.37	0.97	3.22	45.88
Glossosomatidae	0.00	0.50	1.35	0.96	3.18	49.06
Corbiculidae/ Sphaeriidae	0.33	0.50	1.35	0.96	3.17	52.23
Psephenidae	0.17	0.50	1.30	0.97	3.07	55.30
Parastacidae	0.50	0.00	1.28	0.96	3.01	58.31
Ecnomidae	0.50	0.17	1.27	0.97	2.98	61.29
Copepoda	0.50	0.00	1.23	0.97	2.89	64.18
Gomphidae	0.83	0.67	1.14	0.78	2.67	66.85
Corydalidae	0.17	0.33	1.06	0.77	2.50	69.35
Oniscigastridae	0.17	0.33	1.05	0.77	2.47	71.82
Baetidae	0.67	1.00	0.93	0.69	2.19	74.01
Cladocera	0.33	0.00	0.87	0.69	2.03	76.05
Ceratopogonidae	0.33	0.00	0.80	0.69	1.88	77.93
Simuliidae	0.83	0.83	0.78	0.60	1.82	79.75
Dytiscidae	0.17	0.17	0.74	0.60	1.74	81.50
Chironomidae/Tanypodinae	0.17	0.17	0.70	0.61	1.65	83.15
Hydridae	0.17	0.17	0.68	0.61	1.59	84.74
Scirtidae	0.17	0.17	0.68	0.61	1.59	86.33
Dugesiiidae	0.00	0.17	0.50	0.44	1.17	87.50
Veliidae	0.17	0.00	0.49	0.44	1.15	88.65
Atyidae	0.17	0.00	0.44	0.44	1.03	89.69
Chironomidae/Orthoclaadiinae	0.83	1.00	0.44	0.44	1.03	90.72

Groups 2014 & 2016

Average dissimilarity = 39.45

Species	Group 2014		Group 2016		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Chironomidae/Diamesinae	0.00	1.00	2.28	8.38	5.77	5.77
Elmidae	1.00	0.17	1.91	2.11	4.85	10.63
Ecnomidae	0.83	0.17	1.66	1.55	4.21	14.84
Physidae	0.83	0.17	1.66	1.55	4.21	19.06
Dugesiidae	0.83	0.17	1.62	1.55	4.10	23.15
Chironomidae/Orthoclaadiinae	0.33	1.00	1.54	1.36	3.90	27.05
Corydalidae	1.00	0.33	1.54	1.37	3.89	30.94
Chironomidae/Chironominae	1.00	0.33	1.53	1.36	3.87	34.81
Parastacidae	0.67	0.00	1.47	1.37	3.73	38.54
Veliidae	0.67	0.00	1.47	1.37	3.73	42.26
Chironomidae/Tanypodinae	0.67	0.17	1.36	1.22	3.46	45.72
Philopotamidae	1.00	0.50	1.22	0.98	3.08	48.80
Corbiculidae/ Sphaeriidae	0.83	0.50	1.17	0.97	2.98	51.78
Simuliidae	0.50	0.83	1.17	0.98	2.96	54.74
Glossosomatidae	0.17	0.50	1.13	0.97	2.88	57.62
Psephenidae	0.33	0.50	1.12	0.98	2.83	60.45
Corixidae	0.50	0.67	1.12	0.97	2.83	63.27
Caenidae	1.00	0.50	1.09	0.98	2.76	66.03
Diphlebiidae (=Amphipterygidae)	0.50	0.00	1.07	0.98	2.72	68.75
Hydracarina	0.67	0.67	1.04	0.87	2.64	71.39
Gomphidae	0.83	0.67	0.94	0.78	2.39	73.78
Dytiscidae	0.33	0.17	0.84	0.78	2.14	75.92
Telephlebiidae (=Aeshnidae)	1.00	0.67	0.81	0.69	2.05	77.97
Leptoceridae	1.00	0.67	0.80	0.69	2.02	79.99
Gripopterygiidae	0.67	1.00	0.77	0.69	1.94	81.93
Oniscigastridae	0.00	0.33	0.75	0.69	1.91	83.84
Ceratopogonidae	0.33	0.00	0.74	0.69	1.87	85.72
Ostracoda	0.33	0.00	0.74	0.69	1.87	87.59
Hydridae	0.17	0.17	0.58	0.61	1.48	89.07
Conoesucidae	0.83	1.00	0.44	0.44	1.11	90.18

Groups 2015 & 2016

Average dissimilarity = 42.62

Species	Group 2015	Group 2016	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Chironomidae/Diamesinae	0	1	2.82	9.05	6.63	6.63
Oligochaeta	0	1	2.82	9.05	6.63	13.25
Conoesucidae	0.17	1	2.4	2.14	5.62	18.88
Simuliidae	0.17	0.83	2.02	1.56	4.75	23.62
Corixidae	0	0.67	1.91	1.38	4.47	28.1
Hydracarina	0	0.67	1.85	1.37	4.33	32.43
Corydalidae	0.67	0.33	1.59	1.09	3.73	36.16
Chironomidae/Chironominae	0.67	0.33	1.57	1.09	3.69	39.85
Corbiculidae/ Sphaeriidae	1	0.5	1.49	0.98	3.5	43.35
Psephenidae	0.83	0.5	1.46	0.98	3.43	46.78
Physidae	0.5	0.17	1.43	0.97	3.34	50.13
Telephlebiidae (=Aeshnidae)	0.5	0.67	1.42	0.98	3.34	53.46
Glossosomatidae	0.83	0.5	1.42	0.98	3.33	56.79
Chironomidae/Orthoclaadiinae	0.5	1	1.42	0.98	3.32	60.11
Philopotamidae	0.5	0.5	1.41	0.97	3.31	63.43
Caenidae	0.5	0.5	1.41	0.97	3.31	66.74
Elmidae	0.5	0.17	1.37	0.98	3.22	69.96
Leptoceridae	0.67	0.67	1.28	0.87	3	72.95
Gomphidae	1	0.67	1.05	0.7	2.45	75.41
Oniscigastridae	0	0.33	0.93	0.69	2.19	77.6
Dixidae	0.33	0	0.9	0.69	2.12	79.71
Ecnomidae	0.17	0.17	0.79	0.61	1.86	81.57
Hydridae	0.17	0.17	0.77	0.61	1.81	83.38
Tipulidae	0.83	0.83	0.77	0.61	1.81	85.19
Dytiscidae	0.17	0.17	0.74	0.61	1.74	86.94
Chironomidae/Tanypodinae	0.17	0.17	0.74	0.61	1.74	88.68
Hydrophilidae	0.17	0.17	0.71	0.61	1.66	90.34

Groups Quarry Treatment & Upstream Control
Average dissimilarity = 38.12

Species	Quarry Treatment	Upstream Control	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Ecnomidae	0.13	0.75	1.71	1.40	4.48	4.48
Corixidae	0.13	0.63	1.45	1.17	3.81	8.29
Glossosomatidae	0.63	0.13	1.45	1.16	3.80	12.09
Corydalidae	0.75	0.38	1.41	1.09	3.69	15.78
Physidae	0.38	0.63	1.37	1.02	3.59	19.37
Psephenidae	0.63	0.50	1.27	0.97	3.32	22.69
Caenidae	0.50	0.63	1.26	0.97	3.31	26.00
Conoesucidae	0.50	0.50	1.24	0.98	3.25	29.24
Elmidae	0.63	0.63	1.21	0.90	3.16	32.41
Hydridae	0.00	0.50	1.19	0.96	3.13	35.53
Hydracarina	0.50	0.25	1.18	0.97	3.09	38.62
Parastacidae	0.13	0.50	1.16	0.97	3.04	41.66
Telephlebiidae (=Aeshnidae)	0.63	0.75	1.16	0.86	3.03	44.70
Oligochaeta	0.75	0.63	1.15	0.85	3.02	47.72
Leptoceridae	0.63	0.75	1.15	0.85	3.00	50.72
Philopotamidae	0.88	0.63	1.11	0.80	2.92	53.64
Chironomidae/Orthocladiinae	0.63	0.75	1.08	0.85	2.82	56.46
Chironomidae/Chironominae	0.63	0.88	1.02	0.80	2.67	59.13
Simuliidae	0.75	0.75	1.00	0.75	2.61	61.74
Dytiscidae	0.13	0.38	0.98	0.80	2.57	64.31
Chironmidae/Diamesinae	0.25	0.25	0.92	0.76	2.42	66.73
Corbiculidae/ Sphaeriidae	1.00	0.63	0.91	0.76	2.38	69.12
Veliidae	0.25	0.25	0.84	0.76	2.21	71.33
Chironomidae/Tanypodinae	0.25	0.25	0.84	0.76	2.21	73.54
Baetidae	0.75	0.88	0.78	0.65	2.06	75.59
Diphlebiidae (=Amphipterygidae)	0.13	0.25	0.67	0.66	1.77	77.36
Dugesidae	0.25	0.13	0.67	0.66	1.76	79.13
Empididae	0.00	0.25	0.61	0.55	1.59	80.72
Copepoda	0.00	0.25	0.59	0.57	1.56	82.27
Acarina	0.13	0.13	0.59	0.52	1.54	83.82
Scirtidae	0.00	0.25	0.59	0.57	1.54	85.36
Hydroptilidae	0.00	0.25	0.52	0.57	1.36	86.71
Gripopterygidae	0.88	0.88	0.50	0.52	1.31	88.03
Ceratopogonidae	0.13	0.13	0.48	0.52	1.26	89.28
Ostracoda	0.13	0.13	0.48	0.52	1.26	90.54

Appendix J: Monitoring Results and Compliance Tables

Appendix J: Monitoring Data

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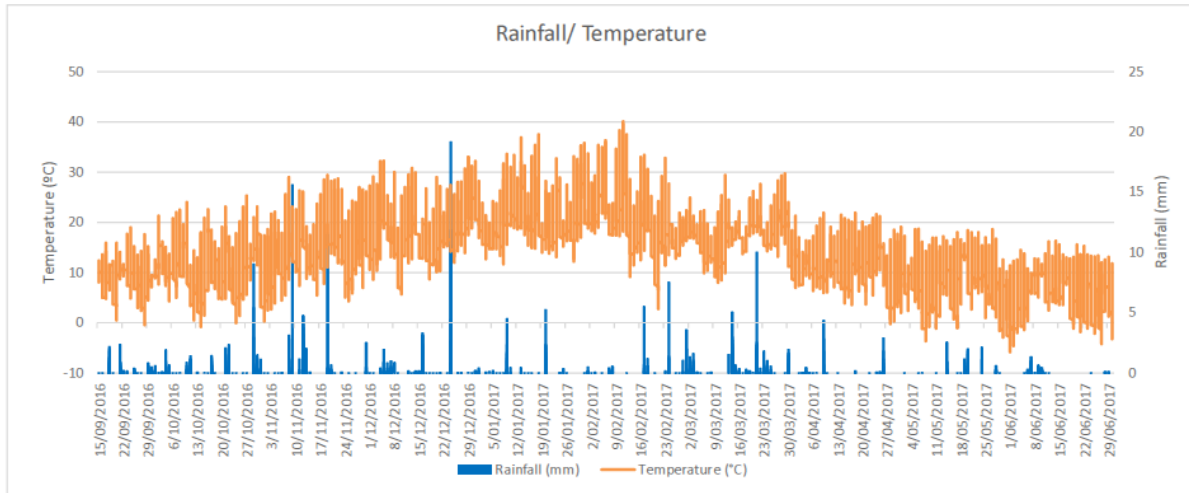
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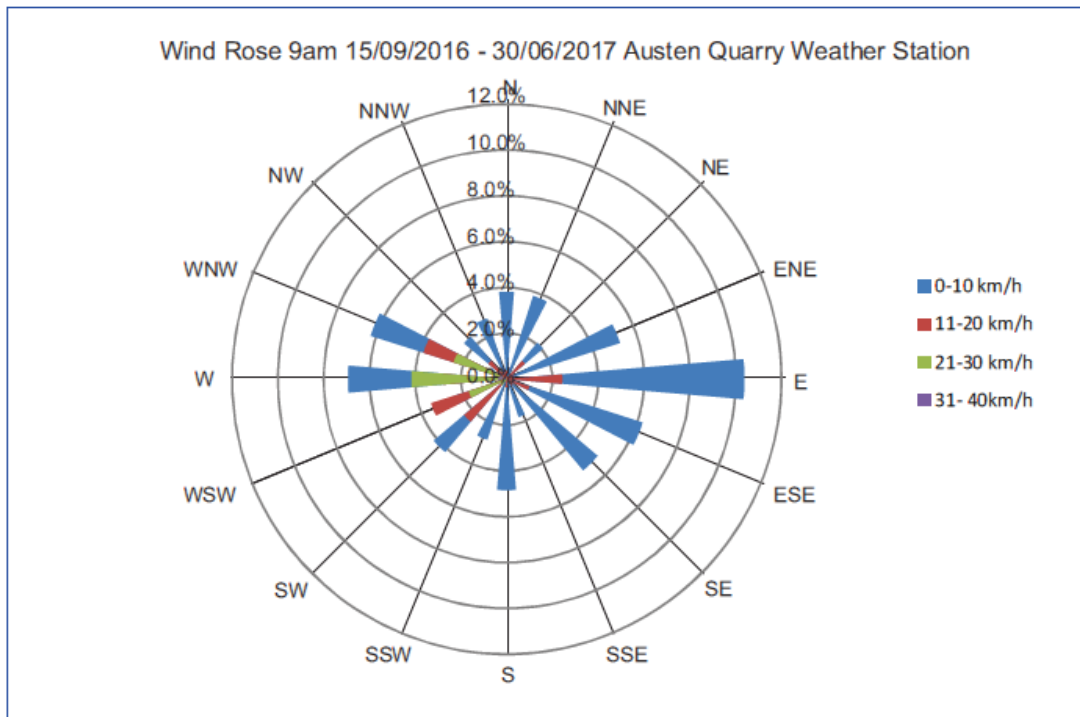
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1.1. Climate

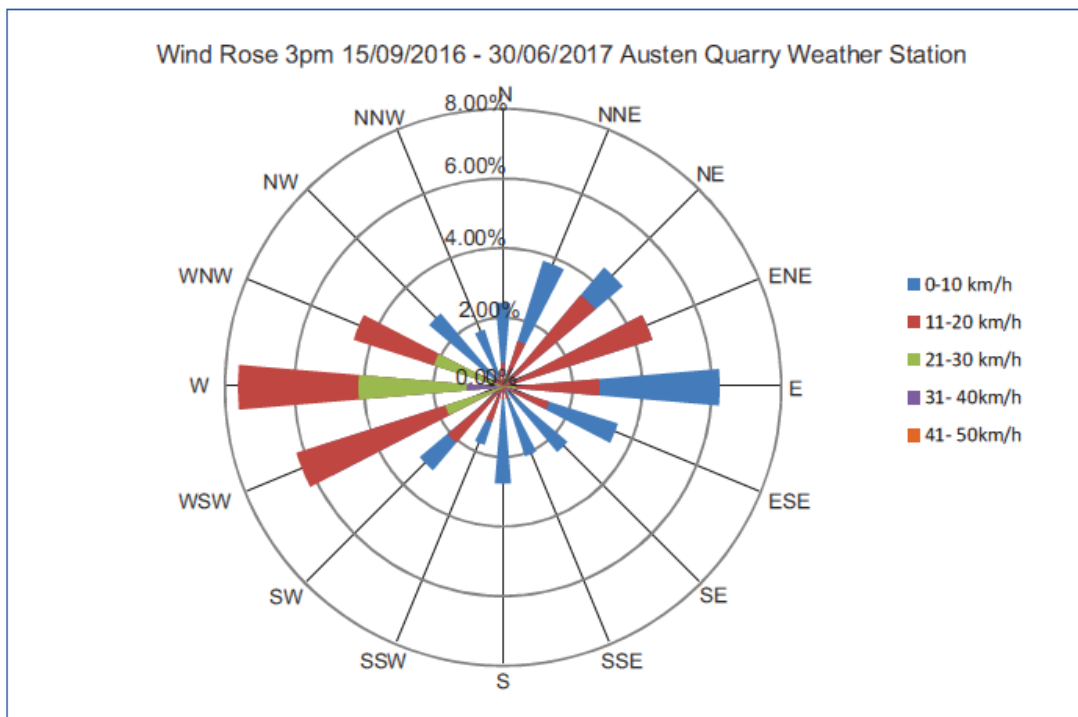
Graph 1: Rainfall and Temperature Data



Graph 2: Wind Rose 9am



Graph 3: Wind Rose 3pm



1.2. Noise

Table 1. Attended noise measurement results

Location	Time	LA _{eq,15min} due to Quarry Operations (DBA)	Criteria LA _{eq,15min} (DBA)	Comments
R48	05:47 to 06:02	Inaudible	35	Highway traffic and individual vehicles could be distinctly heard along the Great Western Highway and Jenolan Caves Road. Birdsong and highway traffic dominate noise levels, 47.1dB(A), LA _{eq,15min} . Engine braking on highway is clearly discernible.
R48	06:03 to 06:18	Inaudible		As above, birdsong and highway traffic dominate noise levels, 45.8 dB(A), LA _{eq,15min} . Trucks entering and leaving via the site access road were visually observed, but inaudible at all times. Fast moving vehicles on the public road near the quarry were visible and audible. Engine braking on highway is clearly discernible.
R24	06:26 to 06:41	Inaudible		Noise levels dominated by the rushing water of the river, ~ Birdsong and highway traffic dominated noise levels, 64.7dB(A), LA _{eq,15min} , and passing vehicles. Engine braking is clearly discernible, along with vehicle noise on the wooden bridge nearby.
R31	06:57 to 07:12	Inaudible		Measurement at the nearest and potentially most impacted receptor indicate no audible noise from the site. Bird noise dominates the soundscape 44.9 dB(A), LA _{eq,15min}
R31	07:17 to 07:32	<31*		As above, 44.4 dB(A), LA _{eq,15min} except that a haul truck carting rejects up and over a ridge was visually observed, and was barely audible for approx. 4secs, when meter readings were approx. 34 dB(A). Return trip was not audible.
R31	15:02 to 15:17	Inaudible		Bird noise dominates the soundscape, 37.3 dB(A), LA _{eq,15min} .
R24	15:30 to 15:45	Inaudible		Noise levels dominated by the rushing water of the river, 64.9 L _{Aeq,15min} , and passing vehicles. Engine braking is clearly discernible, as is vehicle noise on the wooden bridge nearby.
R48	15:53 to 16:08	Inaudible		Highway noise audible and constant, engine braking noise less dominant than in the morning, Bird call a significant source also, and some buzzing insects, 49.7 dB(A), L _{Aeq,15min}

Sourced from Todoroski Air Sciences' Attended and Unattended Compliance Noise Monitoring Report September 2016.

* Estimated based on observed meter readings at the time and barely audible noise from the source.

Table 2. Noise Monitoring Compliance Summary

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Noise generated by the development does not exceed 35dB(A) $L_{Aeq(15mins)}$ at all privately-owned residences during the Day.	Compliant	Nil	Nil
Noise generated by the development does not exceed 35dB(A) $L_{Aeq(15mins)}$ at all privately-owned residences during the Evening.	Compliant	Nil	Nil
Noise generated by the development does not exceed 35dB(A) $L_{Aeq(15mins)}$ at all privately-owned residences during the Morning Shoulder.	Compliant	Nil	Nil
Noise monitoring is to be conducted at least every six months.	Not Compliant	A single noise monitoring campaign conducted for the reporting period.	Noise monitoring during forthcoming reporting periods are to be conducted biannually.
Ensure all equipment on site has sound power levels at or below that nominated for noise modelling purposes.	Compliant	Nil	New equipment to be monitored next report period

1.3. Blasting

Table 3. Blast Monitoring Hartley Village

Blasting	Date	Blast Number	Limits	Units of Measure	Results
Ground Vibration	26.09.2016	114	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	26.09.2016	114	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	6.10.2016	115	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	6.10.2016	115	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	19.10.2016	116	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	19.10.2016	116	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	7.11.2016	117	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	7.11.2016	117	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	15.11.2016	118	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	15.11.2016	118	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	8.03.2017	119	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	8.03.2017	119	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	30.11.2016	120	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	30.11.2016	120	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	14.12.2016	121	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	14.12.2016	121	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	1.02.2016	122	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	1.02.2016	122	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	15.02.2017	123	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	15.02.2017	123	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	1.03.2017	124	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	1.03.2017	124	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	23.03.2017	125	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	23.03.2017	125	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	28.03.2017	126	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	28.03.2017	126	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	26.04.2017	128	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	26.04.2017	128	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	10.05.2017	129	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	10.05.2017	129	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	24.05.2017	130	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	24.05.2017	130	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	2.06.2017	131	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	2.06.2017	131	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	7.06.2017	132	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	7.06.2017	132	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	14.06.2017	133	5 - trigger point >0.51	mm/s	Nil Trigger
Overpressure	14.06.2017	133	115 - Trigger point <88	dB	Nil Trigger
Ground Vibration	28.06.2017	134	5 - trigger point >0.51	mm/s	0.62
Overpressure	28.06.2017	134	115 - Trigger point <88	dB	Nil Trigger

Blast monitoring reports are available on request.

Table 4. Blast Monitoring Compliance Summary

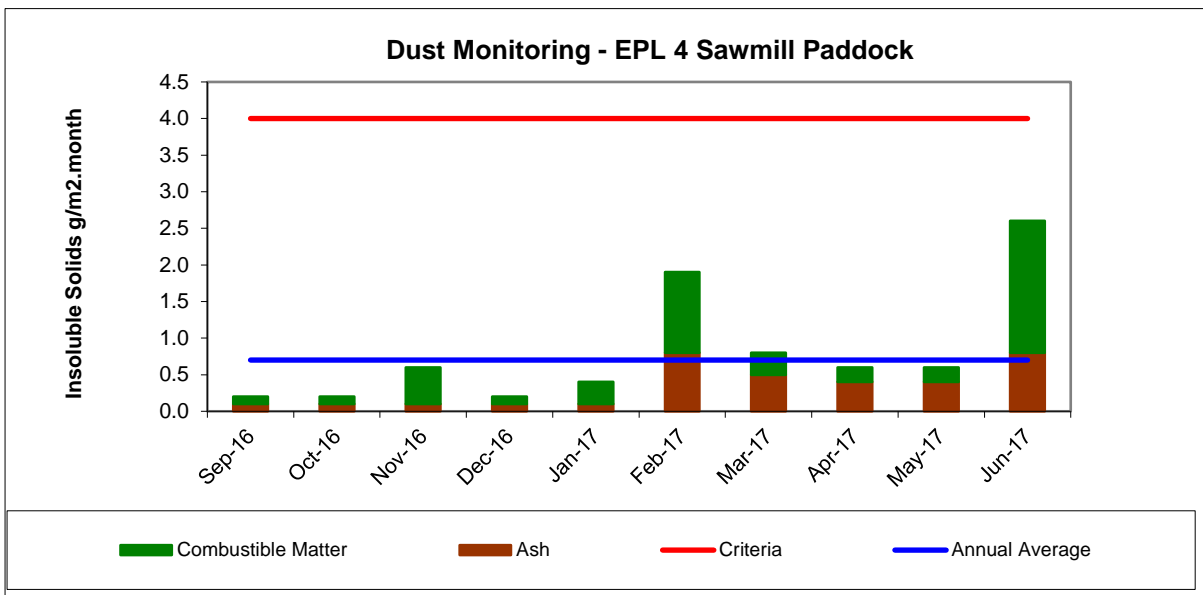
Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Blasting on the site does not exceed an Airblast overpressure (dB(L in Peak) of 120 at 0% allowable exceedance at any residence on privately owned land.	Compliant	Majority of blasts were undertaken with monitoring devices recording a "Nil trigger".	No actions required
Blasting on the site does not exceed an Airblast overpressure (dB (L in Peak) of 115 at 5% of the total number of blasts over a period of 12 months at any residence on privately owned land.	Compliant	Majority of blasts were undertaken with monitoring devices recording a "Nil trigger".	No actions required
Blasting on the site does not exceed a Ground vibration (mm/s) of 10 at 0% allowable exceedance at any residence on privately owned land.	Compliant	Majority of blasts were undertaken with monitoring devices recording a "Nil trigger".	No actions required
Blasting on the site does not exceed an Ground vibration (mm/s) of 5 at 5% of the total number of blasts over a period of 12 months at any residence on privately owned land	Compliant	Majority of blasts were undertaken with monitoring devices recording a "Nil trigger".	No actions required
Investigation and response to Complaints	N/A	No complaints were received during the reporting period	N/A
The applicant may carry out a maximum of 1 blast per calendar week, unless an additional blast is required following a blast misfire. This condition does not apply to blasts required to ensure the safety of the quarry or workers on site	Compliant	During the reporting period, no more than 1 blast was conducted within the working week (See Table 14)	No actions required

1.4. Air Quality

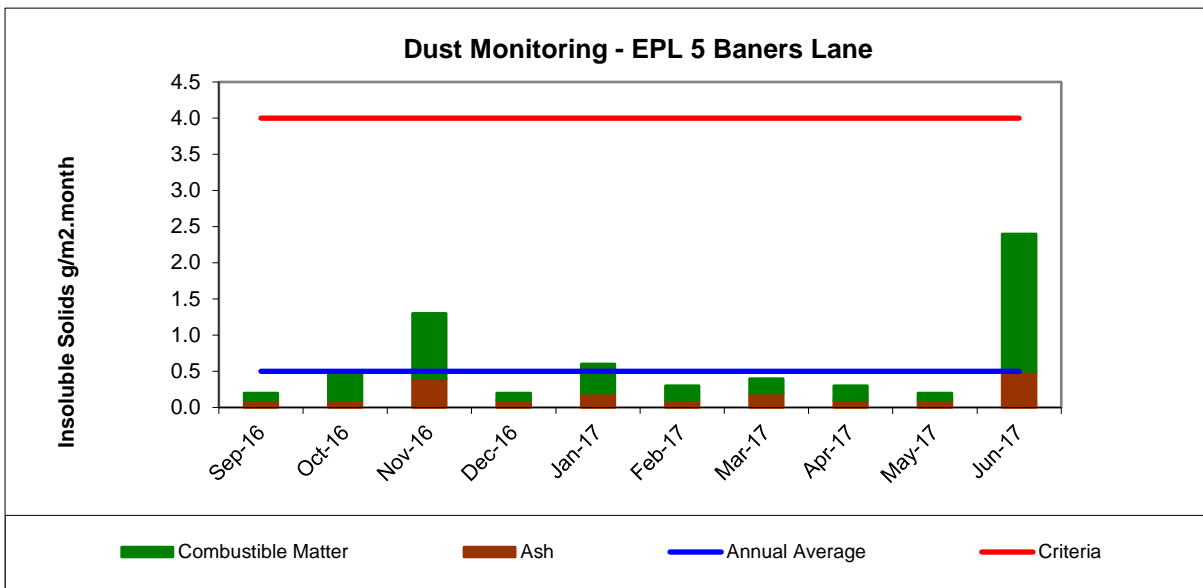
Table 5. Depositional Dust Monitoring

Site	Average Insoluble Solids (g/m ² .month) for Report Period	Annual Average Insoluble Solids (g/m ² .month) to 30/06/17	Limit Annual Average (g/m ² .month)
EPL Point 4 Sawmill Paddock	0.9	1.5	4
EPL Point 5 Baners Lane	0.6	0.5	4
EPL Point 6 Bald Hill	0.8	0.7	4

Graph 4: Dust Monitoring EPL4



Graph 5: Dust Monitoring EPL5



Graph 6: Dust Monitoring EPL6

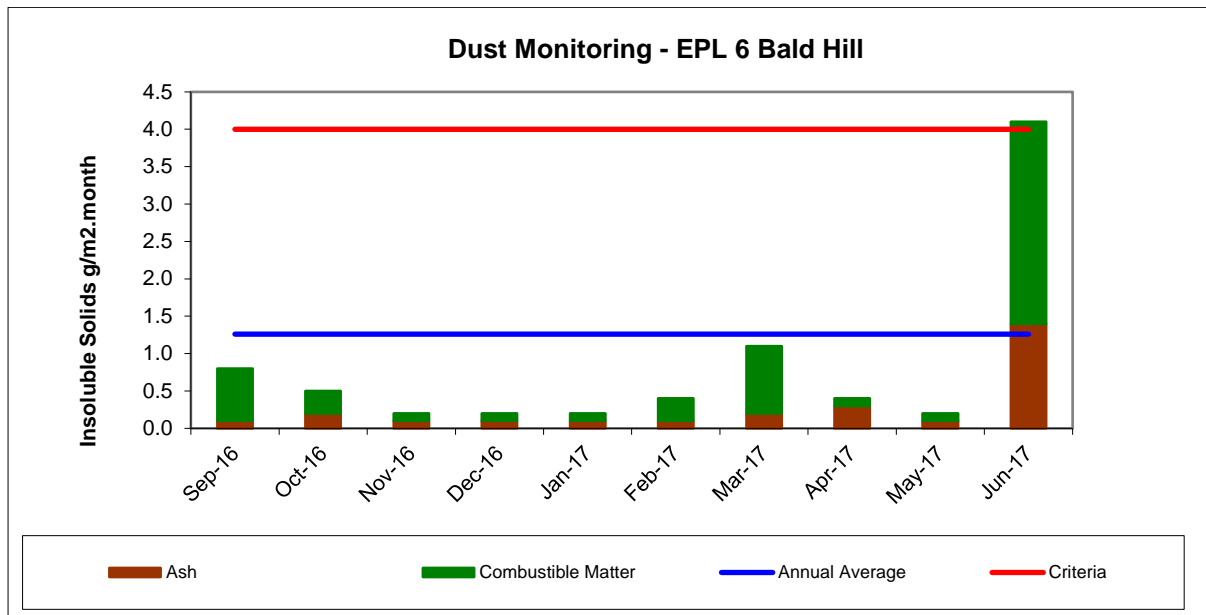
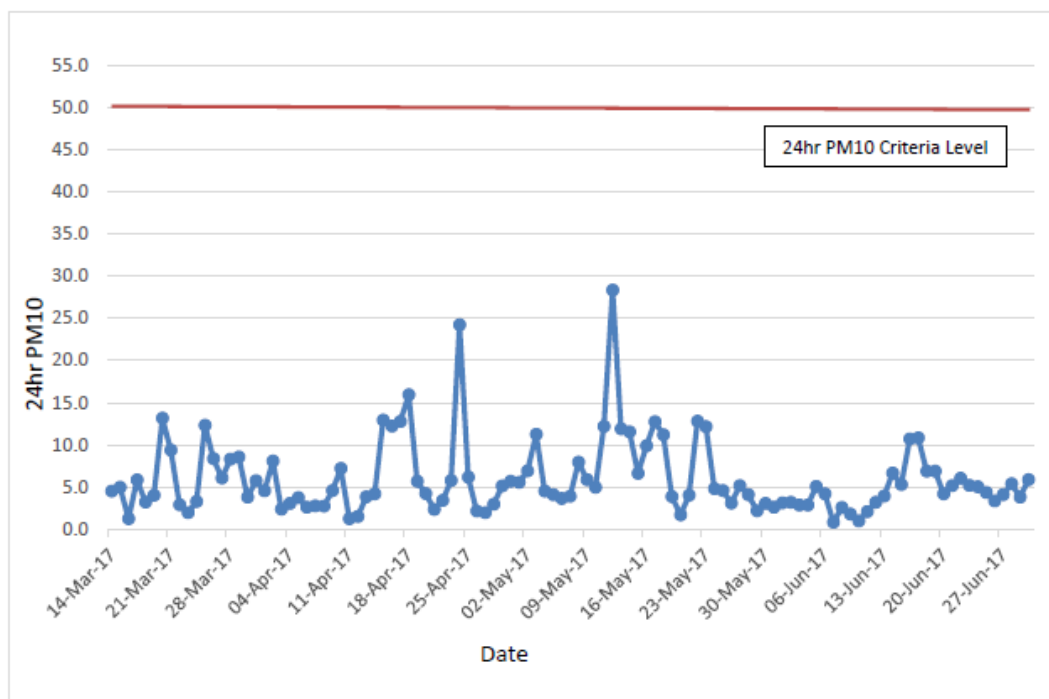


Table 6. Particulate Matter Monitoring Summary

Pollutant	Monitoring Results (µg/m3) *	Limit (µg/m3)	R31 Predicted Maximum (µg/m3)
24hr Maximum PM ₁₀	28.4	50	48.4
Annual Average PM ₁₀	6.0	30	8.6
Annual Average TSP	15.0#	90	8.6

* Based on 3.5 months of data only
 # Calculated from PM₁₀

Graph 7: 24-hour PM₁₀ Monitoring (14/03/17 to 30/06/17)



Sourced from R.W. Corkery & Co. Pty Limited, September 2017, Austen Quarry Particulate Matter Monitoring Report March to June 2017.

Table 7. Air Quality Monitoring Compliance

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Particulate matter (PM10) emissions generated by the development do not exceed an annual average of 30µg/m ³ at any residence on privately owned land.	Compliant	Nil	No actions required
Particulate matter (PM10) emissions generated by the development do not exceed an incremental impact of greater than 50µg/m ³ at any residence on privately owned land over a 24 hour period.	Compliant	Nil	No actions required
Total suspended particulates (TSP) emissions generated by the development do not exceed an annual average of 90µg/m ³ at any residence on privately owned land.	Compliant	Nil	No actions required
Deposited dust emissions generated by the development do not exceed an incremental impact on the annual average of 2g/m ² /month at any residence on privately owned land.	Compliant	Nil	No actions required
Deposited dust emissions generated by the development do not exceed an annual average of 4g/m ² /month at any residence on privately owned land.	Compliant	Nil	No actions required
Relevant meteorological parameters to be recorded onsite for the life of the development.	Compliant	Meteorological data recorded from the Lithgow and Mt Boyce BOM meteorological stations as well as a weather station on site	No actions required

1.5. Transport

Table 8. Transport Monitoring Summary

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Transport no more than 1.1 million tonnes of quarry products from the site during any financial year.	Compliant	Nil	N/A
Dispatch no more than 250 laden trucks from the site in any one day.	Compliant	Nil	N/A
Dispatch no more than 150 laden trucks from the site per day, averages over the total number of dispatch days in any calendar month.	Compliant	Nil	N/A
Truck movements (hourly, daily, weekly, monthly and annually) to be published on website every 6 months	Compliant	Nil	N/A
Monitor the delays for vehicles turning right onto the Great Western Highway at two yearly intervals from 2022 onwards.	Not Triggered	Nil	N/A

1.6. Visual Amenity

Plate 1.50mm Focal Length



Photography supplied by client

Plate 2. September 2017 Photo Point at 28mm Focal Length



Photography supplied by client

Plate 3. September 2017 Photo Point at 40mm Focal Length



Photography supplied by client

Plate 4. September 2017 Photo Point at 50mm Focal Length



Photography supplied by client

Table 9. Visual Monitoring Summary

Approval criteria / EIS Predictions	Performance during the period	Trend / key management implications	Implemented / proposed actions
Monitor the visual impacts annually from vantage points surrounding the quarry.	Compliant	N/A	N/A

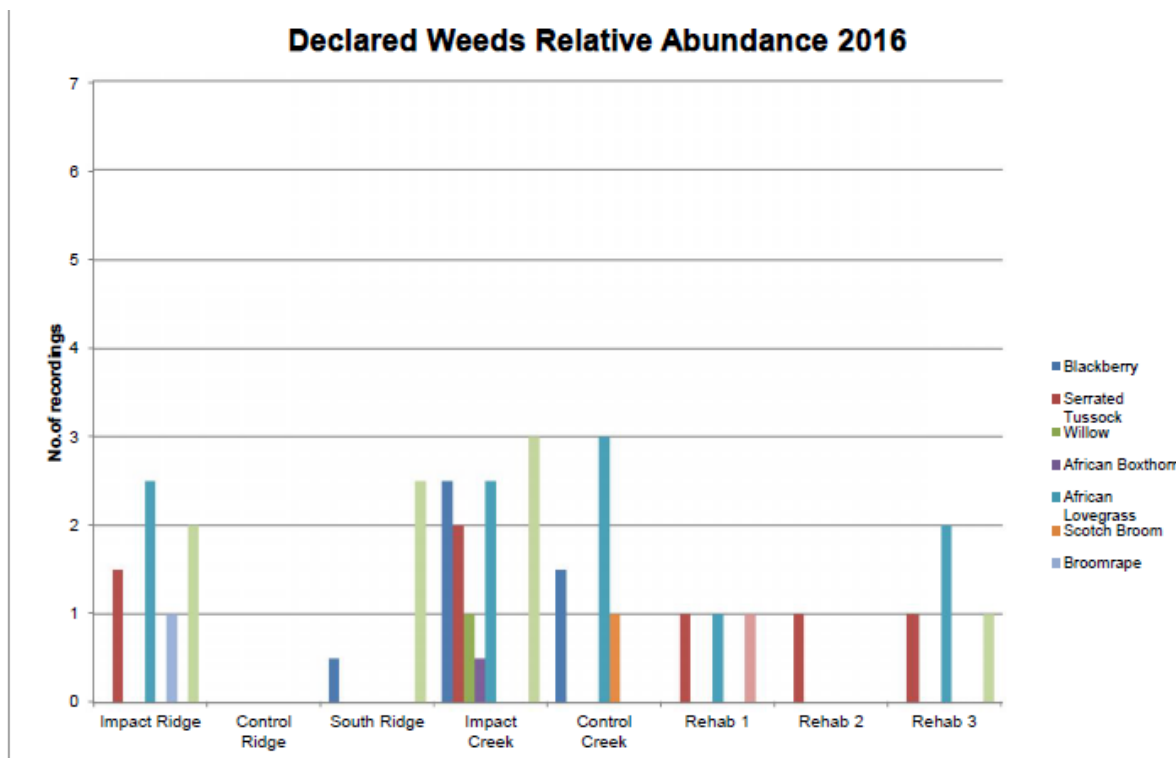
1.7. Terrestrial Ecology

Table 10. Declared Weed Relative Abundance (no' of recordings)

Scientific name	Common Name	New Ridge	Control Ridge	South Ridge	Impact Creek	Control Creek	Rehab 1	Rehab 2	Rehab 3
<i>Cytisus scoparius</i>	Scotch Broom					1			
<i>Eragrostis curvula</i>	African Love grass	2.5			2.5	3	1		2
<i>Lycium ferocissimum</i>	African Boxthorn				0.5				
<i>Nassella trichotoma</i>	Serrated Tussock	2.5			2		1	1	1
<i>Orobanche sp.</i>	Broomrape								
<i>Rubus fruticosus</i>	Blackberry			1	2.5	1.5			
<i>Salix sp</i>	White/ Weeping Willow				2				
<i>Senecio Madagas-carinesis</i>	Fireweed						1		
<i>Hypericum perforatum</i>	St. Johns Wort	2		2.5	3				1

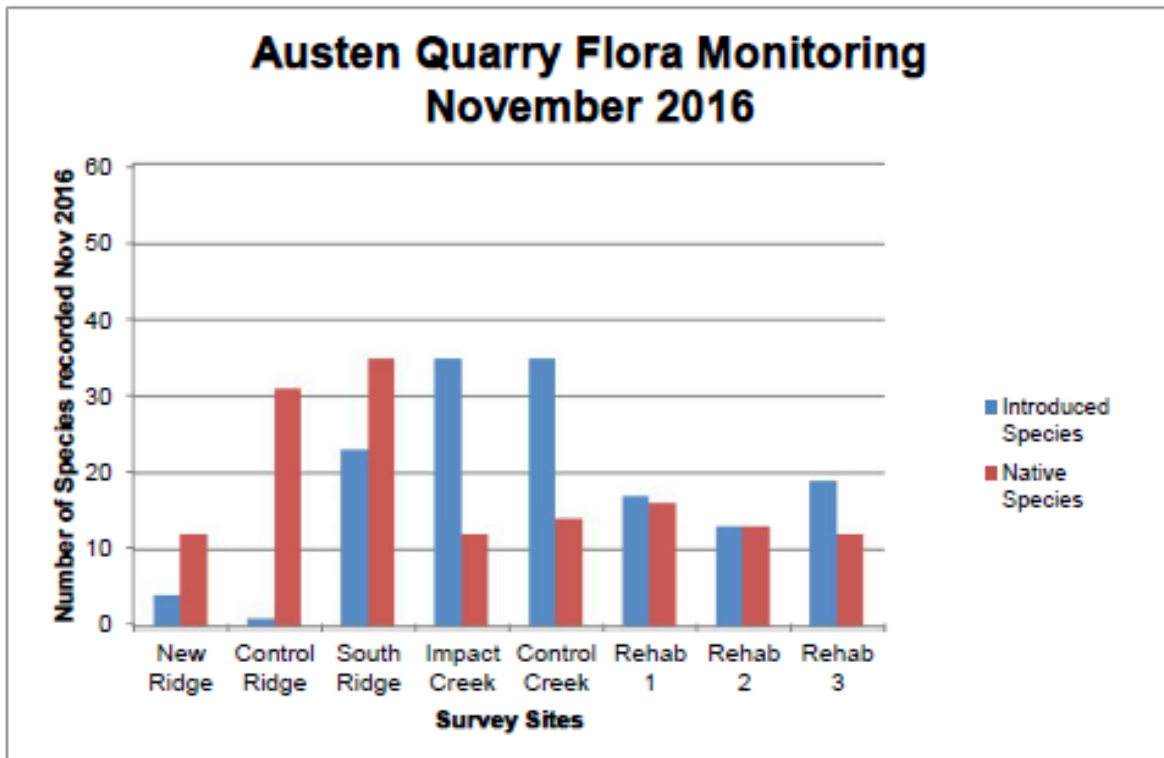
Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 8: Declared Weeds Relative Abundance



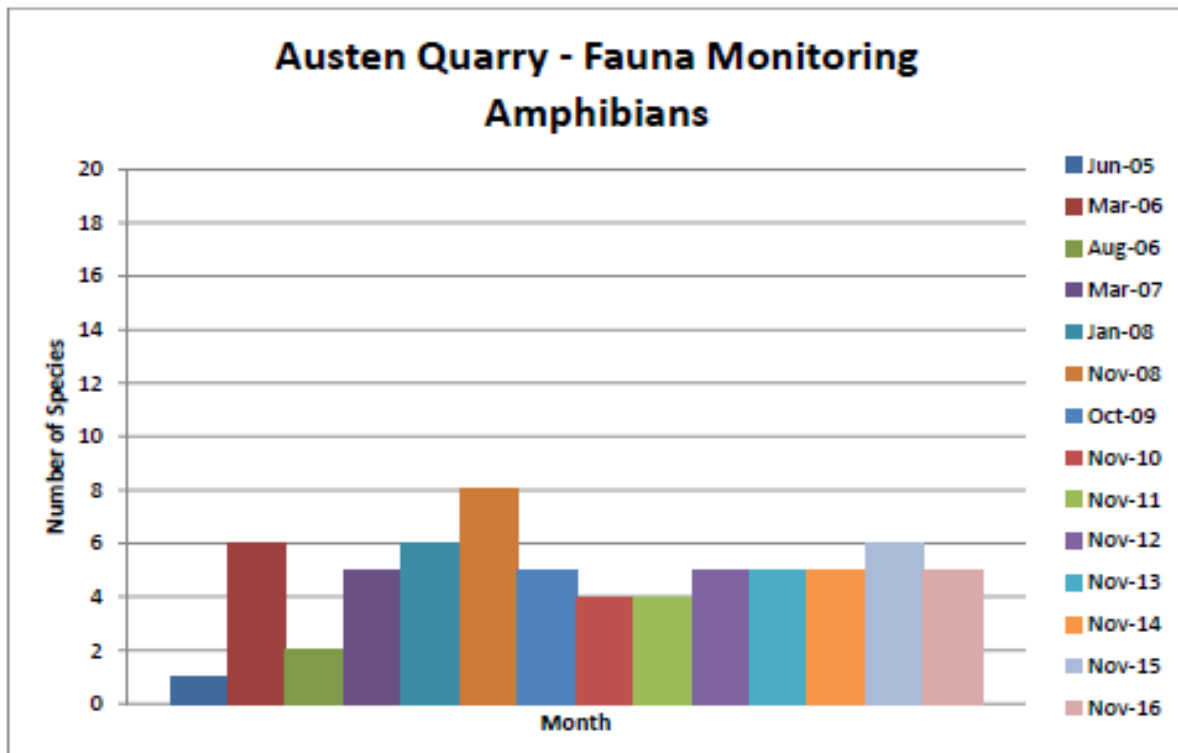
Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 9: Flora Monitoring



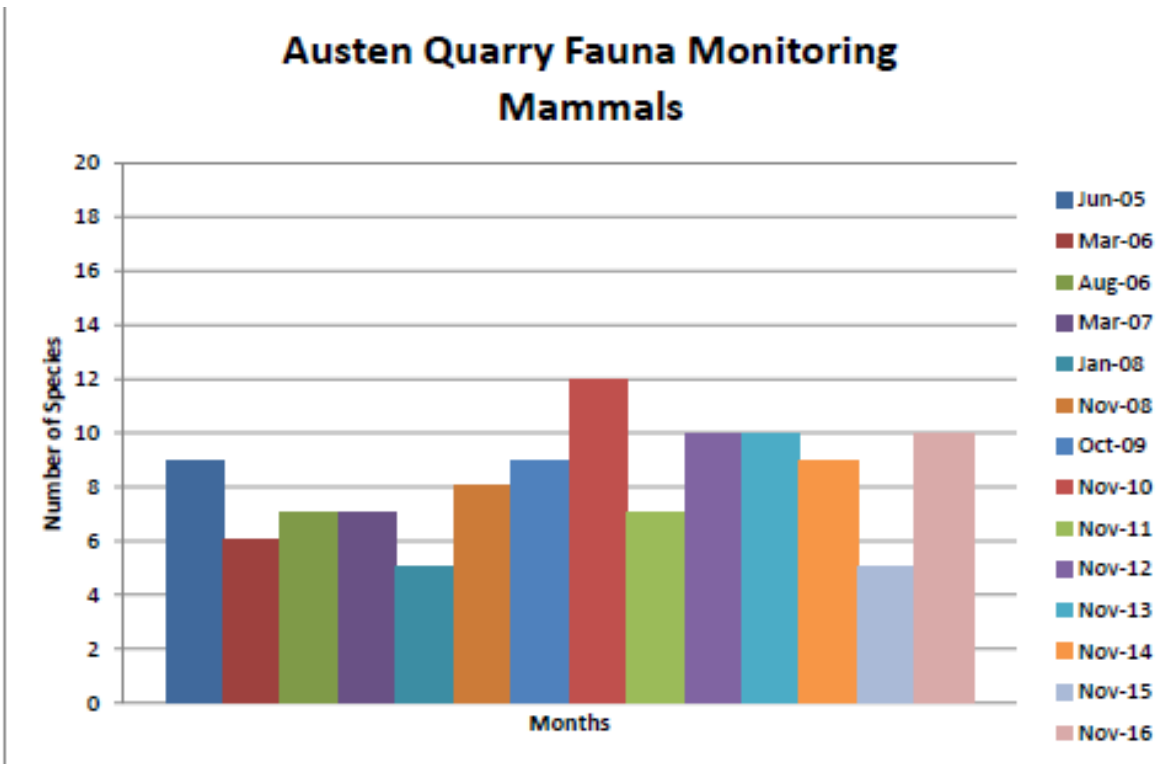
Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 10: Fauna Monitoring



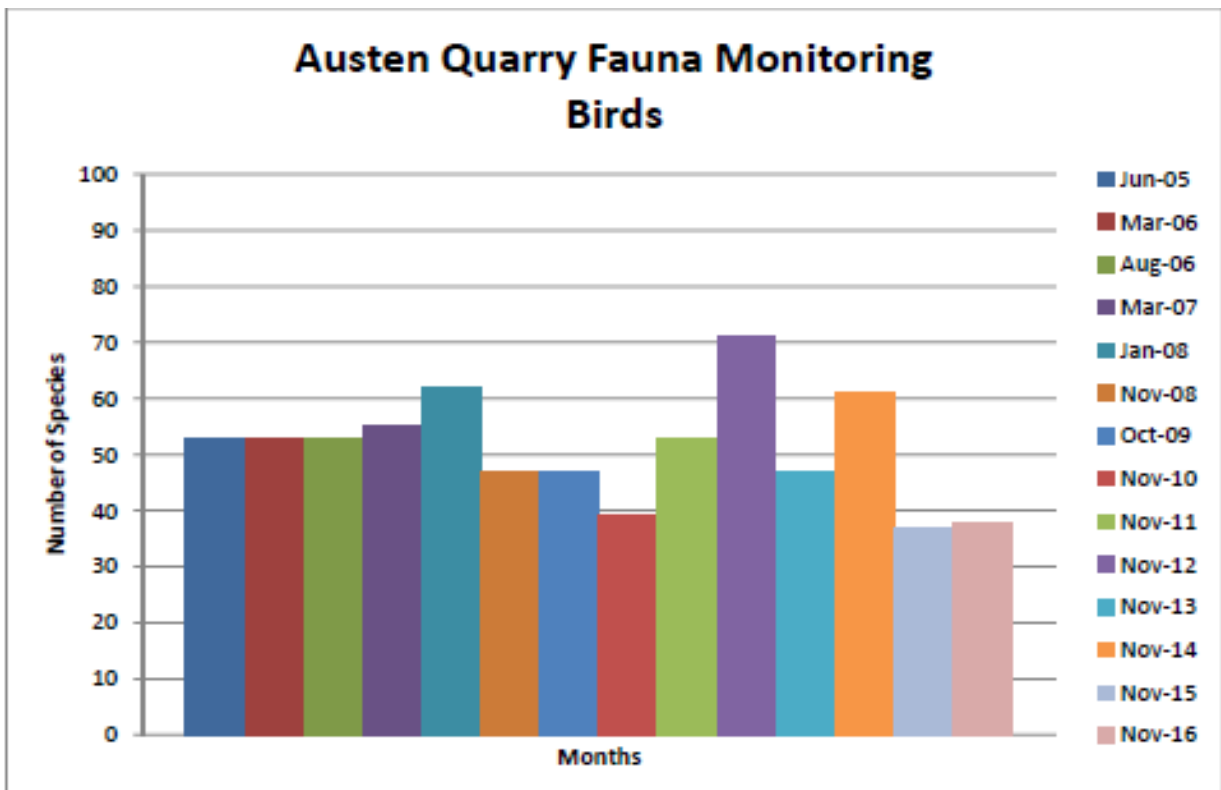
Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 11: Fauna Monitoring - Mammals



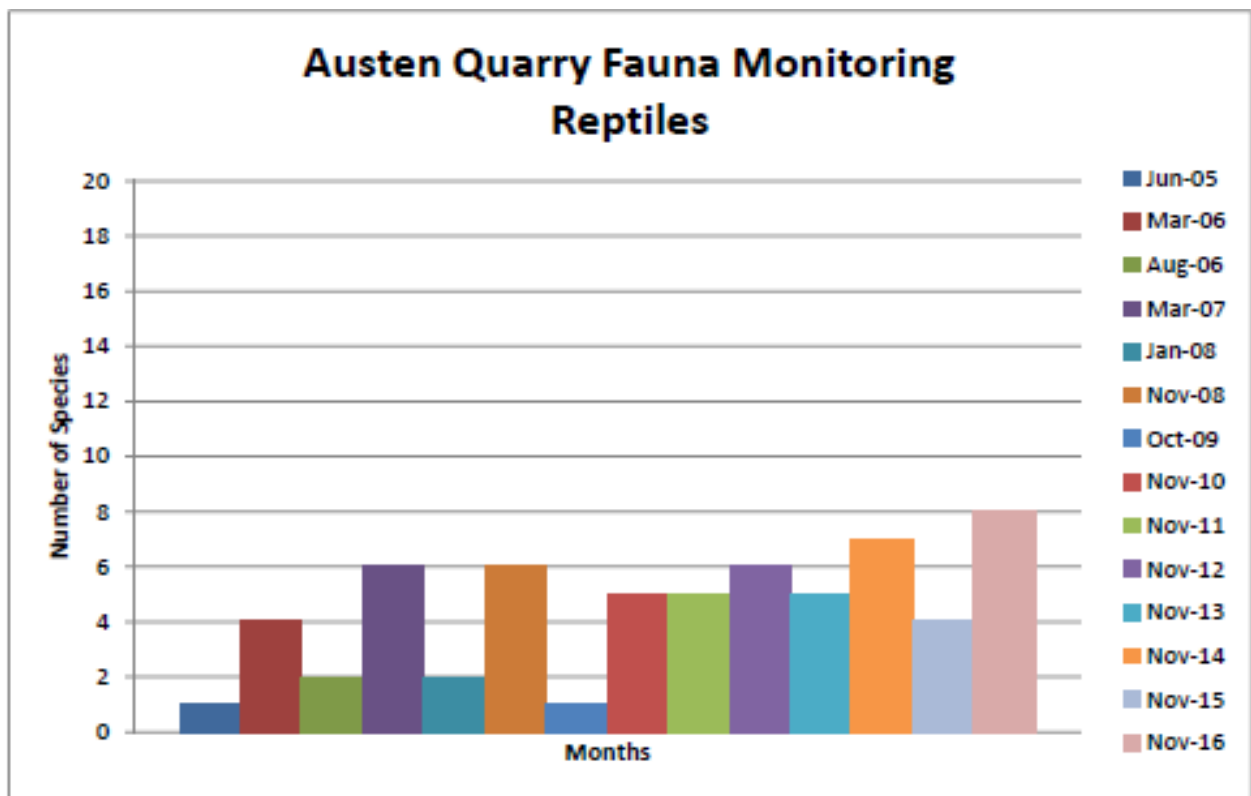
Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 12: Fauna Monitoring- Birds



Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Graph 13: Fauna Monitoring- Reptiles



Sourced from Onsite Environmental Monitoring: Ecological Monitoring Report November 2016

Appendix K: DPE Correspondence



Mr Daniel Reed
Strategy & Business Development Analyst
Hy-Tec Industries Pty Ltd
PO Box 6770
SILVERWATER NSW 1811

Dear Mr Reed

**Austen Quarry (SSD 6084)
Biodiversity and Rehabilitation Bond Preparation Approvals**

I refer to the email of 15 February from Mr Nick Warren of R W Corkery on behalf of Hy-Tec Industries seeking confirmation on matters relating to the implementation of Austen Quarry's conditions of consent.


The Department agrees that the first Conservation and Rehabilitation Bond should address the rehabilitation liabilities associated with the first three years of proposed operation of the Austen Quarry. The calculation of these liabilities should be based on the use of DRE's Rehabilitation Cost Calculation Tool.

The Secretary has approved Mr Nick Warren as a suitably qualified and experienced person to undertake this rehabilitation cost calculation.

The Secretary has also approved 15 September 2018 as the revised date for securing the Biodiversity Offset Areas.

Should you have any enquiries in relation to this matter, please contact Melanie Hollis on the details above.

Yours sincerely


Howard Reed 20.2.17
Director Resource Assessments
As nominee of the Secretary

Krystal Viola

From: Daniel Reed <Daniel.Reed@adbri.com.au>
Sent: Tuesday, 20 June, 2017 11:32 AM
To: Rob Corkery; Nicholas Warren
Cc: Darryl Thiedeke
Subject: FW: Austen Quarry Rehabilitation/Conservation Bond

Morning Rob, Nick,

Please see the below from DPE,

Regards,

Daniel Reed

Strategy and Business Development Analyst



M [0428 688 895](tel:0428688895)
P O Box 6770, Silverwater NSW, 1811
T 61 2 9647 2866
E Daniel.Reed@Hy-Tec.com.au
W www.hy-tec.com.au

From: Gen Seed [mailto:genevieve.seed@planning.nsw.gov.au]
Sent: Tuesday, 20 June 2017 9:12 AM
To: Daniel Reed <Daniel.Reed@adbri.com.au>
Cc: Melanie Hollis <Melanie.Hollis@planning.nsw.gov.au>
Subject: Austen Quarry Rehabilitation/Conservation Bond

Good Morning Daniel

In accordance with condition 30 of Schedule 3 of SSD-6084, the conservation and rehabilitation bond was due for the Austen Quarry on 2 June 2017.

Please can you provide me with:

- the nominated suitably qualified expert to calculate/verify the calculation, including a copy of their CV ;
- a calculation of the bond in accordance with condition 30 including:
 - (a) *calculating the cost of implementing the Biodiversity Offset Strategy over the next 3 years;*
 - (b) *calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of quarrying operations; and*

Please ensure this documentation is submitted no later than **11 July 2017**.

If you have any questions, please contact me on the details below.

Thanks

Gen

Genevieve Seed
Senior Planning Officer
Resource Assessments

Krystal Viola

From: Nicholas Warren
Sent: Wednesday, 12 July, 2017 2:45 PM
To: Genevieve Seed (genevieve.seed@planning.nsw.gov.au)
Cc: Thiedeke Darryl (Darryl.Thiedeke@adbri.com.au)
Subject: 652 - Austen Quarry - Rehabilitation Bond Estimate

Good afternoon Genevieve,

Following our discussion yesterday, I am writing to you to request an extension to the deadline to submit the rehabilitation bond estimate for the Austen Quarry (in accordance with Condition 30 of Schedule 3 of SSD 60840).

We have been delayed in sourcing quotes from demolition and earth works contractors and expect to have a final response on these matters latter this week or early next week.

To that end, we request a week extension with submission of the bond estimate expected by close of business on Wednesday 19 July 2017.

Regards,
Nick

Nick Warren
Senior Environmental Consultant
B.Sc., M. Bus.(Marketing), M. Env.Sc.
Mobile: 0437 635 975
Email: nick@rwcorkery.com

RW Corkery & Co Pty Limited

Geological and Environmental Consultants



Brooklyn
Level 1, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Phone: (02) 9985 8511
Fax: (02) 6361 3622
Email: brooklyn@rwcorkery.com
Website: www.rwcorkery.com

Orange
62 Hill Street
ORANGE NSW 2800

Phone: (02) 6362 5411
Fax: (02) 6361 3622
Email: orange@rwcorkery.com

Brisbane
Suite 5, Building 3,
Pine Rivers Office Park
205 Leitchs Road
BRENDALE QLD 4500

Phone: (07) 3205 5400
Fax: (02) 6361 3622
Email: brisbane@rwcorkery.com

This message is intended for the addressee named and may contain confidential/privileged information. If you are not the intended recipient, please delete it and notify the sender. Any confidentiality or privilege between R. W. Corkery & Co. Pty Limited and Client is not waived or lost because this email has been sent to you by mistake. You should scan any included files for viruses.

Krystal Viola

From: Gen Seed <genevieve.seed@planning.nsw.gov.au>
Sent: Thursday, 13 July, 2017 12:35 PM
To: Nicholas Warren
Cc: Thiedeke Darryl (Darryl.Thiedeke@adbri.com.au)
Subject: Re: 652 - Austen Quarry - Rehabilitation Bond Estimate

Hi Nick

This extension is granted.

Thanks

Gen

Genevieve Seed

Senior Planning Officer
Resource Assessments
NSW Department of Planning & Environment
320 Pitt St
Sydney NSW 2000 Australia
T +61 2 9274 6489
E genevieve.seed@planning.nsw.gov.au

From: Nicholas Warren <nick@rwcorkery.com>
Sent: Wednesday, 12 July 2017 2:45:27 PM
To: Gen Seed
Cc: Thiedeke Darryl (Darryl.Thiedeke@adbri.com.au)
Subject: 652 - Austen Quarry - Rehabilitation Bond Estimate

Good afternoon Genevieve,

Following our discussion yesterday, I am writing to you to request an extension to the deadline to submit the rehabilitation bond estimate for the Austen Quarry (in accordance with Condition 30 of Schedule 3 of SSD 60840).

We have been delayed in sourcing quotes from demolition and earth works contractors and expect to have a final response on these matters latter this week or early next week.

To that end, we request a week extension with submission of the bond estimate expected by close of business on Wednesday 19 July 2017.

Regards,
Nick

Nick Warren

Senior Environmental Consultant
B.Sc., M. Bus.(Marketing), M. Env.Sc.
Mobile: 0437 635 975
Email: nick@rwcorkery.com

Appendix L: Security Bond



National Australia Bank Limited ("Bank")
 ABN 12 004 044 937

Bank Guarantee

Guarantee No : HY TEC IND00031

To:

NSW DEPARTMENT OF PLANNING AND ENVIRONMENT	A.C.N./A.R.B.N./ABN	38 755 709 681
--	---------------------	----------------

(The Beneficiary)

For:

HY-TEC INDUSTRIES PTY LTD	A.C.N./A.R.B.N./ABN	90 070 100 702
---------------------------	---------------------	----------------

(The Customer)

Agreement:
 AUSTEN QUARRY EXTENSION (SSD 6084)

Amount: 1,302,703.00 Currency of AUD

Amount in words: ONE MILLION THREE HUNDRED AND TWO THOUSAND SEVEN HUNDRED AND THREE DOLLARS ONLY

1. In consideration of the Beneficiary agreeing at the request of the Customer and the Bank to accept this guarantee in connection with the Agreement, the Bank undertakes to pay the Beneficiary an amount or amounts not exceeding the Amount in total.
2. Payment of the Amount or any part or parts of the Amount will be made by the Bank to the Beneficiary:
 - a) upon the Bank receiving at any NAB branch located within Australia while this guarantee remains in force an unconditional written demand from the Beneficiary accompanied by this guarantee; and
 - b) without reference to the Customer; and
 - c) despite any notice given to the Bank by the Customer not to pay to the Beneficiary any moneys payable under this guarantee; and
 - d) irrespective of the performance or non-performance by the Customer or the Beneficiary of the Agreement in any respect; and
 - e) with no obligation on the Bank to enquire as to the performance or non-performance of the Agreement in any respect by the customer or the Beneficiary; and
 - f) with no obligation on the Bank to enquire as to the correctness or validity of any demand pursuant to sub-clause 2(a) of this clause.
 - g) at the Bank's election in cash, bank cheque or funds transfer into the Beneficiary's nominated account.
3. Where a demand and payment is made pursuant to clause 2, for a sum that is less than the Amount, the Bank will issue to the Beneficiary a replacement guarantee for the balance of the Amount then remaining, after such part payment or payments.
4. The Bank's liability under this guarantee is not affected or discharged in any way by any variation of the Agreement or by any extension of time or other forbearance on the part of the Beneficiary or the Customer to the other.
5. The Bank may terminate this guarantee at any time upon payment to the Beneficiary of the Amount or the balance of the Amount remaining after any part payment of the Amount, or such lesser amount as the Beneficiary requires.
6. If two or more persons are named as the Beneficiary, this guarantee takes effect for the benefit of them jointly and a demand under this guarantee by any one or more of them is deemed to be a demand by both or all of them jointly. Payment by the Bank under this guarantee to any one or more of them discharges this guarantee to the extent of the amount so paid.
7. The benefit of this guarantee is not assignable by the Beneficiary.
8. This guarantee continues in force until the earliest of the following events occurs:
 - a) this guarantee is returned to the Bank during normal banking hours at the NAB branch located at **Institutional Banking Level 32, 500 Bourke Street, Melbourne VIC 3000** and if this branch is no longer permanently open, to any NAB branch located within Australia (other than for a payment in accordance with clause 2(a));

- b) notification in writing has been received by the Bank at the NAB branch as detailed in clause 8 (a) from the Beneficiary that this guarantee is no longer required;
 - c) payment is made under clause 2 or 5 to the Beneficiary by the Bank of the whole of the Amount or the balance of the Amount remaining after any part payment or payments of the Amount, or such lesser amount as the Beneficiary requires.
9. a) In the events of clause 8 (a) & (b), the Beneficiary must return this guarantee to the Bank at the NAB branch as detailed in clause 8 (a);
- b) In the events of clause 8 (c), the Beneficiary must return this guarantee to the Bank at any NAB branch located within Australia.
10. This guarantee is governed by and is to be construed in accordance with the laws of the place where it is executed by the Bank.

Dated 17th August 2017
 (day) (month) (year -ccyy)

Executed on behalf of the National Australia Bank Limited by its Attorney

Name of Attorney **THAO TAYLOR**

who holds the position of Level 2 Attorney under Power of Attorney dated 1 March 2007

in the presence of:


 Signature of Attorney

Signature of witness 

Name of witness **MICHAEL BURNS**

Appendix M: EPL Monitoring Results

AuS-10 Rhyolite - Licence number 12323

Dam 1 - SB1 - EPL Point 1

Licence Discharge Point 1

Guidance range		Range - 6.5 - 8.5	<1500us/cm		<30 mg/l	20	10 mg/l			
Month	Number of Samples	pH	Electrical Conductivity	Turbidity	Total Dissolved Solids	Total Suspend Solids	Oxygen demand	Oil/Grease	Volume Discharged - KL	Comment
Jul-2016	0									
Aug-2016	0									
Sep-2016	0									
Oct-2016	0									
Nov-2016	0									
Dec-2016	0									
Jan-2017	0									
Feb-2017	0									
Mar-2017	0									
Apr-2017	0									
May-2017	0									
Jun-2017	0									
Total		0	0	0	0	0	0	0	0	
	Mean	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
	Lowest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Highest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

EPL POINT 2

Range - 6.5 - 8.5

Upstream Location AQW-1

Month	Number of Samples	pH	Electrical Conductivity	Turbidity	Total Dissolved Solids	Total Suspend Solids	Oxygen demand	Oil/Grease	Volume Discharged - KL
Jul-2016	1	7.66	481	4	316	0	<2	<5	Nil Discharge
Aug-2016	1	6.9	369	19	242	18	2	<5	Monthly sample
Sep-2016	1	8.47	443	5	270	0	2	<5	Monthly sample
Oct-2016	1	6.6	450	3	294	0	<2	<5	Monthly sample
Nov-2016	1	8.03	493	2	304	0	<2	<5	Monthly sample
Dec-2016	1	8.15	461	4	284	0	<2	<5	Monthly sample
Jan-2017	1	7.36	473	4	276	0	<2	<5	Monthly sample
Feb-2017	1	7.77	499	4	312	0	<2	<5	Monthly sample
02.03.2017	1	7.97	451	3	290	0	<2	<5	Monthly sample
29.03.2017	1	7.91	283	5	202	0	4	<5	Monthly sample
01.05.2017	1	6.79	183	2	218	12	<2	<5	Monthly sample
01.06.2017	1	7.95	438	2	254	0	<2	<5	Monthly sample
29.06.2017	1	8.2	452	1.7	220	0	5	<5	Monthly sample
Total		99.76	5476	58.7	3482	30	13	0	
	Mean	8.31	456.33	4.89	290.17	2.50	1.08	0.00	
	Lowest	6.60	183.00	1.70	202.00	0.00	2.00	#DIV/0!	
	Highest	8.47	499.00	19.00	316.00	18.00	5.00	0.00	

EPL Point 3

COXS RIVER LOWER CROSSING 6/7/2011 - AQW3

Month	Number of Samples	pH	Electrical Conductivity	Turbidity	Total Dissolved Solids	Total Suspend Solids	Oxygen demand	Oil/Grease	Volume Discharged - KL
Jul-2016	1	8.03	471	6	303	<5	<2	<5	Monthly sample
13.07.2016	1	8.05				<5		<5	Discharge EPL 10
14.07.2016	1	7.96				<5		<5	Discharge EPL 10
26.07.2016	1	7.86				<5		<5	Discharge EPL 10
27.07.2016	1	7.25				<5		<5	Discharge EPL 10
Aug-2016	1	7.14	331	33	186	26	2	<5	Monthly sample
10.08.2016	1	6.54				<5		6	Discharge EPL 9
30.08.2016	1	6.73				<5		<5	Discharge EPL 10

0
0
0
0
0
26
6
0

06.09.2016	1	6.72				<5		<5	Discharge EPL 10	0
07.09.2016	1	6.95				<5		<5	Discharge EPL 9&10	0
Sep-2016	1	7.06	418	5	262	<5	2	<5	Monthly sample	0
21.09.2016	1	7.26		4		<5		<5	Discharge EPL 10	0
Oct-2016	1	6.68	438	3	292	<5	<2	<5	Monthly sample	0
05.10.2016	1	6.87	447	3		<5		<5	Discharge EPL 10	0
Nov-2016	1	8.2	497	4	296	6	<2	<5	Monthly sample	6
Dec-2016	1	8.09	454	2	254	<5	<2	<5	Monthly sample	0
Jan-2017	1	7.29	478	4	288	<5	4	<5	Monthly sample	0
Feb-2017	1	7.65	508	2	310	<5		<5	Monthly sample	0
02.03.2017	1	8.33	496	3	334	<5	<2	<5	Monthly sample	0
16.03.2017	1	7.95		8		<5		<5	Discharge EPL 9	0
29.03.2017	1	7.72	282	4	192	<5	4	<5	Monthly sample	0
04.04.2017	1	7.51		3		<5		<5	Discharge EPL 10	0
01.05.2017	1	7.56	183	1	214	<5	<2	<5	Monthly sample	0
01.06.2017	1	8.15	445	2	248	<5	<2	<5	Monthly sample	0
29.06.2017	1	8.0	415	1.5	241	<5	4	<5	Monthly sample	0
Total		179.52	5392	82.5	3117	32	16	6		
		14.96	449.33	6.88	259.75	2.67	1.33	0.50		
Mean		7.50	418.79	5.21	263.08		3.20	6.00	#DIV/0!	1.52
Lowest		6.54	183.00	1.00	186.00	6.00	2.00	6.00		0.00
Highest		8.33	508.00	33.00	334.00	26.00	4.00	6.00		26.00

Dust Monitoring

EPL Point 4

Month	Number of Samples	Sawmill	Insoluble Solids	Combustible Matter	Ash
Jul-2016	continuous	Sawmill	1.0	1.0	<0.1
Aug-2016	continuous	Sawmill	<0.1	<0.1	<0.1
Sep-2016	continuous	Sawmill	<0.1	<0.1	<0.1
Oct-2016	continuous	Sawmill	0.1	0.1	<0.1
Nov-2016	continuous	Sawmill	0.5	0.5	<0.1
Dec-2016	continuous	Sawmill	<0.1	<0.1	<0.1
Jan-2017	continuous	Sawmill	0.4	0.3	0.1
Feb-2017	continuous	Sawmill	1.9	1.1	0.8
Mar-2017	continuous	Sawmill	1.9	0.4	1.5
Apr-2017	continuous	Sawmill	0.8	0.3	0.5
May-2017	continuous	Sawmill	0.6	0.2	0.4
Jun-2017	continuous	Sawmill	2.6	1.8	0.8
			9.8	5.7	4.1
		Mean	1.09	0.63	0.68
		Lowest	0.1	0.1	0.1
		Highest	2.6	1.8	1.5

Dust Monitoring

EPL Point 5

Month	Number of Samples	Baners Lane	Insoluble Solids	Combustible Matter	Ash
Jul-2016	continuous	Baners Lane	0.4	0.4	<0.1
Aug-2016	continuous	Baners Lane	<0.1	<0.1	<0.1
Sep-2016	continuous	Baners Lane	<0.1	<0.1	<0.1
Oct-2016	continuous	Baners Lane	0.4	0.4	<0.1
Nov-2016	continuous	Baners Lane	1.3	0.9	0.4
Dec-2016	continuous	Baners Lane	<0.1	<0.1	<0.1
Jan-2017	continuous	Baners Lane	0.6	0.4	0.2
Feb-2017	continuous	Baners Lane	0.2	0.2	<0.1
Mar-2017	continuous	Baners Lane	0.4	0.2	0.2
Apr-2017	continuous	Baners Lane	0.3	0.2	0.1
May-2017	continuous	Baners Lane	0.1	0.1	<0.01
Jun-2017	continuous	Baners Lane	2.4	1.9	0.5
			6.1	4.7	1.4
		Mean	0.68	0.52	0.28

Lowest	0.1	0.1	0.1
Highest	2.4	1.9	0.5

Dust Monitoring

EPL Point 6

Month	Number of Samples	Bald Hill	Insoluble Solids	Combustible Matter	Ash
Jul-2016	continuous	Bald Hill	0.4	0.4	<0.1
Aug-2016	continuous	Bald Hill	<0.1	<0.1	<0.1
Sep-2016	continuous	Bald Hill	0.8	0.7	0.1
Oct-2016	continuous	Bald Hill	0.5	0.3	0.2
Nov-2016	continuous	Bald Hill	0.1	0.2	<0.1
Dec-2016	continuous	Bald Hill	<0.1	<0.1	<0.1
Jan-2017	continuous	Bald Hill	0.2	0.1	0.1
Feb-2017	continuous	Bald Hill	0.6	0.3	0.3
Mar-2017	continuous	Bald Hill	1.1	0.9	0.2
Apr-2017	continuous	Bald Hill	0.4	0.1	0.3
May-2017	continuous	Bald Hill	0.1	0.1	<0.01
Jun-2017	continuous	Bald Hill	4.1	2.7	1.4
			8.3	5.8	2.6
		Mean	0.83	0.58	0.37
		Lowest	0.1	0.1	0.1
		Highest	4.1	2.7	1.4

ND - Not Detected

Requirement to Monitor
Volume or Mass - Points
1, 8, 9, 10, 11

Kilolitres per day	Daily during any discharge	Estimate				
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EPL POINT 8

Dam 2 - SB2b

Range - 6.5 - 8.5

Month	Number of Samples	pH	Electrical Conductivity	Turbidity	Total Dissolved Solids	Total Suspend Solids	Oxygen demand	Oil/Grease	Volume Discharged - KL	Comment
Jul-2016	0									
Aug-2016	0									
Sep-2016	0									
Oct-2016	0									
Nov-2016	0									
Dec-2016	0									
Jan-2017	0									
Feb-2017	0									
Mar-2017	0									
Apr-2017	0									
May-2017	0									
Jun-2017	0									
		0	0	0	0	0	0	0		
	Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Lowest	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Highest	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

EPL POINT 9

South of O/Burden dump

Dam 3 - SB3a

Range - 6.5 - 8.5

Month	Number of Samples	pH	Electrical Conductivity	Turbidity	Total Dissolved Solids	Total Suspend Solids	Oxygen demand	Oil/Grease	Volume Discharged - KL	Comment
11.07.2016	1	6.68				19		<5	Nil Discharge	Sample only
12.07.2016	1	7.45				7		<5	1ml	Discharge
9.08.2016	1	6.61				<5		7		Sample Only

		0	0	0	0	0	0	0	0
Mean		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lowest		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Highest		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AuS-10 Rhyolite - Licence number 12323

Blasting	Frequency	Date	Blast Number	Limits	Units of measure	Results	Monitor Location - Hartley Village
Ground Vibration	Per Blast	05.07.2016	110	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	05.07.2016	110	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	25.07.2016	111	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	25.07.2016	111	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	10.08.2016	112	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	10.08.2016	112	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	30.08.2016	113	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	30.08.2016	113	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	26.09.2016	114	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	26.09.2016	114	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	06.10.2016	115	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	06.10.2016	115	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	19.10.2016	116	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	19.10.2016	116	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	07.11.2016	117	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	07.11.2016	117	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	15.11.2016	118	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	15.11.2016	118	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	08.03.2017	119	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	08.03.2017	119	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	30.11.2016	120	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	30.11.2016	120	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	14.12.2016	121	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	14.12.2016	121	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	01.02.2017	122	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	01.02.2017	122	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	15.02.2017	123	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	15.02.2017	123	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	01.03.2017	124	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	01.03.2017	124	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	23.03.2017	125	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	23.03.2017	125	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	28.03.2017	126	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	28.03.2017	126	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast		127	5 - trigger point >0.51	mm/s		
Overpressure	Per Blast		127	115 - Trigger point <88	dB		
Ground Vibration	Per Blast	26.04.2017	128	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	26.04.2017	128	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	10.05.2017	129	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	10.05.2017	129	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	24.05.2017	130	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	24.05.2017	130	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	02.06.2017	131	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	02.06.2017	131	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	07.06.2017	132	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	07.06.2017	132	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	14.06.2017	133	5 - trigger point >0.51	mm/s	Nil Trigger	√
Overpressure	Per Blast	14.06.2017	133	115 - Trigger point <88	dB	Nil Trigger	√
Ground Vibration	Per Blast	28.06.2017	134	5 - trigger point >0.51	mm/s	0.62	√
Overpressure	Per Blast	28.06.2017	134	115 - Trigger point <88	dB	Nil Trigger	√

Grant's Head Quarry - Licence Number 4040

	Pollutant	Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
EPL Point 1 - sump	Units of Measure	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Month	Number of Samples									
09.08.2016	1	0.20	0.001	<0.001	0.001	0.104	<0.001	<0.00001	0.014	0.091
16.11.2016	1	0.275	0.0003	0.0005	0.0011	0.158	0.0017	<0.00001	0.0256	0.126
24.01.2017	1	0.096	0.0003	0.0009	0.0012	0.17	0.0007	0.00023	0.0373	0.169
20.04.2017	1	0.215	<0.0002	0.0005	0.0005	0.324	0.0004	<0.00001	0.0244	0.09
29.06.2017	1	0.163	0.0003	0.0008	0.0007	0.143	0.0024	<0.0003	0.0269	0.208

	Pollutant				Total Suspended Solids Max 30 Milligrams per litre		Hours of pump operation	Requirement to Monitor Volume or Mass - KL
EPL Point 1 - sump	Units of Measure	pH (wet) Range 5.3 to 7.0	Electrical Conductivity	Turbidity	mg/l	Oil and Grease Visible	Hours	KL
Month	Number of Samples	pH	µS/cm	NTU	mg/l	Visible	Hours	KL
28.06.2016	1	6.6	342	2.9	5	<5	24	6,825.6
04.07.2016	1	5.6	454	5.2	6	<5	24	6,825.6
01.08.2016	1	5.9	452	18	7	<5	24	6,825.6
09.08.2016	1	6.3	343	24	11	<5	19	5,403.6
16.08.2016	1	6.3	358	18	15	<5	24	6,825.6
01.09.2016	1	5.7	393	25	7	<5	24	6,825.6
19.09.2016	1	6.7	413	1.9	<3	<5	24	6,825.6
16.11.2016	1	6.3	393	6.3	9	<5	19	5,403.6
07.12.2016	1	6.3	418	11	5	<5	24	6,825.6
03.01.2017	1	6.2	468	7.9	11	<5	24	6,825.6
24.01.2017	1	6.1	431	5.5	5	<5	11	3,128.4
16/02/2017	1	5.4	428	3.1	<3	<5	14	3,981.6
2/03/2017	1	6.2	437	2.9	4	<5	24	6,825.6
9/03/2017	1	5.7	378	9.4	10	<5	24	6,825.6
21/03/2017	1	6.3	230	7.8	9	<5	24	3,412.8
23/03/2017	1	6.4	239	7.7	9	<5	24	3,412.8
24/03/2017	1	6.2	248	5.2	7	<5	24	3,412.8
27/03/2017	1	6.0	275	7.8	8	<5	24	3,412.8
28/03/2017	1	5.7	249	9.2	10	<5	24	3,412.8
29/03/2017	1	6.7	293	5.8	10	<5	24	3,412.8
30/03/2017	1	6.1	224	7.3	9	<5	24	3,412.8
31/03/2017	1	5.6	262	12	11	<5	24	3,412.8
3/04/2017	1	5.8	244	8.3	7	<5	24	3,412.8
4/04/2017	1	5.6	250	9.6	9	<5	24	3,412.8
10/04/2017	1	5.8	278	6.7	6	<5	24	3,412.8
11/04/2017	1	5.3	282	4.1	4	<5	24	3,412.8
12/04/2017	1	5.8	292	4.7	5	<5	24	3,412.8
20/04/2017	1	5.2	315	2.4	<3	<5	0	
26/04/2017	1	6.3	341	3	<3	<5	24	3,412.8
17/05/2017	1	5.9	396	2.5	<3	<5	24	6,825.6
5/06/2017	1	5.6	391	2.7	<3	<5	24	6,825.6
6/06/2017	1	5.7	400	3.8	<3	<5	24	6,825.6

+ Metal suite - Discharge

Pump change 142,000Lt/Hr

Metal suite sample only - Nil Discharge

Pump change back to 284,400Lt/Hr

7/06/2017	1	5.7	386	4	4	<5	24	6,825.6
14/06/2017	1	6.1	272	9.8	7	<5	24	6,825.6
29.06.2017	1	6.0	369	5.8	9	<5	24	6,825.6

Grant's Head Points 2 & 3		Standing Water Level Meters (mAHD)		Standing Water Level Metres (mAHD)
	Position ID	Quarterly	Position ID	Quarterly
30.03.2016	MW05	4.609	MW06	4.759
26.05.2016	MW05	4.644	MW06	4.794
23.09.2016	MW05	4.589	MW06	4.757
12.12.2016	MW05	4.443	MW06	4.577
28.03.2017	MW05	4.814	MW06	4.934
19.06.2017	MW05	4.619	MW06	4.839

Grant's Head Point 4	Position ID	Conductivity	pH	Standing Water Level	Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
23.09.2016	NW01S	417	4.83	-0.117									
23.09.2016	NW01D	410	6.62	-0.556									
12.12.2016	NW01S	454	5.1	-0.923	<0.05	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.001	0.003	0.032
12.12.2016	NW01D	470	4.39	-1.305	0.42	<0.001	<0.0002	<0.001	0.002	<0.001	<0.001	0.002	0.011
28.03.2017	NW01S	123.7	4.87	0.205									
28.03.2017	NW01D	444.1	4.43	-0.345									
19.06.2017	NW01S	481	4.65	0.83									
19.06.2017	NW01D	508	4.37	0.19									

Grant's Head Point 5	Position ID	Conductivity	pH	Standing Water Level	Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
23.09.2016	NW02S	270	3.89	-7.696									
23.09.2016	NW02D	700	5.88	-0.307									
12.12.2016	NW02S	352	3.79	-8.112	0.34	<0.001	<0.0002	<0.001	0.002	<0.001	<0.001	<0.001	<0.005
12.12.2016	NW02D	870	5.86	-1.135	<0.05	0.004	<0.0002	<0.001	<0.001	<0.001	<0.001	0.014	<0.005
28.03.2017	NW02S	275.2	4.29	-7.73									
28.03.2017	NW02D	741	5.97	-0.92									
19.06.2017	NW02S	345	3.79	-7.9									
19.06.2017	NW02D	873	5.84	-0.845									

Grant's Head Point 6	Position ID	Conductivity	pH	Standing Water Level	Aluminium	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
23.09.2016	NW03S	332	3.99	-11.248									
23.09.2016	NW03D	1205	4.89	-29.519									
12.12.2016	NW03S	435	3.66	-11.336	0.23	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005
12.12.2016	NW03D	1318	5.63	-30.475	<0.05	<0.001	<0.0002	<0.001	<0.001	<0.001	<0.001	0.03	0.042
28.03.2017	NW03S	338.4	4.59	-10.83									
28.03.2017	NW03D	1301	7.05	-29.76									
19.06.2017	NW03S	440	5.25	-10.815									
19.06.2017	NW03D	1412	5.46	-30.45									

Grant's Head Quarry - Licence Number 4040

Blasting	Frequency	Date	Limits	Units of measure	Results Bonny Hills 1st House	Results - Sherwood House	Blast No #
Ground Vibration	Per Blast	19.01.2016	5 - trigger point >0.27	mm/s	4.42	Nil Trigger	# 109
Overpressure	Per Blast	19.01.2016	115 - Trigger point >100	dB	101.5	Nil Trigger	# 109

Ground Vibration	Per Blast	29.03.2016	5 - trigger point >0.27	mm/s	1.53	0.57	# 110
Overpressure	Per Blast	29.03.2016	115 - Trigger point >100	dB	106.5	113.1	# 110
Ground Vibration	Per Blast	13.07.2016	5 - trigger point >0.27	mm/s	1.5	0.76	# 111
Overpressure	Per Blast	13.07.2016	115 - Trigger point >100	dB	102.4	94.1	# 111
Ground Vibration	Per Blast	21.07.2016	5 - trigger point >0.27	mm/s	3.94	0.78	# 112
Overpressure	Per Blast	21.07.2016	115 - Trigger point >100	dB	110.2	108.7	# 112
Ground Vibration	Per Blast	23.08.2016	5 - trigger point >0.27	mm/s	2.12	Nil Trigger	# 113
Overpressure	Per Blast	23.08.2016	115 - Trigger point >100	dB	113	Nil Trigger	# 113
Ground Vibration	Per Blast	13.10.2016	5 - trigger point >0.27	mm/s	1.48	Nil Trigger	#114
Overpressure	Per Blast	13.10.2016	115 - Trigger point >100	dB	101.5	Nil Trigger	#114
Ground Vibration	Per Blast	14.12.2016	5 - trigger point >0.27	mm/s	1.68	Nil Trigger	#115
Overpressure	Per Blast	14.12.2016	115 - Trigger point >100	dB	101.7	Nil Trigger	#115
Ground Vibration	Per Blast	10.02.2017	5 - trigger point >0.27	mm/s	3.5	Nil Trigger	#116
Overpressure	Per Blast	10.02.2017	115 - Trigger point >100	dB	109.1	Nil Trigger	#116
Ground Vibration	Per Blast	05.07.2017	5 - trigger point >0.27	mm/s	1.18	Nil Trigger	#117
Overpressure	Per Blast	05.07.2017	115 - Trigger point >100	dB	98.9	Nil Trigger	#117

Tumbulgun EPL 3430

Tumbulgun Point 1		Pollutant	OIL and Grease -10 Milligrams per Lt.	Total Suspended Solids Max 50 Milligrams per litre	pH (wet) Range 6.5 to 8.5	Requirement to Monitor Volume or Mass	
Month	Number of Samples	Frequency	Less than 24 hours before Discharge	Less than 24 hours before Discharge	Less than 24 hours before Discharge	Daily when wastes (water) discharged Klitres per day	Why Sampled - Discharge or Random?
Jul-2016	Nil						
Aug-2016	Nil						
Sep-2016	Nil						
Oct-2016	Nil						
Nov-2016	Nil						
Dec-2016	Nil						
Jan-2017	Nil						
Feb-2017	Nil						
Mar-2017	Nil						
Apr-2017	Nil						
May-2017	Nil						
Jun-2017	Nil						

Tumbulgun Point 2		Pollutant	OIL and Grease -10 Milligrams per Lt.	Total Suspended Solids Max 50 Milligrams per litre	pH (wet) Range 6.5 to 8.5	Requirement to Monitor Volume or Mass	
Month	Number of Samples	Frequency		Monthly during discharge	<24hrs prior to discharge	Daily when wastes (water) discharged Klitres per day	Why Sampled - Discharge or Random?
Jul-2016	Nil						
Aug-2016	Nil						
Sep-2016	Nil						
Oct-2016	Nil						
Nov-2016	Nil						
Dec-2016	Nil						

Jan-2017	Nil						
Feb-2017	Nil						
Mar-2017	Nil						
Apr-2017	Nil						
May-2017	Nil						
Jun-2017	Nil						

Tumbulgum EPL 3430

Tumbulgum Blast Monitoring results

Blasting	Frequency	Date	Limits	Units of measure	Loc # 1 - 43 Pollard Rd	Loc # 2 - 2 Pollard Rd	Loc # 3 - 729 - 731 Dulguigan Rd	Blast #
Ground Vibration	Per Blast	07.07.2016	5 - trigger point >0.51	mm/s	No Trigger	1.048	Not required	#21
Overpressure	Per Blast	07.07.2016	Max 115 - Trigger point >110	dB	No Trigger	113.5	Not required	#21
Ground Vibration	Per Blast	07.07.2016	5 - trigger point >0.26	mm/s	0.302	0.571	Not required	#22
Overpressure	Per Blast	07.07.2016	Max 115 - Trigger point >100	dB	104.2	105.5	Not required	#22
Ground Vibration	Per Blast	26.08.2016	5 - trigger point >0.26	mm/s	0.58	0.89	Not required	#24
Overpressure	Per Blast	26.08.2016	Max 115 - Trigger point >100	dB	106.5	104.2	Not required	#24
Ground Vibration	Per Blast	07.10.2016	5 - trigger point >0.26	mm/s	0.29	0.6	Not required	#25
Overpressure	Per Blast	07.10.2016	Max 115 - Trigger point >100	dB	101.9	100	Not required	#25
Ground Vibration	Per Blast	14.10.2016	5 - trigger point >0.26	mm/s	0.51	1.7	Not required	#26
Overpressure	Per Blast	14.10.2016	Max 115 - Trigger point >100	dB	105.5	108.4	Not required	#26
Ground Vibration	Per Blast	20.02.2017	5 - trigger point >0.51	mm/s	No Trigger	0.696	Not required	#27
Overpressure	Per Blast	20.02.2017	Max 115 - Trigger point >115	dB	No Trigger	102.8	Not required	#27
Ground Vibration	Per Blast	20.02.2017	5 - trigger point >0.51	mm/s	No Trigger	0.539	Not required	#28
Overpressure	Per Blast	20.02.2017	Max 115 - Trigger point >115	dB	No Trigger	102.8	Not required	#28
Ground Vibration	Per Blast	03.05.2017	5 - trigger point >0.26	mm/s	No Trigger	0.55	Not required	#29
Overpressure	Per Blast	03.05.2018	Max 115 - Trigger point >100	dB	No Trigger	104.9	Not required	#29
Ground Vibration	Per Blast	03.05.2019	5 - trigger point >0.26	mm/s	0.52	2.29	Not required	#30
Overpressure	Per Blast	03.05.2020	Max 115 - Trigger point >100	dB	107.5	108	Not required	#30
Ground Vibration	Per Blast	23.05.2017	5 - trigger point >0.26	mm/s	0.34	0.35	Not required	#31
Overpressure	Per Blast	23.05.2017	Max 115 - Trigger point >100	dB	104.2	105.5	Not required	#31
Ground Vibration	Per Blast	23.05.2017	5 - trigger point >0.26	mm/s	0.34	0.35	Not required	#32
Overpressure	Per Blast	23.05.2017	Max 115 - Trigger point >100	dB	104.2	105.5	Not required	#32
Ground Vibration	Per Blast	23.05.2017	5 - trigger point >0.26	mm/s	0.67	1.12	Not required	#33
Overpressure	Per Blast	23.05.2017	Max 115 - Trigger point >100	dB	107.5	105.5	Not required	#33

Yarrabee Rd Quarry - Licence Number 11462

Yarrabee Rd Point 3		Pollutant	Total Suspended Solids Max 50 Milligrams per litre	pH (wet) Range 6.5 to 8.5	Requirement to Monitor Volume or Mass
Month	Number of Samples	Frequency	<24hrs prior to discharge	<24hrs prior to discharge	Daily when wastes (water) discharged Litres per day

29.06.2016	1		6	8.1	Nil Discharge	Sample only
06.03.2017	1		7	8.2		Sample only
01.05.2017	1		<3	8.9		Sample only
Number of samples	3					

Mean
Lowest
Highest

6.50	8.40	#DIV/0!
6.00	8.10	-
7.00	8.90	-

Yarrabee Rd Quarry - Licence Number 11462

Blasting	Frequency	Date	Limits	Units of measure	Results	Blast #	Blast ID
Ground Vibration	Per Blast	18.01.2016	5 - trigger point >0.27	mm/s	0.49	#52	SEQ2016-01
Overpressure	Per Blast	18.01.2016	Max 115 - Trigger point >100	dB	111.6	#52	SEQ2016-01
Ground Vibration	Per Blast	08.02.2016	5 - trigger point >0.27	mm/s	3.21	#53	SEQ2016-02
Overpressure	Per Blast	08.02.2016	Max 115 - Trigger point >100	dB	114.6	#53	SEQ2016-02
Ground Vibration	Per Blast	08.03.2016	5 - trigger point >1.00	mm/s	0.89	#54	YRQ-1601
Overpressure	Per Blast	08.03.2016	Max 115 - Trigger point >105	dB	118.1	#54	YRQ-1601
Ground Vibration	Per Blast	30.03.2016	5 - trigger point >1.00	mm/s	2.23	#55	YRQ-1602
Overpressure	Per Blast	30.03.2016	Max 115 - Trigger point >105	dB	109.9	#55	YRQ-1602
Ground Vibration	Per Blast	28.04.2016	5 - trigger point >1.00	mm/s	No Trigger	#56	YRQ-1603
Overpressure	Per Blast	28.04.2016	Max 115 - Trigger point >105	dB	No Trigger	#56	YRQ-1603
Ground Vibration	Per Blast	30.06.2016	5 - trigger point >1.00	mm/s	1.68	#57	SEQ2016-03
Overpressure	Per Blast	30.06.2016	Max 115 - Trigger point >105	dB	114.9	#57	SEQ2016-03
Ground Vibration	Per Blast	02.08.2016	5 - trigger point >1.00	mm/s	1.59	#58	YRQ-1604
Overpressure	Per Blast	02.08.2016	Max 115 - Trigger point >105	dB	104.9	#58	YRQ-1604
Ground Vibration	Per Blast	25.08.2016	5 - trigger point >1.00	mm/s	0.54	#59	YRQ-1605
Overpressure	Per Blast	25.08.2016	Max 115 - Trigger point >105	dB	107.8	#59	YRQ-1605
Ground Vibration	Per Blast	05.10.2016	5 - trigger point >1.00	mm/s	1.36	#60	YRQ-1606
Overpressure	Per Blast	05.10.2016	Max 115 - Trigger point >105	dB	114.0	#60	YRQ-1606
Ground Vibration	Per Blast	17.11.2016	5 - trigger point >1.00	mm/s	1.11	#61	YRQ-1607
Overpressure	Per Blast	17.11.2016	Max 115 - Trigger point >105	dB	112.5	#61	YRQ-1607
Ground Vibration	Per Blast	15.12.2016	5 - trigger point >1.00	mm/s	1.28	#62	YRQ-1608
Overpressure	Per Blast	15.12.2016	Max 115 - Trigger point >105	dB	111.1	#62	YRQ-1608
Ground Vibration	Per Blast	16.02.2017	5 - trigger point >1.00	mm/s	0.65	#63	YRQ-1701
Overpressure	Per Blast	16.02.2017	Max 115 - Trigger point >105	dB	114.8	#63	YRQ-1701
Ground Vibration	Per Blast	28.03.2017	5 - trigger point >1.00	mm/s	Nil Trigger	#64	YRQ-1702
Overpressure	Per Blast	28.03.2017	Max 115 - Trigger point >105	dB	Nil Trigger	#64	YRQ-1702
Ground Vibration	Per Blast	06.06.2017	5 - trigger point >1.00	mm/s	1.61	#65	YRQ-1703
Overpressure	Per Blast	06.06.2017	Max 115 - Trigger point >105	dB	110.1	#65	YRQ-1703
Ground Vibration	Per Blast	21.06.2017	5 - trigger point >1.00	mm/s	0.52	#66	YRQ-1704
Overpressure	Per Blast	21.06.2017	Max 115 - Trigger point >105	dB	111.7	#66	YRQ-1704