


Rix's Creek Mine 2019 Annual Review



Rix's Creek South Arties Pit Rehabilitation (Frog Pond habitat).

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

Name of Operation	Rix's Creek Mine
Name of operator	Bloomfield Collieries Pty Ltd
Development consent / project approval # Rixs Creek North Rixs Creek South	PA 08_0102 DA 49/94
Name of holder of development consent / project approvals	Bloomfield Collieries Pty Ltd
Mining Lease #	CL357, ML1630, ML1648, ML1649, ML1650, ML1651, CL352, ML1432 & ML1725
	Bloomfield Collieries Pty Ltd
Water License #	20WA219698, 20BL172249, 20BL170863, 20BL170864
Name of holder of water license	Bloomfield Collieries Pty Ltd
MOP / RMP start date Rixs Creek North Rixs Creek South	1/12/2018 15/3/2013 (Note: Rix's Creek North and South MOP now combined. MOP commencement date 1/12/2019).
MOP / RMP end date Rixs Creek North Rixs Creek South	31/12/2020 15/3/2020
Annual Review start date	1/1/2019
Annual Review end date	31/12/2019
I, Chris Quinn, certify that this audit report is a true and accurate record of the compliance status of Rix's Creek Mine for the period 1/1/2019 – 31/12/2019 and that I am authorised to make this statement on behalf of Bloomfield Collieries Pty Ltd.	
Name of authorised reporting officer	Chris Quinn
Title of authorised reporting officer	Environmental Advisor
Signature of authorised reporting officer	
Date	26/3/2020

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List of Abbreviations

AHD	Australian Height Datum
AR	Annual Review
BOA's	Biodiversity Offset Areas
bcm	Bank cubic metre
CHPP	Coal Handling and Preparation Plant
CCC	Community Consultative Committee
DA	Development Application
dB	Noise decibels (linear)
dBA	Noise decibels (A-weighted)
DDG	Depositional Dust Gauge
DPIE	Department of Planning, Industry and Environment
EA	Environmental Assessment
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EL	Exploration Licence
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environment Protection Authority
GCP	Ground Core Piezometer
GDE	Ground Dependent Ecosystems
GHG	Greenhouse Gas
EPL	Environment Protection Licence
g/m ² /mth	Grams per square metre per month
HVAS	High Volume Air Sampler
HRSTS	Hunter River Salinity Trading Scheme
IEA	Independent Environmental Audit
ISO	International Standard
l/s	Litres per second
LHPA	Livestock Health and Pest Association
LGA	Local Government Area
MBGL	Meters Below Ground Level
MCM	Monthly Communication Meetings
MIC	Maximum Instantaneous Charge
mm/s	Millimetres per second
MOP	Mining Operations Plan
MI	Megalitre
ML, MPL, CCL & CL	Mining Leases
Mt	Million tonnes
MU's	Management Units
NAG	Noise Assessment Group
NRAR	Natural Resources Access Regulator
OC	Open Cut
PA	Project Approval
PIRMP	Pollution Incident Response Management Plan
PM ₁₀	Particulate matter (dust) with a diameter of less than 10 microns
PPM	Parts Per Million
PPV	Peak Particle Velocity
RCS	Rix's Creek South
RCN	Rixs Creek North
RCM	Rix's Creek Mine
ROM	Run-of-mine
RR	Resources Regulator
SEPP	State Environmental Planning Policy
STP	Sewerage Treatment Plant
TBT	Toolbox Talk
TBG	The Bloomfield Group
TEOM	Tapered Element Oscillating Microbalance
TPH	Total Petroleum Hydrocarbons
TSP	Total Suspended Particulates
VWP	Vibrating Wire Piezometer
WMP	Water Management Plan
WSP	Water Sharing Plan
µS/cm	Micro Siemens per centimetre
µg/m ³	Micrograms per cubic metre

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SECTION 1 STATEMENT OF COMPLIANCE

Table 1 Summary Statement of Compliance for Major Approvals

Were all conditions of the relevant approval(s) complied with?	
DC # DA 49/94 Mod 9	NO
PA 08_0102 Mod 7	NO
EPL3391	NO
ML # 1432, CL342	NO
ML # CL 357, ML 1630, ML 1648-1651	NO

The non-compliances identified with PA 08_0102 and associated mining leases are detailed in **Table 2** below.

Table 2 Summary of Non Compliances with Rix's Creek North PA 08_0102 and EPL3391

Condition	Non-Compliance	Risk Level	Addressed in 2018 AR/ comments
Schedule 3 , Condition 2 Schedule 3, Condition 3 Schedule 3, Condition 4 Schedule 3, Condition 5	Noise monitoring does not assess the proportion of privately owned land for which exceedances may occur.	Administrative	Section 6.2
Schedule 3, Condition 22 Schedule 3, Condition 23	Air quality monitoring does not assess the proportion of privately owned land for which exceedances of the cumulative criteria may occur.	Administrative	Section 6.4

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Condition	Non-Compliance	Risk Level	Addressed in 2018 AR/ comments
Schedule 3, Condition 27 (d)	<p>On the 3/11/2019 the RCN NW TEOM filter was blocked, therefore Camberwell UHAQMN data was substituted for this day.</p> <p>From the 7/12/2019 – 9/12/2019 the RCN SE TEOM had a blocked filter, which required the TEOM to be repaired. Data from the Singleton NW UHAQMN was substituted for this period.</p> <p>From the 2/11/2019 – 5/11/2019 the RCN NE TEOM had a filter malfunction, which required the TEOM to be repaired. Data from the Camberwell UHAQMN was substituted for this period.</p> <p>The NW Dustrak recorded 12ug/m3 data from the 1/1/2019 - 4/1/2019. Servicing was completed on the dust unit to restore functionality.</p> <p>On the 01/05/2019 to the 6/5/2019 the NW Dust Trak lost data to a software update that didn't back up the data on the data logger or Environmental SCADA system.</p>	Low	Section 6.4.3
CL 357, ML 1630, ML 1648-1651	Section 240 Notice for unexplained areas low species diversity and areas of high weed density on pasture rehabilitation. The MOP did not adequately define final landuses and stages of progression towards achieving final landuse. Additionally, various stages of rehabilitation are to be informed by data obtained from analogue monitoring sites which was deemed limited.	Low	Section 11.3
EPL 3391 Cond L3.1	On the 8 April 2019 Rix's Creek North exceeded the noise limit under Condition L3.8 at location NM5, EPA Identification 32.	Low	Section 11.1

The non-compliances identified with DA49/94 and associated mining leases are detailed in **Table 3** below.

Table 3 Summary of Non Compliances with Rix's Creek South DA49/94

Condition	Non-Compliance	Risk Level	Addressed in 2019 AR/ comments
Schedule 2, Condition 6(c)	No formal building maintenance program was implemented to specifically review the maintenance of buildings.	Administrative	To be superceded by SSD6300 approval.

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Condition	Non-Compliance	Risk Level	Addressed in 2019 AR/ comments
ML1432, CL342	Section 240 Notice for unexplained areas low species diversity and areas of high weed density on pasture rehabilitation. The MOP did not adequately define final landuses and stages of progression towards achieving final landuse. Additionally, various stages of rehabilitation are to be informed by data obtained from analogue monitoring sites which was deemed limited.	Low	Section 11.3

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SECTION 2 INTRODUCTION

This 2019 Annual Review is compiled pursuant to Schedule 2, Condition 19 of DA49/94 and Schedule 5, Condition 10 of PA08_0102. Additionally, this Review satisfies the environmental reporting requirements of the Department of Planning, Industry and Environment (DPIE) and the Resources Regulator (RR), The Environment Protection Agency (EPA) and the Natural Resources Access Regulator (NRAR). This reporting period extends from 1 January 2019 to 31 December 2019. This Annual Review has been prepared in accordance with the Post Approval Requirements for State Significant Developments – Annual Review Guideline (DPE 2015).

Rix’s Creek Mine is wholly owned by Bloomfield Collieries Pty Limited (BCL) an Australian owned family company.

Rix’s Creek (South) Mine (RCS) commenced operations in July 1990 following the granting of Development Consent DA 86/2889 and Coal Lease No. 352 on 20 October 1989. This followed the submission of Coal Lease Application No. 185, an Environmental Impact Statement (EIS) and a public inquiry into the development application. Subsequently DA 49/94 was approved on the 19 October 1995 for a period of 21 years from the date of issue of a mining lease in satisfaction of Mining Lease Application No. 17. Mining Lease 1432 was subsequently issued on 24 June 1998.

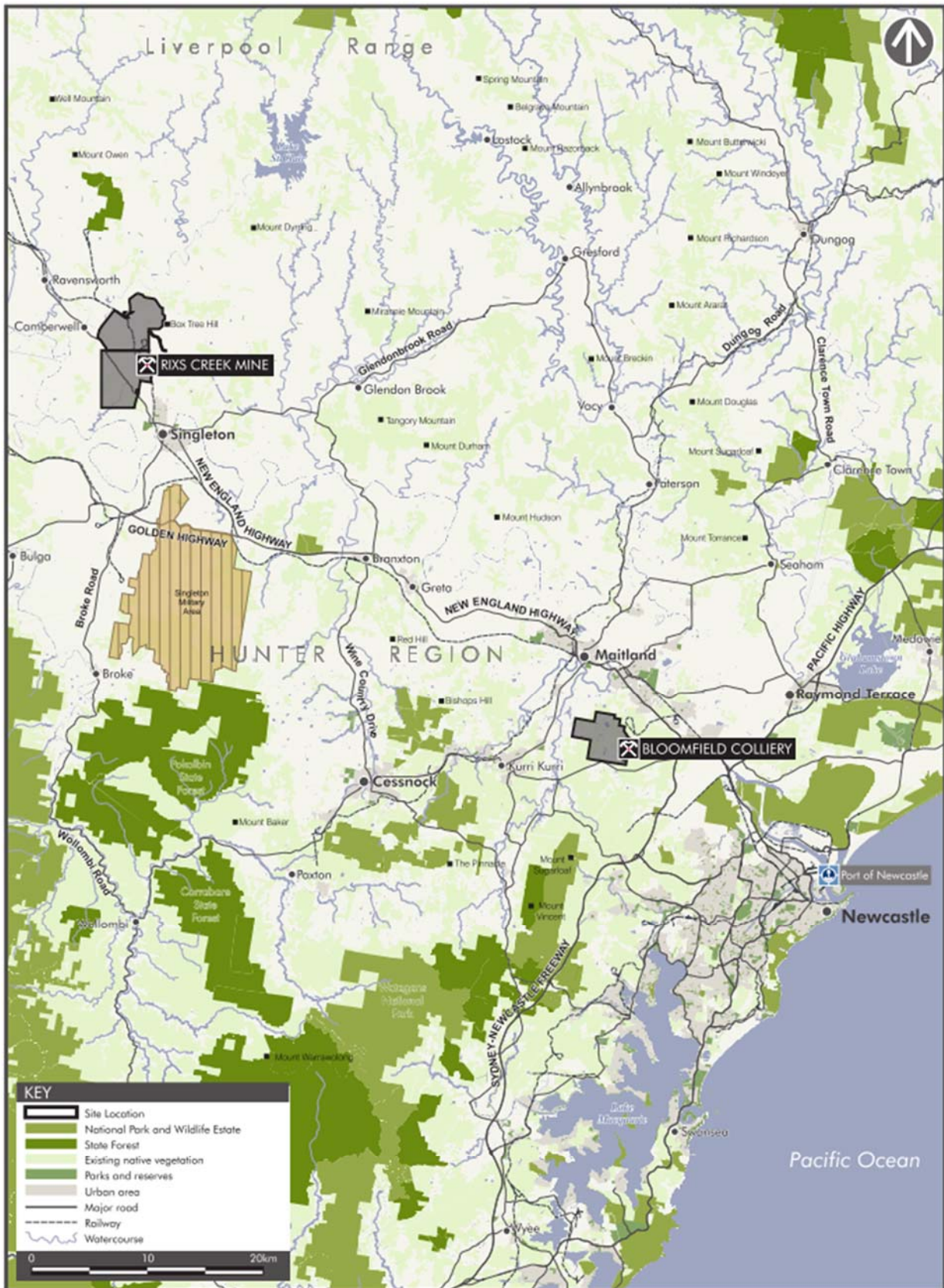
In 2015, BCL submitted a development application to extend Mining Operations within the area for a further 21 years. This project was named the Rix’s Creek (South) Continuation of Mining Project. Following extended assessment of the above Project, during the 2019 Annual Review period, BCL sought extension to the Project Approval (DA 49/94) duration for nine (9) months to allow continued coal extraction while the Continuation Project assessment was undergoing due process.

During the 2019 Annual Review period, the Rix’s Creek South Continuation of Mining Project (SSD 6300) was approved by the Independent Planning Commission of NSW providing further approval for mining within the area until 2040. During the 2019 Annual Review reporting period, SSD 6300 was not commenced. SSD 6300 was commenced on 24 February 2020.

In December 2015, HV Coking Coal Pty Limited (Glencore) completed the purchase of 100% of the Integra Mining Operations Complex. BCL subsequently purchased, from Glencore, the previous Integra Open Cut Operations, Coal Handling Preparation Plant, Train Loading Infrastructure and the Rail Loop. Under the “Operating, Infrastructure Access and Services Agreement”, entered into by Glencore and BCL, all current mining operations covered by the 2010 Integra Complex Consent, Project 08_0101 Integra Underground Project and Project 08_0102 Integra Open Cut Project, can continue. BCL operate the Open Cut Operations as Rix’s Creek Northern Operations (RCN). This governs open cut mining in the Camberwell Pit area. Delivery of Project 08_0101 Run of Mine (ROM) coal from the Underground Mine, Coal Preparation and Train Loading Operations are all operated and managed by BCL.

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THE Bloomfield GROUP

• RIX'S CREEK •

BLOOMFIELD COLLIERIES -
CURRENT MINING OPERATIONS - LOCATION PLAN

Figure 1 Regional Context Plan

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Rixs Creek North & Rixs Creek South

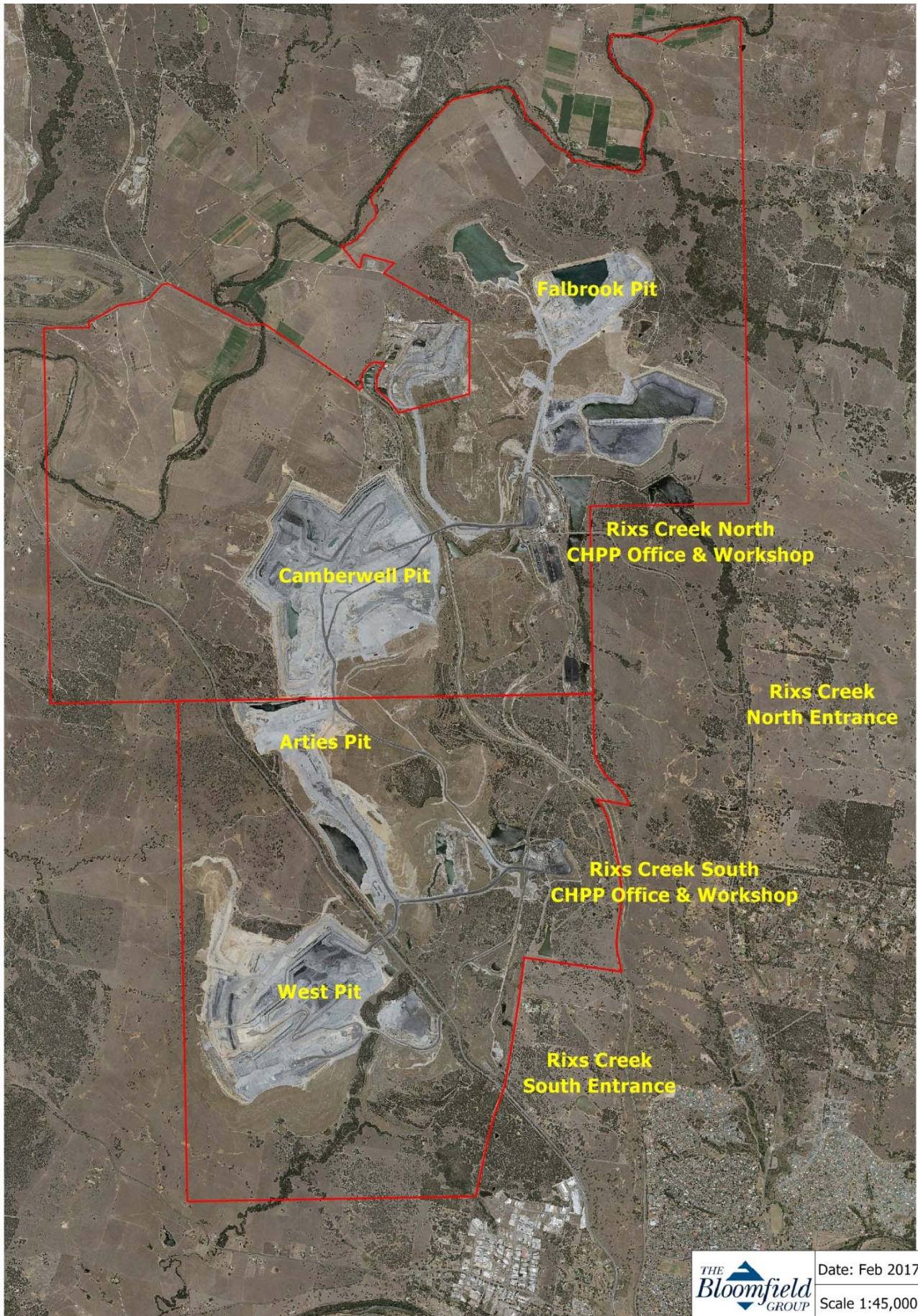


Figure 2 Site Layout and Locality Plan showing Mining Lease Boundary

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Rixs Creek North & Rixs Creek South

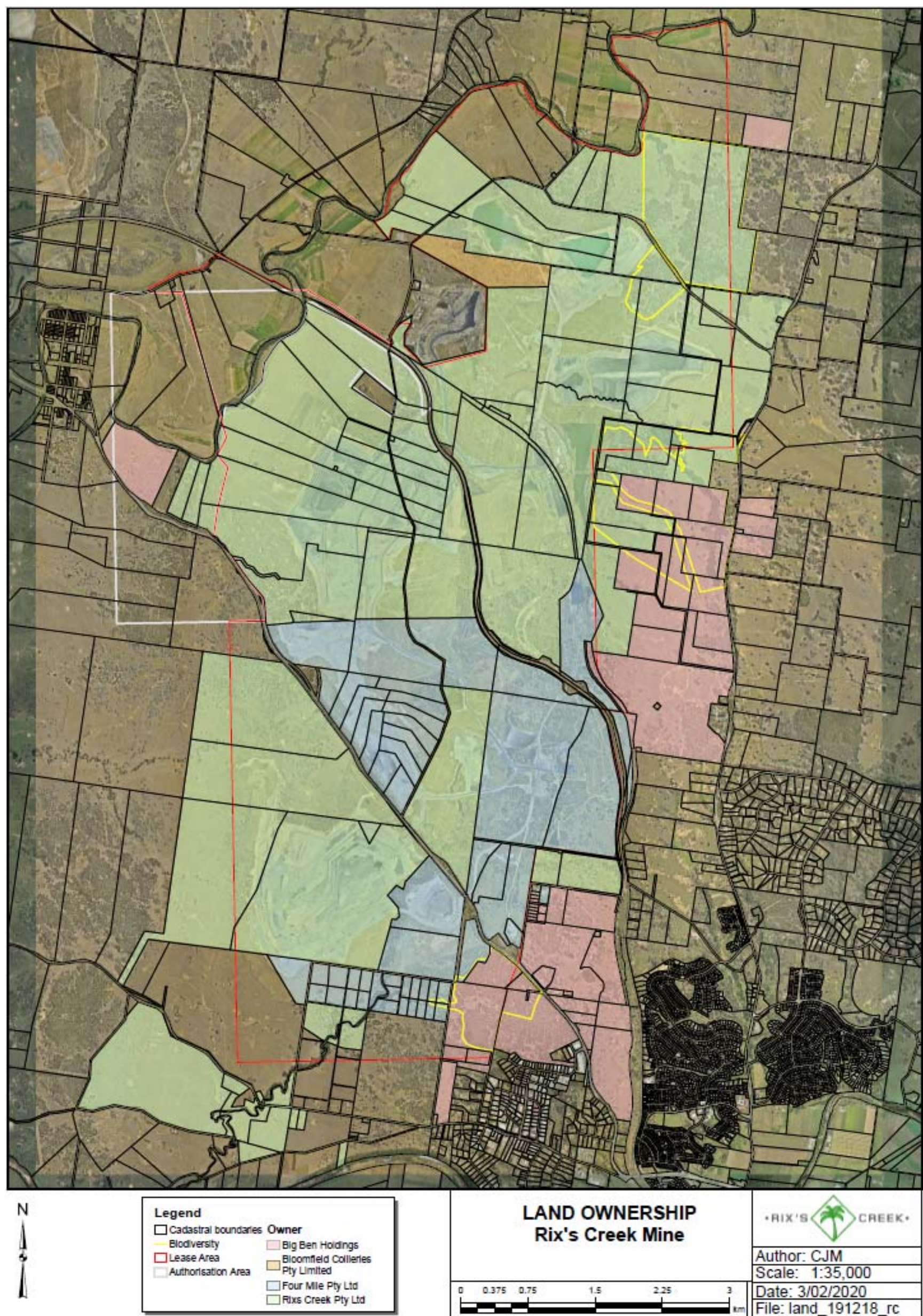


Figure 3 Land Ownership December 2019

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2.2 Mine Contacts

Rix’s Creek Pty Limited

Site:-

Rix’s Creek Lane
Singleton NSW 2330

Postal Address:-

P O Box 4
EAST MAITLAND
NSW 2323.

Telephone:-

02 65788800

Fax:-

02 65711066

Rix’s Creek Community & Blasting Hotline:-

02 49302665 (24hr)

info@bloomcoll.com.au

The Bloomfield Group Chief Operations Officer:- Luke Murray

Responsible for overseeing all Bloomfield Group operations.

E-mail:- lmurray@bloomcoll.com.au

Rix’s Creek Mine Operations Manager:-

Brendan Clements

Responsible for overseeing all Rix’s Creek Mine operations.

E-mail:- bclements@bloomcoll.com.au

Rix’s Creek Technical Services Manager:-

Tim Gentle

Responsible for survey and mine planning.

E-mail:- tgentle@bloomcoll.com.au

The Bloomfield Group Environment Manager :- Chris Knight

Responsible for consulting with regulatory authorities as required, provide measures for continual improvement to site procedures and ensuring all personnel are trained and competent in relation to environmental aspects of the mine site.

E-mail:- cknight@bloomcoll.com.au

Rix’s Creek Environmental Advisor:-

Chris Quinn

Responsible for assisting monitoring and reporting on the environmental performance of the operation and co-ordinating the rehabilitation on the mine site.

E-mail:- cquinn@bloomcoll.com.au

Rix’s Creek Environmental Officer:-

Hannah Lumsden / David Holmes

Responsible for assisting monitoring and reporting on the environmental performance of the operation.

E-mail:- hlumsden@bloomcoll.com.au / dholmes@bloomcoll.com.au

Bloomfield / Rix’s Creek Website:-

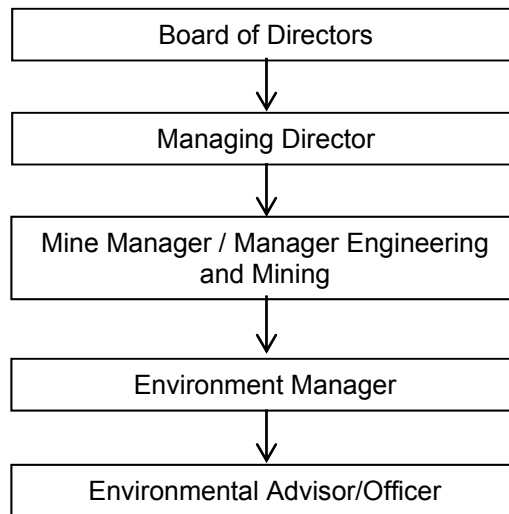
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2.3 Organisational Chart (Environment)

As per Rix's Creek Mine Management Structure Register document:



2.4 Employment Demography

Rix's Creek currently has 320 employees comprising of staff and operators. This is an increase from the 303 employees reported in the 2018 Annual Review. The increase in employment is largely attributed to the increased operations in the Camberwell Pit as well as the requirement for staff roles and production roles. The areas which include the largest number of employees are Singleton Council (30%), Maitland City Council (25%) and Cessnock City Council (20%). Rix's Creek mine endeavour to employ local personnel and local contractors are preferentially engaged as required.

Table 4 Demographic Breakdown at Rix's 2019

Council Area	No.	%
Singleton Council	95	30%
Maitland City Council	79	25%
Cessnock City Council	65	20%
Lake Macquarie City Council	19	6%
Newcastle City Council	17	5%
Muswellbrook Shire Council	12	4%
Port Stephens Council	10	3%
Upper Hunter Shire Council	10	3%
Dungog Shire Council	7	2%
Gunnedah Shire Council	2	1%
Mid Coast Council	2	1%
Central Coast Council	1	0%
Tamworth Regional Council	1	0%

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SECTION 3 – APPROVALS

Current approvals, tenements and MOP for RCM are summarised in Table 5.

Table 5 RCM approvals, tenements and MOP

Approval Number	Description	Issue Date	Expiry Date
Approvals			
NSW Department of Planning, Industry and Environment			
PA No. 08_0102	Development Consent for the construction and operation of surface coal mine extensions.	26 November 2010	31 December 2022 (now superseded to 31 December 2035 – Mod 6)
Modification 1	Modification to acquisition and mitigation properties, increase Falbrook Pit dump height, North crib huts, Implementation date for OLC extension, BOA extension	18 March 2012	31 December 2022 (now superseded to 31 December 2035 – Mod 6).
Modification 3	Eliminate OLC, modify Falbrook Pit Operating hours (7a-10p x 7d), additional mitigation property, amend noise criteria at property 112, Further extension to BOA (2 years)	5 October 2012	31 December 2022 (now superseded to 31 December 2035 – Mod 6).
Modification 2	OLC extension (6months), BOA extension (6 months)	1 February 2013	31 December 2022 (now superseded to 31 December 2035 – Mod 6).
Modification 4	Application submitted April 2014 to revise BOA strategy	24 February 2016.	31 December 2022 (now superseded to 31 December 2035 – Mod 6).
Modification 5	Transport and Processing of ROM coal from either Open Cut at either CHPP.	26 February 2016	31 December 2022 (now superseded to 31 December 2035 – Mod 6).
Modification 6	Application submitted Feb 2016 to separate consolidated approval into individual Underground and Open	23 August 2016.	31 December 2035

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Approval Number	Description	Issue Date	Expiry Date
	Cut approvals- and extend timeframe for open cut mining operations till 2035.		
Modification 7	The exploration drilling activities as described in EA (Mod 7)	1 September 2017	31 December 2035
Modification 8	Previous mined area outside approved open cut limit.	3 April 2019	31 December 2035
DA No. 49/94	Development Consent for the construction and operation of surface coal mine extensions.	19 October 1995	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 1	Consent modification to amend monitoring requirements	11 February 1999	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 2	Consent modification for Rix's Creek Mine to receive ROM coal from Glennies Creek Underground Mine and to process the coal for transport by rail (2003)	30 June 2006	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 3	Consent modification for Rix's Creek Mine to receive, process and transport bulk coal samples from the Bickham Exploration Project (2004);	15 June 2004	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 4	Consent modification for Rix's Creek Mine. To allow a tunnel under the New England Highway (2009);	27 August 2009	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 5	Consent modification for Rix's Creek Mine to enable the construction and operation of a rail loop, associated clean coal stockpile and rail loading facility (2013)	25 November 2013	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 6	Consent modification for Rix's Creek Mine to increase the total volume of material that can be moved annually to 16.1 million bcm (2014);	2 December 2014	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94 MOD 7	Consent modification for Rix's Creek Mine for ROM coal from Rix's Creek North (former Integra Mine site) to be processed at RCS Coal Handling and Preparation Plant (CHPP) (2016);	26 February 2016	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94	Consent modification for Rix's Creek Mine Satellite ROM Pads.	20 December 2016	24 June 2019

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Approval Number	Description	Issue Date	Expiry Date
MOD 8			(now 24 March 2020- Mod 10)
DA No. 49/94 MOD 9.	Consent modification for Rix's Creek Mine. (Dried tailings refuse to be emplaced in overburden dumps at Rix's Creek North (up to 500,000 m3) and overburden from Rix's Creek South to be placed at Rix's Creek North (up to 5,000,000 m3).	01 September 2017	24 June 2019 (now 24 March 2020- Mod 10)
DA No. 49/94	Consent Order- 2017/211784- NSW Land and Environment Court.	12 July 2017	24 June 2019 (now 24 March 2020- Mod 10)
DA 49/94 MOD 10	Consent Modification for Rix's Creek Mine Extension of approval for coal extraction until 24 March 2020.	12 June 2019	24 March 2020
SSD 6300	Rix's Creek Continuation of Mining Project	12 October 2019	12 October 2040
Singleton Shire Council			
DC	Hydrocarbon Storage Shed	7 December 2005	-
DC	Control Room	12 September 2005	-
Approval to Demolish Existing Dwelling and Shed	Dwelling and shed located at Lot 93 DP 752442 Middle Falbrook Road	13 April 2005	-
DC 719/2003	For Glennies Creek to Ashton Water Pipeline	13 February 2004	-
DC 90/2001 (Mod)	Alteration / additions to transportable office building	13 June 2001	-
DC 90/2001	For new offices and bathhouse	5 April 2001	-
BA 1/99	Construction of awning within Integra underground muster area	26 March 1999	-
BA 2/99	Bathroom / office complex	26 March 1999	-

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Approval Number	Description	Issue Date	Expiry Date
DA 51/90	Stockpile and Rail Loading Facility	18 October 1990	-
7666/2019	Middle Falbrook Road Closure Permit	22 May 2019	-
18/00657	Consent for Permanent Road Closure- Disused Section of Middle Falbrook Road	18 September 2019	-
8167/2019	Stony Creek Road Road Use (Closure for Blasting).	30 May 2019	15 June 2020 (Renewed Annually).
5586/2019	New England Highway Road Closure Permit	2 April 2019	-
Tenements			
CL352	Coal Lease	13 September 2011	October 2031
ML1432	Mining Lease	24 June 1998	July 2019 – (Renewal Pending)
CL357	Coal Lease	27 March 1990	27 March 2032
ML1630	Mining Lease	16 March 2009	16 March 2030
ML1648	Mining Lease	4 January 2011	4 January 2032
ML 1649	Mining Lease	4 January 2011	4 January 2032
ML1650	Mining Lease	4 January 2011	4 January 2032
ML1651	Mining Lease	4 January 2011	4 January 2032
ML 1725	Mining Lease	6 March 2018	11 November 2033
Roads and Maritime			
New England Highway – Road Occupancy Licence.		Lic No 1185380	Renewed until 30 June 2020 (12-monthly renewal)
Mining Operations Plans (at end of period)			

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Approval Number	Description	Issue Date	Expiry Date
	Mining Operations Plan	1 December 2019	1 December 2022

Issued By	Number	Grant date	Expiry, renewal or anniversary date	Comment	
Environment Protection Licence					
NSW Environment Protection Authority.	EPL 3391	21 August 2000	03 April (Annually)	For coal mining and processing at the Rixs Creek North (Integra open cut) and Rix's Creek, South on a scale of >5 million tonnes coal handled and >5 million tonnes of coal products loaded.	
Dangerous Goods Notification					
SafeWork NSW	NDG 028098 (RCN)	14/4/2019		Notification of Dangerous Goods on Premises (ammonium nitrate, emulsions and combustible liquids).	
SafeWork NSW	NDG 032405 (RCS)	14/4/2019		Notification of Dangerous Goods on Premises (ammonium nitrate, emulsions and combustible liquids).	
Bore Licences					
Natural Resource Access Regulator	Number		Category	Volume	Purpose
	20BL169513		Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock

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Issued By	Number	Grant date	Expiry, renewal or anniversary date		Comment
	20BL172249		Mining	100(ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	20BL170863		Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	20BL170864		Mining	100(ML/yr)	1 x Bore (dewatering groundwater)

Issued By	Number	Grant Date	Expiry, Renewal or Anniversary Date	Comment
NSW Environment Protection Authority. Radiation Management Licence No: 5079169	Radiation Regulated Material ID 8661	-	14 April 2020	Old No: RR10119
	Radiation Regulated Material ID 8663	-	14 April 2020	Old No: RR10120
	Radiation Regulated Material ID 8664	-	14 April 2020	Old No: RR10121
	Radiation Regulated Material ID 9121	-	14 April 2020	Old No: RR7561

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SECTION 4 – OPERATIONS SUMMARY

Table 5 Rix’s Creek North PA08_0102 Production Summary

Material	Approved limit	Previous Reporting Period	This Reporting Period	Next Reporting Period
Waste Rock / Overburden	N/A	10,402,073 BCM	7,352,886BCM	6,909,502
ROM Coal / Ore	4.5 Million Tonne per annum (Western Mining area ONLY)	2,979,572t**	1,213,920t**	1,922,411
Coarse reject / Fine reject (Tailings)	N/A	768,114t*	1,072,039t*	969,409
Saleable product	N/A	1,419,730t	721,893t	953,002

* RCN CHPP washed Integra UG Coal only. Coarse reject and tailings generated from processing Integra Underground Coal. RCN Open Cut Coal processed at RCS CHPP.

** RCN Open Cut Coal tonnage processed at RCS CHPP.

Table 6 Rix’s Creek South DA49/94 Production Summary

Material	Approved limit	Previous Reporting Period	This Reporting Period	Next Reporting Period
Waste Rock / Overburden	16.1 Million BCM total material movement as per DA 49/94 Mod 6	8,343,078 BCM	7,621,847BCM	6,641,917
ROM Coal / Ore	N/A	1,694,275t	2,332,364t	2,287,249
Total Material Movement on Site – Overburden + Coal	16.1 Million BCM total material movement as per DA 49/94 Mod 6	9,472,595 BCM	9,287,821	8,929,166
Coarse reject / Fine reject (Tailings)	N/A	2,740,806t*	2,854,747t	1,328,935t
Saleable product	N/A	656,991t	1,177,855t	958,314

*Combined coarse reject and tailings from RCS CHPP which processes both RCN and RCS ROM Coal.

During 2019, the Rix’s Creek North CHPP washed Glencore’s Integra Underground ROM Coal, with fine tailings from the coal washing process being deposited in Rix’s Creek North prescribed emplacement facility Tailings Dam 2. Course reject from the processing of Integra UG’s coal was disposed within the Rix’s Creek North open cut area.

Coal that was extracted from both the Rix’s Creek North and Rix’s Creek South open cut areas was processed at the Rix’s Creek South CHPP. The fine tailings from coal washing process was stored in Rix’s Creek South’s Emplacement Area 4, which is referred to as MB19. Dry tailings was disposed of within Rix’s Creek South open cut area. Course reject was disposed within the Rix’s Creek South open cut area.

Rix’s Creek South DA49/94 operated significantly below its maximum total material movement of 16.1 Million BCM during 2019. At Rix’s Creek North PA (08_0102) ROM coal production was significantly less than the maximum allowable limit of 4.5 Million Tonnes per annum.

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Rixs Creek North & Rixs Creek South

Table 7 Rix's Creek North Production

YEAR	ROM COAL PRODUCTION (tonnes)	OVERBURDEN REMOVAL (bank cubic metres)	APPROVAL LIMIT ROM Coal (Tonnes) (Western Mining Area ONLY)
2016	915,011	4,825,050	4,500,000*
2017	1,804,652	11,564,760	4,500,000*
2018	2,979,572	10,402,073	4,500,000*
2019	1,213,920	7,352,886	4,500,000*

* Project Approval 08_0102 Sch 2, Con.7.

Table 8 Rix's Creek South Production History

YEAR	RON-of-MINE COAL PRODUCTION (tonnes)	OVERBURDEN REMOVAL (bank cubic metres)	Total Movement of Material on site (bank cubic metres)	APPROVAL LIMIT (bank cubic metres)
1990	300,000			
1994	800,000			
1997	1,700,000	7,198,000	8,898,000	15,000,000
1998	1,800,000	7,052,000	8,852,000	15,000,000
1999	1,888,900	7,635,000	9,523,900	15,000,000
2000	2,288,900	7,635,000	9,923,900	15,000,000
2001	1,679,400	7,460,000	9,139,400	15,000,000
2002	1,754,001	7,787,685	9,541,686	15,000,000
2003	1,943,095	8,768,068	10,711,163	15,000,000
2004	1,931,383	8,511,771	10,443,154	15,000,000
2005	1,628,753	9,567,000	11,195,753	15,000,000
2006	2,015,042	11,547,989	13,563,031	15,000,000
2007	2,096,320	11,150,416	13,246,736	15,000,000
2008	2,096,697	11,020,152	13,116,849	15,000,000
2009	2,338,424	10,698,123	13,036,547	15,000,000
2010	2,367,229	10,267,881	12,635,110	15,000,000
2011	2,212,703	10,589,386	12,802,089	15,000,000
2012	2,689,935	10,341,895	13,031,830	15,000,000
2013	2,747,880	11,502,321	14,250,201	15,000,000
2014	2,760,693	13,234,085	15,994,778	16,100,000*
2015	2,847,899	13,364,730	15,073,469	16,100,000
2016	2,662,223	13,534,982	15,132,316	16,100,000
2017	2,013,486	9,266,678	10,609,002	16,100,000
2018	1,694,275	8,343,078	10,037,353	16,100,000
2019	2,332,364t	7,621,847	9,954,211	16,100,000

*Development Consent 49/94 - Mod 6 approval granted November 2014.

The tailings at Rix's Creek Mine is transported by pipeline and safeguarded by:-

- use of welded poly pipe;
- containment dams located along the length of the pipeline;
- regular pipeline inspections; and
- differential flow meters.

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The solid-bowl centrifuge system located at the RCS CHPP enables a lower amount of tailing's to be transported by pipeline as the water removed during the tailing's 'drying' process allows for co-disposal of the 'dried' tailing's within the open cut emplacement area in a similar fashion to overburden. Early testing of dump areas has shown minimal surface slumping / cracking when this dried tailing's material is capped with sufficient overburden material from the mining process.

Return water is decanted from the emplacement area and pumped back to the containment water system that feeds the coal preparation plants. This maximises the recycling of mine water across site.

At Rix's Creek North CHPP, fine tailings is pumped to prescribed emplacement facility Tailings Dam 2. A sloping decant structure was built in 2011 when the Tailings Dam was augmented. This allows the tailings return water to be transported to D1 for water to be reused for coal washing and dust suppression at Rix's Creek North.

Table 12 Rix's Creek North Coal Transport PA 08_0102

YEAR	Product Coal railed from RCN Rail Loop (tonnes)	Coal Transport limit (Tonnes)
2019	2,915,422	7,300,000

4.1 Exploration

No exploration drilling was conducted in 2019 at RCM.

4.2 Land Preparation

8.3Ha of land preparation or pre- stripping ahead of the existing open cut mining operations was carried during 2019. The Bloomfield Groups Permit to Disturb was utilised prior to clearing any land within the defined Dulwich Block Area at the Camberwell Pit. As per the permit to disturb process, a flora and fauna survey was conducted of the area prior to any clearing taking place. The Archaeology Assessment was previously completed for this area.

4.3 Construction

Construction of the RCS Coal Handling Preparation Plant (CHPP) acoustic wall was completed 2019. The Northern and Eastern cladding on the RCS CHPP was completed in July 2019 to reduce noise to our sensitive receivers to the east of Rix's Creek Mine.

4.4 Mining

Rix's Creek Mine, which includes both Southern and Northern operations operated three shifts a day, 15 shifts a week for 48 weeks during 2019. Day shift operated between 06:20 and 14:20, afternoon shift operated between the hours of 14:20 and 22:20 hours and night shift 22:20 and 06:20.

The major operation took place in the Camberwell Pit at Rix's Creek Northern operations. The Liebherr R9800 excavator (EX9800) continued to operate at Rix's Creek North. The two Hitachi 3600 excavators continued operation in the Camberwell Pit. The Caterpillar 6060 (EX6060) was relocated from Camberwell Pit operations to Rix's Creek South West Pit in April 2018.

Operations also took place in West Pit western side of Rix's Creek South with the Hitachi 5500 excavator (EX5500) and the Hitachi EX3600 excavator (EX3600-1) in operation at West Pit.

No Mining occurred in the Falbrook Pit at RCN which remains in Care and Maintenance.

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There has been no major change to mining methods on site during the reporting period. Overburden and inter-burden were removed utilising the Liebherr R9800 excavator, Caterpillar 6060 (EX6060) Hitachi EX5500 excavator, Hitachi EX3600 excavator, and large front end loaders (Caterpillar 994 & 992). These machines load 220 (Caterpillar 793) and 180 (Caterpillar 789) tonne rear dump trucks. Associated with this machinery is the normal suite of ancillary equipment (bulldozers, graders, water carts and drills) used in the overburden and coal removal process.

During 2019 the main operation areas includes mining of the Rix's Creek North Camberwell Pit. Rix's Creek West Pit will continue to progress in a north-west direction aligned with the current MOP in place (i.e. between the out of pit dump and the New England Highway).

Table 13 is a list and number of the major pieces of equipment utilised on site for the mining operation.

Table 13 Equipment List 2019

Equipment List 2019	
Caterpillar 789 Truck	26
Caterpillar 793 Truck	11
Caterpillar 994 Front-End Loader	4
Caterpillar 992 Front-End Loader	3
Caterpillar 950 Front-End Loader	1
Liebherr R9800 Excavator	1
Hitachi EX5500 Excavator	1
Hitachi EX3600 Excavator	3
Caterpillar 6060 Excavator	1
Caterpillar D 11 Bulldozer	8
Caterpillar D 10 Bulldozer	6
Caterpillar Tiger R690B Bulldozer	1
Caterpillar Tiger 854 Bulldozer	1
Caterpillar 16G Grader	1
Caterpillar 16H Grader	1
Caterpillar 24H Grader	2
Redrill SK75	1
Redrill SK50	1
Sandvik Drill D75K	1
Sandvik Drill D50-i	1
Volvo Stemming Truck	2
Volvo Lube Truck	2
Caterpillar 773 Lube truck	1
Caterpillar 785 Water Cart (114,000 l)	3

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Caterpillar 777 Water Cart (80,000 l)	3
ACCO Water Cart (10,000 l)	1

4.6 Waste Management

The following waste streams were serviced during the reporting period:

Waste Water: Grey water generated on site consisting of domestic waste water from the bathhouse facility's, associated amenity areas and administration areas pass through septic systems approved by the local authorities. RCS: OSSM Approval No: 2820/2002 expiry 30/06/2020.RCN: OSSM Approval No 1379/1999.

These septic facilities comprise primary and secondary treatment process with solid waste processed by anaerobic bacteria. Effluent passes to a maturation pond prior to disposal by evaporation and land irrigation. The septic systems are regularly inspected by a specialist water treatment contractor. The septic tanks are vacuum cleaned out to remove sludge build up on a quarterly schedule or as required by a suitably qualified waste contractor and the resulting waste is removed from site.

Waste Oil: Waste oil from mining equipment as a result of scheduled maintenance operations, breakdown repairs is collected in a storage tanks and there after removed for recycling by a licenced waste oil contractor. Most mining machinery is greased automatically by an on board system. The system is refilled from a bulk bin on the mobile service cart. Alternatively, this is carried out in the main workshop. Any oil contaminated water is contained within bunded storage areas, passed through specialised oil separation systems before being collected the licenced waste oil contractor.

Waste Metal: Scrap metal is collected for recycling on a regular basis and as required. The metal recycler sorts into hard and soft metal for further economic benefit to the company. A tidy up initiative continued in 2019, which saw a large portion of disused scrap metal be recycled to improve the cleanliness of areas around RCM.

Copper Bin: Assorted copper on site, mostly from electrical wiring, is recycled by a metal contractor and collected on a regular basis and as required. Most wiring remains with the protective layer attached but where economical a contractor strips assorted wire on-site for further economic benefit to the company. A copper waste bin is located in the RCS and RCN electrical workshop to further minimise waste.

General Waste: General waste garbage is placed in large bins and taken off site by a licenced waste contractor for disposal.

Paper/Cardboard Recycling: Paper and Cardboard is placed in large bins and taken off site by licenced contractor for further recycling. Small paper/recycling bins are placed within the main offices, workshops and CHPP's to enhance recycling.

Plastic wrapping: Plastic wrapping recycling was introduced during 2015 to site. Plastic used in the wrapping of parts and other assorted uses across site is placed in tied-off bags within the store and collected with the paper/cardboard recycling for further recycling off-site by the waste contractor.

Batteries: Small general use batteries (AA, AAA, C, D, etc.) recycling was introduced during 2015 to site. Sealed battery tubs are located within the offices, electrical workshop and RCN workshop for further recycling off site by the waste contractor. Large batteries are also stored on bunded pallets, or within designated battery bays and taken off site by a licenced waste contractor.

Oil Filter Bin: Used oil filters from heavy vehicles are placed in a large lidded bins located at both the Southern and Northern workshops. These are taken off site by licenced contractor for cleaning and recycling at the waste contractor's facility

Hydraulic Hose Bins: Two hydraulic hose bins are located at the RCS and RCN workshops and

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regularly serviced by a licenced waste contractor.

Oily Rag Bins: There are several labelled Oil rag bins located in and around the RCS and RCN mechanical workshops and they are regularly serviced as required by a licenced waste contractor.

Used printer cartridges: These are placed in a large bin within the main office and taken off site by contractor for recycling at the waste contractor's facility as required.

Poly Pipe recycling: Poly Pipe was stored on site and reused as required in 2019.

Electronic Waste: E waste is segregated and transported offsite to a local recycler by the primary waste contractor. E-waste can include, printer cartridges, old computers and outdated electronic components from operational machinery.

Table 14 2019 Waste Volumes

Description	2019	2018 Total	2017 Total
Liquid Waste	22,500	10,838	
Metal Recycling	305,100	247,984	373,364
Batteries recycling (kg)	12,400	*	2,428
Copper (kg)	13,100		
Oily Water	12,600	20,000	
Waste Oil (L)	431,400	412,470	388,300
Paper and Cardboard (kg)	13,705	10,831	15,171
Timber Recycling(kg)	36,340	7,380	
General Waste (kg)	187,547	154,636	134,809
Oily Rags (kg)	4,400	1,800	
Hydraulic hoses (kg) and Oil Filters	6,600	7,400	20,230
E-waste (kg)	933	500	641
Fluro recycling(kg)	86	70	180

** waste consultant couldn't provide actual figures on battery recycling. Recycling of batteries did occur in 2018.*

4.7 Product Stockpiles

Raw coal is transported from the active mining areas in 180 and 220 tonne rear dump trucks (Caterpillar 789 and 793) to the 30,000 tonne capacity run of mine (ROM) stockpile at the coal preparation plant or the two satellite ROM stockpiles prior to washing. Product coal (clean coal) is conveyed to a 1,000 tonne bin and then transported by road vehicles 2.0 kilometres to the rail loading facilities. Each coal transportation semi-trailer holds approximately 48 tonnes of clean coal.

The capacity of the clean coal stockpile at the rail loading facility is 185,000 tonnes.

At Rix's Creek North, Caterpillar 789 and 793 haul trucks transport coal from the Integra Underground ROM stockpile, along the RL100 haul road to the RCN CHPP. Haul trucks either place the ROM coal directly into the coal hopper for processing or stockpile the ROM coal at the RCN stockpile.

4.8 Hazardous Material Management

Under Schedule 11 of the Work Health and Safety Regulation notification of hazardous substances occurred during 2018. The listing of dangerous goods stored on site is listed below:-

Depot 1	Above ground tank for Class C1, UN 00C1 Diesel.	220,000 litres
Depot 2	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 3	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 5	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 6	Above ground tank for Class 3, UN 1989 Aldehydes, N.O.S.	15,000 litres
Depot 8	Above ground tank for Class C1, UN 00C1 Combustible liquids	60,000 litres
GAS1	Cylinder store for Class 2.1, UN1001 Acetylene, dissolved	1,000 litres
GAS2	Cylinder store for Class 2.2, UN1072 Oxygen, compressed	1,000 litres

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GAS2	Cylinder store for Class 2.2, UN1006 Argon, compressed	1,000 litres
RCN1	Above ground tank for Class 5.1, Ammonium Nitrate	50,000 kg
TKN1	Above ground tank for Class 5.1, Ammonium Nitrate Emulsion	60,000 kg
TKN2	Above ground tank for Class 5.1, Ammonium Nitrate Emulsion	30,000 kg

A separate licence for the storage and handling of explosives on the site has also been made to WorkCover. License number:- XSTR100131 is granted until 5/7/2022 The listing of explosives stored on site is listed below:-

MAG1	Magazine Class 1.1B, UN 360, Detonator Assemblies non-electric	10,000 units
MAG1	Magazine Class 1.4S, UN 349, Articles, Explosives, N.O.S.	10,000 metres
MAG1	Magazine Class 1.4B, UN 255, Detonators, Electric for blasting	10,000 units
MAG2	Magazine Class 1.1D, UN 65, Cord, detonating, flexible	3,000 metres
RCN1	Explosives Receptacle Class 5.1, Ammonium Nitrate (ANFO)	50,000 kg
TNK1	Above ground tank Class 5.1, UN 3375, ANFO Emulsion	80,000 litres
TNK2	Above ground tank Class 5.1, UN 3375, ANFO Emulsion	36,000 litres

Access to Safety Data Sheets is through the ChemAlert web site. The register is continually updated as new products are brought onsite.

Explosives are stored in explosive magazines located on site.

4.9 Other Infrastructure Management

There has been an ongoing maintenance program on infrastructure associated with the Rix's Creek mining operation. This has included painting of assorted buildings and substations sheds across site.

During 2019, planned maintenance work was completed on the Rix's Creek North CHPP for washing of Integra UG ROM coal.

There has been an ongoing maintenance program replacing existing older lights with new modern LED lighting that shields and directs light more directly toward the ground rather than outwards. When fixed lighting is installed at Rix's Creek Mine, the external lighting is assessed to comply with *Australian Standard 4282: 2019 – Control of Obtrusive Effects of Outdoor Lighting*.

4.10 Bush Fire Management

An updated Bushfire Management Plan was submitted to the Rural Fire Services (RFS) for consultation in October 2019.

A slashing program was undertaken to reduce fuel loads. Excessive grass and weeds were sprayed around site infrastructure to further reduce fuel loads. Rix's Creek and AusGrid also conducted spraying and mulching of power line easements across site throughout the year.

Proactive management was undertaken which included trimming trees that could potentially come in contact with overhead power lines and implementing an inspection program for tree trimming near the overhead power lines to reduce the occurrence of grass fires.

During 2014 Rix's Creek purchased a property and existing four-bay shed in Maison Dieu in which the shed is provided to the Rural Fire Service – Darlington brigade in sponsorship by the Bloomfield Group at no cost. This sponsorship continued in 2019.

Fuel reduction programs are undertaken on an as needed basis and done in conjunction with the local Rural Fire Service and local landholders. Areas of land owned within the lease and outside of the active mining area and rehabilitated areas will continually be leased to lessee's to graze cattle in a bid to minimise fuel loads across site.

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SECTION 5 – ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 Actions Required at Previous Annual Review

On the 23 September 2019 the Resources Regulator provided correspondence stating that the 2018 Annual Review generally satisfies Annual Environmental Management Reporting conditions of CL357 (1973), ML1630 (1992), ML1648 (1992), ML1649 (1992), M1650 (1992), ML1651 (1992), ML1725 (1992), CL352 (1973) and ML1432 (1992).

The Department of Planning Industry and Environment (DPIE) conducted a desk top audit for both the Rix’s Creek South and the Rix’s Creek North 2018 Annual Review and stated that it generally meets the requirements of the approvals. There were no actions requested from the desk top audit.

SECTION 6 ENVIRONMENTAL PERFORMANCE

An extensive environmental monitoring program is conducted throughout the site and surrounding areas to monitor the impacts of the operation. Environmental parameters monitored include local meteorology, air quality, water quality, blast vibration, blast over pressure and noise.

6.1 Meteorological

RCM mine operates a meteorological station on the site. The RCM meteorological station is located on the Western extent of RCS west Pit operations and has real-time capabilities for all personnel to access via computer or phone. In September 2019 a new weather station was installed with specification requirements associated with AS/NZS 3580.14:2014 (Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring applications). The RCM meteorological station record the following environmental parameters:-

- wind speed and direction;
- Sigma Theta;
- temperature (2m and 10m);
- relative humidity;
- solar radiation; and
- rainfall.

These parameters are recorded at 10-minute intervals and downloaded on a monthly basis. To complement this, Rix’s Creek Mine is a member of the Upper Hunter Sounding Group Joint Venture (UHSGJV) which provides access to an atmospheric prediction model providing more accurate weather parameter predictions for the Rix’s Creek operation. This information is used by management to access environmental conditions for blast scheduling, and determine when adverse conditions exist to cease dumping to exposed locations. This model also forecasts meteorological data for the following day so operational activities can be scheduled for the predicted conditions.

6.1.1 Rainfall

Total rainfall for the period was 381.1 mm over 54 days, which was 316 mm below average for the year. The yearly average for Singleton is 698 mm. The monthly rainfall data is provided in **Table 15** and **Figure 4** shows the results graphically.

March and September were the only months to receive above average rainfall. Prolonged drought conditions were experienced during the reporting period within the Singleton Local Government Area (LGA).

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Table 15 Annual Rainfall

RIX'S CREEK ANNUAL RAINFALL 2019													
Month	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Total Rainfall	46	41.5	146.5	16	16.4	27.25	12.5	2.25	57	0.5	15.2	0	381.1
Average Rainfall	75	72	71	56	46	57	51	42	45	51	58	74	698
Wet days (>0.5 mm rainfall)	7	4	7	5	8	8	5	1	3	1	5	0	54

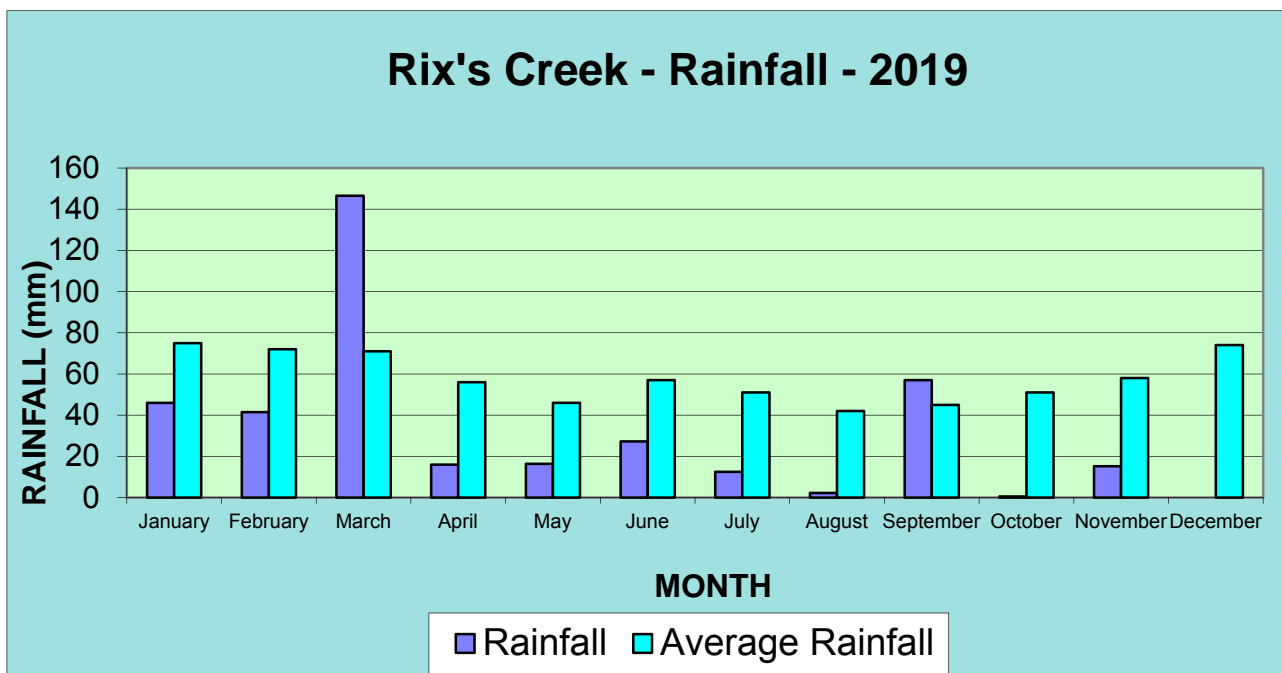


Figure 4 Annual Rainfall 2019

6.1.2 Temperature

The maximum temperature of 42.5°C occurred on 21st December and the minimum temperature of 2.4°C was recorded on 22nd June. **Figure 5** shows the monthly average maximum and minimum temperatures for the site as well as the maximum and minimum recorded temperatures.

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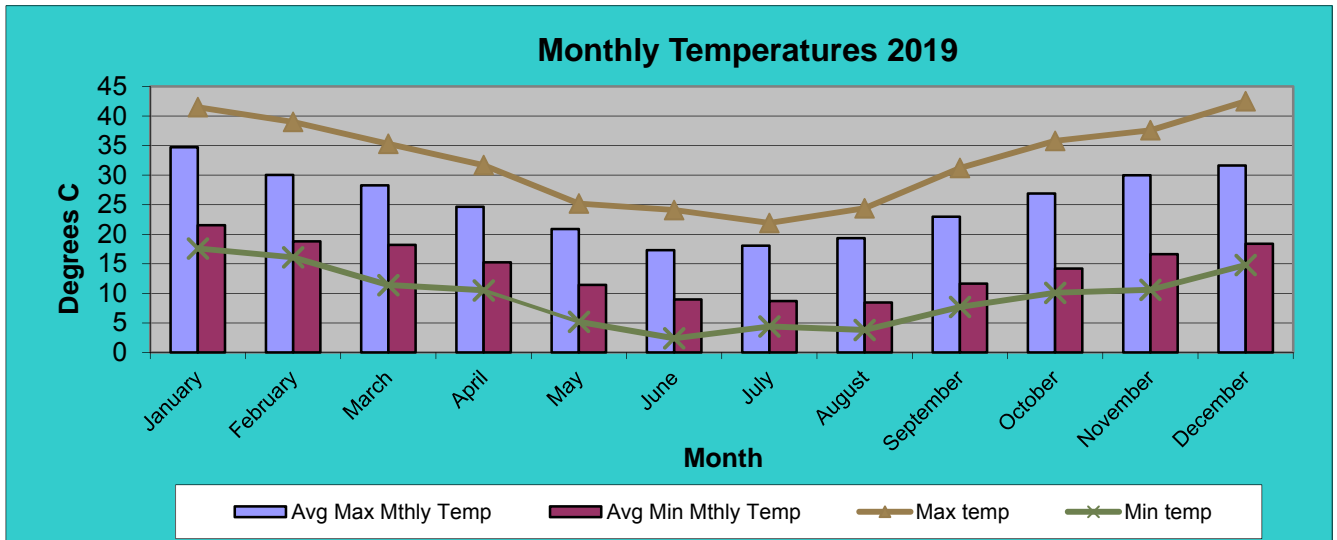


Figure 5 Average Monthly Maximum & Minimum Temperature 2019

6.1.3 Wind Speed and Direction

The results of wind speed and direction monitoring shows similar trends to previous years. During summer the winds are predominant from the south east and winter the northwest. Autumn and spring are typically transitional seasons with winds distributed between both northwest and south-easterly directions. From all of the windroses it is evident the dominant wind direction for the 2019 calendar year was from the north-west.

Figure 6 shows the seasonal windroses generated for the site on a seasonal basis.

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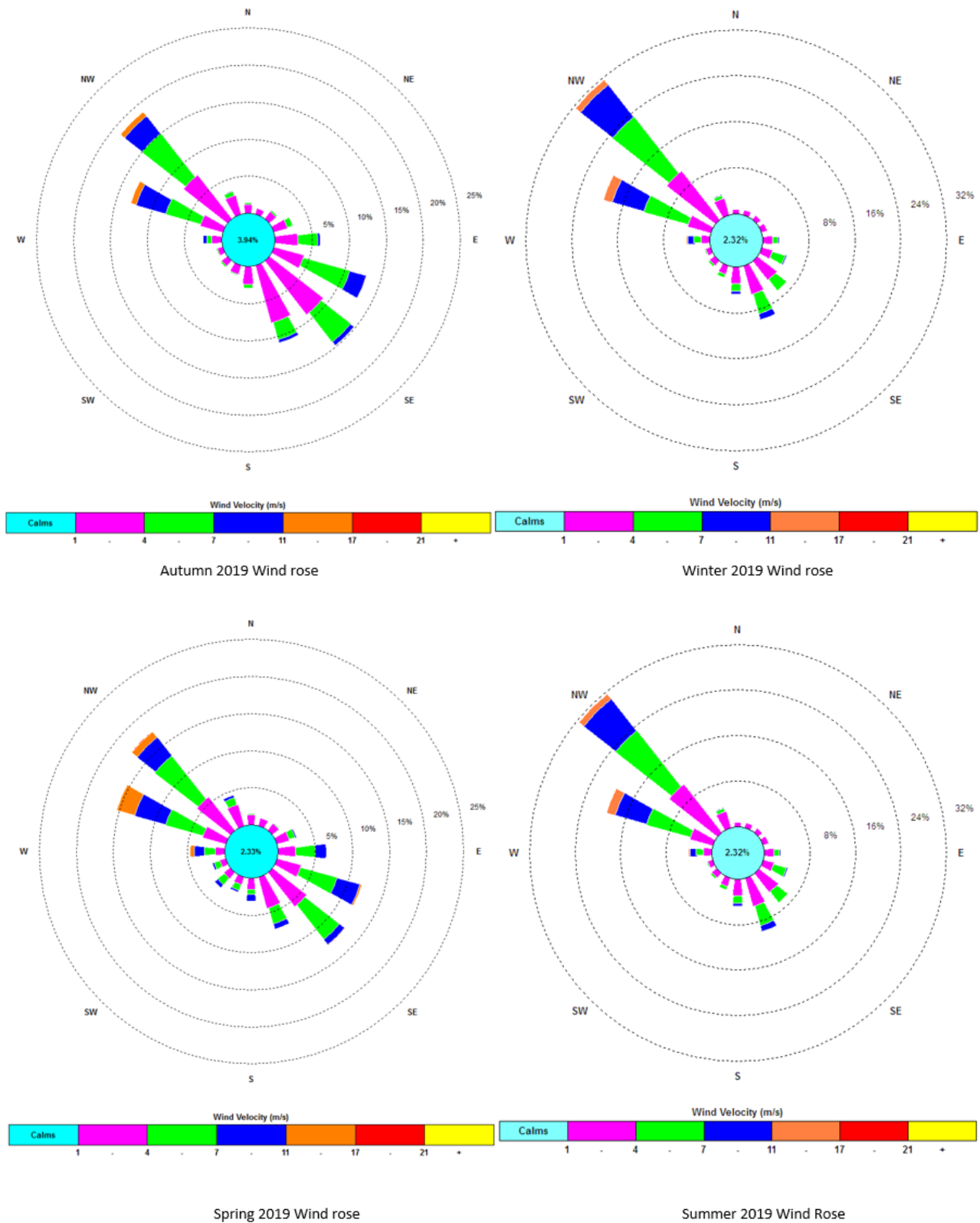


Figure 6 Windrows for Rix's Creek 2019

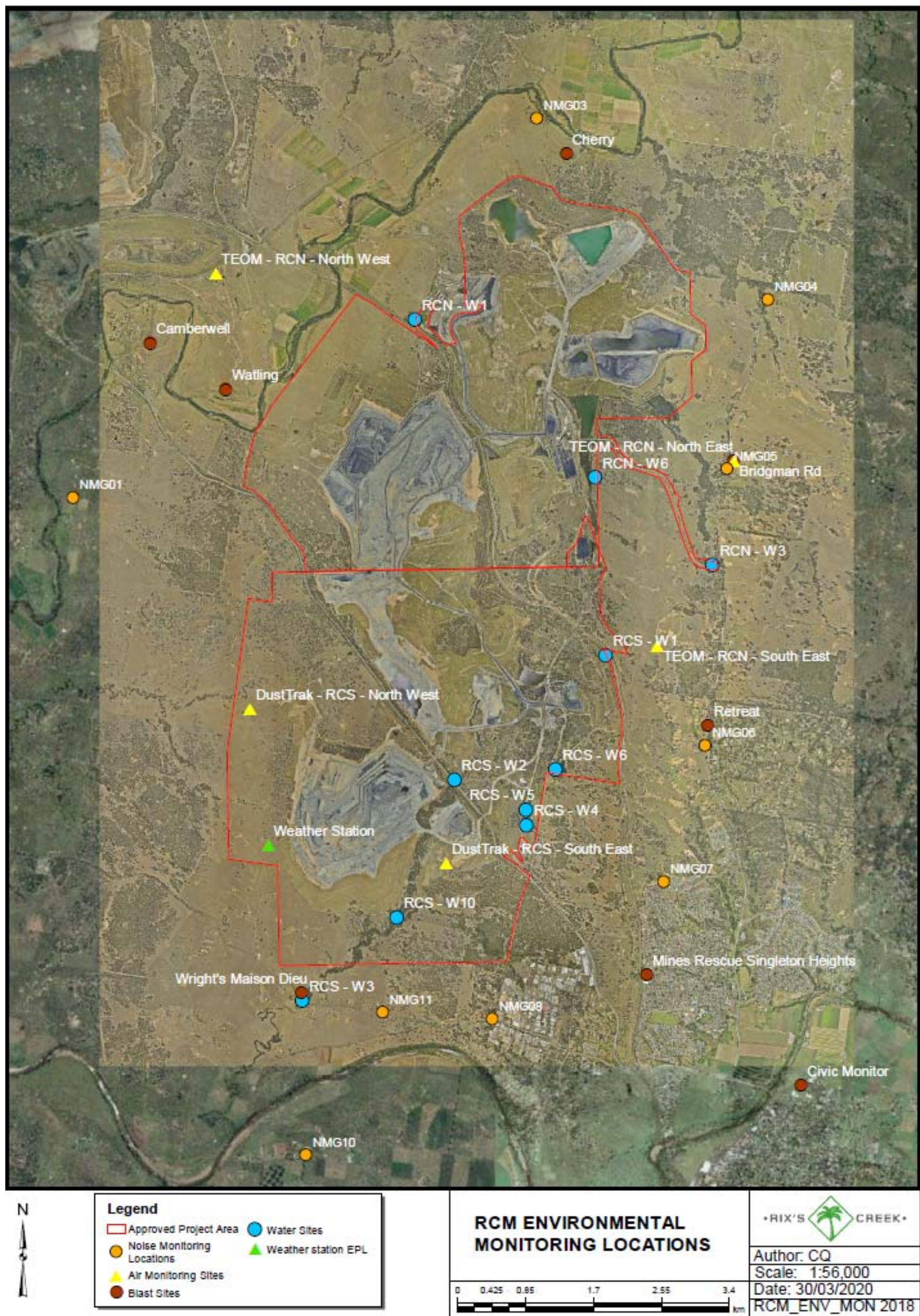


Figure 7 Rix's Creek Mine Compliance Environmental Monitoring Locations

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6.2 Operational Noise

6.2.1 Environmental Management

The primary objectives of the RCM Noise Management Plan is to ensure compliance with legislative requirements, support procedures to manage and monitor noise emissions from the mine and provide management mechanisms to minimise the potential for noise from the mine to cause off site impacts were possible.

Residences surrounding RCM have been grouped generally according to the locality and local acoustic environment. These groupings are referenced in the relevant EAs as Noise Assessment Groups (NAG).

The RCM Noise Management Plan, which includes both Rix’s Creek Southern and Rix’s Creek Northern mining operations was approved by DPE on the 19 December 2017. The Noise Management Plan was updated on the 24/07/2019 with an updated noise protocol being established between nearby mines. This updated NMP was subsequently approved by DPIE on 31 July 2019.

A variation of EPL 3391 was approved on the 23 April 2019. The variation approved the relocation of the NM06 noise monitoring site away from the private residences dwelling to minimise the disturbance on the private residence. The NM06 location was located a short distance from the original NM06 location and is still representative of the NM06 Noise Assessment Group.

Rix’s Creek EPL section states that Rix’s Creek must seek to ensure that its rail spur is only accessed by locomotives approved to operate on the NSW rail network in accordance with noise limits L6.1 to L6.4 in RailCorp’s EPL (No. 12208) and ARTC’s EPL (No. 3142) or a Pollution Control Approval issued under the former Pollution Control Act 1970. Rix’s Creek Mine has actively ensured that, as per ARTC’s Environmental Protection Licence (EPL no. 3142), the locomotives accessing the Rix’s Creek rail spur are approved for use on the ARTC network.

6.2.2 Environmental Performance

On the 8 April 2019 Rix’s Creek Mine exceeded the noise limit under Condition L3.1 at location NM05, EPA Identification 32, after application of the modifying factor required for low frequency noise as required under Condition L3.8 and Section 4 of the Noise Policy for Industry (2017).

The noise exceedance was not considered a non compliance under the PA 08_0102. The exceedance was for the second 15 minute reading as required under the EPL 3391, the first 15 minute reading was compliant and therefore not an exceedance of the PA 08_0102.

A remeasure of the noise from the operation determined that the noise exceedance was not sustained and therefore not in breach of the EPL, Conditions of Project Approval PA 08_0102 or Noise Management Plan as per section 11.1.3 of the Industrial Noise Policy.

No formal correspondence has been received in relation to the one (1) externally reportable incident to the EPA. DPIE were notified of the EPL3991 exceedance.

A review of the projects environmental noise performance is described in the monthly attended noise monitoring compliance reports available on The Bloomfield Groups website:

<https://www.bloomcoll.com.au/sustainability/environmental-management/rixs-creek/assessments/epl-monitoring>

6.2.3 Incidents and Complaints

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Ten (10) noise complaints were recorded during 2019, a decrease on the thirteen (13) that was recorded during the 2018 period and Thirty four (34) that were recorded for noise during 2017. Rix’s Creek Mine investigate all complaints. All complaints that RCM receive are investigated with actions taken if required.

RCM employ an Environmental Technician that conducts noise monitoring during afternoon and night shifts when Rix’s Creek Mine is operational. If the operational noise from the mine is recorded within 2dB of the noise compliance limits, the Open Cut Examiner (OCE) is notified and operations are changed to reduce operational noise.

6.2.4 Further Improvements.

All equipment is checked and maintained on a regular basis to ensure noise attenuation equipment silencers – mufflers are operational. Sound suppression will continue for any new pieces of equipment prior to commencing work/s on-site.

During 2019 the RCS CHPP was sound attenuated (eastern and northern walls) to minimise noise travelling south-east from this area. The installation of the acoustic panelling had shown a reduction in A-weighted sound power levels of up to 7dB.

A new noise software package was also developed in consultation with Global Acoustics and was introduced at Rix’s Creek Mine to assess if low frequency or tonal noise penalties apply. This software is used in combination with the recently updated weather station which determines if the meteorological conditions and atmospheric stability criteria apply. This tool enables the Environmental Technician the capability to assess real-time low frequency and tonal penalties to ensure that we comply with the NPFI.

Installation and commissioning of a new real time noise Management monitor occurred near the NM05 (Bridgman Road) receiver in November 2019. The noise monitor can apply 1/3 octave low frequency and tonal noise penalties in real time in accordance with the Noise Policy for Industry Guidelines 2017 (NPFI). This system provides alarms when measured noise levels are within 2 db of the noise criteria (Level 1 Alarm), above the noise criteria (Level 2 Alarm), or sustained over two 15 minute periods, (Level 3 Alarm). Each level of alarm requires action by either the noise technician or RCN washery operator.

During 2014 Rix’s Creek worked with Todoroski Air Sciences (TAS) and Nigel Holmes to develop a 3-D predictive noise model for the Mine. The meteorological data from the Hunter Valley Meteorological Sounding Group Joint Venture (HVMSGJV), meteorological forecasts for the Rix’s Creek mine site is used to develop half hourly predictions, of noise enhancement conditions, for each twenty four hours of Mine production. This model has been validated over a period greater than four years and to date noise enhancement has been identified at offsite locations in accordance with the model’s forecast prediction.

The model continues to be upgraded from time to time as necessary. The model was upgraded during 2015 to include all offsite receptors (residences) and was again upgraded in 2016 to include the Rix’s Creek North operation once purchased. During 2017 further upgrades to the 3-D noise model occurred, with areas of operational noise enhancement being highlighted in yellow within the open cut area. This provides Rix’s Creek Mine with additional proactive tools to manage noise when enhancement is predicted by ensuring that the allocation of sound attenuated equipment is utilised in the yellow/orange highlighted areas.

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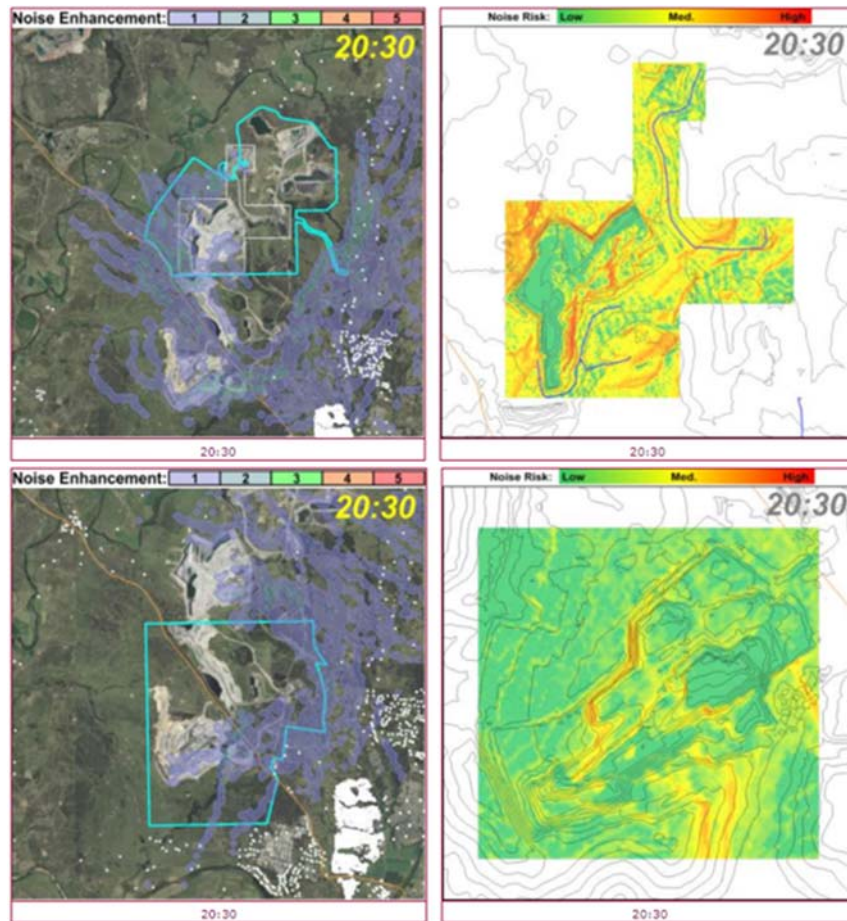


Figure 8 RCS and RCN predictive mine noise forecast models

*White dots indicate off-site receptors / residences closest to mining operation.

The use of the 3-D noise model to predict areas of possible meteorological enhancement of Rix’s Creek open cut noise, to plan mine working locations, has been successful in controlling its noise impact to current Environment Protection License (EPL 3391) Project Specific Noise Criteria as per Noise Pollution Production Program (U1 Premises Noise Limits: 12323_PRP_R02 as submitted by Global Acoustics). An integral part of the Noise Management Plan is using real time attended monitoring. The monitoring results assist in calibration of the noise model and aid the production shift supervisor in determining suitable placement of the mines production units to keep mine noise levels to license conditions.

6.3 Blasting

6.3.1 Environmental Management

The RCM Blast Management Plan combines Rix’s Creek Southern and Rix’s Creek Northern operations. On the 24/7/2019 the blast cumulative protocol was updated in coordination with the nearby mines and included in the approved Blast Management Plan. (Subsequently Approved 31/7/2019).

The conditions specified in the Development Consents and Environmental Protection License require blasts to be designed to minimise air blast overpressure and ground vibration. Blasts are designed to ensure that there is less than 5% probability of exceeding an air blast overpressure of 115 dB_(Linear) to a maximum of 120 dB_(Linear) and vibration with peak particle velocity of 5 mm/sec to a maximum of 10 mm/sec at the closest residence (not owned by the applicant outside the mining lease). Blasting frequency is also limited to one blast a day in the Camberwell Pit, this was maintained during the

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reporting period.

The conditions state that blasting is to be carried out in accordance with the *Australian Standard 2187-2006 Explosives - Storage and Use* and in terms of ANZECC Guidelines and to the satisfaction of the EPA.

During the year blasting in the West Pit has taken place within the 500m exclusion zone under an approved procedure to close the Highway to traffic during blasting. The Company has approval from the Roads and Maritime Services (RMS) to conduct closures of the Highway for blasting under a Road Occupancy License (currently ROL 1185380)– This approval is renewed annually.

Real-time wind speed and direction information is used in scheduling blasting operations to minimise offsite effects of air blast overpressure and dust. The Company is one of the joint venture partners in the Meteorological Sounding Group. This group has purchased equipment to measure wind speed, direction and temperature in the atmosphere. This data is then used to better predict the impacts of atmospheric conditions that can result in overpressure enhancement off site. The on-site weather station also has real-time data that can be viewed at any time by relevant site personnel. This weather station has the ability to alarm when conditions are not suitable for blasting i.e. wind speed currently greater than 10 m/s.

All blasts are monitored to record air blast overpressure and peak particle velocity at residences most likely to be effected. The modelling of dust and fume associated with blasting commenced during March 2012 and is constantly validated using DustTrak monitors, TEOM dust monitors and App-Tek OdaLog gas monitors. The monitoring was in conjunction with Rix's Creek daily EnvMet and NOx emissions predictive modelling. The NOx modelling shows various predicted outcomes and has continued to provide an integral part of Rix's Blast regime during 2019 and can be seen in Figure 9. The pink dots on the model are the closest residences/receptor's that can potentially be impacted via blasting. During 2019 App-Tek OdaLog gas monitors were intermittently utilised during blasting operations to measure any potential fume emanating from a blast in conjunction with the dust / fume model.

Schedule 2, Condition 12(BII) of DA 49/94 and Schedule 3 Condition 16(c) of PA 08_0102 requires coordination of blasting onsite with nearby mines to minimise cumulative blasting impacts. Rix's Creek send out an email blast notification to nearby mines prior to all blasts that provides a figure of the location of the blast and the intended time of firing. Rix's Creek Mine also receives blast notifications from nearby mines which identifies the intended time and position of the blast so that coordination of blasts times can occur between mine sites. A formalised communication protocol was also developed among neighbouring mine sites during the reporting period.

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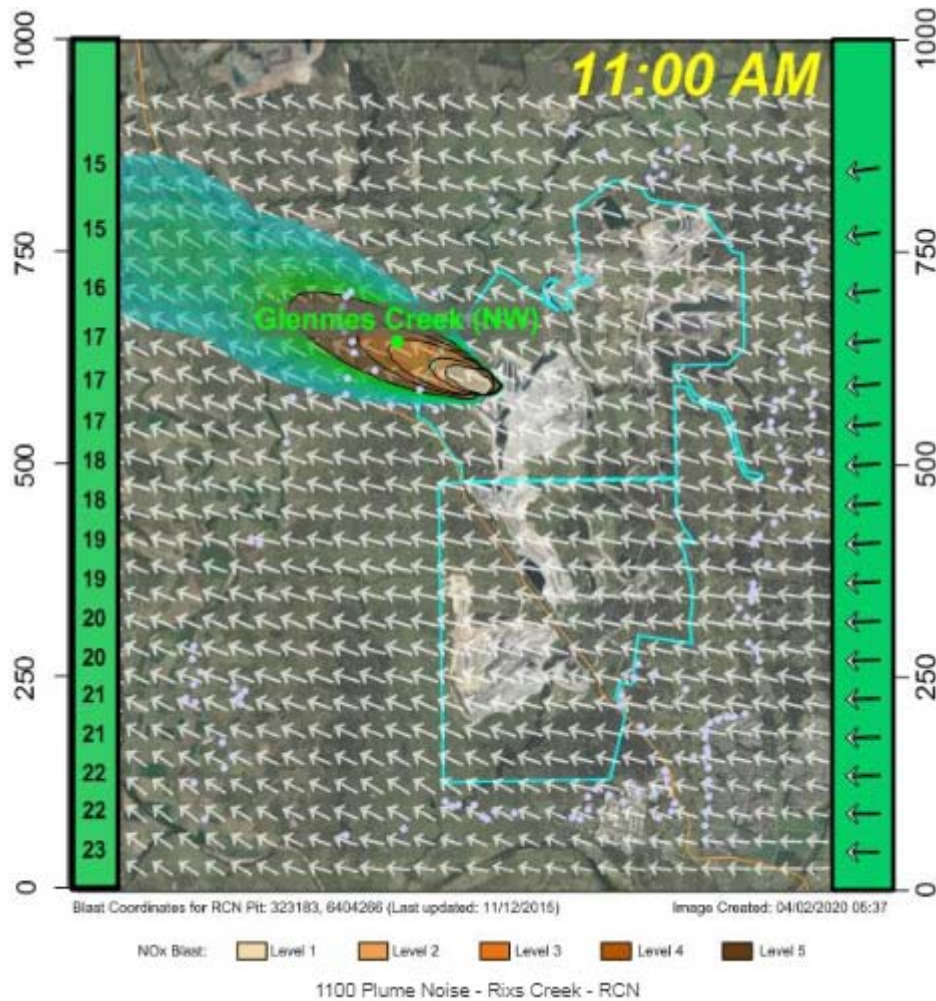


Figure 9 Blast Dust / Fume 'Plume' Model incorporated into the RCN site in 2019.

6.3.2 Environmental Performance

During 2019 a total of 107 production blasts were initiated into overburden. 53 blasts were fired in the Camberwell Pit at Rix's Creek Northern operations and 54 shots were fired in the West Pit at Rix's Creek Southern operations.

Rix's Creek North PA 08_0102 allows one blast a day in the Camberwell Pit, unless an additional blast is required following a blast misfire. This was complied with during the 2018 reporting period. All blasts fired at Rix's Creek Mine were carried out between 9am and 5pm Monday to Saturday. No blasts were fired on Sundays or public holidays in accordance with PA (08_0102) and DA 49/94 conditions.

Individual blast results for 2019 are shown on the Bloomfield website:

<https://www.bloomcoll.com.au/sustainability/environmental-management/rixs-creek-assessments/epl-monitoring>

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Of the 107 blasts the fume ratings recorded were as follows:

Rating		A	B	C
0	78	-	-	-
1	-	12	6	2
2	-	5	3	1
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-

6.3.3 Incidents and Complaints

During the reporting period 107 blasts were initiated across Rix's Creek Mine.

No blast during the period exceeded the ground vibration criteria of 5mm/sec (5 % of the total number of blasts over a calendar year) or 10mm/sec.

One (1) blast on the 9 May 2019 exceeded the 115 dB blast overpressure level at the Mines Rescue monitor however this did not exceed the 5 % of the total number of blasts over a calendar year criteria. No blast exceeded the 120 dB criteria.

During the previous 2018 reporting period, a blast was fired on 12 July 2018 which resulted in an overpressure level of 120.8 at the Civic blast Monitor located near the Council Chambers in Singleton. The incident was self reported to DPIE and NSW EPA with subsequent investigation by DPIE forming the view that the incident was a breach of Schedule 2, Condition 12 of DA 49/94. Subsequently in February 2019 DPIE issued a Penalty Infringement Notice (PIN) for non compliance with blasting at the Civic Monitor. Provision of further information and consideration of events revised the determination by the Department and the PIN was withdrawn. Following this withdrawal BCL and DPIE agreed to include the Civic Blast Monitor as a compliance monitor as noted in the approved Blast Management Plan. Following this event Rix's Creek Mine have further incorporated further improvements to blasting including the use of a stemming truck capable of measuring the amount of stemming material delivered to each hole and further refinements of the EnvMet Blast forecasting model.

During the reporting period blasts were cancelled and rescheduled due to unfavourable weather conditions, this included rainfall, windspeed, wind direction, dust potential, fume potential and overpressure potential.

During 2019, three (3) complaints were received in relation to blasting at Rix's Creek Mine. This is a reduction from the five (5) blast complaints received in 2018.

6.3.4 Further Improvements

BCL is an active participant of the Terrock EnvMet Research Project. This project provides access to a prediction model for atmospheric enhancement for overpressure. This information is used to access the potential for overpressure enhancement due to the predicted atmospheric conditions throughout the day. This information can then be used to schedule blasting operations to minimise off site environmental impacts resulting from blast overpressure. The models (overpressure, fume and dust) are now capable to have predictive forecasting for atmospheric conditions two days ahead to further enhance blasting opportunities during ideal weather conditions. The models specifically include nearest receptors which are likely to be affected by blasting activities.

Rix's Creek have access to several predictive weather models in which products are selected for

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blasting based on possible weather conditions prior to blasting. Blast products will continually be reviewed and trialled where thought beneficial throughout 2019 to minimise fume emitted from blasting. Fume will continually be monitored on site to manage any onsite and offsite impacts in the case of a fume event resultant from a blast. Two gas analysers are also set-up downstream of all blasts to monitor any potential gasses released from blasts on the site boundary.

The ACCO 10,000L water cart was used for crusting drill cuttings from the drill and blast process. The watering of drill cuttings occurs on the shot and is also prioritised when unfavourable wind conditions are predicted. The smaller ACCO 10,000L watercart is also used for dust control on smaller light vehicle access roads throughout the RCM due to its increased manoeuvrability.

6.4 Air Quality

6.4.1 Environmental Management

The Rix's Creek Mine Air Quality and Greenhouse Gas Management Plan (AQGGMP) details the dust management practices and the air quality monitoring network at Rix's Creek Mine.

On the 24/7/2019 the AQGGMP was updated to include the air quality cumulative protocol which is coordinated with the nearby mines. The Management Plan was subsequently approved by DPIE on 31/7/2019.

The air quality assessment criteria are listed in **Table 16**.

TEOM and Dusk Track systems offer the vital advantage of real-time access to continuous air quality data as well as the upstream and downstream differentials across the site.

The following air quality monitoring and associated reporting will utilise:-

- 2 dust deposition gauges (DDG28 and DDG32);
- 3 TEOM's units to sample particulates less than 10 microns (PM10) in diameter via real-time / continuous monitoring (RCN NW, RCN SE and RCN NE);
- 2 Dust Trak units which sample particulates less than 10 microns (PM10) in diameter via real-time continuous monitoring (RCS NW and RCS SE).

Table 16 Air Quality Assessment Criteria

POLLUTANT	STANDARD	PERIOD	AGENCY
TSP	90µg/m3	Annual average	EPA/DPE/
PM10	50µg/m3	24 hour maximum (contribution)	EPA/ DPE
	30µg/m3	Annual average	EPA/ DPE
	50µg/m3	24 hour average; 5 exceedances permitted a year	National Environment Protection Measure (NEPM)
Depositional Dust	4g/m2/month	Annual maximum total deposited dust level	EPA/ DPE
	2g/m2/month	Annual maximum increase in deposited dust level	EPA/ DPE

Dust Deposition Gauges

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Two (2) Depositional Dust Gauges were sampled during the reporting period. The location of the DDG's are referred to in **Figure 7**.

The dust deposition gauges conform to Australian Standard 2724.1- 1984 Ambient Air - Particulate Matter, Part 1 - Determination of Deposited Matter expressed as insoluble solids and ash residue. Gauges have 150 mm funnels located 2 metres above the ground.

Tapered Element Oscillating Microbalance (TEOM)

The approved AQGGMP has three (3) TEOMS which were reinstated at Rix's Creek North site during February 2016. PM10 is assessed for the purpose of real-time environmental management as defined by Standards Australia AS/NZS 3580.9.8.2008: Methods for sampling and analysis of ambient air – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser.

The location of the TEOMS are shown in **Figure 7**.

Dust Trak Monitors

Two Dust Trak units sample particulates less than 10 microns (PM10) in diameter via real-time continuous monitoring. Dust Trak monitors are located at the Rix's Creek Southern operations and are located toward the North West of the mining operations in West Pit (Dust Trak RCS NW). the other Dust Trak unit is located on the South Pit rehabilitation (Dust Trak RCS SE).

The location of the Dust Trak monitor's are shown in **Figure 7**.

Environmental controls employed to minimise dust generation includes the application of recycled mine water to haulage roads and areas with heavy use by machinery, application of recycled mine water to drill pads (i.e. fine cuttings) and sprinkler systems on coal stockpile areas and the surrounds of the washing plant.

Operational procedures for blasting include not blasting under adverse weather conditions i.e. high wind and direction conditions; when there is a likelihood that dust generated from the blast will reduce visibility at the lease boundary or New England Highway. Wind speed and direction information is available for staff to make informed decisions regarding the prevailing weather conditions when scheduling blasts. This data is available real time from Rix's Creek weather station as well as the Hunter Valley Meteorological Sounding Group Joint Venture - Lemington site and through improved localised meteorologic daily forecasts.

This information is used to schedule operations so as to minimise the potential for dust emissions. Under adverse weather conditions overburden is not dumped to exposed locations. When these conditions exist the overburden removal and dumping operation is modified with dumping occurring either in pit or to areas not exposed to the prevailing winds, alternatively operations may be ceased until conditions are suitable. For blasting, information is used in a model to predict the potential for meteorological reinforcement of overpressure as well as directional travel of dust/fume from a blast. The model shows the likelihood which receptors that may be affected by the blast which in turn can alter the timing of the blast being initiated.

The network of ambient air quality monitors surrounding the mine operation and are positioned in areas representative of the surrounding sensitive receptor locations and background air quality levels. The ambient monitoring data provide insight into the potential dust contribution due to the operations.

The Camberwell and Singleton sites measure PM_{2.5} as well as PM₁₀. The closest unit to the operation is the Singleton NW sites measuring PM₁₀. The prevailing winds are predominately from the northwest during autumn/winter and southeast during spring/summer which indicate they are suitably located to measure any contribution from the Mine and can be used to further verify site monitoring results for PM₁₀.

During 2019 a site-specific dust forecasting tool was used to predict the potential for dust emissions

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being created on site and affecting air quality. This forecasting tool uses predictive met-data to highlight times throughout the day the operation may be affected. Based on this, the operation can be modified before the high potential of dust to occur. This includes utilising increased supervisor inspections, additional water carts, re-schedule servicing of equipment, work lower in the pit, shut-down equipment, activate water sprays on stockpiles, where required.

Tuesday 11th of February 2020

11/02/2020																										
	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am			12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed (m/s)	2.1	3.0	2.2	1.5	1.2	1.6	1.3	1.4	1.2	1.3	1.1	2.2	Wind Speed (m/s)	1.9	1.9	3.6	4.1	6.4	9.7	6.8	1.8	4.0	3.8	4.5	3.8	
Wind Direction	NW	W	WSW	E	ESE	NE	E	SE	ESE	SE	ESE		Wind Direction	SSE	SE	ESE	ESE	NE	ENE	ENE	S	SSE	S	SW	SW	
Max 1-hour average PM ₁₀ concentration (µg/m ³)																										
North-East	4	18	58	3	0	0	0	0	0	0	0	0	North-East	0	0	0	0	0	0	0	0	0	0	19	8	

12/02/2020												13/02/2020													
	12am	2am	4am	6am	8am	10am	12pm	2pm	4pm	6pm	8pm	10pm			12am	2am	4am	6am	8am	10am	12pm	2pm	4pm	6pm	8pm
Wind Speed (m/s)	2.0	0.5	2.2	2.0	2.6	3.8	3.2	7.0	7.4	7.3	6.0	5.5	Wind Speed (m/s)	3.6	5.4	3.7	4.6	5.9	6.2	8.5	8.3	8.3	5.5	4.8	
Wind Direction	S	E	SSE	S	SE	SSE	SSE	ESE	E	ESE	ESE	SE	Wind Direction	SE	ESE	SE	SE	ESE	ESE	ESE	SE	SE	SE	SE	
Max 2-hour average PM ₁₀ concentration (µg/m ³)																									
North-West	12	19	30	2	4	4	3	1	1	0	0	4	North-West	1	11	6	8	3	3	2	2	2	2	2	2

Forecast Date: 11 Feb 2020 - 13 Feb 2020

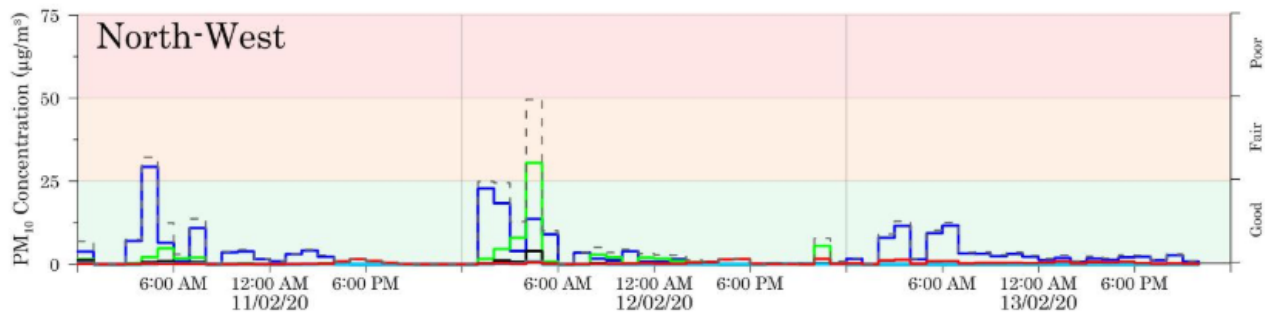


Figure 10 Example of dust forecasting tool to assist operations during 2019

Table 17 Dust Monitoring Sites

SITE	LOCATION
28	Off New England Highway north-west of lease. Relocated August 2011
32	Pre-School Gardner Circuit

6.4.2 Environmental Performance

Insoluble Solids

During the 2019 reporting period both Dust Depositional gauge DDG28 and DDG32 complied with the Insoluble Solids Dust Deposition assessment criteria of an annual average result of less than 4 gm/m²/month. The 2019 average of DDG28 was 2.8 g/m²/month while 2019 average of DDG32 was 3.5 g/m²/month.

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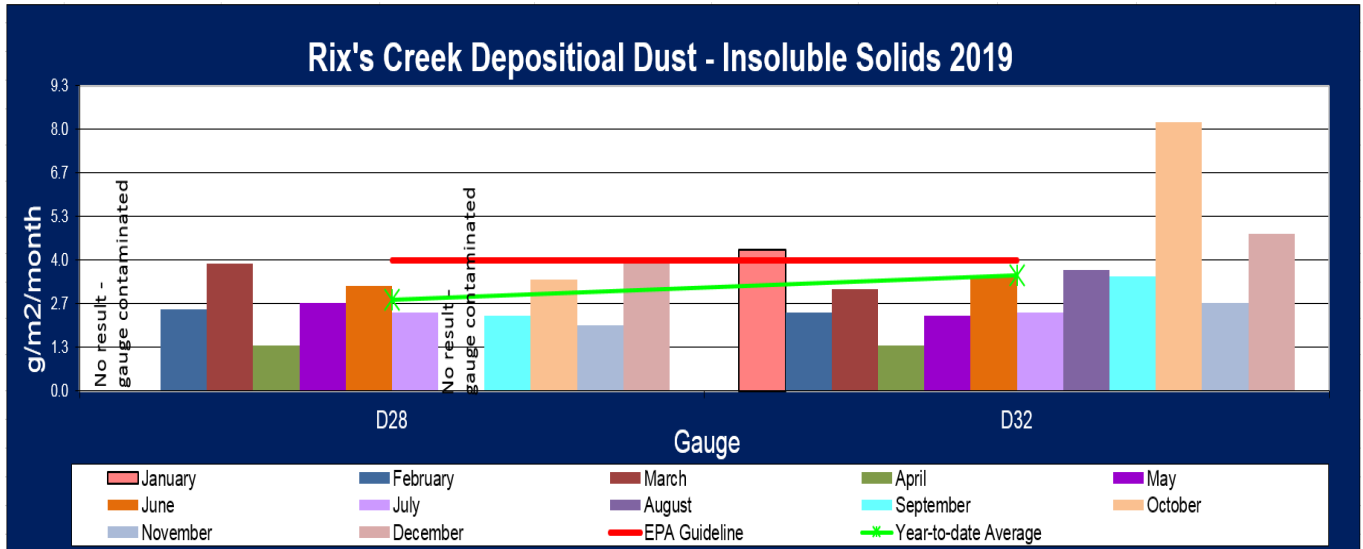


Figure 11 Rix's Creek Insoluble Solids Dust Deposition 2019

Figure 11 displays the individual monthly insoluble solids deposition rates for each gauge and annual average deposition result in g/m²/month. There were no contaminated samples recorded in 2019.

In October 2019 DDG32 recorded 8.6 g/m²/month and therefore exceeded the average result of 4 g/m²/month. DDG 32 also recorded results exceeding the average of 4 g/m²/month in January (4.3 g/m²/month) and December (4.8 g/m²/month).

DDG 28 recorded 4 g/m²/month in December 2019, which equalled but didn't exceed the annual criteria.

Particulates Less Than 10 Micron

During the 2019 reporting period, the NW RCN TEOM exceeded the 24hour PM10 contribution on 99 occasions, the NE RCN TEOM exceeded the 24 hour PM10 contribution on 55 occasions and the SE RCN TEOM exceeded the 24 hour PM10 contribution on 71 occasions. On days when the 24 hour PM10 exceeded 50ug/m³ the analysis of upstream contribution compared to the downstream contribution identified no exceedances of Rix's Creek Mines cumulative contribution occurred.

Table 18 provides analysis of the upstream and downstream TEOM monitors in conjunction with the prevailing wind direction and shows that the upstream receptor (NW RCN TEOM) has elevated readings when compared to the downstream (SE RCN TEOM) receptor. This trend indicates that the elevated air quality readings are generally coming from upstream sources in a North Westerly direction from Rix's Creek Mine.

The monthly averages and 12 month rolling averages are shown in **Figure 12**. The RCN NW TEOM recorded elevated monthly averages in November (70.1ug/m³) and December (63.1ug/m³). This period coincided with low rainfall and regional bushfires that had an influence on the monitors during the reporting period.

In comparison the SE RCN TEOM (which recorded an annual average of 35.5ug/m³) recorded elevated monthly averages in November (65.4ug/m³) and December (52.9ug/m³).

When the Rix's Creek North air quality results for 2019 are compared to the 2009 Environmental Assessment modelled results for year 6 part pit extent of the operations, it was determined that the annual average at the RCN NW TEOM (38.6 ug/m³) was higher than the EA prediction at the mine owned residence ID 85 (24 ug/m³), which is where the location of the RCN NW TEOM is located. The South East TEOM (35.5 ug/m³) and North East TEOM PM10 (31.0 ug/m³) averages were also above

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the 2009 EA predictions for year 6 part pit extent operations. This can be attributed to significantly low rainfall during 2019 and regional bushfires in October, November and December 2019, which coincided with elevated regional air quality levels.

During the 2019 reporting period both Dust Trak RCS NW and Dust Trak RCS SE recorded below average monthly results of 30 ug/m³ between January and September. The DustTrak units recorded averages above 30ug/m³ October (NW Dust Trak 35.83), November (NW DustTrak 43.03, SE Dust Trak 44.59) and December (NW DustTrak 61.17, SE Dust Trak 60.72). Elevated air quality levels, were attributed to the prolonged drought conditions and regional bushfires during the October, November and December 2019 period.

The annual average for Dust Trak RCS NW in 2018 was 24.03 ug/m³ and Dust Trak RCS SE recorded an annual average result of 23.50 ug/m³.

The Camberwell Upper Hunter Air Monitoring Network (UHAQMN) monitor recorded an annual average of 39.9ug/m³ for the 2018 reporting period, an increase from 31.1 ug/m³ recorded for the 2018 reporting period. The Singleton NW Hunter Air Monitoring Network (UHAQMN) monitor recorded an annual average of 34.6 ug/m³ for the 2019 reporting period, an increase from 26.9 ug/m³ recorded for the 2018 reporting period.

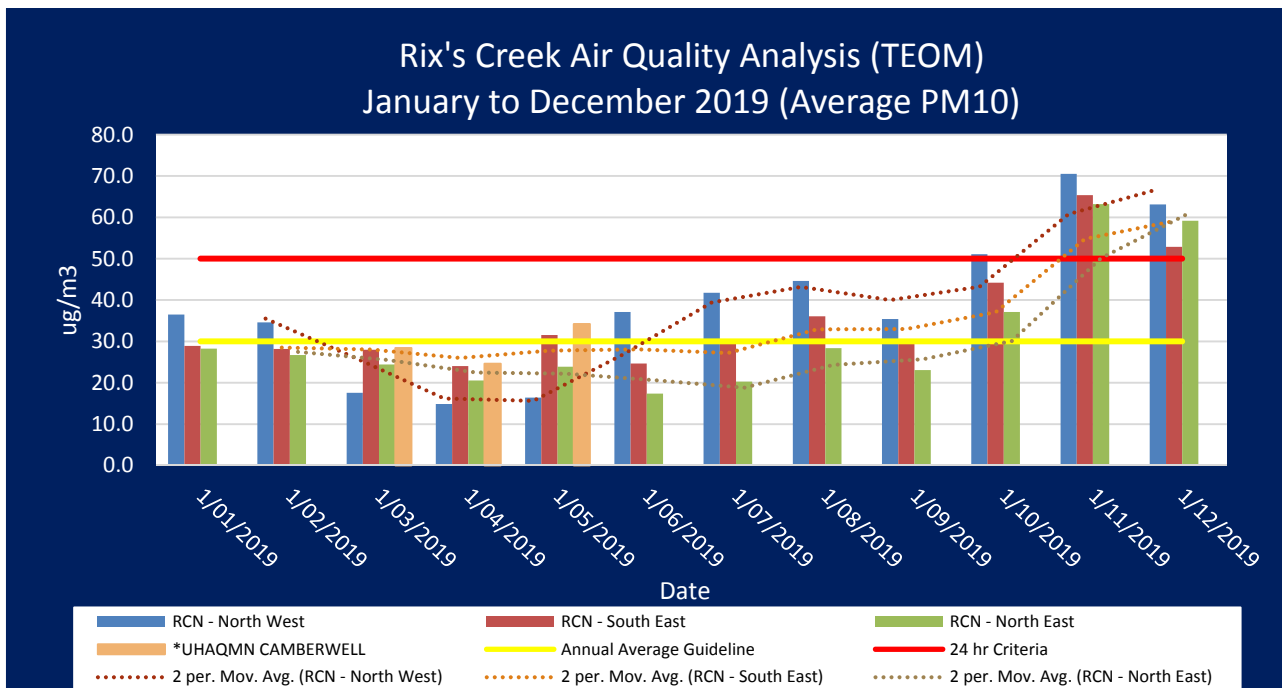


Figure 12 Particulate Matter less than 10 Micron Monthly Average and 12 Month Rolling Averages 2019 - TEOM

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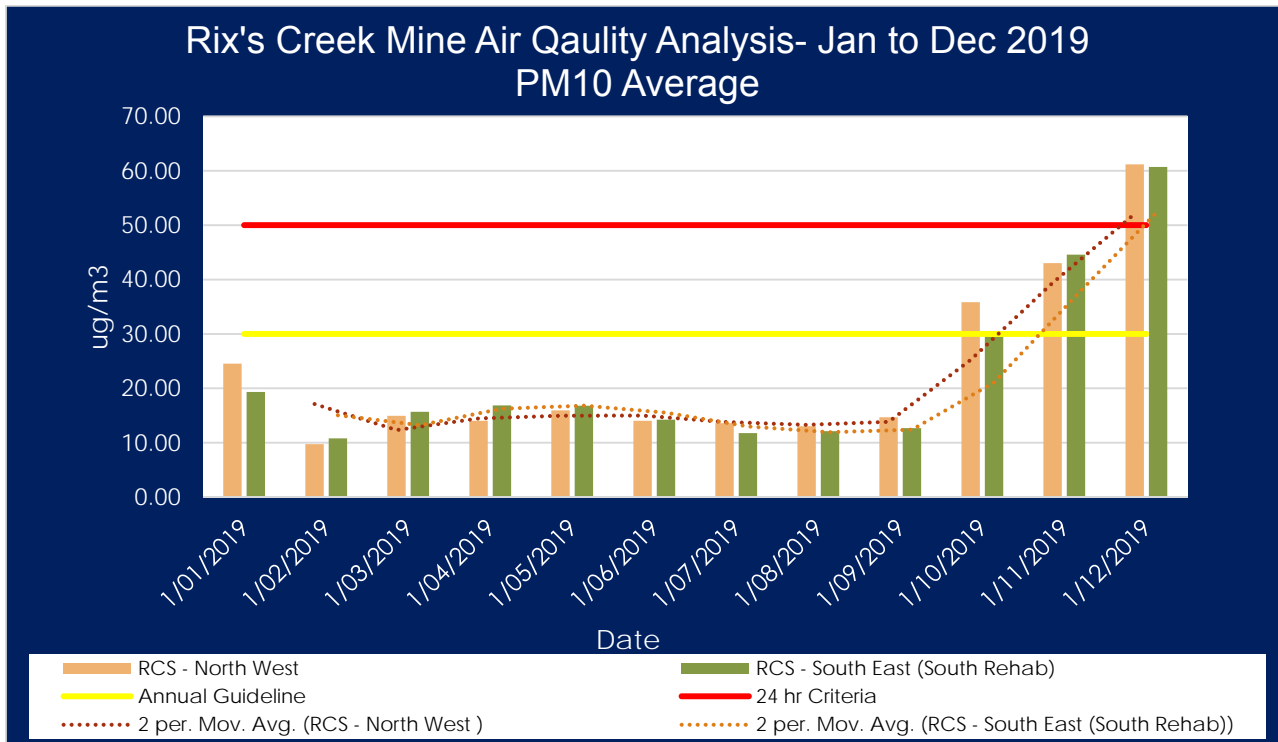


Figure 13 Particulate Matter less than 10 Micron Monthly Average and 12 Month Rolling Averages 2018 – DustTrak

Table 9 Analysis of Air Quality under adverse weather conditions upstream, downstream air quality difference.

Date	RCN NW TEOM 24 Av(ug/m3)	RCN SE TEOM 24 Hr Av (ug/m3)	Upstream downstream Differential (RCM Contribution)	Predominant Wind Direction	Max Wind Speed (m/s)
18/01/2019	50.7	40.1	-10.5	NW	8.5
19/01/2019	60.9	56.1	-4.8	NW	11.5
31/01/2019	56.2	39.8	-16.4	NW to SE shift	15.8
10/02/2019	63.2	56.4	-6.8	NW	8.5
12/02/2019	70.6	54.7	-15.8	SE	8.5
13/02/2019	73.9	66.7	7.2	SE	10.5
19/02/2019	57.8	57.4	-0.4	NW to SE shift	13.8
*6/03/2019	96.4	89.8	-6.6	NW	14.5
*11/03/2019	67.2	82.3	-15.1	SE	10.3
*31/03/2019	72.0	86.5	14.5	NW	10.0
*8/04/2019	55.3	53.6	-1.7	NW	8.3
*9/04/2019	57.3	62.6	5.3	NW	11.8
*26/04/2019	78.8	54.5	-24.3	NW	10.3
*26/05/2019	48.8	51.7	2.9	NW	9.5
*27/05/2019	113.8	67.9	-45.9	NW	17.0
31/05/2019	54.6	36.3	-18.2	NW	10.8
8/06/2019	52.7	39.2	-13.5	NW	4.8
13/06/2019	54.3	47.1	-7.2	NW	10.8

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14/06/2019	60.7	25.2	-35.5	NW	5.3
2/07/2019	50.9	53.1	2.2	NW	6.5
11/07/2019	63.9	46.8	-17.1	NW	13.8
12/07/2019	63.5	42.8	-20.6	NW	15.0
13/07/2019	60.1	29.7	-30.4	NW	12.5
21/07/2019	54.7	32.1	-22.6	NW	12.8
23/07/2019	71.5	25.6	-46.0	NW	10.8
3/08/2019	50.4	35.1	-15.3	NW	9.3
7/08/2019	54.8	45.5	-9.3	NW	9.3
8/08/2019	78.2	53	-25.2	NW	14.5
9/08/2019	104.2	75.3	28.9	NW	16.0
10/8/2019	91	71.8	-19.2	NW	14.8
15/08/2019	51.3	52.4	1.1	NW	10.3
16/08/2019	61.9	53.1	-8.8	NW	10.8
17/08/2019	57.7	49.7	-8.1	NW to SE shift	8.5
19/08/2019	70.6	58.6	-11.9	W	12.0
20/08/2019	63.2	46.6	-16.6	NW	11.8
21/08/2019	70.3	45.8	-24.5	NW	15.0
22/08/2019	60.8	37.9	-22.9	NW to SE shift	11.3
24/08/2019	72.2	58.4	-13.8	NW	13.8
25/08/2019	59.7	48.0	-11.7	NW to SE shift	10.8
6/09/2019	69.5	59.0	-10.6	NW	20.3
7/09/2019	50.9	35.5	-15.4	NW	18.0
12/09/2019	68.9	52.8	-16.1	NW	12.0
13/09/2019	61.7	64.6	-2.9	SE	6.5
16/09/2019	57.1	68.6	11.5	NW to SE shift	13.0
27/09/2019	54.4	38.2	-16.2	NW	9.5
28/09/2019	54.3	57.3	3.0	NW to SE shift	10.0
4/10/2019	65.8	74.6	8.8	NW	11.3
7/10/2019	61.2	64.0	2.8	NW to SE shift	11.5
8/10/2019	51.3	33.4	-17.9	NW	14.3
16/10/2019	58.1	51.0	7.1	SE	9.3
17/10/2019	60.3	47.0	-13.4	NW	15.8
18/10/2019	85.2	65.0	-20.3	NW	8.8
19/10/2019	72.4	69.9	-2.5	NW	11.8
24/10/2019	67.0	55.9	-11.1	NW	8.5
25/10/2019	63.1	60.5	-2.6	NW	10.5
26/10/2019	109.6	108.7	-0.9	NW	18.0
27/10/2019	118.9	117.4	-1.5	NW	10.3
28/10/2019	59.5	59.3	-0.2	NW to SE shift	11.5
29/10/2019	55.2	55.4	0.2	SE and NE shift	6.8
30/10/2019	132.2	110.4	-21.8	NW	6.3
31/10/2019	153.2	105.9	-47.4	NW to SE shift	10.3
1/11/2019	77.5	71.1	6.4	SE	9.8
**3/11/2019	65.3	55.1	-10.2	NW	16.3

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7/11/2019	88.9	80.0	-8.9	NW	16.0
8/11/2019	86.0	101.7	15.7	NW	17.3
12/11/2019	86.7	112.9	26.2	NW	16.0
15/11/2019	62.7	90.5	27.8	NW	12.3
16/11/2019	72.4	75.7	-3.3	SE	11.5
17/11/2019	69.0	68.2	-0.8	SE	13.0
20/11/2019	52.2	47.4	4.7	SE	10.8
21/11/2019	109.5	111.3	1.8	NW to SE	6.3
22/11/2019	119.9	131.6	-11.7	SE	13.0
23/11/2019	75.2	73.3	-1.9	NW to SE shift	10.0
24/11/2019	58.3	54.6	-3.7	NE	7.5
25/11/2019	64.6	49.8	-14.8	NW	8.5
26/11/2019	124.4	113.8	-10.6	NW	20.8
27/11/2019	116.2	124.4	-8.2	SE	8.8
28/11/2019	68.5	67.0	-1.5	SE to NW shift	10.5
29/11/2019	115.6	102.1	-13.5	NW	9.8
30/11/2019	82.6	99.5	16.9	NW to SE shift	12.5
1/12/2019	64.9	51.2	-13.7	NW	14.3
2/12/2019	84.8	95.0	10.3	W	18.3
3/12/2019	65.2	74.6	9.4	NW	13.0
4/12/2019	68.2	56.1	-12.0	W	12.0
5/12/2019	88.6	76.9	-11.6	NW	13.3
6/12/2019	83.3	105.9	22.6	NW	14.5
***7/12/2019	72.3	91.7	19.4	NW to SE	10.0
***8/12/2019	52.3	37.5	-14.8	SE	11.8
***9/12/2019	73.6	71.9	-1.7	E to SE	8.8
10/12/2019	105.5	101.7	3.8	SE	12.8
11/12/2019	97.0	67.9	29.2	SE	13.0
14/12/2019	65.5	62.0	-3.5	NW	10.8
15/12/2019	63.7	46.7	-16.9	NW	9.0
16/12/2019	69.5	68.6	1.0	SE	10.8
19/12/2019	89.4	96.9	-7.5	SE	15.8
21/12/2019	78.8	75.7	-3.2	NW to SE shift	18.0
28/12/2019	66.1	36.7	-29.4	NW to SE shift	8.3
29/12/2019	62.3	39.6	-22.7	NW to SE shift	7.5
30/12/2019	83.3	61.3	-21.9	NW to SE shift	6.3
31/12/2019	83.0	78.0	-5.0	NW	12.8

* Calibration issue with RCN NW TEOM. Camberwell UHAQMN data substituted for 6/3/2019 -27/05/2019.

** Blocked filter at RCN NW TEOM. Camberwell UHAQMN data substituted for 3/11/2019.

*** RCN SE TEOM block Filter. NW Singleton UHAQMN data substituted from 7/12/2019 – 9/12/2019.

6.4.3 Reportable Incidents

At RCN, servicing of the NW TEOM on the 27/05/2019 determined that the unit malfunctioned from the 6/3/2019 to the 27/05/2019 as the TEOM flow sensor was sampling outside the accepted calibration parameters. The RCN TEOM was operational during the period, however, due to the

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TEOM recording events consistently lower than the Camberwell UHAQMN TEOM, the Camberwell UHAQMN data was also assessed during this period.

On the 3/11/2019 the RCN NW TEOM filter was blocked, therefore Camberwell UHAQMN data was substituted for this day.

From the 7/12/2019 – 9/12/2019 the RCN SE TEOM had a blocked filter, which required the TEOM to be repaired. Data from the Singleton NW UHAQMN was substituted for this period.

From the 2/11/2019 – 5/11/2019 the RCN NE TEOM had a filter malfunction, which required the TEOM to be repaired. Data from the Camberwell UHAQMN was substituted for this period.

The NW Dustrak recorded 12ug/m3 data from the 1/1/2019 - 4/1/2019. Servicing was completed on the dust unit to restore functionality. On the 01/05/2019 to the 6/5/2019 the NW Dust Trak lost data to a software update that didn’t back up the data on the data logger or Environmental SCADA system.

Due to the prolonged drought during 2019 and regional bushfires in October, November and December, more maintenance, calibrations and filter change outs were required to ensure that the dust monitors remained operational during the reporting period.

6.4.4 Further Improvements

Further improvements to be completed in 2020 include the integration of all RCM dust monitoring units onto the Rix’s Creek Mine teledata environmental monitoring network.

6.5 Biodiversity

6.5.1 Environmental Management

The Rix’s Creek North Biodiversity Management Plan (BMP) was approved by DPIE. The objectives of the Biodiversity Management Plan are to rehabilitate, revegetate and manage land for biodiversity within the biodiversity offset areas and the mine site during and post mining.

For Rix’s Creek Southern operations (DA49/94), no threatened species have been identified on site in the EIS prepared for the operation or since then as the operation has progressed. No area of significant habitat exists on the site. *“The site has been extensively disturbed as a result of previous land uses and similar species and habitats exist in surrounding areas. No rare or endangered plant or animal species were observed during the study or are likely to occur on the site.”* Environmental Impact Statement for Proposed Modification of Mining Operations – Rix’s Creek Coal Mine, November 1994.

6.5.2 Environmental Performance

The ecological monitoring of Rix’s Creek North biodiversity offset areas is prescribed in Section 2.7 – Flora and Fauna Monitoring of the Biodiversity Management Plan 2018 – 2020. Components relevant to monitoring at Rix’s Creek North include:

- inspection of 76 installed nest and roost boxes for a variety of tree hollow dependent fauna, including the threatened Brush-tailed Phascogale, Squirrel Glider and honeybees;
- diurnal and nocturnal surveys along seven (7) designated transects for the threatened and protected species;
- monitoring of feral predators by use of remote infra-red cameras, presence of impact / damage, sightings and scats, and
- comprehensive surveys for all fauna groups conducted in 2018 and 2020, then every three (3) years.

The revised Biodiversity Management Plan (2017) prescribes bi-annual (every two years) comprehensive fauna monitoring surveys for the period 2018 and 2020, then every 3 years after that.

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Flora and Fauna monitoring was completed in the 2018 reporting period and is planned to be completed in the spring 2020.

The increase in the intensity of survey effort will result in a more comprehensive data set of fauna records for the offset areas and enable more detailed comparisons of cumulative trends. This is evidenced by the increased bird species diversity recorded at Rix's Creek North. In 2007, the EIS surveys detected the presence of 52 bird species. Surveys in 2018 recorded seventy nine (79) species, with a cumulative total of one hundred and fifteen (115) species. Additionally, three new bird species were detected in 2018. This will also assist in the analysis of key performance targets required for the BMP going forward.

6.5.3 Reportable Incidents

No reportable incidents relating to flora and fauna management occurred during the 2019 reporting period.

6.5.4 Further Improvements

Enhancement of the Martins Creek Biodiversity Area is planned for the 2020 period. This will involve the preparation and seeding of six half hectare plots within Martins Creek BOA with the Narrow-Leaved Ironbark, Spotted Gum, Grey Box open forest community.

6.6 Aboriginal Heritage

6.6.1 Environmental Management

Aboriginal heritage issues identified in the RCS DA49/94 EIS have been addressed. Application was made and Consent No:- SZ 163 granted on 25/5/97 under Section 90 of National Parks and Wildlife Act , 1974 to Carry out the Destruction of an Aboriginal Relic/Place. The Consent was issued in relation to Aboriginal sites NWP #37-6-244 and #37-6-245.

In accordance with the Rix's Creek North Project Approval (08_0102) an Aboriginal Heritage Management Plan sets out the procedures for the protection of Aboriginal sites as well as the salvage and care of Aboriginal objects found within the operational activities. Additional objectives of the Aboriginal Heritage Management Plan are:

- To establish an ongoing Aboriginal stakeholder consultation process;
- To describe the manner in which certain Aboriginal sites will be salvaged;
- To provide a summary research design and work plan for the sub surface excavation of select sites and areas; and
- To describe a program for Aboriginal site survey and assessment in areas not addressed by the original EA.

The Aboriginal Heritage Management Plan also outlines the importance of ongoing consultation with Aboriginal stakeholders during mining. All staff and contractors as part of a site induction are provided with information on what constitutes an artefact and what to do if an item of Aboriginal heritage is located.

6.6.2 Environmental Performance

Prior to commencement of mining in West Pit, four known Archaeological sites, listed as R1, R2, R12 and R15 were fenced to prevent damage. During 2019 fencing of these areas was maintained.

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6.6.3 Reportable Incidents

No artefacts were identified during operations during the 2019 reporting period.

6.7 Non-Aboriginal Heritage

6.7.1 Environmental Management

The Rix’s Creek Coke Ovens and associated works adjacent to Rix’s Creek Lane are the subject of an Order made under Section 130 (1) of the Heritage Act, 1997. The order was made on 23/7/82.

The Rix’s Creek Coke Ovens are also classified by the Natural Trust of Australia and are included in the Trust Register.

As such the Company prepared in 1989 a Rix’s Creek Coke Ovens Conservation Plan. The Plan outlines the measures the Company has put in place and operational controls to conserve the area.

The Plan was reviewed during 2004 by Peter Lonergan of Cracknell & Lonergan a heritage architect. The following recommendations were made:-

17. It is my opinion that any active conservation to the fabric is unwarranted and inappropriate. The ovens ceased operation some 60 years prior to the conservation plan and now 15 years later little further deterioration has occurred, or is evident.

Rix’s Creek North operations has a Non Aboriginal Management Plan which addresses management of non –aboriginal heritage.

If during the course of works any previously unknown historical archaeological material or heritage sites/items are uncovered or identified, all work in the area of the item(s) shall cease immediately and a suitably qualified and experienced archaeologist will be consulted. If the archaeologist considers the archaeological material uncovered constitutes an archaeological ‘relic’, the Heritage Branch, OEH will be consulted, in accordance with Section 146 of the Heritage Act 1977 (NSW), to determine an appropriate course of action prior to the recommencement of work in the area of the item.

6.7.2 Environmental Performance

A program of cutting and cleaning the dead wood around the area was undertaken during 2006 and weed control over the area is undertaken as necessary. Mother-of-Millions weeds around the area were sprayed again this year as well as assorted Pear (*Opuntia spp.*) species. Some scattered African Boxthorn weed species were also found and sprayed as necessary. Galenia was sprayed across several old spoil heaps. Restricted access and security of the area has been maintained throughout 2019.

In 2019, at Rix’s Creek North, the grave site of *James Halliday Glennie* was fenced with galvanised fence around the old wood and rail fence that protected the grave site.

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6.7.3 Reportable Incidents

There were no reportable incidents in relation to natural heritage during the 2019 reporting period.

6.7.4 Further Improvements.

The program of protection of the Coke oven area and other known natural heritage sites will continue. Annual inspections are undertaken of the areas with known heritage. Any weeds identified will be sprayed. Vegetation maintenance may be required as necessary and fencing and signage are checked for adequacy.

Within the consent conditions of SSD6300, Rix's Creek Mine will update the Blast Management Plan to include a strategy to monitor, mitigate and manage the effects of blasting on the Coke Ovens, including:

- Undertaking annual dilapidation surveys (or as otherwise agreed with the Planning Secretary) by a suitable qualified structural engineer, the first must be undertaken prior to any blasting in the North Pit and the last of which must be undertaken within one year after blasting is completed within the North Pit.
- Reviewing and establishing final ground vibration criteria and tailoring blast design to comply with this criteria.
- Remediating any blasting-related damage to the satisfaction of Council and the Heritage Division.

SECTION 7 WATER MANAGEMENT

7.1 Rix’s Creek Setting and Context

7.1.1 Geology

Local Geology

The Project is confined within a geological basin-like north–south trending syncline that hosts the Permian coal reserves that are part of the Whittingham Coal Measures. The syncline is approximately 8 km long by 3 km wide and is bounded by the Camberwell and Darlington Anticlines. The syncline is asymmetrical, the western limb generally dipping at a steeper angle than the eastern limb. The syncline is also locally double-plunging forming the synclinal basin structure centred on the Rix’s Creek operations. North of the Rix’s Creek mining lease, the syncline plunges to the north.

The major coal seams identified in the Rix’s Creek syncline are (in descending stratigraphic order):

- Lemmington Seam
- Pikes Gully Seam
- Arties Seam
- Liddell Seam
- Barrett Seam
- Hebden Seam.

The seams typically out-crop within the syncline, with the outcrop of Barrett and Hebden seams to the east, west, and south, marking the limit of the mineable seams. The target coal seams vary widely throughout the area and often occur as several dispersed splits, separated by interburden sediments that comprise alternating sandstone, siltstone, conglomerate, mudstone and shale, as well as occasional minor coal seams. The interburden between the Barrett and Upper Hebden seams increases to more than 20 m in the northern and western regions, rendering the Upper Hebden seam uneconomical to mine.

7.1.2 Hydrogeological Setting

Conceptual Hydrogeological Model

The conceptual hydrogeological model for Rix’s Creek is relatively simple in that the basin-like structure of the Rix’s Creek Syncline acts to isolate the Coal Measures from the broader regional hydrogeological regime, with little groundwater interaction through the bounding low permeability siltstones.

The basin-like structure as defined by the base of the Hebden Seam (and upper surface of the underlying siltstone basement rock of the Saltwater Creek Formation) is depicted on Figures 19 and 20 (below).

The limbs of the anticline have a relatively shallow dip on the eastern limb with the western limb dipping at a much steeper angle. The syncline axis also plunges from the north and south. The lowest point of the Coal Measures in the synclinal basin is approximately -130mAHD.

Although geologically more complex on the local scale due to the splitting and merging of multiple minor seams, the aquifer system at Rix’s Creek has been simplified and represented by a layer cake style system, with the layer geometry reflecting the synclinal basin structure. Within the layer cake, the major coal seams represent the main aquifers, with the interburden units acting as low permeability aquitards between the aquifers. Within the coal seam aquifers, preferential groundwater flow is along the bedding. Large scale groundwater flow vertically between coal units is impeded by the low permeability interburden units consisting of siltstones, sandstones, tuffs and shales.

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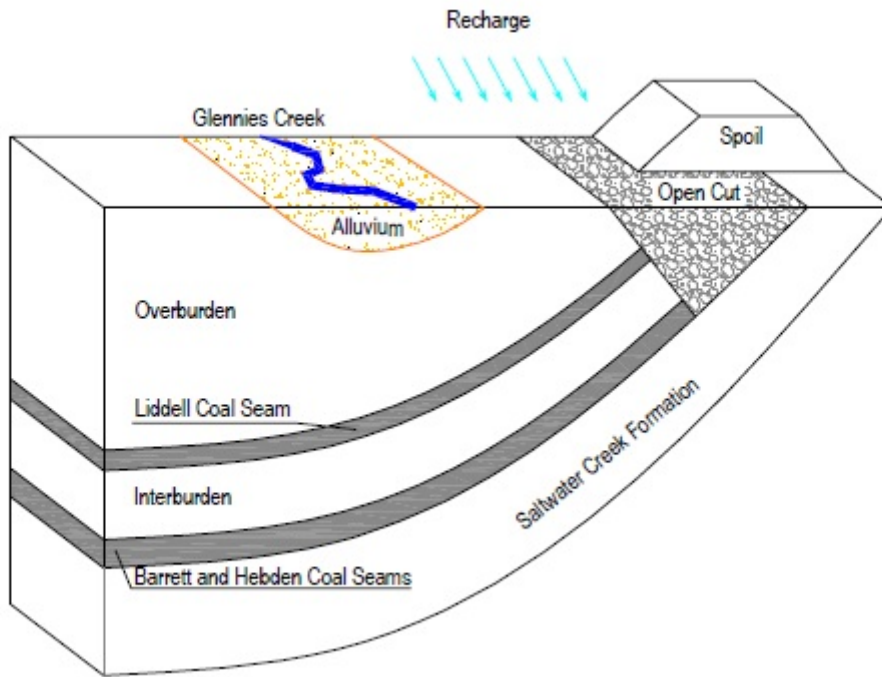


Figure 14 Conceptual Hydrogeological Model of the Rix's Creek Syncline area

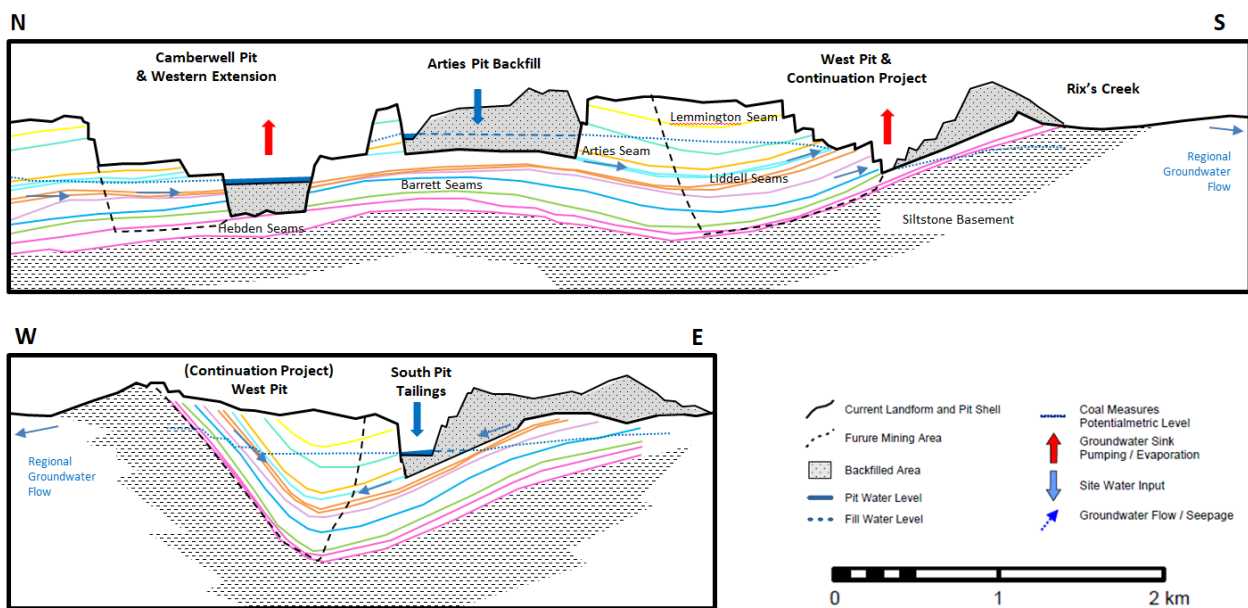


Figure 15 Conceptual Hydrogeological Cross Section

Aquifer Recharge

Rainfall recharge and infiltration will occur on remnant regolith areas, as well as rehabilitated mine areas, and direct rainfall to open cut areas. A degree of enhanced recharge and infiltration will also occur from the Old North Pit water storage and the deposition of tailings slurry in South Pit (although tailings seepage is anticipated to be a minor contributor to the overall water balance).

The lack of water level response observed at shallow monitoring bores in the creek alluvial system, located within the limit of Coal Measures outcrop, demonstrates the disconnection of the shallow regolith and alluvial aquifers from the deeper groundwater regime. It also shows that the shallow aquifers in these locations are locally reliant on direct rainfall recharge, and that this has not been diminished by the ongoing mining operations.

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Hydrological Setting

Figures 20 and 21 gives an indication of the approximate extent of the surface water catchments draining to the various storages within the Rix's Creek sites. In the RCN area, the eastern portion of the Falbrook Pit area intercepts runoff from the Reedy Creek catchment. Several diversion banks with excavated channels are used to divert clean catchment runoff around or through areas disturbed by mining operations.

In the RCS area, the Artes Pit, West & South Pit are surrounded by natural landforms that slope inwards towards the active mining area which directs any runoff over disturbed areas to flow back towards the pits. Clean water diversion structures have been installed to divert clean water away from active pits in average rainfall conditions.

In the vicinity of the mine footprint, all clean water flowing through or around the mine site area finds its way into either Glennie's Creek or Rix's Creek and ultimately into the Hunter River.

The catchment areas and diversion structures are progressively changing with the ongoing excavation of approved mining areas – and are adapted and maintained to enable the outcomes described above.

Groundwater Dependent Ecosystems (GDE's)

The proximity of GDEs to the Project area has been assessed by reviewing the Water Sharing Plan (WSP) and the Groundwater Dependent Ecosystem Atlas (Bureau of Meteorology, 2012). The findings have confirmed that there are no identified GDEs in the vicinity of the Project (RCS and RCN).

Most of the existing mine footprint is situated up hydraulic gradient of Rix's Creek and there are no alluvium deposits associated with the creek in the immediate vicinity of the mine. Surface water monitoring data (EC and flow observations) obtained from the creek shows the water to be relatively fresh (EC <200 µS/cm) and flows to be occasional, which suggests that the flow within the Creek is almost entirely derived from surface water run-off.

As there is no alluvium in the mining area and no apparent base flow contributions, the pumping or interception of groundwater with the Permian Coal Measure aquifer from current or future mining activities is unlikely to impact upon on creek flow volumes in the regolith/alluvial aquifer system. The only risks to the creek therefore relate to water quality impacts associated with dirty water runoff.

7.2 Water Licences

Rix's Creek has the following active groundwater licences:

Table 10 Rix's Creek Water Licences

Bore Licences					
	Number	Category	Volume	Purpose	
Natural Resource Access Regulator	20BL169513	Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock	
	20BL172249	Mining	100(ML/yr)	Open Cut (dewatering groundwater) Hard Rock	
	20BL170863		Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock

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	20BL170864		Mining	100(ML/yr)	1 x Bore (dewatering groundwater)
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7.21 Water Management

In January 2019 the RCM Water Management Plan was approved combining both RCN and RCS to rationalise and combine the monitoring programme. This 2019 water review uses the monitoring programme outlined in RCM combined Water Management Plan.

A static water balance was calculated for 2019 providing information on inputs and outputs for RCM operations and the results are shown in **Table 20**.

Rix's Creek Mine Results

Table 20 shows that in 2019 the strategy was to manage water levels in the open cut at Rix's Creek Mine operations by pumping water to the CHPP for re-use, to surface dams and disused pits to maximise evaporation. Water is pumped to the CHPP Dams and from west pit open cut operations and MB 19 water storage area.

The Camberwell Pit was dewatered to Dirty Water Dam 1 (D1), the CHPP supply dam. Water carts operated from the fill point adjacent to the workshop hardstand over the whole year.

Rixs Creek has a water management system where all water on-site has generally been retained in storages: mine water dams, mine voids and tailings dams for re-use by mining and processing operations. Water can be transferred from these storages via pipelines to the CHPP, the mine or to Ashton Coal. Water can also be pumped to the Great Ravensworth Area Water Sharing Scheme (GRAWSS) which occurred during the reporting period.

In 2019, the strategy was to manage water levels in the open cuts by pumping water to the CHPP for re-use, to surface dams and disused voids to maximise evaporation. Water is pumped to the CHPP Dams and the North Pit Tailings Dam from the open cuts. Water carts were operated over the whole year.

Dust Suppression

Historically, the main loss or consumption of water at Rixs Creek is via the moisture retained in the product coal or waste reject material as well as water utilised for dust suppression.

Fresh Water Use

39.85 megalitres (ML) of potable water was sourced from the Singleton town water supply in 2019 for potable supply and bathhouse facilities.

Hunter River Salinity Trading Scheme

Rixs Creek South does not discharge under the Hunter River Salinity Trading Scheme.

Evaporation

Estimated evaporation from site process water dams totalled 1650 ML in 2019. The major evaporation occurred at:

- The Process Dams, approximately 183 ML;
- The Tailings Dams MB19 210 ML;
- The tailings dams, approximately 462 ML;
- The Possum Skin Dam, approximately 230 ML;
- The in-pit voids, approximately 320 ML;
- Dirty Water Dams 1 & 3; approximately 245 ML.

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Groundwater

There was an estimated 83 ML of groundwater inflow into the Rix’s Creek South open cut voids during the reporting period.

There was an estimated 100 ML of groundwater inflow into the Rix’s Creek North open cut voids during the reporting period.

The groundwater inflow and seepage from rehabilitated emplacements and spoil dumps into the Underground Portal Storage was estimated at 795 ML.

Site Inventory

Site inventory decreased at RCM from 10,274 ML to 9,130 ML during 2019. This was from a combination of increased loss through evaporation and pumping of water to the GRAWSS.

Surface Water Dams

Water inventories in site process water dams totalled generally decreased over the year due to less than average rainfall:

The Falbrook Pit is used as a storage for excess mine water and the inventory fell from 4540 ML to 3270 ML over the year as water was pumped to Integra UG and to D1 for RCN CHPP processing and dust management.

Possum Skin Dam inventory ranged from 380 ML (about 20% of capacity) in January, closing the year at an estimated 200 ML.

DWD 1 was mostly steady around 300 ML over the year.

Free water in the tailings dams declined from around 520 ML to 310 ML over the year.

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Table 11 Estimated Sample Static Water Balance Rix's Creek Mine 2019

Water Stream	2019 (ML)	Estimation technique
Inputs		
Imported Fresh Water	0	high
Imported Potable	39.85	High (metered)
Groundwater Seepage To Open Cuts	273	Low
Underground Dewatering	39.2	High (metered)
Rainfall Runoff – Into Dirty Water System	1248	Moderate (catchment)
Recycled to CHPP from Tails & Storage (not included in total below)	1,520	Low
Water from ROM Coal	679	Low
Total Inputs	3,799.9	
Outputs		
Groundwater Seepage Out (Down dip losses and high wall evaporation)	795	Low
Dust Suppression – Water Carts	852	moderate (metered)
Exported to Other Mines – through GRAWSS	385.4	high (metered)
Evaporation Fans & Sprays	0	high
Evaporation - Mine Water & Tailings Dams	1650	low
Entrained in Process Waste	916	low
Water in Product Coal	305	low
Potable Usage	39.85	High (metered)
Total Outputs	4,943.25	
Estimated Change in Pit Storage (decreased)	-1,144.2	

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Rixs Creek North & Rixs Creek South

7.2.1 Climate/Rainfall

Specific rainfall during 2019 is as follows:

- Over the review period, the highest rainfall events at all stations occurred in March and September 2019 which were the result of storm events.
- 2019 annual rainfall at Rix’s Creek was 381.1mm, which is significantly lower than the long-term average of 698mm.

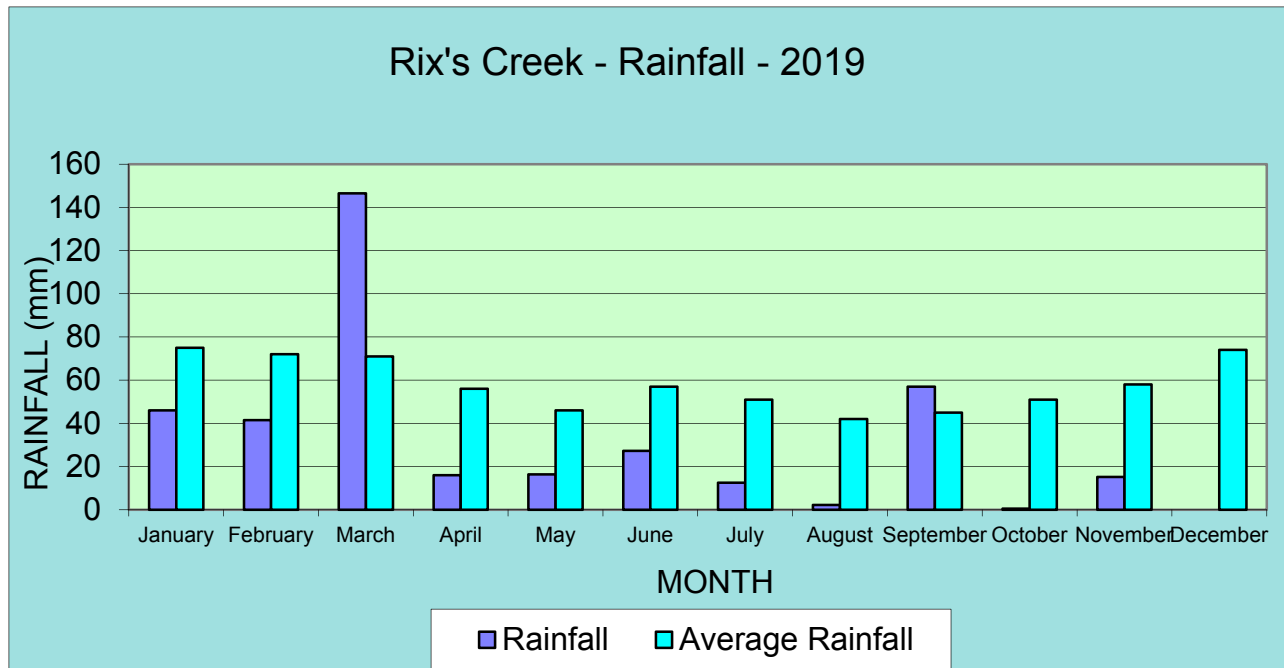


Figure 16 Annual Rainfall at Rix’s Creek 2019

Annual rainfall results are plotted for the last 19 years and are presented in Figure 18.

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Rixs Creek North & Rixs Creek South

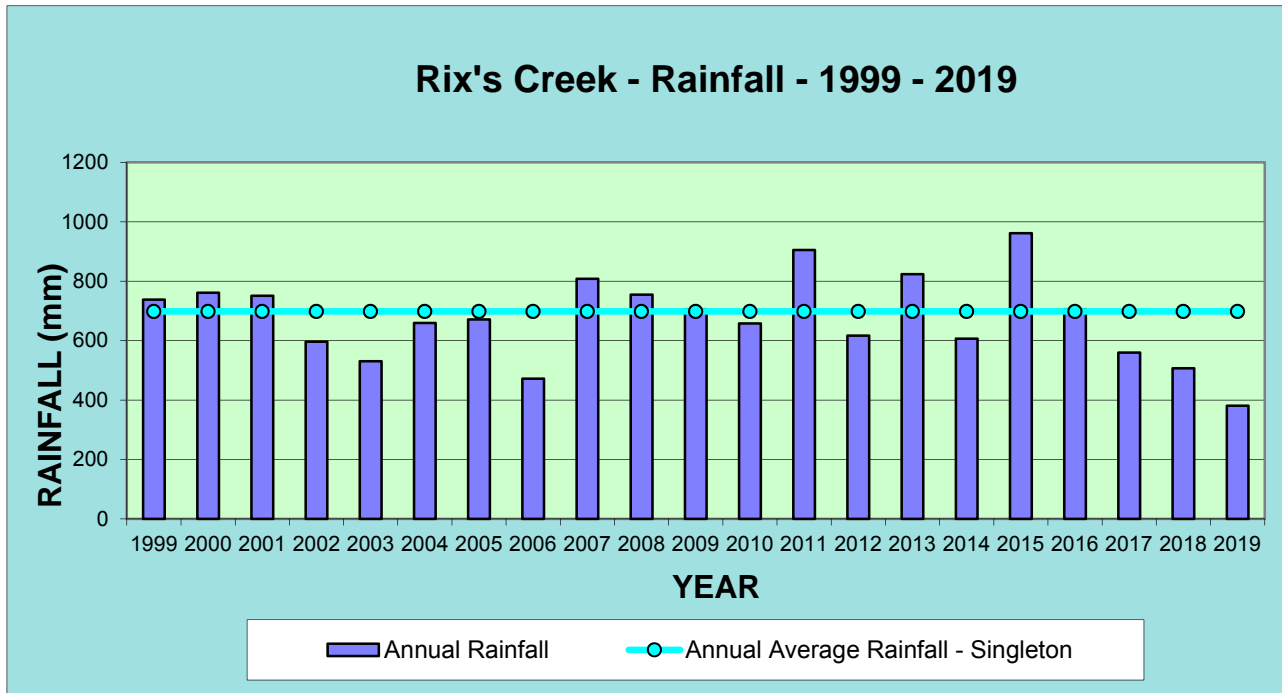


Figure 17 Annual rainfall at Rix's Creek 1999-2019

7.3 Surface Water

7.3.1 Environmental Management

The water management system at Rix’s Creek mine has been designed with the primary objectives of:

- Segregation of uncontaminated, clean water runoff, from contaminated-mine water on site; and
- Priority use of, and safe containment on site of contaminated water.

Clean Water

Runoff from undisturbed areas is directed away from mining operations through diversion banks and channels. The clean water is directed into Rix’s Creek, which flows through the lease. North of the New England Highway the Creek consists of a number of flow lines in smaller catchments. South of the Highway Rix’s Creek is a defined flow line amongst a belt of riparian vegetation.

Water quality is monitored in the Creek on a monthly basis when there is sufficient water to sample as Rix’s Creek is an ephemeral stream. Water quality is also monitored in a smaller creek north of the operation labelled Deadman’s Creek.

For Rix’s Creek Northern operations, in the open cut mining lease area east of the main Northern Railway Line, rainwater runoff from non-mined or rehabilitation areas, as well as from the diversion of the Martins Creek and Blackwattle Creek catchments, is collected in a series of four dams (C1, C2, C3 and C4). A vegetated clean water channel connects these dams. C3 and C4 are maintained with sufficient freeboard to ensure adequate surge capacity during storm events. Three further dams, C5, C6 and C6a are sediment laden water dams in the south of the mining lease and these dams bywash to Dam C3.

The area west of the Main Northern Railway Line had several dams constructed in 2000 due to the increase in South Pit operations and the need to separate clean and mine water. The water management system comprises clean water dams C7 to C11. The dams and diversion banks divert clean runoff water from entering mine workings. Dams C7, C8 and C11 bywash and flow into C4 via the vegetated channel, while dam C9 (west of the south pit) bywashes into Station Creek. Dam C10 was located in the active mining area and was ‘mined-through’ in 2001.

Mine Water

Runoff from disturbed areas is contained within a system of detention dams designed to allow settlement of the suspended solids. Runoff from active mining areas is pumped to the dirty water storages.

Tailings from the coal beneficiation process are directed to the emplacement area and water decanted off the tailing’s dam surface is recycled through the coal handling and preparation plant.

First priority is given to the use of contaminated water in mine operations. Mine water is used in the coal beneficiation process and for dust suppression via water carts for haul road watering and spraying coal stockpiles.

Hunter River Salinity Trading Scheme

Although Rix’s Creek is a member of the scheme there has been no need to discharge saline water and the instrumentation necessary to participate in the scheme was not installed. As a consequence, Rix’s Creek is unable to discharge and EPA has subsequently revoked the discharge component of the Environmental Protection Licence.

Rix’s Creek runs the length of the Rix’s Creek South mining lease area. A small portion on the east side of the site adjacent to Rix’s Creek Lane is drained by a tributary of Rix’s Creek, known as ‘Stone Quarry Gully’.

Grab samples are taken from Rix’s Creek Southern site in four locations. They are:-

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- Site 1 - Railway Underpass, as the Creek enters the site;
- Site 2 - New England Highway Bridge, at the mid-point through the mine site;
- Site 10 – Below Operation, on Rix’s Creek below the operation; and
- Site 3 - Maison Dieu Road Bridge, after the Creek has left the site.

Water storage dams 1, 2, and 6 are sampled and analysed monthly. The locations of these dams are shown on Figure 23 with the relationship being:-

- Site 4-Clean Water Dam 1 - (CWD 1)
- Site 5-Clean Water Dam 2 - (CWD 2)
- Site 7-Clean Water Dam 6 - (CWD 6)

For Rix’s Creek Northern operations, Environmental Protection Licence (EPL 3391) requires the monitoring of surface waters for pH, EC, TSS and TDS at the following sites on a monthly basis:

- W3 - Martins Creek, where it enters the site;
- W6 - Blackwattle Creek, where it enters the site; and
- W1 - Station Creek, where it leaves the mine site.

EPL Samples are taken on a monthly basis. Sampling site locations are indicated on Figure 19.

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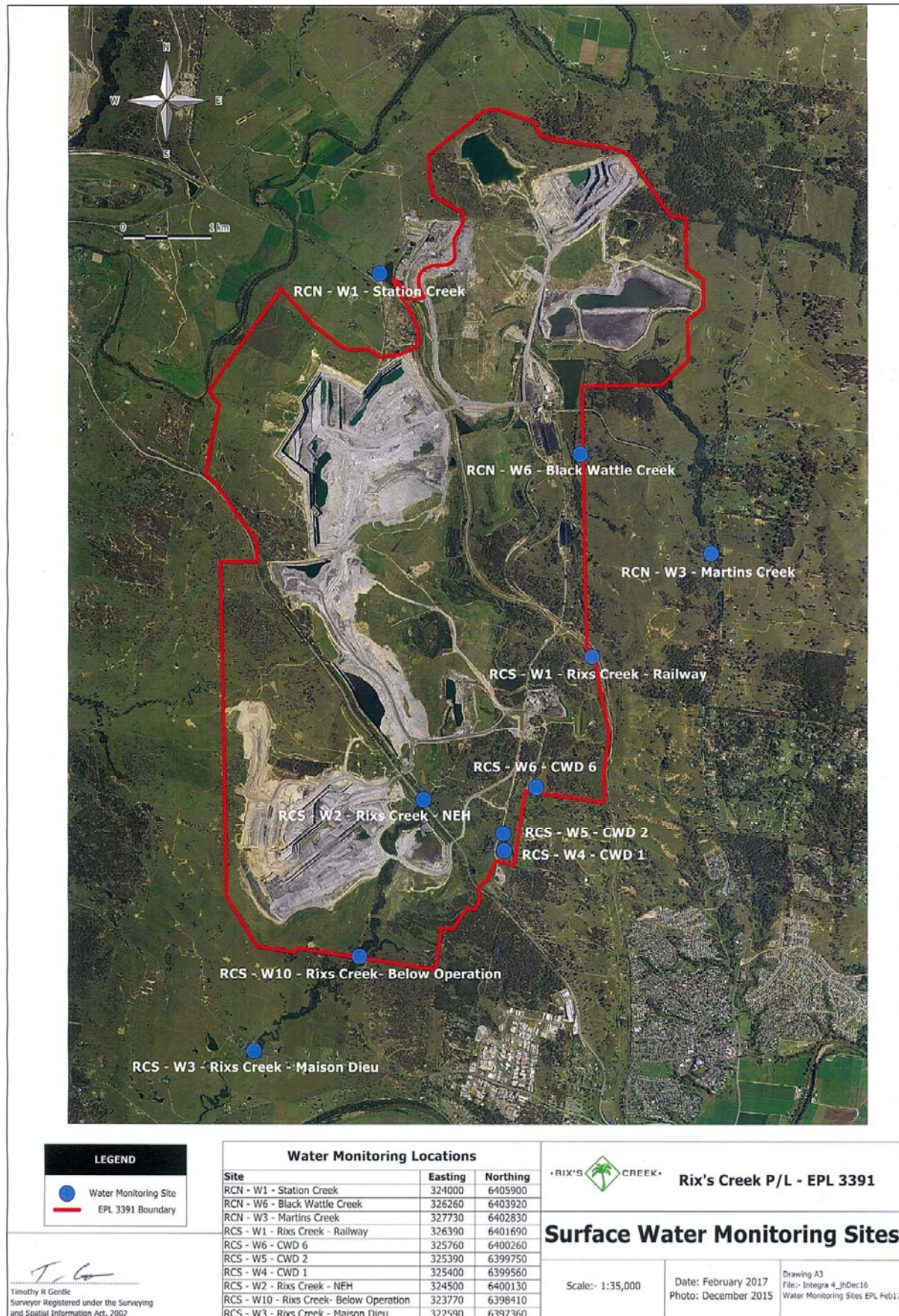


Figure 18 EPL 3391 water monitoring sites

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Table 12 RCN Surface Water Monitoring Sites

Monitoring Point	Location
W1	Station Creek
W3	Martins Creek
W4	Glennies Creek upstream of the Station Creek confluence
W5	Glennies Creek downstream of the Station Creek confluence
W6	Blackwattle Creek
W7	Stony Creek where it crosses Stony Creek Road
W10	Clean Water Dam – C4
W11	Glennies Creek downstream at Camberwell where it crosses the New England Highway
W12	Clean Water Dam – C1
W13	Clean Water Dam – C6
W14	Clean Water Dam – C3
W15	Clean Water Dam – C6A (after C5 spillway channel before clean water channel)
W16	Sediment Control Dam – C7
W17	Clean Water Dam – C2
W18	Clean Water Dam – C5
W19	Mine Water Dam D1
W20	Northern Stock Water Dam No. 1
W21	Northern Stock Water Dam No. 2
W22	Station Creek Up
W23	Station Creek Down
GCS003	Possum Skin Dam
GCS004	PS Dam Seepage Collector
GCS005	PS Dam Clean Water diversion Sediment Pond
SD1	South Sediment Dam
SD2	Central Sediment Dam
SD3	North Sediment Dam
GC1	Middle Falbrook Rd Bridge
GC2	Glennies Creek Nobles Crossing
Nobles Crossing	Nobles Crossing

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Figure 19. Rix's Creek North Ground and Surface Water Monitoring sites

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7.3.2 Environmental Performance

Water samples are analysed for water quality parameters of pH, electrical conductivity, total dissolved solids and total suspended solids. The water samples are analysed by Steel River Testing Mayfield as well as ALS Laboratory Group at Warabrook. Both laboratories are registered by the National Association of Testing Authorities, Australia (NATA).

Rix's Creek Mine surface water results

During the 2019 surface water assessment, January and from May to September coincided with relatively higher pH levels due to below average rainfall during the month. March, October and December were the only months with above average rainfall which correlated with decreased pH levels and salinity levels across monitoring locations.

pH

The pH results are presented in **Appendix 1**. The general pH trend in the Creeks and site dams is to decrease under flow conditions and increase in times of stagnant conditions or limited flow. The decrease in pH under flow conditions reflects the slightly acidic nature of rainfall. The pH ranged from 5.8 to 10.2 throughout 2019.

The surface water assessment the pH of upstream ephemerals W6 (Black Wattle Creek) ranged between 7.2 and 8.0 and W3 (Martins Creek) ranging between 6.6 and 7.0. the Upstream Railway underpass recorded pH between 7.0 and 9.3. W1 (Station Creek) down stream ephemeral monitoring site is located downstream of mining operations and recorded a neutral to slightly elevated pH during the reporting period ranging between 7.0 and 9.3.

Due to the prolonged drought the pH was slightly elevated when compared to the 2018 and 2017 results.

Electrical Conductivity (Salinity)

The Electrical Conductivity results are presented in **Appendix 1**. Salinity levels at RCM generally fluctuated in correlation with variations in rainfall and flowing vs non-flowing conditions, ranging from 245µS/cm to 9,340µS/cm during the 2019 reporting period.

Results ranged from 245 µS/cm at the Clean Water Dam 1 to 9,340 µS/cm at the Dirty Water Dam 1.

The EC of upstream ephemeral W3 (Martins Creek) ranged between 241µS/cm (March) and 346µg/cm (May), with W3 being too low to sample on nine (9) occasions. W1 (Station Creek) monitoring site is located downstream of mining operations and recorded range slightly brackish during the reporting period ranging between 324 and 1,466µS/cm. W1 was too low to sample on three (3) occasions. Clean Water Dam 1 ranged from 221µS/cm (April) to 446µS/cm (February).

Total Dissolved Solids

The Total Dissolved Solids (TDS) results for Rix's Creek Mine are presented in **Appendix 1**. TDS ranged from 146 mg/l – Clean Water Dam 6 to 7,105 mg/L – Dirty Water Dam 1. The higher TDS levels reflect dryer than average conditions in Rix's Creek. Throughout the reporting period there were prolonged dry periods resulting in no flow periods at the Railway underpass site, NEH Bridge and Maison Dieu Bridge.

TDS ranged from 113 mg/l (September) – W7 Stoney Creek to 8,240 mg/l (November) – W20 Dam. The higher results during April to August and October to December reflect typically dryer conditions in Rix's Creek. Total dissolved solids at monitoring site W1 (Station Creek) ranged between 310 mg/l in April and 1130mg/l in January. W6 (Black Wattle Creek) water flow is usually stagnant in drier

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periods with low rainfall. on nine (9) occasions Black Wattle Creek was too low to sample during 2019.

Total Suspended Solids

Total Suspended Solids (TSS) results are presented in **Appendix 1**. TSS ranged from 2 mg/l at the Railway underpass under no flow conditions to 284 mg/l at the Below Operations site. The general trend is for levels to increase down the catchment under flow conditions. This historic trend is an indication that the water flowing in the Creeks picks up sediment and increases the sediment load down the catchment. This trend is depicted in the 2018 period and is consistent with previous reporting periods.

Rix's Creek North Results

Total Suspended Solids

TSS results are presented in **Appendix 1**. TSS results ranged from 1 mg/l (February) at the W12 Dam C1 site under no flow conditions to 139 mg/l (December) at the W6 Backwattle Creek with flow following sampling undertaken after a rain event. The general trend is for levels to increase down the catchment under flow conditions. This historical trend is an indication that the water flowing in the Creeks picks up sediment and increases the sediment load down the catchment.

7.3.3 Reportable Incidents

There were no external reportable incidents that occurred in the reporting period.

7.4 Groundwater

The groundwater monitoring sites across the Rix's Creek mine sites have been combined in **Table 24** and are provided as a reference to compare Rix's Creek South and Rix's Creek North.

Table 13 Rix's Creek Ground Water Monitoring Sites

Bore ID	License	Easting	Northing	Screened Interval (mgl)	Stick Up (m)	Surface Elevation (mAHD)	Total Depth (mbgl)
Rix's Creek North							
Open Cut Piezometers and Wells							
Glennies Creek Alluvium							
GCP9	(20BL171708)	323259	6407315	Unknown	1.5	69.885	9
GCP10	(20BL171708)	324414	6408030	Unknown	0.7	74.891	11.5
GCP19	(20BL171708)	325086	6408333	8.5 - 12	0.63	77.5	12
GCP20	(20BL171708)	325201	6408179	5.2 - 8.2	0.67	82	8.2
GCP21	(20BL171721)	324466	6407916	6 to 11	0.82	76	11
GCP22	(20BL171721)	324558	6407814	8.5 - 12	0.7	75	12
GCP23	(20BL171721)	324535	6407659	4.6 - 8	1.01	75	8
Coal Measure							
GCP1	(20BL169631)	325124	6406664	Unknown	0.34	96.013	108
GCP2	(20BL169631)	325160	6406490	Unknown	0.61	105.495	105
GCP5	(20BL169631)	324337	6406203	Unknown	0.54	80.334	108
GCP6	(20BL169631)	324941	6406784	Unknown	0.38	102.931	126
GCP7	(20BL169628)	325864	6407071	60 - 72 and 96 - 102	0.1	93.034	120
GCP8	(20BL169630)	326332	6407214	Unknown	0.44	105.095	120
GCP13	(20BL169628)	326169	6406745	Unknown	0.15	105.356	66
GCP14	(20BL169628)	325774	6407042	Unknown	0.66	90.99	123
GCP15	(20BL169628)	325912	6406961	Unknown	0.42	95.035	114
GCP16	(20BL169628)	326029	6407077	Unknown	0.7	98.853	120
GCTB	(20BL169631)	325149	6406572	Unknown	0.2	102.564	90

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Bore ID	License	Easting	Northing	Screened Interval (mgb)	Stick Up (m)	Surface Elevation (mAHD)	Total Depth (mgb)
Extended Southern Pit							
Glennies Creek Alluvium							
GCP28	(20BL171722)	322651	6405459	6.7 -12.0	0.8	69.5	12
GCP29	(20BL171722)	323191	6405356	4.5 - 10.0	0.9	71	10
GCP30	(20BL171720)	322438	6404649	5.5 -12.0	0.94	67.5	12
Coal Measure							
GCP27	(20BL171881)	323197	6406037	36.5-37.5	1.11	70	27.5
GCP32	(20BL171880)	322491	6404250	49.0-55.0	0.66	70.5	55.55
GCP34	(20BL171879)	322800	6403235	47.0-56.25	0.61	101	56.25
GCP36	(20BL171722)	322915	6405320	14.5-16.0	0.85	70.5	16
GCP38	(20BL171878)	323468	6405626	17.0-24.3	0.98	71	24.3
GCP17		323803	6409986	5.5-7.5			7.5
Rix’s Creek South							
Regolith (Upper weathered zone)							
BH3		325457	6401923	5-8	0.97	100	11
BH4		323982	6398666	7-10	0.74	63	10
BH8		321803	6401175	5-14	0.8	85.446	20
Coal Measure							
BH1		323190	6400562	115-121, 127-130	0.85	113	130
BH2		322936	6401923	84-87	0.98	136	90
BH5		324562	6399924	63-66	1.04	76.469	66.5
BH7		323345	6401709	150.5- 198.5	0.72	100.86	200.5
20BL170864		324633	6400335		0.3	80.5	~70

7.4.1 Monitoring Background

As part of the Water Management Plan for Rix’s Creek Mine, a monitoring programme has been implemented to detect any impacts from mining on the groundwater regime, and from neighbouring groundwater users. The monitoring programme incorporates both shallow and deep groundwater monitoring locations monitoring the water levels in the Glennie’s Creek Alluvial deposits and the Permian Coal Measures around both Rix’s Creek South Colliery and the Rix’s Creek North Colliery.

Mining activities that have the potential to impact groundwater levels and quality are:

- Tailings emplacement area
- Spoils and emplacement
- Surface water bodies – these may locally control groundwater levels in surrounding spoil and Permian strata; and
- Waste dumps & Coal Handling plant – surface water runoff and associated water quality issues.

7.4.2 2019 Groundwater Monitoring Performance

Rix’s Creek South Groundwater Levels

In accordance with Modification 4 of the Rix’s Creek South development consent (DA 49/94) the DPI Water required a groundwater monitoring programme to be developed for Rix’s Creek south operations that:

- detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores, which could be affected by the development;

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- groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts of the development;
- a program to monitor groundwater inflows to the open cut mining operations, and impacts of the development on the regions aquifers, any groundwater bores, and surrounding watercourses.

For Rix’s Creek South operations, three piezometers are installed into the Permian coal measures and three into overlying regolith zone. Bore details are summarised in **Table 25**.

Piezometers BH1, BH5 and BH7 are the deeper bore holes into the coal measures while Piezometers BH3, BH4 and BH8 are shallow into the overlying regolith. The monitoring network also included the existing production bore 20BL170864. BH2 was installed in the Permian coal measures, however this bore was destroyed in 2011.

Piezometer BH6 was proposed but was not completed due to several problems when drilling during 2015, with BH8 being completed in its place.

Groundwater level monitoring has been undertaken since 2010 and on a quarterly basis from 2012 to 2019 in accordance with the 2019 Rix’s Creek Mine Water Management Plan (WMP).

Groundwater levels for Rix’s Creek South groundwater bores have remained fairly consistent in the shallow aquifer since the commencement of monitoring ground water levels with the Coal Measures acting in hydraulic isolation from the shallow regolith and alluvium aquifer systems. This can be seen in the BH1 hydrograph (screened in Arties seam), with water levels correlating with mine water management activities in the Arties Pit.

Depressurisation was observed in BH1, BH5, BH7 and 20BL170864 in response to ongoing Coal Measures dewatering in the broader Rix’s Creek area, with BH5 recovering when pumping at 20BL170864 ceased. In early December 2017 BH5 and 20BL170864 resumed their depressurisation.

The piezometers in BH4 and BH8 have remained relatively stable throughout the monitoring period, indicating the deeper coal measures are hydraulically separated from the shallow regolith and alluvium system.

BH3 has shown a slight decline in water levels in association with decreased rainfall, however, the bore log notes that the screened interval is within a small coal seam and may be connected to the deeper coal measures than the shallow regolith unit. Its water levels ranged from 5.17 – 6.23mbgl.

During 2019 BH4 ranged from 2.75 – 3.00mbgl and BH8 ranged between 2.90 – 3.00mbgl.

Overall the regolith water levels are relatively stable in the shallow water table with fluctuating responses to rainfall and no observable correlation to water levels in the Coal Measures.

The groundwater levels are presented in **Appendix 2**.

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Table 14 Rix's Creek South 2019 Groundwater Monitoring Network

Bore ID	Type	Depth (mbgl)	Location	Change in Water Levels during 2019 (m)
BH1	Standpipe Piezometer	130	Middle of basin - Upper / Lower Arties	Bore Damaged Aug 2017
BH3	Standpipe Piezometer	11	East of waste dump / backfill area- Regolith and shallow coal seams	-0.26
BH4	Standpipe Piezometer	10	Rix's Creek south of Pit 3- Regolith	0.67
BH5	Standpipe Piezometer	66.5	East of Rix's Creek / tailings emplacement area- Lower Barrett	-9.41
20BL170864	Production bore	~70	Above underground Workings- All coal seams	-18.07
BH7	Standpipe Piezometer	200.5	Bottom of basin- Hebden	-4.79
BH8	Standpipe Piezometer	20	Dead Man's Creek wet of coal outcrop – regolith	-0.36

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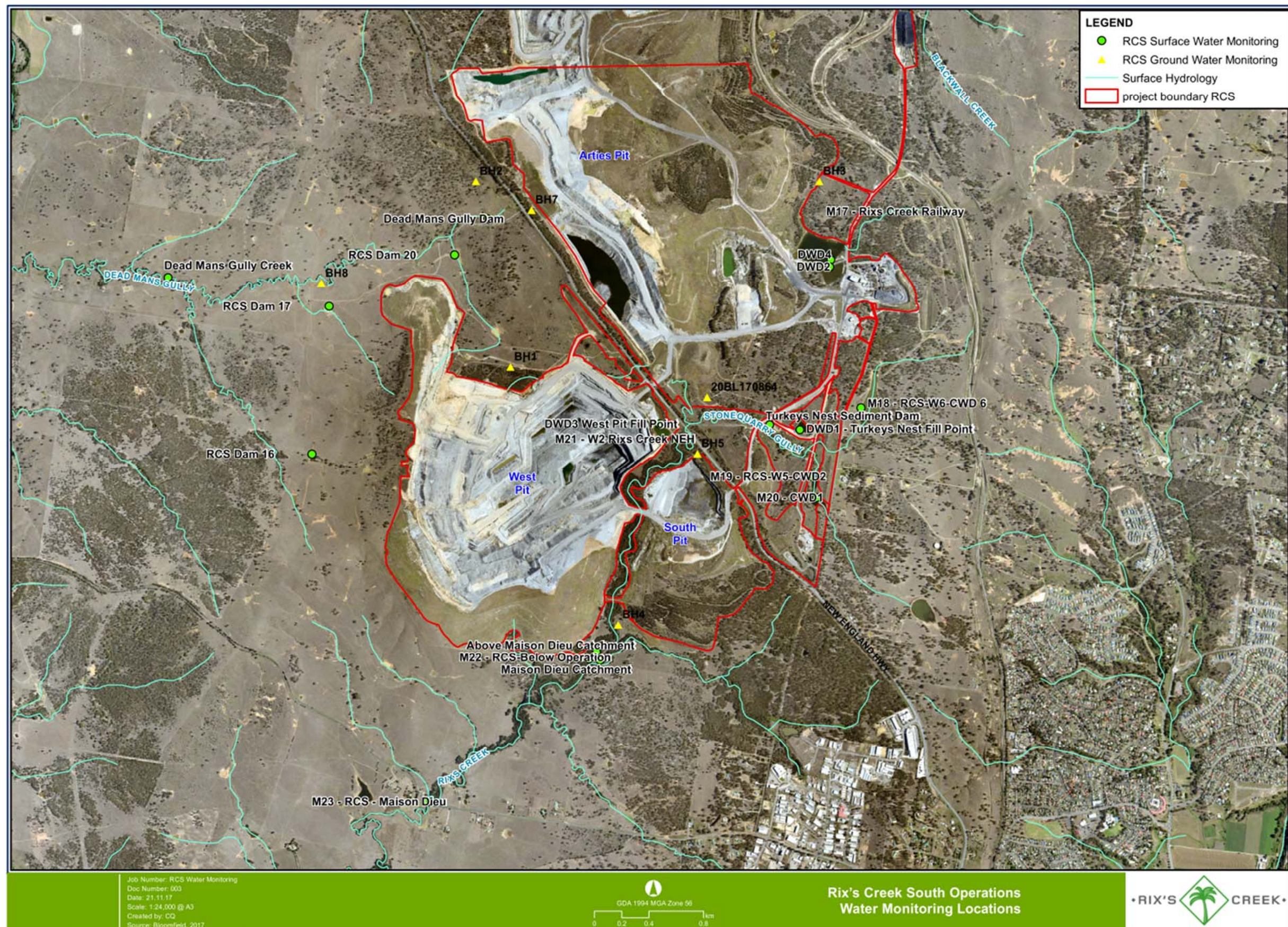


Figure 20. Rix's Creek South Groundwater and Surface Water Monitoring sites

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Pit Inflows

Groundwater inflow for the Rixs Creek South (RCS) Mine is licenced for 100ML/year (20BL170863).

The 2017 revised groundwater model predicted the 2019 RCS annual groundwater inflow at 100ML/year, with the measured annual groundwater inflow estimated at 83 ML.

Rix’s Creek South Groundwater Quality

The salinity in the coal seam (BH5) ranged between 2,820 – 7,320 mg/L.

A replacement bore for BH2 installed during July 2015 (BH7) had salinities ranging from 3,880 – 7,250 mg/L during 2019.

Salinity within BH3 and BH4 ranged from 4,200 – 21,420 mg/L which is consistent with the parameters outlined in the Rix’s Creek South Water Management Plan.

Salinity levels are relatively consistent in the coal seams and the regolith which indicates limited connectivity (and mixing) between the two aquifer zones.

No negative water quality trends are being driven from mining operations in the area which is consistent with the hydrogeological conceptualisation and impact assessment predictions.

Rix’s Creek North Groundwater Levels

Piezometers, bores and private wells included in the 2019 Rix’s Creek Mine Groundwater Monitoring Plan include the Foybrook Formation basement coal measures as well as the Glennie’s Creek and Station Creek alluvium groups.

Due to the complex interactive depressurisation effects of numerous coal mines on steady state groundwater levels within the model area, calibration of the 2017 groundwater model was focused on obtaining correlation between known and modelled mine inflow rates, as opposed to matching observed and modelled groundwater levels.

The Rix’s Creek North groundwater monitoring program with the results are presented in **Appendix 2**.

Piezometers GCP32 – GCP37 recorded partial data. Richards Bore was not monitored during 2019 as its monitoring has shifted to the underground operations and GCP20 was dry throughout 2019.

Alluvium

From the 2017 Environmental Assessment, the model indicated that groundwater within alluvial aquifers associated with Glennie’s Creek and Station Creek had the potential to be marginally to negligibly affected by the proposed pit during its active mining phase, with drawdowns ranging up to 1.2m near the Mine Area until the pit excavation was completed.

As shown in **Table 26** results up to the end of 2019 show the alluvium water levels have been relatively consistent with some variation induced by rainfall, evaporation and natural creek flow process.

Alluvial groundwater level monitoring indicated no response to mining outside of the influences of normal climatic variability in proximity to drawdown associated with the Falbrook Open Cut in the Glennie’s Creek catchment, or the Camberwell Open Cut in the Glennie’s Creek and Station Creek catchments.

Dewatering of the neighboring/underlying coal seams and broad depressurisation of the Permian basement has not resulted in water level impacts within the creek alluvium system.

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Alluvial groundwater level monitoring indicated no response to mining outside of the influences of normal climatic variability in proximity to drawdown associated with the Falbrook Open Cut in the Glennies Creek catchment, or the Camberwell Open Cut in the Glennies Creek and Station Creek catchments.

Dewatering of the neighboring/underlying coal seams and broad depressurisation of the Permian basement has not resulted in water level impacts within the creek alluvium system. The results are presented in **Appendix 2**.

Table 15 Rix's Creek North Ground Water Monitoring Network

Bore ID	Type	Total Depth (mbgl)	Formation	Change in Water Levels during 2019 (m)
GCP09	OSP	9	Glennie's Creek Alluvium	0.15
GCP10	OSP	11.5	Glennie's Creek Alluvium	0.03
GCP 19	OSP	12	Glennie's Creek Alluvium	0.12
GCP20	OSP	8.2	Glennie's Creek Alluvium	n/a
GCP21	OSP	8.2	Glennie's Creek Alluvium	0.08
GCP22	OSP	12	Glennie's Creek Alluvium	0.03
GCP23	OSP	8	Glennie's Creek Alluvium	-0.05
GCP28	OSP	12	Glennie's Creek Alluvium	0.07
GCP29	OSP	10	Glennie's Creek Alluvium	n/a
GCP30	OSP	12	Glennie's Creek Alluvium	0.05
GCP32	OSP	55.56	Camberwell Pit Basement	0.33
GCP34	OSP	56.26	Camberwell Pit Basement	n/a
GCP36	OSP	15.98	Camberwell Pit Basement	0.06
GCP38	OSP	24.31	Camberwell Pit Basement	-0.13
GCP02	OSP	105	Falbrook pit Basement	0.03
GCP05	OSP	108	Falbrook pit Basement	0.28
GCP06	OSP	126	Falbrook pit Basement	0.62
GCP07	OSP	120	Falbrook pit Basement	-9.83
GCP08	OSP	120	Falbrook pit Basement	-5.76
GCP13	OSP	66	Falbrook pit Basement	-4.96
GCP14	OSP	123	Falbrook pit Basement	-8.00
GCTB	OSP	90	Falbrook pit Basement	0.25

The results for groundwater analysis, including range, mean and standard deviation are presented in **Appendix 2**.

Basement

As shown in **Appendix 2** the basement monitoring data to the end of the 2019 reporting period indicated;

- Recovery of GCP7, 8, 13 and 14 during 2017 associated with water storage in the Falbrook Pit, followed by a decline in water levels within GCP7, 8, 13, 14, 27 and GCP32 in and after October 2017, along with normal climatic variability for the remaining piezometers within the Falbrook Open Cut; and
- All other basement bores at RCN continued to maintain relatively constant water levels associated with regional depressurisation influences.

Pit Inflows

The potential proposed RCN pit groundwater inflows from the 2009 ground water environmental assessment predicted that full pit ground water inflows of 73 ML/year in 2014 and 117ML/year from 2019.

Table 21 refers to the 2019 static water balance, which estimated groundwater seepage from RCN mine at 100ML for 2019, which is close to the model predicted volumes based on timing and range.

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TD2 Dam

Monitoring wells B1 to B6 monitor the groundwater pressure within the TD2 dam wall, which is driven by the water stored in the dam, and is separate from the underlying regional groundwater system.

The results recorded in each piezometer were relatively stable throughout the 2019 (and previous) reporting periods.

Bores 4, 5 and 6 have been dry since December 2015.

Rix's Creek North Groundwater Quality

The pH and salinity in the Glennie's Creek alluvial open standpipe piezometers have not shown any significant trend since they were installed in 2007, except for a reducing salinity profile in GCP30 between mid-2009 and early 2011.

The pH and salinity in the Camberwell basement open standpipe piezometers have not shown any significant trends since they were installed after mid 2007.

The pH and salinity in the Falbrook Open Cut basement open standpipe piezometers has not shown any significant trends since they were installed in 2012 except for a fall in salinity in GCP14 in mid 2016 to late 2017, and GCP08 in early 2018, both of which are north of the Falbrook Pit and may be influenced by fresher stored water within the Falbrook pit void.

GCP7 and GCP8 salinity began to rise after late July 2019.

The 2019 monitored electrical conductivity and pH have not varied above the 2019 WMP trigger levels of >15% variation from the average 2003 – 2016 salinity baseline data, or >0.5 pH.

The results for groundwater analysis, including range, mean and standard deviation are presented in **Appendix 2**.

7.5 Erosion and Sediment

7.5.1 Environmental Management

Erosion and sedimentation control is an integral part of the water management across the entire site. Erosion control on reshaped and rehabilitation areas is achieved by having the minimum delay in time and area between the active mining operation and establishing rehabilitation. Contour embankments are integral design components of final landform design and shaping procedures, these structures direct flows of water into relevant catchment facilities.

Revegetation of rehabilitation areas is undertaken as soon as an area becomes available with the aim to establishing a minimum of 70% ground cover, the level required to adequately control soil erosion. Accompanied with this is the use of sediment detention basins in front of the operation, along haulage roads and on drainage lines flowing from establishing rehabilitation areas.

Throughout 2019 sediment dams across site were de-silted whilst climatic conditions were dry allowing adequate access and works to take place. This required the use of a 20 tonne excavator accompanied by a 12 tonne tipper truck. Several other smaller sediment dams and drainage lines were also cleaned via an on-site backhoe as required throughout the year. These sediment dams contain the same material as that excavated from the open cut operation as well as clays, soil and silt from the surrounding environment.

Rix's Creek Mine participated in a mulch blanket trial and provided a suitable site to the north of the operation for demonstration and ongoing education for sediment and erosion control. Compost Blankets are a method of erosion control using a 50mm layer of specified compost to form a blanket on damaged sites bereft of top soil. The blankets are often injected with seed endemic to the area, to rehabilitate the site with native flora and eventually encourage native fauna back to the site. However, at the Rix's Creek site a pasture mix, in alignment with the approved final landuse was be applied. The compost has specifications that are fit-for-purpose and only available through source separated compost from quality processors.

Monthly sediment and erosion checklists were completed at Rix's Creek South and Rix's Creek North mine, with routine repairs to sediment fences being completed during the reporting period.

7.5.2 Environmental Performance

Total Suspended Solids (TSS) results from water sampling is used as a key indicator of sediment control. TSS results are discussed in Section 7.3 Surface Water environmental performance section.

7.5.3 Reportable Incidents

No reportable incidents relating to erosion and sediment occurred during the 2019 reporting period.

7.5.4 Further Improvements

Any sediment collected within the light-vehicle wash-down pad, heavy-vehicle wash-down pad, diesel fill-point sump, electrical workshop sump, mechanical workshop sump are all cleaned regularly with the sediment particles relocated to the site bioremediation areas. Bioremediation procedure is discussed in detail in Section 6.14.

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SECTION 8 REHABILITATION

8.1 Buildings

Maintenance of structures is undertaken on as needs basis throughout the year. Throughout 2019 infrastructure sheds and structures were painted as necessary. The preferred colour scheme is light green (known as rivergum green) with this same colour utilised on the colorbond fencing installed adjacent to the bridge of the cut and cover tunnel as well as major infrastructure across the site. Rix's Creek North infrastructure will remain the non-intrusive beige colour.

8.2 Post Landform Land Use

Land capability at Rix's Creek Mine is predominantly Class IV and Class V which is suitable for grazing. The primary post mining land use goal is to provide improved pasture species with scattered tree lots and tree corridors linking surrounding rehabilitated areas, proposed tree planting corridors and surrounding existing native vegetation. The overburden emplacement areas are designed to be sympathetic to the surrounding landscape.

For Rix's Creek Northern operations, tree corridors will be established over the Falbrook Pit (formerly referred to as Old North Pit) waste emplacement to link the rehabilitation of the Falbrook Pit with the rehabilitation of the Camberwell Pit (formerly referred to as extended South Pit) final landform. It is anticipated that this will provide a north-south link across the RCN project Area, which will link the Biodiversity Offset Areas that join the Falbrook Pit.

The progressive rehabilitation when compared to the respective Mining Operations Plans is referred in Tables 27 and 28 and demonstrated in plates in section 8.5.

8.3 Resources Regulator Signoff on Rehabilitation

In 2019 no areas of rehabilitation received formal sign-off from Resources Regulator that the land use objectives and completion criteria have been met.

8.4 Rehabilitation Performance during the Reporting Period

The aim of rehabilitation at Rix's Creek Colliery is to reinstate the pre-mining land capability of grazing land, with stable landforms, compatible with the surrounding landscape, and allow for a range of possible post-mining land-uses such as agricultural lots. Rix's Creek Mine have established grazing on mine rehabilitated land in the West Pit and Camberwell Pit operations. Local community residents currently agist these rehabilitated areas, with rehabilitation monitoring being completed to determine the long term viability of grazing on rehabilitated land.

As defined in the Rix's Creek Rehabilitation Strategy 2018, the rehabilitation objectives for final landform and landscape for the site are:

General

- Land will be rehabilitated in accordance with the approved relevant RR standards applicable at the time of rehabilitation.
- Rehabilitated land will represent a minimal source of offsite environmental impacts, such as dust, water pollution, visual amenity, weeds and odour.
- Rehabilitated land will require ongoing management inputs no greater than similar adjacent land.
- Rehabilitation will be compatible with the proposed post-mining land-use.

Landform

- Rehabilitated land will be safe and stable.
- Land and soil capability comparable to that pre-mining.

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- Mined land will be re-contoured to a landform compatible with the surrounding natural landscape.
- Reinstatement of a stable drainage network.

Growing media

- A sustainable vegetation cover will be established on rehabilitated land (soils).

Vegetation

- Rehabilitated land will be topsoiled, fertilised and sown with grass and/or native vegetation species.
- A sustainable vegetation cover will be established on rehabilitated land.
- Grazing areas will be established with a range of species suitable for pasture production in the area.
- Tree area will be established with native species by either direct seeding or tubestock planting techniques.

Infrastructure which has no use post mining

- All infrastructure, including roads, will be removed and rehabilitated unless RR agrees otherwise.
- Footings are only required to be removed to the existing ground level only, covered with a minimum of 0.5 metres of fill and rehabilitated.
- Electricity supply infrastructure (overhead lines, poles, substations, etc.) will be removed unless RR agrees otherwise.

During the reporting period a total of 16.8 ha was rehabilitated across Rix's Creek Mine. A further breakdown of this can be seen in Table 27 and 28.

Table 16 2019 Rehabilitation Summary RCN

Locator	Site Name	Type	Date Sown	Species mix	Area (ha)
Camberwell Pit	Rail Corridor Rehab	Pasture	September	Pasture #1	3.4
TOTAL 2019 @ RCN					3.4
CUMULATIVE TOTAL INCLUDING 2019 @ RCN					422.9

Table 17 2019 Rehabilitation Summary RCS

Locator	Site Name	Type	Date Sown	Species mix	Area (ha)
West Pit	Old North Pit Void	Pasture	November	Pasture #1	1.6
West Pit	West Pit South Batter	Pasture	December	Pasture #1	12.2
TOTAL 2019 @ RCS					13.4
CUMULATIVE TOTAL INCLUDING 2019 @ RCS					445.7

Camberwell Pit Rail Corridor

The Camberwell Pit Rail Corridor site was rehabilitated in September 2019 totalling 3.4 ha. This area was direct seeded via a tractor using pasture species (Pasture mix #1).

The area was created using overburden from the Camberwell Pit operation then clay and subsoil (300-500 mm thick) from the Camberwell South West pre-strip was shaped onto a 8-10 degree slope. This slope was overlaid with approximately 100 mm of topsoil from the Camberwell Pit pre-strip area. Prior to seeding the area was spread with biosolids at a rate of 100 tonnes / hectare and ripped into the soil with a tractor. The rip lines were created across the contour to minimise erosion from surface run-off. This area creates good undulation to the Arties Pit dump which has a more natural aesthetic for passing road-users.

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The material used in the construction has no relevant chemical characteristics, acid forming or spontaneous combustion potential. During the seeding process a starter fertiliser was spread at a rate of 200 kg/ha. Since the post mining land use for this rehabilitation will be grazing, greater emphasis has been placed on the removal of small to moderate rocks. The contours that were created have been formed so that four wheel drives can drive over the contours.

Old North Pit Void

The Arites Pit Old North Pit rehabilitation site was rehabilitated in November 2019 totalling 12.2 ha. This area was direct seeded via a tractor using pasture species (Pasture mix #1).

The area was created using overburden from the Arties Pit operation then clay and subsoil (300-500 mm thick) from the Camberwell South West pre-strip was shaped onto a 8-10 degree slope. This slope was overlaid with approximately 100 mm of topsoil from the Camberwell Pit pre-strip area. Prior to seeding the area was spread with biosolids at a rate of 100 tonnes / hectare and ripped into the soil with a tractor. The rip lines were created across the contour to minimise erosion from surface run-off. This area creates good undulation to the Arties Pit dump which has a more natural aesthetic for passing road-users.

The material used in the construction has no relevant chemical characteristics, acid forming or spontaneous combustion potential. During the seeding process a starter fertiliser was spread at a rate of 200 kg/ha. Since the post mining land use for this rehabilitation will be grazing, greater emphasis has been placed on the removal of small to moderate rocks. The contours that were created have been formed so that four wheel drives can drive over the contours.

West Pit South Batter

The West Pit South Batter rehabilitation was commenced in December 2019, where 1.6 ha was completed of the shaped area. This area was direct seeded via a tractor using pasture species (Pasture mix #1).

The area was created using overburden from the West Pit operation then clay and subsoil (300-500 mm thick) from the West Pit pre-strip was shaped onto a 10 degree slope. This slope was overlaid with approximately 100 mm of topsoil from the West Pit pre-strip area. Prior to seeding the area was spread with biosolids at a rate of 80 tonnes / hectare and ripped into the soil with a tractor. The rip lines were created across the contour to minimise erosion from surface run-off. This area creates good undulation to the West Pit South batter which has a more natural aesthetic for passing road-users.

The material used in the construction has no relevant chemical characteristics, acid forming or spontaneous combustion potential. During the seeding process a starter fertiliser was spread at a rate of 200 kg/ha. Early indications also show some weed (galenia) which will be monitored and managed accordingly. Some rock and timber structures were also created throughout the area as habitat for ground-dwelling creatures and native bees.

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As shown in Table 29, 13.4 ha was rehabilitated in 2019 at RCS giving RCS a cumulative area rehabilitated of 449.7 ha since 1990. This cumulative area is 35.5 ha behind the 2019 RCS MOP cumulative total of 485.4 ha. In 2019 Rix's Creek South operations focused on completing the rehabilitation of the Old North Pit Void. Due to lower overburden production during 2019, the old North Pit Void wasn't filled and still required shaping and additional overburden before rehabilitation could commence. A 9.2ha area was shaped and not rehabilitated in 2019. A small portion of the South West section requires shaping in early 2020. Rehabilitation will be completed during the 2020 period. Due to the rehabilitation occurring in a drought period, rehabilitation of this area after rain fall will have better rehabilitation outcomes than ameliorating and seeding the area in a drought.

Due to efforts on rehabilitation the Old North Pit Void area, rehabilitation commenced in December 2019 on the West Pit South area. The reason that we commenced this in December is that there was low availability of low odour biosolids, with deliveries occurring in early December 2019. The rehabilitation spreader, that spreads the biosolids, also had a major failure while ameliorating this area and required a major overhaul. Therefore this area was not fully completed during the 2019 period. The West Pit South Batter has been shaped during the reporting period and will be completed in 2020.

The RCS Tailings Emplacement Areas 3 and 4 are currently being capped with overburden material. Due to the slow nature of the capping process, this has taken longer than anticipated, therefore there remains 16.2 ha remains as non-capped tailing emplacement area compared to the 2019 MOP Emplacement Area in which the area was proposed to be capped. 1.2 ha of capping was completed at Emplacement Area 3 during the reporting period. Emplacement Area 3 capping will be prioritised during the 2020 period.

Table 30 shows 3.4 ha was rehabilitated in 2019 at RCN giving RCN a cumulative area rehabilitated of 422.9 ha. This cumulative area is 27.1 ha behind the cumulative total of 450.0 ha in 2019 MOP requirements as seen in Table 34. The 5.2 ha landform area was shaped during the reporting period and will be completed during 2020.

During 2019 the Falbrook Pit landform has been partially shaped, however the batter requires more overburden to be placed to the east to reach the final landform design. The Falbrook Pit is currently in care and maintenance, with no mining taking place. Due to the long haul of overburden from the Camberwell Pit to the Falbrook Pit rehab site, this rehabilitation of the Falbrook Pit was not completed during the 2019 period. The New RCM MOP approved in December 2019 took this into consideration and this area was removed from the 2020 rehabilitation requirement, with new areas being prioritised for completion in the Camberwell Pit, which is closer to current mining operations. When mining commences in the Falbrook Pit, this area will be prioritised for rehabilitation.

The new approved Rix's Creek Mine (RCM) MOP combines the superseded RCN and RCS MOPs. In Table 29 and table 30, the new 2020 RCM MOP requirements are provided.

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Table 18 RCS Rehabilitation and Disturbance Areas (ha) compared to MOP

Domain / Phase	2018 Actual	2019 MOP	2019 Actual	2020 RCM MOP*
Infrastructure Area	63.8	60.1	81.9	207.6
Tailing's Emplacement Area –RCS	17.4	0	16.2	84.2
Active Mining Area RCS	143.6	128.7	131.0	232.8
Overburden Emplacement Area -RCS	310.4	244.5	302.3	675.1
Rehabilitated Lands – Pasture phase – Ecosystem and landuse establishment	7.5	30.6	13.4	-8.6
Rehabilitated Lands – Pasture; Ecosystem and Landuse Sustainability	118.2	195.8	89.9	174
Total Rehabilitation – Ecosystem and Landuse Sustainability (incl. pre MOP rehabilitation)	436.3	485.4	449.7	689.8

Table 19 Rehabilitation and Disturbance Areas (ha) compared to MOP

Domain / Phase	2018 Actual	2019 MOP	2019 Actual	2020 MOP*
Infrastructure Area	109.8	107.5	135.8	207.6
Tailing's Emplacement Area – RCN RCS	67.7	67.7	67.7	84.2
Active Mining Area RCN	98.2	91.6	81.6	232.8
Overburden Emplacement Area _RCN	358.1	353.3	356.2	675.1
Rehabilitated Lands – Pasture; Ecosystem and Landuse Establishment	9.3	14.8	3.4	-8.6
Rehabilitated Lands – Pasture; Ecosystem and Landuse Sustainability	88.6	81.8	76.3	174
Total Rehabilitation – Ecosystem and Landuse Sustainability (incl. pre MOP rehabilitation)	419.8	450.0	422.9	689.8

Figure 22 outlines the progression of rehabilitation during the 2019 reporting period. All areas rehabilitated during 2019 across Rix's Creek Mine were treated with biosolids. The application of biosolids greatly enhances revegetation onsite given the poor quality of available topsoil. Biosolids organic properties also aid in water infiltration which leads to an improvement in soil composition and long-term vegetative growth. Figure 22 also shows the areas that were shaped to final landform but were not ameliorated and seeded during the reporting period due to availability issues with the biosolid spreader.

The high calcium in the biosolids material aids in the reduction of soil dispersibility due to the stabilisation of sodic topsoil. If further amelioration is required when testing soil, during the biosolid application process, gypsum can be used to boost calcium concentrations and minimise clayish topsoil from dispersing.

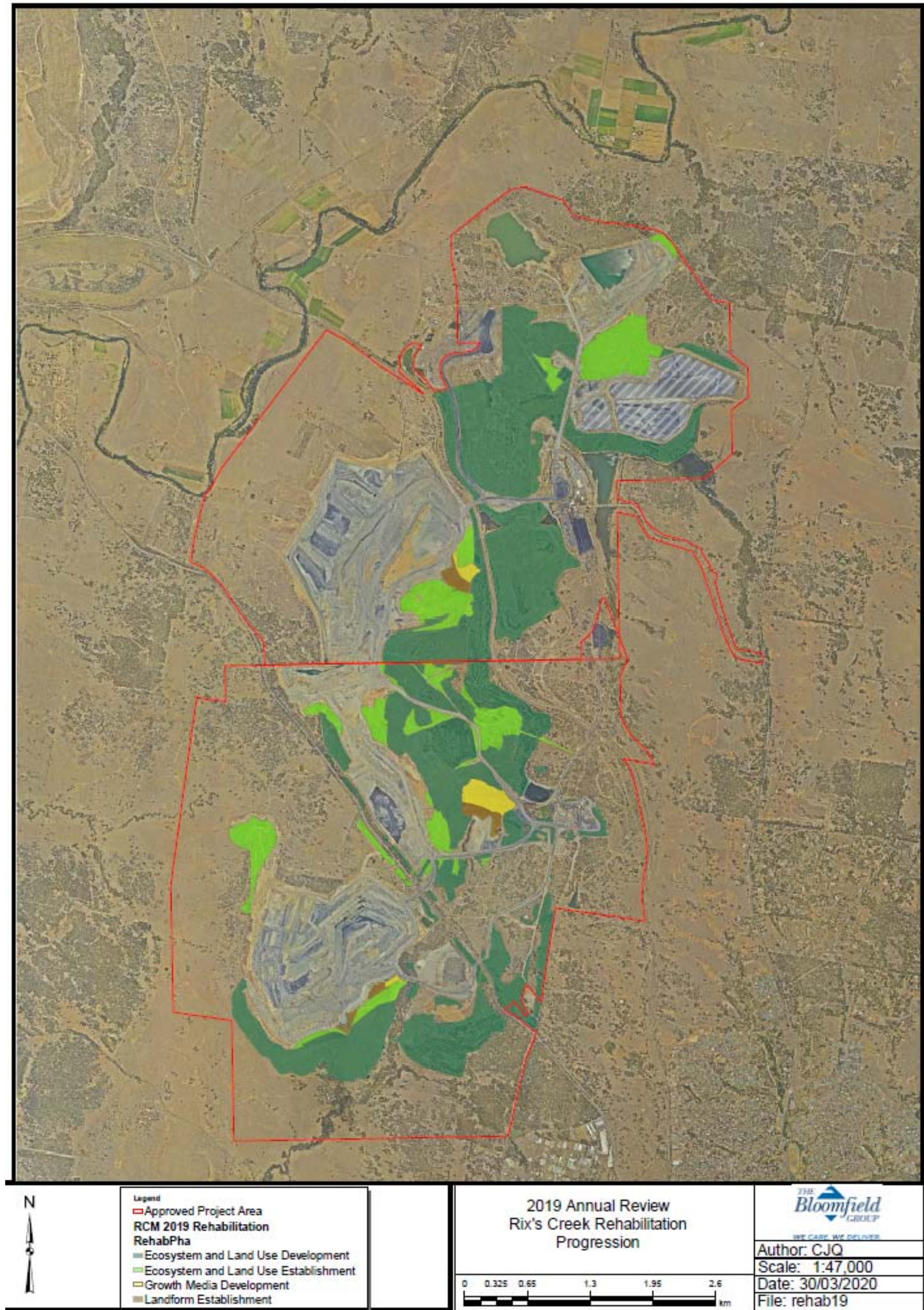


Figure 21 2019 Rix's Creek Mine Rehabilitation

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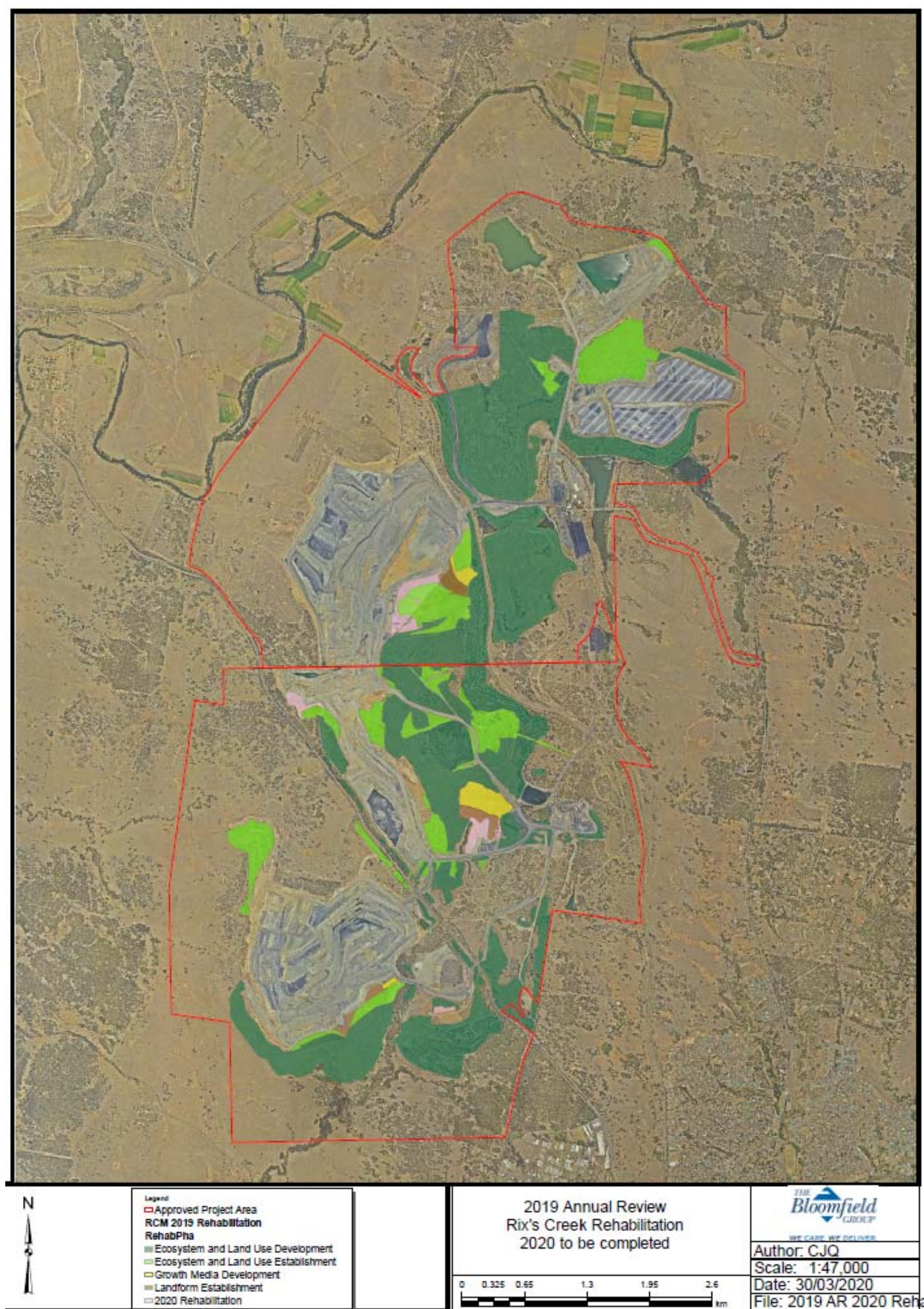


Figure 22 2020 Rehabilitation Areas

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8.4 Other Infrastructure

Rix's Creek South Coal Handling Preparation Plant (CHPP) was upgraded with an acoustic cladding on the western and northern side. The colour of the cladding was river gum green.

8.5 Weed and Pest Management

Ongoing weed control management programs are undertaken on site each year. During 2019 many widespread areas were targeted to control Galenia, African Boxthorn, Mother of Millions, Prickly/Creeping/Tiger Pear, Blue Heliotrope, St. John's wart, Scotch/Safron thistle, Coolatai grass, Cotton bush, Lantana, Castor Oil, Green Cestrum, Bitou bush, Pampas grass, African Olive and Western Australian Wattle (*Acacia Saligna*).

The Western Australian Wattle (*Acacia Saligna*) saw a continued large focus during the 2019 reporting period with spraying occurring regularly throughout all quarters of the year, targeting both established communities identified to be in an active growing phase and also small juvenile reshooting plants coming through from the existing seed bank in previously target areas via follow up spraying.

Cotton Bush communities adjacent to the RCS clean coal road and clean coal stockpile infrastructure was targeted during spring 2019. Green Cestrum within the Glennie's Creek riparian zone was targeted during November and December 2019. Coolatai Grass across the Rix's Creek Northern and Southern operations was the focus during September and September 2019. Targeted areas including the RCN rail infrastructure area, Martin's Creek Biodiversity area, Rix's Creek South rehabilitation. Assorted weeds and grasses surrounding site infrastructure and topsoil stockpiles were also controlled as required.

African Boxthorn, African Olive, Mother of Millions, Blue Heliotrope, St. John's wart, Lantana, Castor Oil, Bitou bush, Pampas grass, African Olive often occur in isolated outbreaks. During 2019 any identified occurrences of these species were identified, reported and managed as necessary. The Environmental component of the Bloomfield Group generic induction process explains to all new personal their responsibility to remain vigilant in identifying potential weed outbreaks and reporting any sightings to supervisors and/or a member of the Environment department.

During the 2019 reporting period a qualified pest control contractor sprayed amenities and infrastructure across site with odourless chemical to control insects.

The following weed species have been identified and treated on-site during 2019:-

- Mother-of-millions, *Bryophyllum* spp. (class 3);
- Galenia, *Galenia pubescens* (non noxious – class 4 Tamworth);
- Pampas grass, *Cortaderia* spp. (class 4);
- Prickly pear, *Cylindropuntia* spp. (class 4);
- Creeping pear, *Cylindropuntia* spp. (class 4);
- Tiger pear, *Cylindropuntia* spp. (class 4);
- African boxthorn, *Lycium ferocissimum* (class 4);
- St John's wort, *Hypericum perforatum* (class 4);
- Paterson's curse, *Echium plantaginum* (class 4);
- Coolatai Grass, *Hyparrhenia hirta*, (class 4);
- Castor Oil, *Ricinus communis* (non noxious – class 4 Sydney area);
- Blue Heliotrope, *Heliotropium amplexicaule* (non noxious - class 4 outside of Singleton LGA);
- Cotton bush, *Gomphocarpus fruticosus* (non noxious);
- Green Cestrum, *Cestrum parqui* (class 3);
- Bitou bush, *Chrysanthemoides monilifera* (non-noxious – class 3/4 out of Singleton LGA);
- Lantana, *Lantana* spp. (class 4);
- Noogoora burr, *Xanthium occidentale* (class 4); and
- African Olive, *Olea europaea subspecies Africana* (class 4).

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Weed management at RCM in 2019 is shown in Figure 24.

In Autumn 2019, a vertebrate pest management program was undertaken across site in consultation with Hunter Local Land Services and aligning with the Hunter Local Land Services Upper Hunter Autumn Wild Dog and Fox Pest Management Program.

The following methods were employed on site to target wild dogs and foxes:

- A total of 172 baits were presented at 43 stations with 17 takes being from Foxes and 15 takes from Wild Dogs based on animal sign left on the mounds and surrounding areas.

The uptake rate throughout this Autumn 2019 control program produced a percentage of 19.2%. This is a low uptake rate as compared to 2018 Program which had 66.4% and can be used as a baseline for future control programs.

All of the poisonous baits were consumed by foxes or wild dogs with no takes by any other species. No non-target species such as Goannas or Eagles were recorded as taking baits.

From February to April and October to December 2019, qualified open range shooters conducted a Kangaroo culling program across site. The shooting was undertaken during night time targeting Eastern Grey Kangaroos (*Macropus giganteus*). Kangaroos were culled and tagged with tags supplied by National Parks and Wildlife Service (NPWS) in accordance with commercial and non commercial harvesting requirements.

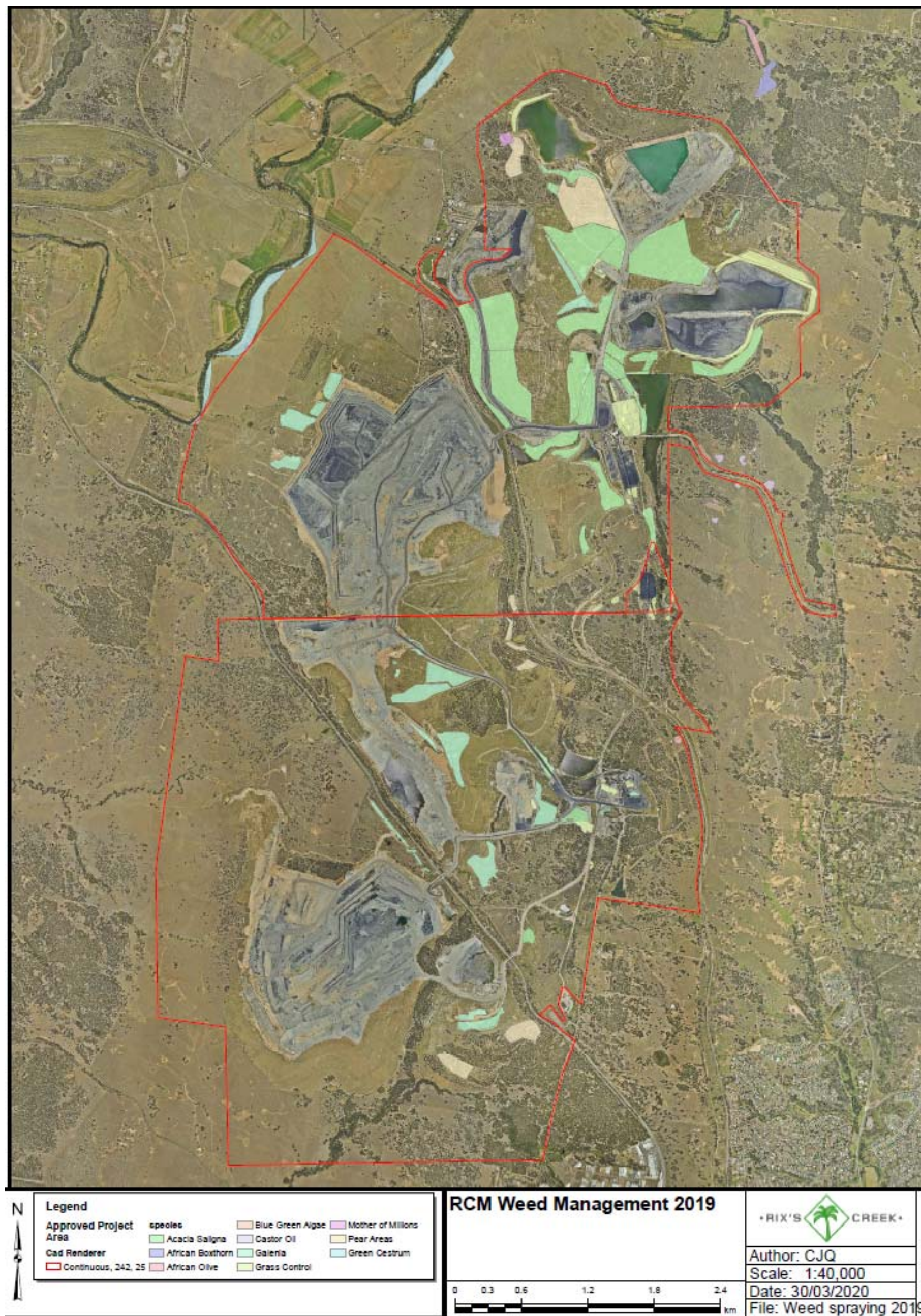


Figure 24. Weed Management Plan

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8.6 Rehabilitation Trials and Research

In late 2018 a new trial commenced for monitoring the productivity of rehabilitated pasture through grazing. The aim of Rix’s Creek Mines rehabilitation has been to support a productive and sustainable grazing land use post mining. The aim of the trial is to demonstrate that livestock enterprises conducted on rehabilitated pastures at Rixs Creek Mine are of comparable productivity to local district pasture land and are capable of grazing over the long term.

The methodology involves two rehabilitated pasture paddocks to be monitored, with identical monitoring of an adjoining natural pasture site which is grazed in a similar fashion will provide an analogue to which the rehabilitation sites can be compared. Monitoring and comparison with both district practice and cattle grazed on undisturbed natural pasture will provide a benchmark for comparison of productive capability.

Pasture and land condition can be compared to ‘target criteria’ and trigger points can be used to initiate adaptive and anticipated changes to grazing and management to suit seasonal conditions. Documentation and recording is needed to allow long term assessment over a number of seasonal conditions.

Pastures have been established on rehabilitated land on both Rix’s Creek and Bloomfield. The aim is to support a productive and sustainable grazing land use.

Monitoring has been conducted to begin long term assessment of progress in achieving a long term sustainable agricultural land use of the rehabilitated land. Monitoring commenced at Rix’s Creek in August 2019.

These areas of rehabilitated mined lands have been grazed with beef cattle.

A period of severe drought affected Rix’s Creek pasture production, resulting in cattle being removed from the Rix’s Creek North rehabilitated grazing pasture. This was a proactive management decision to prevent long term damage of the drought stressed pasture. Removal of cattle from pastures has been a common result of the severe drought throughout the Singleton district. Upper Hunter cattle numbers have been reduced below 30% of ‘normal’ stocking rates in most dryland grazing situations.

At the Rix’s Creek South rehabilitation agistment, grazing continued within the agistment area. The local agistee increased the stocking rate of this agistment during the drought period. The use of the agistment was considered crucial to the agistees drought management strategy. The area was successfully grazed without detriment to the pasture through good grazing management.

Monitoring of the sites has included:

- Measurements of soil sustainability and productivity (and to determine soil amelioration and fertiliser requirements)
- Measurements and indicators of the health and productivity of vegetation/pasture growth on the land.
- Develop some key indicators of and best management practices for pastures on rehabilitated land.
- Provide recommendations for best management practices for future grazing.
- Provide a comparison of the grazing potential of the rehabilitated land and the adjacent analogue natural pasture site.

Soil sampling

Soil analyses of the paddocks to determine baseline soil health and fertility information have been conducted and will be monitored annually. From these results recommendations can be developed for soil fertiliser and /or soil ameliorants.

Topsoil samples have been collected and analyzed by an accredited laboratory for essential plant nutrients including trace elements at both sites.

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The analyses include:

- Soil pH, (acidity alkalinity)
- Electrical conductivity (EC)
- Major nutrient levels (N, P, K, S, Ca, Mg, Na, Cl)
- Important trace elements (for pasture and animal nutrition) e.g. Zn, Cu, Mn, Fe.
- Soil salinity and sodicity levels
- Organic Carbon levels.

Vegetation/Pasture Monitoring

Transects have been established across each paddock (both rehabilitated pastures and in analogue paddocks). These are permanent transects and sampling has been carried out along these transects.

At 10m intervals along the transects assessments of the following have been made:

- Ground cover (to determine soil stability and erosion risk)
- plant species recorded (eg. pasture species, season of growth and weed growth)
- determination of existence of long term perennial pastures or short term annuals
- Plant species identification and determination as either native or exotic.
- The diversity of the species is important for long term stability. Seasonal sampling will help determine the growth cycles of different species.

Ground Cover / Stability Assessments

Ground cover assessments provide a useful and practical tool in assessing the stability of the pastures and grazing management. Ground cover assessments have been conducted at each monitoring date using quadrat assessments along transects in each of the treatments.

Cattle Monitoring

Records of the number of cattle grazing are being collated to determine stocking overall productivity of the grazing cattle.

Estimates of weight gain and production (using sale weights where available) will provide an indication of production levels which can be compared to district averages. Drought conditions have made cattle data collection difficult due to forced sale and removal of some cattle. Comparisons with the district are also difficult due to the variations in conditions across the district and drought feeding on many farms. Cattle on the monitored paddocks have not been supplementary fed.

Weed Presence

The presence of weeds are noted in the pasture composition monitoring. Additional significant weed sightings outside the transects are also noted and reported. Seasonal weed occurrences have been noticeable and very dependent on pasture vigour and ground cover.

8.7 Rehabilitation Monitoring

Rehabilitation monitoring was conducted by an independent Contractor during November 2019. A summary of the 2019 rehabilitation monitoring is referred to below:

Land Landscape Function Assessment

The 2019 pasture monitoring results, in addition to previous year's data, for soil surface stability, infiltration and nutrient cycling are presented below:

Stability: All Pasture Sites met the completion criteria of 50%, reflecting the stability of the rehabilitated landscapes. Erosion and instability issues have historically been minor, and this continues to be the case for

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new sites.

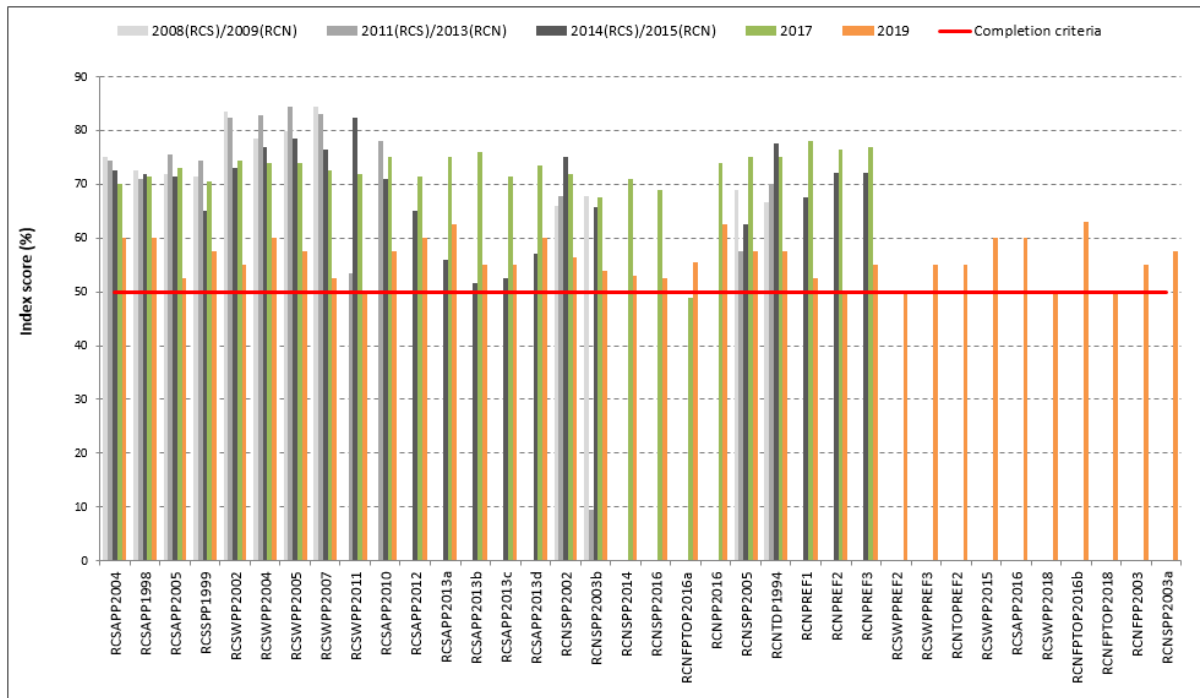


Figure 25 - Stability Index – Pasture sites 2008-2019

Infiltration: This parameter, on average, did not complete completion criteria in 2019. Ground cover protection and thus basal vegetative cover was low this year, due to dieback as a result of drought conditions. Prolonged hot, dry weather has also hardened the soil surface at many sites, and surface resistance was also high, which has impacted the ability of water to infiltrate the soil. Only 28% of sites reached the infiltration completion criteria of 25%, with the remaining 72% of sites reaching values of between 17.5% and 24.6%. Importantly, the majority of Analogue Sites also did not reach the infiltration completion benchmark.

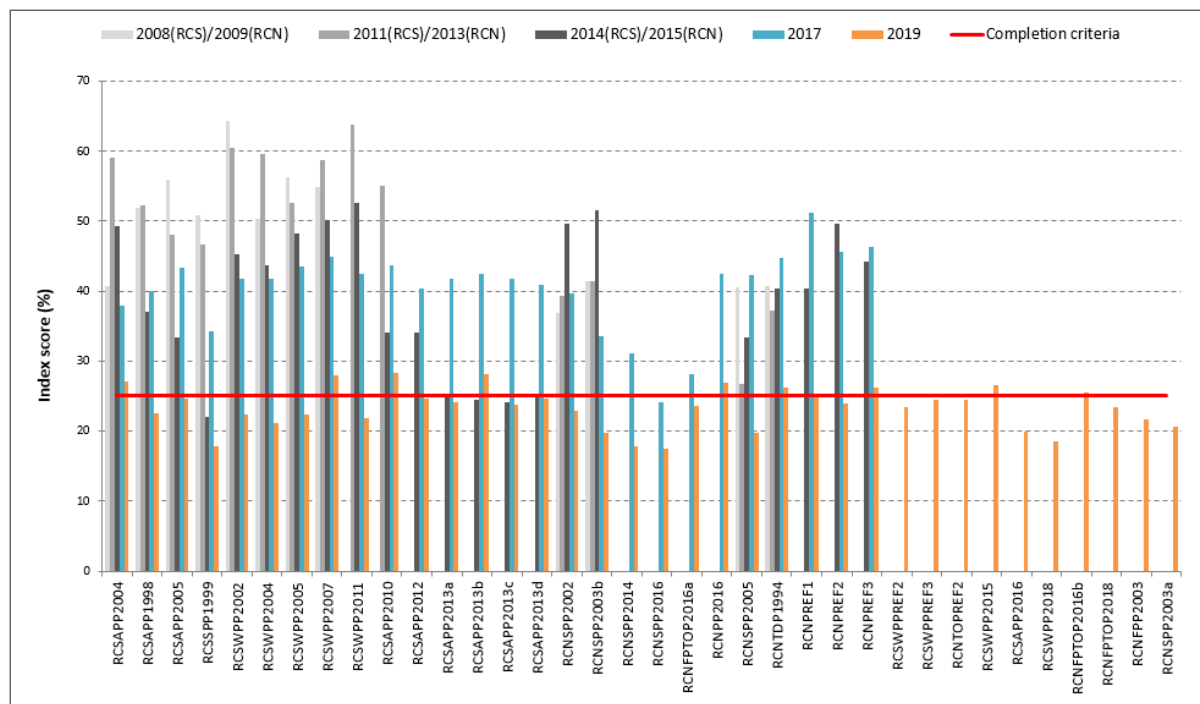


Figure 27 - Infiltration Index - Pasture Sites 2008 – 2019

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Nutrient Cycling: Similar to infiltration, nutrient cycling benchmarks were also not consistently achieved in 2019. This is due to the reduced litter cover and minimal litter decomposition observed at Pasture Sites during this monitoring period. Cryptogam cover was also absent or insignificant at Pasture Sites, and this will have influenced low scores. Only 33% of Pasture Sites met the nutrient cycling benchmark, with the remaining 67% of sites reaching scores between 11.6% and 18.8%. Only one of the pasture Analogue Sites reached the completion criteria of 20%.

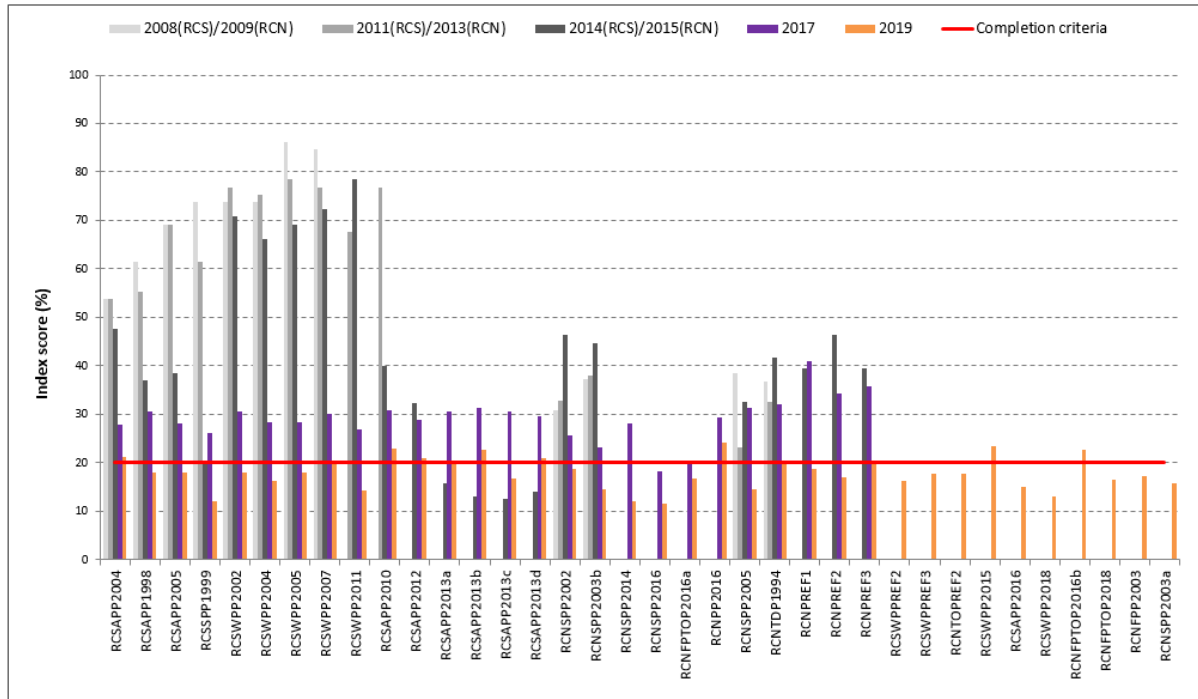


Figure 26 – Nutrient Cycling Index

The landscape function monitoring results have shown a decrease since the previous monitoring event, and this is likely a function of the climatic conditions experienced over the last two years. Given that the results for the Analogue Sites experienced a similar decline, poor landscape functioning is likely not limited to rehabilitated areas and is not a reflection on management practices.

Erosion

No severe erosion issues were recorded that had the potential to compromise landform stability and integrity. Minor issues recorded included slight sheet erosion observed across small areas adjacent to a number of transects, and some scalding occurring where bare patches exist.

Ground Cover

The data has generally shown a decrease in total ground cover between 2017 and 2019 and in many cases did not exceed the MOP completion criteria of total ground cover >70%. However, the Analogue Sites recorded a similar trend, with Analogue Sites amongst the lowest performing sites in terms of ground cover. This is likely a result of the drought conditions experienced across the region since August 2017 which began to intensify in April 2018, which is the probable cause of a decrease in biomass and thus ground cover.

Litter cover generally exceeded live cover at the Analogue Sites, however the opposite was generally true of the Pasture Sites, with most of the cover attributed to live groundcover. This is likely attributable to the high amount of Rhodes grass (*Chloris gayana*) at most of the pasture rehabilitation sites, which is bulky and tends to cover a larger area than the smaller, more sparse native grasses that dominate cover at the Analogue Sites.

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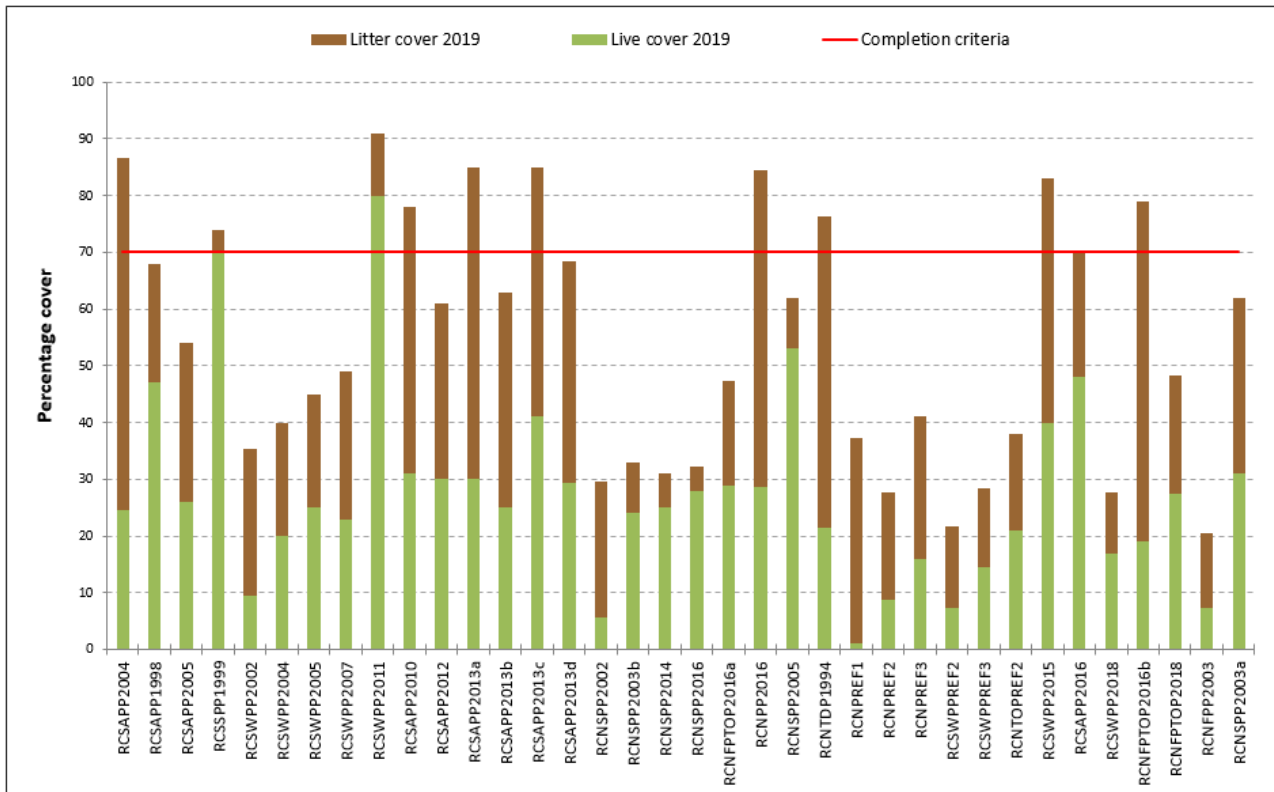


Figure 28 Ground Cover Distribution 2019 – Pasture Rehabilitation Sites

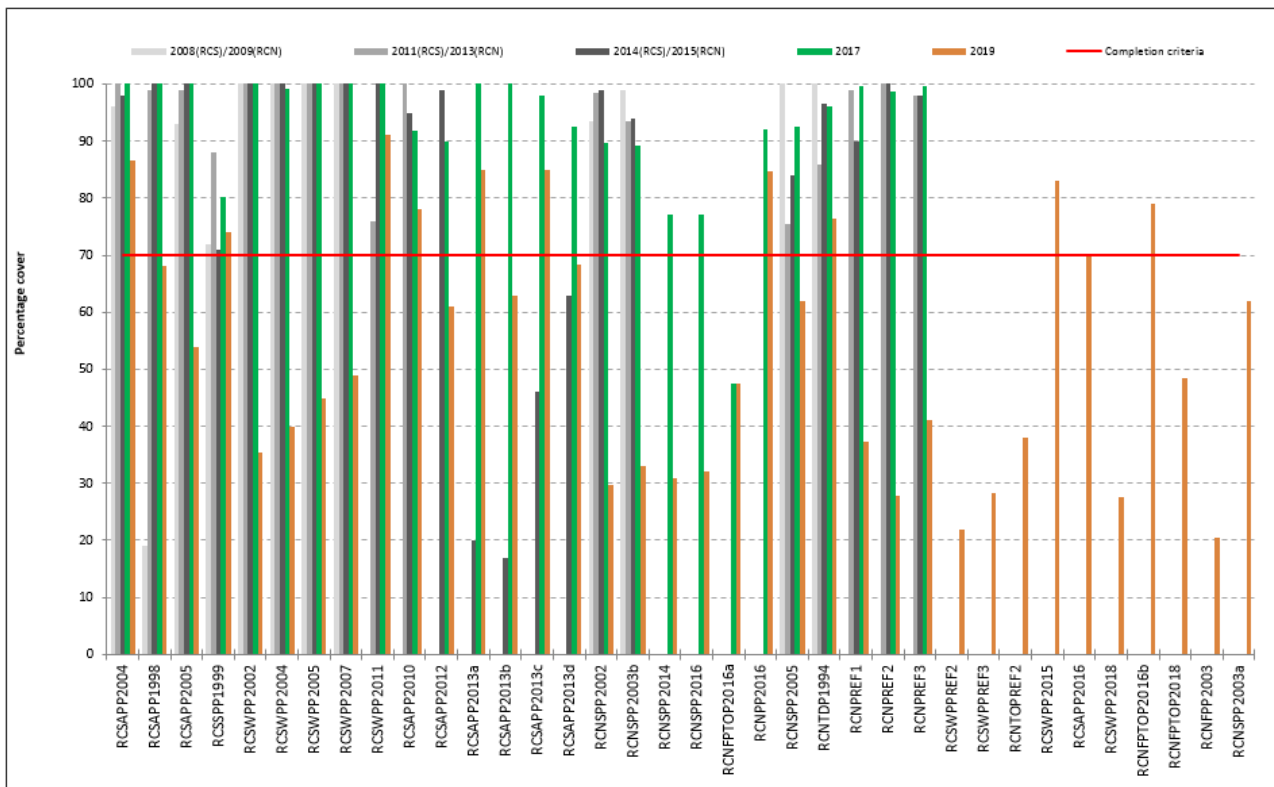


Figure 29 – Long Term Ground Cover Monitoring Results – Pasture Rehabilitation Sites

Feed Quality Testing Results

The feed quality of RCSAPP2004, RCSAPP2005 and RCSWPP2004 was similar to that normally yielded by grassy pasture hays (DPI 2007), which are classed as a low protein dry roughage. In the Hunter Valley, the

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average energy requirement for dry stock is approximately 54.0 MJ/day (DPI 2006). For a stock liveweight of 400kg, cattle would have to eat approximately 7kg of pasture at these sites per day to meet their energy requirement. The recommended feeding rate of poor quality hay is 8kg per head of cattle per day, and so the nutritional requirement of cattle is satisfied at these sites. However, given the variable biomass seen at these sites, and the wastage associated with grazing inefficiencies, grazing requirements (based on pasture yields) are unlikely to have also been met.

Weed Management

A total of five priority weeds were identified across the Pasture Rehabilitation sites, including:

- Galenia (*Galenia pubescens*) - this weed was the most widespread and problematic across the monitored areas. Sites most affected by galenia are RCSAPP2010, RCSAPP2012, RCNSPP2002, RCNSPP2016 and RCSWPP2018.
- Fireweed (*Senecio madagascariensis*) - fireweed was present across most of the Pasture Rehabilitation sites, however it was observed in low densities. The cover of exotic grasses will likely outcompete fireweed, however increased grazing or disturbance could facilitate its spread.
- Prickly pear (*Opuntia stricta* and *Opuntia humifusa*) - these species were widely observed, occurring across sixteen sites though cover was very limited. This species should continue to be monitored to catch potential infestations early.
- African boxthorn (*Lycium ferocissimum*) - boxthorn was observed at two Pasture Rehabilitation sites (RCSWPP2004 and RCSWPP2011). Very limited numbers of this plant were recorded, however it is noted that this number has increased from the 2017 monitoring.
- Coolatai grass (*Hyparrhenia hirta*) - observed at one Pasture Rehabilitation site (RCNTDP1994) and one Analogue Site (RCNTOPREF1). This species is forming a large monoculture patch at RCNTDP1994, and outcompeting both native and pasture species.

Other common exotic species included balloon cotton (*Gomphocarpus fruticosus*), Verbena spp., spear thistle (*Cirsium vulgare*), catsear (*Hypochaeris radicata*), lamb's tongues (*Plantago lanceolata*), Brassica spp and Paddys lucerne (*Sida rhombifolia*). Less common species included fennel (*Foeniculum vulgare*) at RCSAPP2004 and golden wreath wattle (*Acacia saligna*) at RCNFTOP2018. These last two weeds, while present in low numbers, have highly invasive potential and will be controlled while they are still relatively uncommon.

Aside from issues relating to priority weeds, annual weeds were generally at acceptable levels across Tree Sites. Two sites had weed cover exceeding 50%, being RCNSPP2016, which was affected by a severe galenia infestation, and RCNSP2002, which had no native or pasture species and was entirely made up by exotic species. Five sites had weed cover exceeding 25%, being RCSWPP2002 and RCSWPP2004 which contained no native species and limited desirable groundcover, and RCSAPP2016 and RCNSPP2005, which had a high cover of exotic forbs. RCNTDP1994 was also dominated in part by Coolatai grass, and this infestation affected the weed cover score.

The remaining sites weed cover did not exceed 15% and thus met the completion criteria. Weed cover scores (on a scale of 1-5) have increased slightly from 1.42 in 2017 to 2 in 2019. Drought conditions have likely reduced desirable groundcover and increased the vulnerability of newly bare areas to weed infestation.

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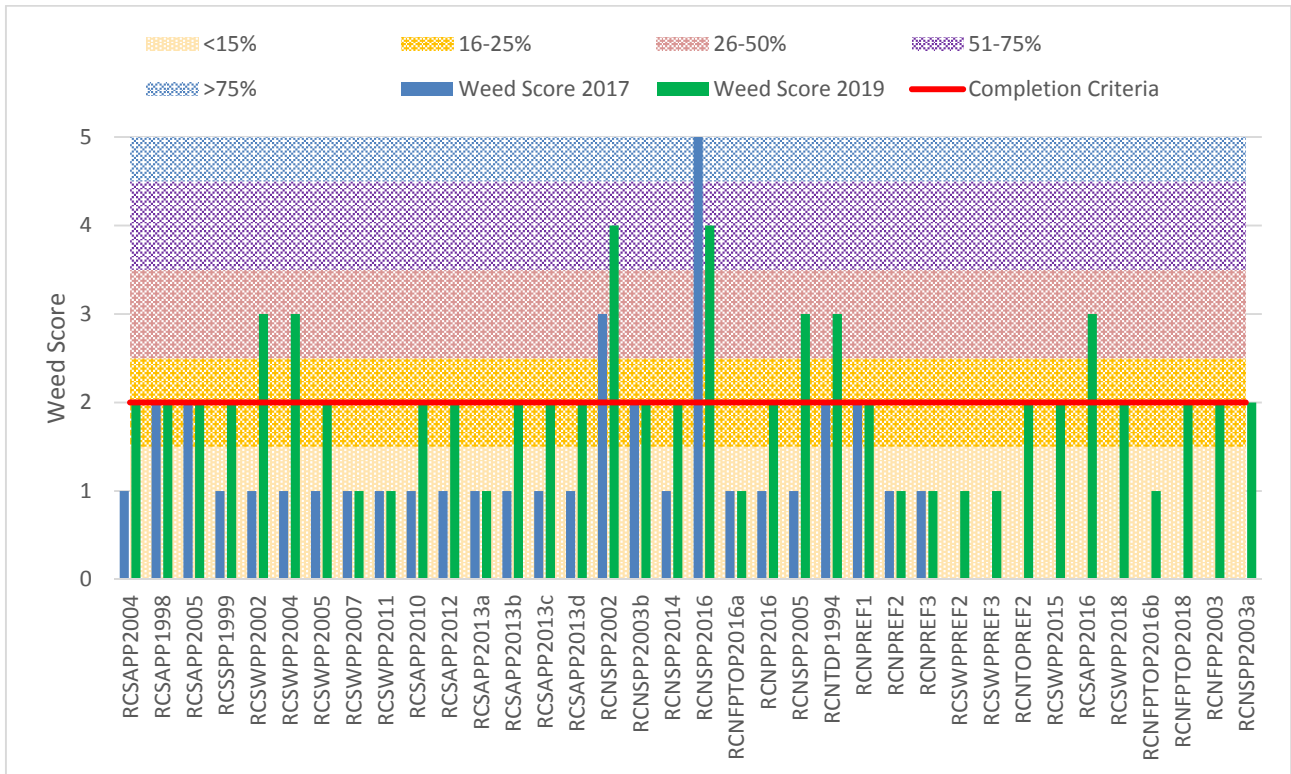


Figure 30 Weed Cover Scores - Pasture Sites

Soil Performance

Soil pH levels were highly variable across monitoring sites and ranged from somewhat acidic (pH <5.5) to somewhat alkaline (pH >8.5). Soils at all Pasture Sites were within acceptable completion criteria ranges, generally returning values that were neutral to slightly acidic. All sites were within an appropriate pH range to support pasture growth (Lake 2000) and the soil at Pasture Sites generally outperformed the Analogue Sites. The Analogue Sites returned pH values on the lower, more acidic side of average; however, all values were within the acceptable completion criteria limits.

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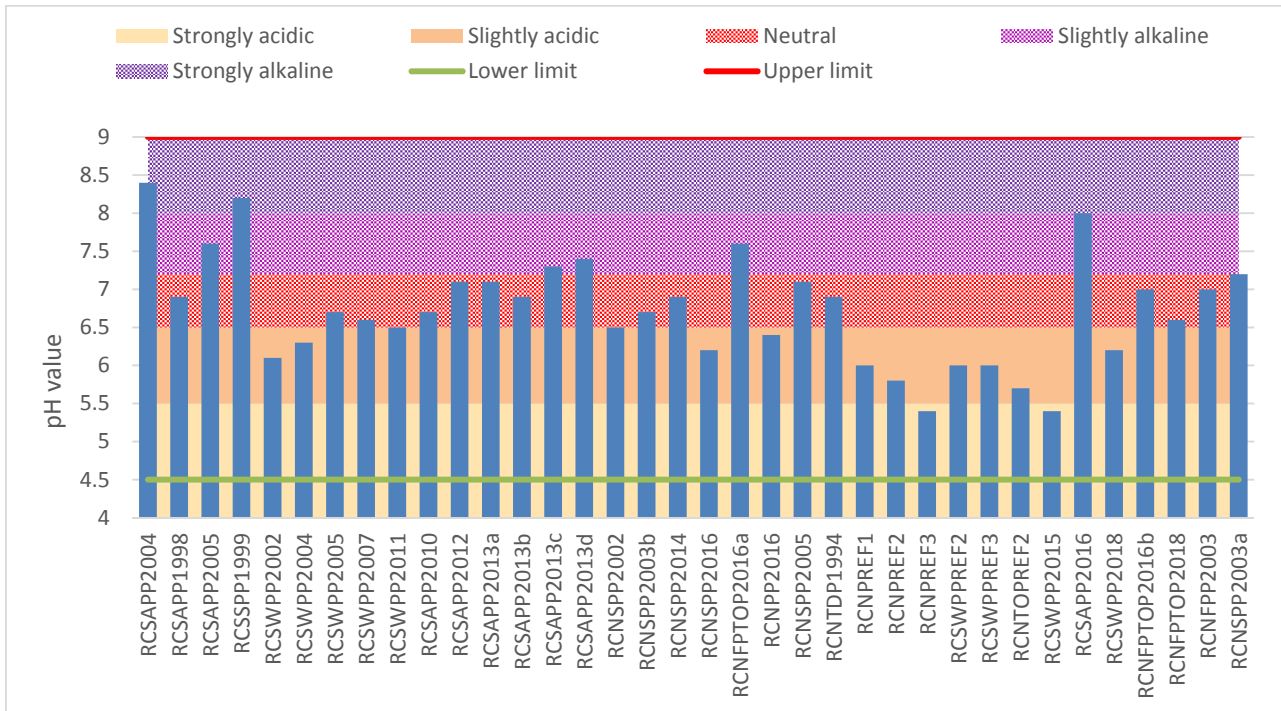


Figure 31 Soil pH Values

Land and Soil Capability

The determination of land capability classes in accordance with the guidelines provided in the NSW OEH Land and Soil Capability Assessment Scheme (2012), which indicated that:

- One site returned a score of 3 (in addition to three Analogue Sites) - high capability land
- 26 sites returned a score of 4 - moderate capability land
- One site returned a score of 5 (in addition to one Analogue Site) - moderate-low capability land
- Three sites returned a score of 6 - low capability land.
- The completion criteria for land and soil capability is that post mining landscapes are returned to classes 4, 5 and 6. A nominal lower limit of class 6 has been used to identify poorer performing classes, as beyond this point (classes 7 and 8), land is generally incapable of most land uses.

All sites returned a Land and Soil Capability Assessment class between 3 and 6, with the poorer performing sites inhibited by soil structure, erodibility and susceptibility to acidification. Generally, the Pasture Sites are performing well, and much similar to Analogue Sites in terms of land and soil capability.

8.8 Key Issues that may Affect Rehabilitation

The weather conditions experienced during the November 2019 monitoring (and 2019 in general) were consistent with significant drought conditions experienced across most of NSW over the last few years.

This has substantial implications in terms of vegetative performance, soil performance and ultimately landscape functioning of the rehabilitated areas at Rix's Creek. Drought conditions lead to decreased soil moisture, plant growth and groundcover, and reduces the capacity of plants to regenerate and reproduce. Drought affects plant and soil nutrient flows, limiting the ability of plants to uptake nutrients and increasing susceptibility of nutrient loss during the next rainfall flush.

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Weed infestation remains the major challenge that has the potential to affect rehabilitation performance across the site, particularly with widespread occurrence and locally severe infestations of Galenia (*Galenia pubescens*), and more localised incursions of Prickly Pear (*Opuntia spp.*), Coolatai grass (*Hyperhenia hirta*) and Western Australian Wattle (*Acacia Saligna*). Efforts have been increased to remove *Acaica Saligna* from previously rehabilitated areas during the 2019 period, with secondary weed spraying conducted on areas where Acacia Salinga has been removed to prevent re-occurrence of the species. Weed management will be a priority in 2019 to ensure that we reduce the amount of invasive species that have the ability to affect rehabilitation at Rix’s Creek Mine.

On 18 June 2019 Inspectors from the Regulator conducted an inspection and review of rehabilitation monitoring of CL357 (1973), ML1630 (1992), ML1648 (1992), ML1649 (1992), ML1650 (1992), ML1651 (1992) and ML1725 (1992) and identified the following:

- Areas of high weed density,
- Unexplained areas of low species diversity within pasture rehabilitation areas,
- A disconnect between monitoring records for rehabilitation areas against completion criteria and rehabilitation maintenance activities.

Following the rehabilitation inspection, Two section 240 notices were provided by the Resources Regulator on the 19 July 2019 for both the Rix’s Creek South and Rix’s Creek North operation. It must be noted that the Resouce Regulator’s observations were formed when the Singleton Local Area was classified as a drought area. The rehabilitated area observed was being grazed and was used by a local farmer as a crucial part of his drought management strategy. The high weed density noted was from Galenia on the fringes of the rehabilted area. This area was prioritised for weed management post inspection to singificantly reduce Galenia from the buffer of the rehabilitated area at Rix’s Creek South.

From the 17 – 19th July NSW Department of Primary Industries / Agricultural NSW conducted assessments on our rehabilitated pastures. This assessment is apart of an ACARP project looking at the physical, biological and chemical aspects of the soil profile development of rehabilitated pastures.

A few items noted by DPI Agriculture;

- In the area where the Resources Regulator noted lack of species diversity DPI Agriculture during a half hour botanal survey noted 27 species including native grasses such as Windmill, Rat- tail and early spring grass, and other pasture species such as bambatsi panic and woolly pod vetch. (other than kikyuyu and rhodes).
- Rix’s Creek Mine was the only site where earthworms have been identified in rehabilitated areas.
- Earthworms were found in areas of rehab as recent as 2012. (six (6) rehab areas from 1995 till 2012 were inspected). (plate 1)
- Dung Beetles were also observed which had not been seen at any other mine rehab site.
- Root penetration of Kikyuyu and Rhodes to a depth of 1.4 metres.

Ongoing works will be undertaken throughout the life of the operation to ensure rehabilitation areas meet the requirements of the completion criteria. These works will mostly include weed control, erosion repairs and planting/seeding to meet the requirements of target vegetation communities. Identification of these works will be through the long term rehabilitation monitoring program and routine inspections. Where erosion riling is prevalent, the use of contours on batters will be formed using a dozer to slow the water velocity and minimise the potential of riling on rehabilitated sites. Rehabilitated areas at the Volcano site and Pin dump in Arties Pit RCS were repaired during the reporting period and will be inspected and monitored for the life of the project. Inspections and corrective actions to rehabilitation will continue to address areas where rill erosion or sheet erosion may occur.

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Plate 01: Earthworm in Rix's Creek Mine rehabilitated pasture July 2019- Source: NSW Agriculture

8.9 Rehabilitation Status

RCN as follows:

Mine Area Type	Last Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast) combined RCM MOP
	Year 2018 (ha)	Year 2019 (ha)	Year 2020 (ha)
Mining Lease	1917	1917	3740.3
Total active disturbance	633.9	620.1	1199.7
Land being prepared for rehabilitation	10.1	9.8	
Land under active rehabilitation	9.3	3.4	-8.6
Completed rehabilitation	419.8	422.9	689.8

RCS as follows:

Mine Area Type	Last Reporting Period (Actual)	This Reporting Period (Forecast)	Next Reporting Period (Forecast) combined RCM MOP
	Year 2018 (ha)	Year 2019 (ha)	Year 2020 (ha)
Total mine footprint	1823.3	1823.3	3740.3
Total active disturbance	535.1	433.3	1199.7
Land being prepared for rehabilitation	4.8	16.2	
Land under active rehabilitation	7.5	13.4	-8.6
Completed rehabilitation	436.3	449.7	689.8

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SECTION 9 COMMUNITY

9.1 Community Engagement.

Rix’s Creek is required under the development consent to participate and co-operate with a Community Consultative Committee (CCC). The committee consists of community representatives and is chaired by Council and other Government representatives are invited to participate on the committee. Rix’s Creek was the first mine in the Hunter Valley to have a CCC which has operated for 29 years.

During 2019 NSW DPIE further updated the Community Consultative Committee Guideline for State Significant Projects (Jan 2019). Rix’s Creek CCC operates in accordance with these guidelines under direction and guidance of Independent Chairperson Ms Lisa Andrews.

The Committee representatives are:-

Independent Chairperson:-	Lisa Andrews
Community representatives:-	Councillor Sarah Lukeman
	Patricia Bestic
	Reg Eveleigh
	Michelle Higgins
	Deidre Olofsson
	Lyn McBain
	David Moran
	Greg Hall

Company representatives:-

Chief Development Officer - Geoff Moore
Chief Operations Officer – Luke Murray
Operations Manager - Brendon Clements
Communications Manager - Damian Butler
Environment Manager – Chris Knight
Environmental Advisor – Chris Quinn
Environmental Officer – Hannah Lumsden

The Committee met three times during the year.

Once on the 8th May 2019 to present the 2018 Annual Review.

On the 13/06/2019 an extra ordinary meeting was convened to consult on Modification 10 DA4/94 approval and process forward for approval of continuation State Significant Development (SSD) 6330.

On the 16/10/2019 to present an operational update as well as a progress update of the continuation project SSD 6300.

Additional community consultation that was conducted during the reporting period included company newsletters which informed community members on updates to Rix’s Creek operations, which included:

- The Rix’s Creek Continuation of Mining Project Newsletter No. 6 dated 13 June 2019.
- The Rix’s Creek Continuation of Mining Project Newsletter No. 7 dated 31st October 2019.
- A number of advertisements in local newspapers such as the Singleton Argus and Coalface.
- A letter box drop between the 28th October and 8th November 2019. This was to satisfy conditions under the SSD 6300 where landowners within a 3km radius of the mine were notified of their right to obtain a base line inspection of their property.

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Notifications on kangaroo culling and 1080 wild dog and fox baiting were also distributed throughout the community during the reporting period.

Internal employee newsletters were also distributed throughout the workforce that provided updates for environmental initiatives occurring onsite.

The Environmental Department and Property Manager maintained a continued active presence within the local community providing updates and information on Rix’s Creek operations to community members.

The Company is a financial member of the Hunter Coal Environmental Group (HCEG).

The Company is a financial member of the Hunter Valley Combined Wild Dog Association (HVCWDA) Incorporation.

The company is also part of the Upper Hunter Mining Dialogue (UHMD) in association with the NSW Minerals Council (NSWMC) which brings industry, community, and key stakeholder groups together across various projects and goals relating to:-

- Land Management
- Social Impacts and Infrastructure
- Water
- Emissions and Health

The Bloomfield Group UHMD representatives are:-

Executive Oversight Committee (Chair):-
Steering Committee:-
UHMD Industry Working Group

Managing Director – John Richards
Chief Development Officer – Geoff Moore
Environment Manager – Chris Knight
Environmental Advisor – Chris Quinn

9.2 Community Contributions.

The company provides support to approximately 30 charitable groups as well as annual sponsorship of around 50 local community groups. In particular in the Singleton Community over the last five years the Company has contributed to:

- Singleton Hospital (purchase of Fetal monitor and humidicrib)
- Rural Aid (Buy A Bale) – to help drought affected Hunter Valley Farmers
- Singleton Business Chamber – Outstanding Business Awards / Hunter Coal Festival – Community Day
- Legacy Australia - Singleton branch
- State Emergency Service - Singleton
- The Samaritans Christmas Lunch – Singleton
- Northern Agricultural Association – Singleton Show
- Newcastle & Hunter Combined Schools ANZAC Service – Singleton
- Singleton Junior Soccer Club, Singleton Netball Association, Singleton YMCA Gym & Swim, Scouts Association Singleton
- Singleton High School, Singleton Heights Pre-School, Skallywags Pre-School
- Singleton Family Support Inc, Ourcare Services Singleton, Witmore Enterprises Singleton
- Darlington Rural Fire Brigade
- Singleton Fire Brigade, Singleton Gymkhana, Singleton Hospital Auxiliary
- Uniting Care Disability Services

Rix’s Creek has had collaboration with Newcastle University and Australian Coal Association Research Program (ACARP) to support effective innovation and development for the improvement of mine operations

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and environmental practices.

9.3 Community Complaints.

All complaints received are registered and investigated. All complaints are referred to the Operations Manager and or Environmental Manager and are dealt with on an individual basis. The Company standard is to personally deal with every complainant to find a resolution to the stakeholders concerns.

In 2015 The Bloomfield Group purchased the previous Integra Vale Open Cut and has combined the complaints received for both the North and South sites since 2016. It is noted a sharp increase in complaints during 2016 which has been significantly reduced over the past few years from the level recorded in 2016. Continued efforts with noise management has seen a significant reduction in noise complaints over the period. (Figure 32).

During 2019 there were 18 complaint received. This is a significant reduction from 2018, where 25 complaints were recorded. No complaints were received in the months February, May and July.

Of the eighteen (18) complaints received in 2019, 10 related to noise, 4 related to dust, 3 related to blasting and 1 related to a lighting complaint.

Refer to **Appendix 3** for the Rix’s Creek Mine Community Complaints Register.

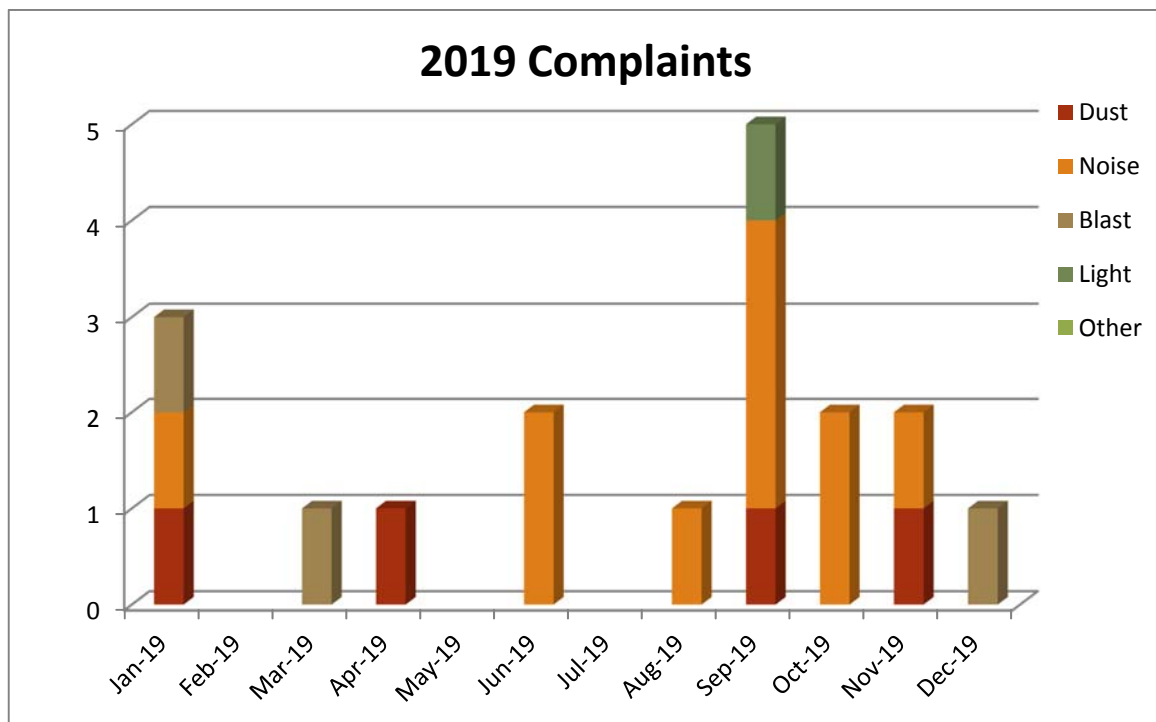


Figure 32 2019 RCM Complaints Summary

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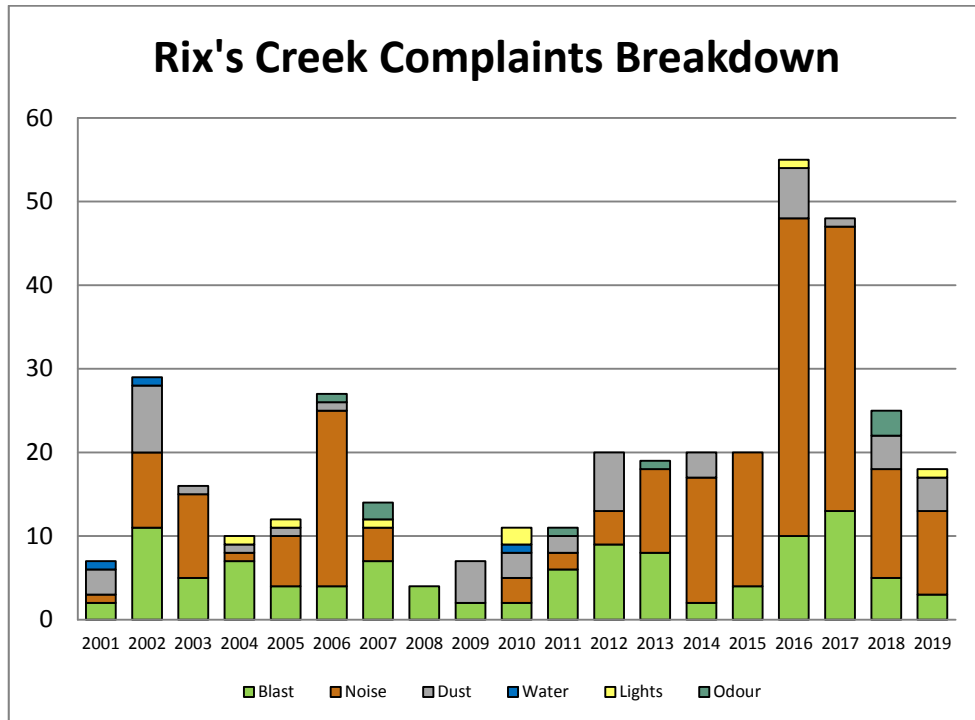


Figure 33 Summary of Rix's Creek Complaints 2001-2019

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SECTION 10 – INDEPENDENT AUDIT

During 2019 an Independent audit was conducted of the Rix’s Creek South DA49/94 approval by GHD during November 2019.

The previous independent audit of the Rix’s Creek North project approval PA 08_0102 was completed in October 2017 by Umwelt.

10.1 Development Consent

A summary of the compliance assessment against Rix’s Creek Mine Development Consents is included below.

Rix’s Creek North Project Approval (PA 08_0102)

The status of proposed actions from the Rix’s Creek North Independent Environmental Audit are presented in **Table 32**. Actions that are ongoing, required no action or were completed prior to this Annual Review have been excluded.

Rix’s Creek South Development Application (DA49/94)

The status of proposed actions from the Rix’s Creek South Independent Environmental Audit are presented in **Table 33**. Actions that are ongoing, required no action or were completed prior to this Annual Review have been excluded.

Rix’s Creek are currently revising the Noise, Blast, Water and Rehabilitation Management Plans to contemporise these plans in alignment with the new requirements of SSD 6300. An extension may be required for submission of these revised plans to allow consultation with required agencies. It is noted that SSD 6300 requires submission of Management Plans within 6 months of commencement.

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Table 20 RCN Audit Response to Auditors Recommendations

Condition / Issue	Identified Non- Compliance	Non Compliance	Recommendation	Rix's Creek's Response	By Date
PA08_0102					
Schedule 3, Condition 2 Schedule 3, Condition 3 Schedule 3, Condition 4 Schedule 3, Condition 5	Noise monitoring does not assess the proportion of privately owned land for which exceedances may occur.	Administrative	Bloomfield either seek to modify the consent to remove the requirement to assess compliance of noise limits over vacant land or approval to complete noise modelling annually to validate noise monitoring results in this regard and report in the annual review or complete modelling as required in response to any complaints received in this regard.	Assessment of the condition will be undertaken annually and a report will be included in the Annual Review. Assessment will utilise the results of the monthly compliance attended noise monitoring and the predictive noise model for the same period to determine compliance. Bloomfield will seek removal of the condition at the next consent modification.	Annually by 31 March
Schedule 3, Condition 22 Schedule 3, Condition 23	Air quality monitoring does not assess the proportion of privately owned land for which exceedances of the cumulative criteria may occur.	Administrative	Bloomfield either seek to modify the consent to remove the requirement to assess compliance of air quality criteria over vacant land or seek approval from the Department to complete air modelling annually to validate monitoring results in this regard and report in the annual review or complete modelling as required in response to any complaints received in this regard.	Assessment of the condition will be undertaken annually and a report will be included in the Annual Review. Assessment will model the results of the PM10 real time monitoring from the Rix's Creek Mine and the Upper Hunter Air Quality Monitoring Network to determine compliance. Bloomfield will seek removal of the condition at the next consent modification.	Annually by 31 March

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Table 21 RCS Audit Response to Auditors Recommendations

2019 Rix's Creek South Mine Independent Environmental Audit Response to Auditors Recommendations



Number	Condition	Auditors Recommendation	Bloomfield's Response
1	Schedule 2, Condition 6	Ensure a review and update of the Landscape Management Plan is completed within 3 months of completion of this audit, and includes a formal building maintenance plan.	This Condition is no longer required upon commencement of SSD 6300.
2	Schedule 2, Condition 11	A review of the NMP, should be completed within 3 months of completion of this audit, and updated to ensure integration of all RCS and RCN operations, including identification of relevant conditions of consent and where they have been addressed/considered.	A Revision of the NMP will be completed and submitted within 3 months of the submission of the Audit in accordance with Sch. 2 Condition 28 (ii).
3	Schedule 2, Condition 12D	A review of the BMP, should be completed within 3 months of completion of this audit, and updated to ensure integration of all RCS and RCN operations, including identification of relevant conditions of consent and where they have been addressed/considered.	A Revision of the BMP will be completed and submitted within 3 months of the submission of the Audit in accordance with Sch. 2 Condition 28 (ii).
4	Schedule 2, Condition 15	The WMP to be updated to include: -A clear explanation of how the water licences and works approvals held by Bloomfield relate to each other and relate to different uses across the Rix's Creek Mine. -A detailed description of the security of water supply, considering the water inventory across the entire Rix's Creek Mine, considering issues such as the recent commissioning of solid bowl centrifuges. -A layout plan showing all drains and water storages that form part of the water management system, including indication of topography such as contours.	A Revision of the WMP will be completed and submitted within 3 months of the submission of the Audit in accordance with Sch. 2 Condition 28 (ii) of DA 49/94.
5	Schedule 2, Condition 16B	Consistent with the approach for Rix's Creek North, consultation should be undertaken with DPIE to confirm acceptance of relevant RMP requirements being adopted into the current MOP.	This will be addressed as part of the required Rehabilitation Management Plan required under SSD6300 Sch.2 Condition B74, and will be submitted in accordance with the condition. Consultation with DPIE is required under this condition.
6	Schedule 2, Condition 16D	Mine Closure Plan to be updated to include objectives and criteria for mine closure for ML 1432 and completion criteria for each domain.	This Condition is no longer required upon commencement of SSD6300. Mine Closure will be noted in the Rehabilitation Strategy and Mining Operations Plans as noted in Sch.2 Condition B72 and B69 respectively.
7	Schedule 2, Condition 28	The Landscape Management Plan, Mine Closure Plan and Rehabilitation Management Plan should be reviewed within 3 months of this audit and revised to address the recommendations of the 2016 IEA.	This Condition is no longer required upon commencement of SSD 6300.

SECTION 11 – INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

Incidents that occurred during 2019 are detailed in this section.

11.1 Noise exceedance low frequency penalty

On the 8 April 2019 Rix's Creek Mine exceeded the noise limit under Condition L3.1 at location NM05, EPA Identification 32, after application of the modifying factor required for low frequency noise as required under Condition L3.8 and Section 4 of the Noise Policy for Industry (2017).

The noise exceedance was not considered a non compliance under the PA 08_0102. The exceedance was for the second 15 minute reading as required under the EPL 3391, the first 15 minute reading was compliant and therefore not an exceedance of the PA 08_0102.

A remeasure of the noise from the operation determined that the noise exceedance was not sustained and therefore not in breach of the EPL, Conditions of Project Approval PA 08_0102 or Noise Management Plan as per section 11.1.3 of the Industrial Noise Policy.

Installation and commissioning of a new real time noise management monitor occurred near the NM05 receiver in November 2019. The noise monitor can apply 1/3 octave low frequency and tonal noise penalties in accordance with the Noise Policy for Industry Guidelines 2017 (NPFI).

A new noise software package was also developed in consultation with Global Acoustics and was introduced at Rix's Creek Mine to assess real time low frequency noise penalties and tonal noise penalties. This tool enables the Environmental Technician the capability to assess real-time low frequency and tonal penalties to ensure that we comply with the NPFI.

11.2 Air Quality Monitoring exceedances in 2019

Air quality monitoring exceedances were externally reported during the 2019 period as prolonged drought and regional bushfires contributed to exceedances of the 24 Hour criteria of 50ug/m3 at TEOMs and Dust Track monitors during the reporting period. When the upstream monitors were compared to the downstream monitor results, there was an indication that air quality was coming from upstream sources generally in a NW direction from the mine. Therefore, Rix's Creek Mine was not the major contributor of air quality monitor exceedances. Refer to Section 6.4 Air Quality for a breakdown of exceedances during the reporting period.

11.3 Section 240 notices for rehabilitation

On 18 June 2019 Inspectors from the Regulator conducted an inspection and review of rehabilitation monitoring of CL357 (1973), ML1630 (1992), ML1648 (1992), ML1649 (1992), ML1650 (1992), ML1651 (1992) and ML1725 (1992) and identified the following:

- Areas of high weed density,
- Unexplained areas of low species diversity within pasture rehabilitation areas,
- A disconnect between monitoring records for rehabilitation areas against completion criteria and rehabilitation maintenance activities.

The Mining Operations Plan for Rix's Creek South Mine has the following gaps:

- The MOP does not adequately define final landuses and stages of progression towards achieving final landuse. Additionally, various stages of rehabilitation are to be informed by data obtained from analogue monitoring sites which is currently limited.
- Further work is required to develop specific and detailed rehabilitation objectives and SMART (specific, measurable, achievable, realistic and timely) completion criteria that clearly define the final land uses (particularly soil quality, species composition, weed abundance).

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Following the rehabilitation inspection, Two section 240 notices were provided by the Resources Regulator on the 19 July 2019 for both the Rix's Creek South and Rix's Creek North operation. It must be noted that the Resource Regulator's observations were formed when the Singleton Local Area was classified as a drought area. The rehabilitated area observed was being grazed and was used by a local farmer as a crucial part of his drought management strategy. The high weed density noted was from Galenia on the fringes of the rehabilitated area. This area was prioritised for weed management post inspection to significantly reduce Galenia from the buffer of the rehabilitated area at Rix's Creek South rehabilitated area. The Rix's Creek South MOP was updated to address the items raised by the Resources Regulator by 4 October 2019.

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SECTION 12 – ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Mining will be focussed in the West Pit (Pit 3) at Rix’s Creek South and Camberwell Pit operations at Rix’s Creek North. Due to coal advances in the West Pit a majority of overburden from the West Pit will be placed in the Arties Pit until coal mining reserves move in a northward fashion. Camberwell Pit mining will process in a southerly manner with pre stripping to the south west of Camberwell Pit to be completed. The Dulwich block located to the North West of the Camberwell Pit will continue to be mined. The overburden placement will be dumped from the eastern section of Camberwell pit and transition to the west in 2020 as per the Mining Operation Plan.

Further improvements to the Rix’s Creek environmental monitoring system include a transition away from the site SCADA system and to implement a Teledata environmental monitoring system that is a standalone system to improve reliability of capturing data.

Environmental management is an ongoing process at Rix’s Creek with continual improvement being made to the existing systems already in place. Management plans will require updating in 2020 upon commencement of SSD 6300 consent.

Table 22 Environmental Performance Improvement Activities

Environmental Performance Improvement Activities	Target Date
Rix’s Creek Mine Rehabilitation Progression	Q1-Q4 2020
Continued upgrades/ validation to the Environmental Forecasting Tools used at Rix’s Creek Mine.	Q4 2020
Flowmeter upgrades around Rix’s Creek Mine. Flowmeter data to be integrated into SCADA network.	Q4 2020
Taking up the SSD_6300 consent, with an update of management plans to be completed within 6 months upon commencement of SSD6300	SSD_6300 commenced 24 February 2020.
Transition from SCADA to Teledata environmental monitoring system	Q4 2020

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SECTION 13 MANAGEMENT PLAN REVIEW

Management Plans are required to be updated when a review is triggered. An update can be triggered by any of the following:-

- Action from independent environmental audit;
- Submission of Annual Review;
- Approval modification;
- Result of an environmental incident; and
- Changes to the operation.

The management plans for both RCN and RCS as required under their relevant approvals are listed in **Table 35** along with their relevant status. On the 24 February 2020 SSD 6300 will be taken up, which will supersede DA 49/94.

Table 23 Environmental Management Plans

Approval Authority	Approval Date	Review Update	Title
	Rixs Creek North		
DPIE	21/12/2017	-	Biodiversity Management Plan to be updated following the determination Mod 4 by the PAC- Feb 2016
DPIE	19/2/2016	-	Heritage Management Plan
DPIE	19/2/2016	-	Waste Management Plan
RR	1/12/2018		Mining Operations Plan (MOP) which becomes the Rehabilitation Management Plan
DA/49/94	Rixs Creek South		
DPIE	2011		Transport Management Plan – Cut & Cover Tunnel
DPIE	Not Triggered	-	Construction Noise Management Plan for Rail Loop
DPIE	22/1/2014	-	Landscape Management Plan
	"	-	- Rehabilitation Management Plan
	"	-	- Final Void Management Plan
	"	-	- Mine Closure Plan
DPIE	Not Triggered	-	Biodiversity Management Plan – Rail Loop
DPIE	Not Triggered	-	Heritage Management Plan – Rail Loop
RR	15/3/2013	1/12/2019	Mining Operations Plan (MOP) which becomes the Rehabilitation Management Plan
	RCM Integrated Management Plan to cover Rixs Creek North & Rixs Creek South Operation		
DPIE	Approved 19/12/2017	24/7/2019	Noise Management Plan
DPIE	Approved 19/12/2017	24/7/2019	Blast Management Plan
DPIE	Approved 19/12/2017	24/7/2019	Air Quality & Greenhouse Gas Management Plan
DPIE	Approved 16/1/2019	June 2019	Water Management Plan

Appendix 1 Rix's Creek Complex Surface Water Sampling Results

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Date Sampled	Month Sampled	W1: Station Ck (EPA Site)				W3: Martins Creek (EPA Site)				W4: GI Ck Up (nobles Xing)				W5: GI Ck Dn (Oxfords)				W6: Blackwattle Ck (EPA Site)			
		pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS
			uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l
22/01/2019	Jan-19	7.2	1466	40	1130					7.7	271	11	156	7.7	270	8	148				
26/02/2019	Feb-19									8	273	6	222	7.9	274	11	225				
20/03/2019	Mar-19	6.9	328	40	446	6.1	241	27	272	7.3	282	5	160	7.4	286	6	185	7.6	2750	10	1700
16/04/2019	Apr-19	6.8	356	9	322	6.2	266	1	310	7.4	356	4	235					7.5	3410	6	2120
15/05/2019	May-19	7.2	413	9	843	7	346	61	632	7.5	282	9	202					7.5	3240	18	2190
19/06/2019	Jun-19	7.8	487	28	419					8	282	6	173	8	277	6	265				
18/07/2019	Jul-19	7.0	575	54	471					7.9	282	5	187	8.0	284	7	189				
15/08/2019	Aug-19	7	591	32	781					7.9	280	3	242	7.9	278	4	220				
19/09/2019	Sep-19	7.7	562	77	591					7.8	277	6	204	7.9	279	4	167	7.7	3700	34	2480
24/10/2019	Oct-19	7.34	1160	28	818					7.82	281	10	155	7.83	288	8	155				
22/11/2019	Nov-19									8.1	342	7	290	8.1	282	10	203				
20/12/2019	Dec-19									7.7	284	10	249	7.8	285	11	237				
	HISTORICAL AVERAGE	7.2	660	35	647	6.4	284	30	405	7.8	291	7	206	7.9	280	8	199	7.6	3275	17	2123
	MIN	6.8	328.0	9.0	322.0	6.1	241.0	1.0	272.0	7.3	271.0	3.0	155.0	7.4	270.0	4.0	148.0	7.5	2750.0	6.0	1700.0
	MAX	7.8	1466.0	77.0	1130.0	7.0	346.0	61.0	632.0	8.1	356.0	11.0	290.0	8.1	288.0	11.0	265.0	7.7	3700.0	34.0	2480.0
	SD	0.3	389.7	21.3	262.4	0.5	54.8	30.1	197.8	0.3	27.5	2.6	42.6	0.2	5.7	2.6	37.7	0.1	398.2	12.4	321.9
		Dry = No sample, site was dry																			
		ns= not sampled																			

Date Sampled	Month Sampled	W7: Stony Ck				W10: Dam C4				W11: GI Ck NEH				W12: Dam C1				W13: Dam C6			
		pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS
			uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l
22/01/2019	Jan-19	6.4	198	43	220	9.2	4870	20	3090	7.7	298	9	149	9.1	4350	22	2680				
26/02/2019	Feb-19					9.6	5630	18	3630	7.8	278	7	235	8.9	5020	17	3000				
20/03/2019	Mar-19	5.8	149	17	241	7.4	1574	76	958	7.4	295	5	206	8.8	2810	22	1550	6	116	162	225
16/04/2019	Apr-19	6.2	134	29	206	7.8	1800	5	1070	7.6	381	2	231	8.3	2660	<1	1490	6.4	152	34	146
15/05/2019	May-19	6.8	169	39	248	7.8	2000	8	1320	7.7	308	4	206	7.9	2870	28	1700	6.9	213	44	241
19/06/2019	Jun-19					7.8	2120	14	1350	7.8	298	24	182	7.8	2870	6	1720	7	234	14	245
18/07/2019	Jul-19					8.1	2140	18	1440	8.0	292	3	191	8.1	2930	10	1810	7.5	218	17	168
15/08/2019	Aug-19					8.3	2340	8	1480	7.9	288	3	202	8.1	3040	6	1830	7.6	233	17	186
19/09/2019	Sep-19	6.3	96	19	113	8.6	2400	7	1540	7.9	284	6	221					7.5	234	18	177
24/10/2019	Oct-19	6.52	137	6	166	8.75	2640	12	1670	7.86	285	6	151	8.72	3560	<5	2030	7.76	303	15	199
22/11/2019	Nov-19					9.1	2760	11	1650	8.7	289	5	151	9.3	3730	5	2200	8.3	460	14	352
20/12/2019	Dec-19					9.6	2940	10	1790	7.8	292	11	208	9.7	4040	3	2410	7.7	798	47	542
	HISTORICAL AVERAGE	6.3	147	26	199	8.5	2768	17	1749	7.8	299	7	194	8.6	3444	13	2038	7.3	296	38	248
	MIN	5.8	96.0	6.0	113.0	7.4	1574.0	5.0	958.0	7.4	278.0	2.0	149.0	7.8	2660.0	3.0	1490.0	6.0	116.0	14.0	146.0
	MAX	6.8	198.0	43.0	248.0	9.6	5630.0	76.0	3630.0	8.7	381.0	24.0	235.0	9.7	5020.0	28.0	3000.0	8.3	798.0	162.0	542.0
	SD	0.3	34.5	14.1	51.3	0.8	1233.7	19.1	797.5	0.3	27.0	5.9	30.5	0.6	765.4	9.2	484.9	0.7	199.1	45.3	118.3
		ns= not sampled																			

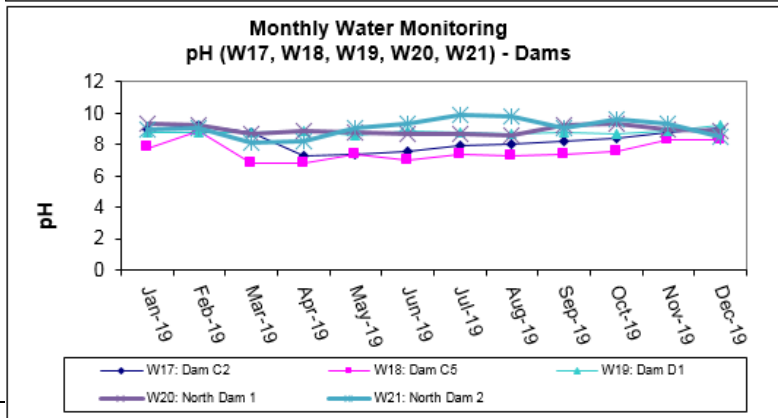
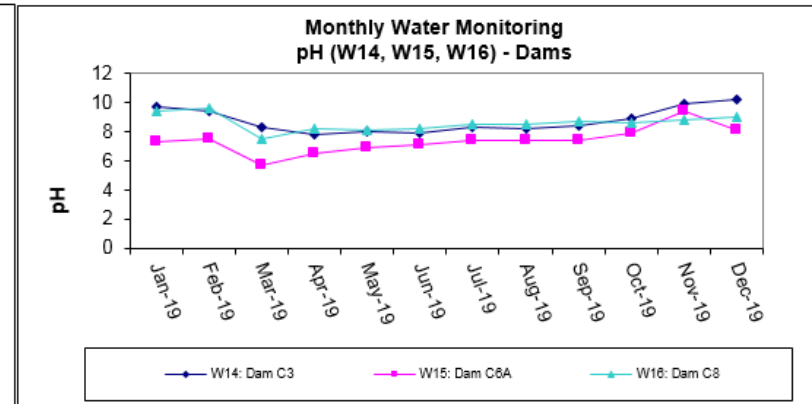
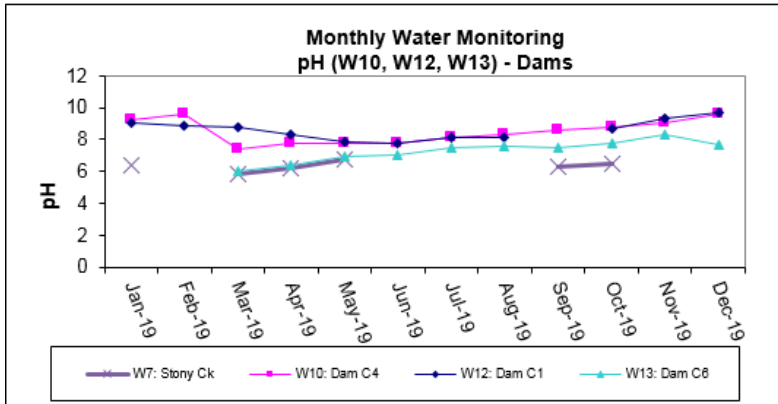
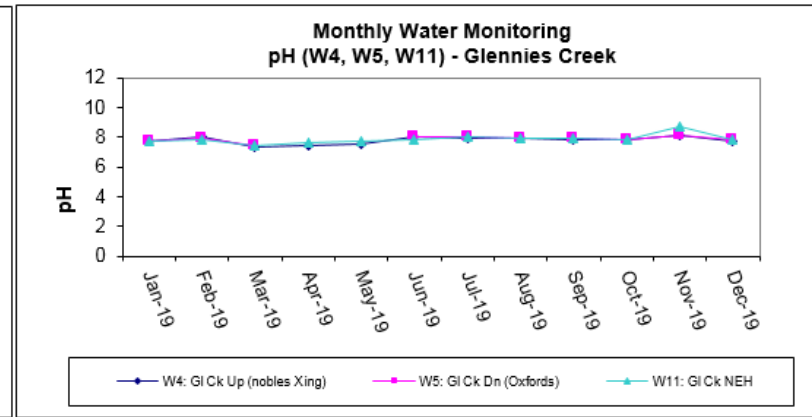
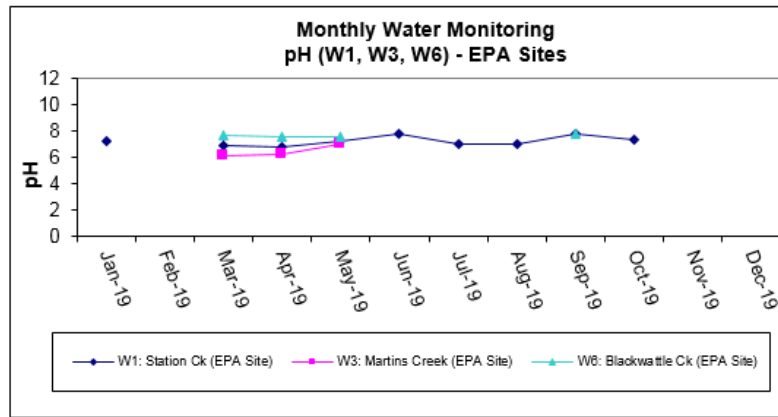
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

Date Sampled	Month Sampled	W14: Dam C3				W15: Dam C6A				W16: Dam C8				W17: Dam C2			
		pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS
			uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l
22/01/2019	Jan-19	9.7	4900	7	3210	7.3	687	21	409	9.4	5720	8	4060	9	2060	21	1180
26/02/2019	Feb-19	9.4	5790	13	3780	7.5	741	18	478	9.6	6260	9	4520	9.2	2230	5	1270
20/03/2019	Mar-19	8.3	2240	5	1310	5.7	100	177	370	7.5	2480	27	1530	8.8	1360	26	767
16/04/2019	Apr-19	7.8	1778	10	1120	6.5	123	22	294	8.2	1716	26	1120	7.3	1070	6	615
15/05/2019	May-19	8.0	1847	27	1290	6.9	152	11	150	8.1	1858	54	1180	7.4	1174	4	685
19/06/2019	Jun-19	7.9	1880	28	1300	7.1	172	14	167	8.2	1928	23	1350	7.6	1300	2	886
18/07/2019	Jul-19	8.3	1957	15	1300	7.4	174	16	162	8.5	2040	24	1390	7.9	1465	6	872
15/08/2019	Aug-19	8.2	2020	11	1250	7.4	204	22	180	8.5	2280	19	1400	8	1656	24	970
19/09/2019	Sep-19	8.4	2260	6	1380	7.4	211	16	190	8.7	2340	10	1520	8.2	1786	9	1030
24/10/2019	Oct-19	8.97	2480	<5	1590	7.87	291	14	212	8.67	2640	5	1630	8.44	2140	9	1300
22/11/2019	Nov-19	9.9	2560	10	1640	9.4	359	15	257	8.8	2830	25	1850	8.8	2080	4	1270
20/12/2019	Dec-19	10.2	2710	18	1670	8.1	495	36	394	9	3180	62	2030	9.1	2310	4	1370
	HISTORICAL AVERAGE	8.8	2702	14	1737	7.4	309	32	272	8.6	2939	24	1965	8.3	1719	10	1018
	MIN	7.8	1778.0	5.0	1120.0	5.7	100.0	11.0	150.0	7.5	1716.0	5.0	1120.0	7.3	1070.0	2.0	615.0
	MAX	10.2	5790.0	28.0	3780.0	9.4	741.0	177.0	478.0	9.6	6260.0	62.0	4520.0	9.2	2310.0	26.0	1370.0
	SD	0.8	1283.7	7.9	846.8	0.9	219.0	46.2	114.1	0.6	1490.0	17.6	1119.8	0.7	440.0	8.5	258.3
	ns= not sampled																
Date Sampled	Month Sampled	W18: Dam C5				W19: Dam D1				W20: North Dam 1				W21: North Dam 2			
		pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS
			uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l
22/01/2019	Jan-19	7.8	965	48	616	8.8	9230	10	6620	9.3	9220	2	6210	9	2830	478	2030
26/02/2019	Feb-19	8.9	1178	86	783	8.8	9790	6	6770	9.2	10760	4	7360	9.1	4740	179	2770
20/03/2019	Mar-19	6.8	127	85	169	8.8	7450	9	4910	8.7	8380	27	5690	8.1	2700	38	1650
16/04/2019	Apr-19	6.8	171	15	156	8.9	7920	6	5340	8.9	8370	4	5740	8.2	1405	15	970
15/05/2019	May-19	7.4	224	8	213	8.6	8450	8	5890	8.8	9370	26	6530	9.1	1506	16	1120
19/06/2019	Jun-19	7	239	10	172	8.9	8900	11	6470	8.7	9350	19	6830	9.3	1566	16	1020
18/07/2019	Jul-19	7.4	232	19	181	8.8	9130	19	6700	8.7	9410	16	6860	9.9	1625	6	1160
15/08/2019	Aug-19	7.3	251	22	196	8.7	9310	20	6710	8.6	9860	11	6920	9.8	1744	23	970
19/09/2019	Sep-19	7.4	271	10	234	8.8	8860	51	6260	9.2	8160	15	5490	9.1	2220	10	1360
24/10/2019	Oct-19	7.59	348	10	225	8.73	9690	34	6700	9.34	10900	36	6920	9.61	3760	<5	2450
22/11/2019	Nov-19	8.3	444	8	277	8.9	9250	8	6450	9	10930	89	7510	9.3	4220	261	2570
20/12/2019	Dec-19	8.3	584	11	382	9.2	9210	6	6580	8.9	11850	32	8240	8.5	5360	127	3460
	HISTORICAL AVERAGE	7.6	420	28	300	8.8	8933	16	6283	8.9	9713	23	6692	9.1	2806	106	1794
	MIN	6.8	127.0	8.0	156.0	8.6	7450.0	6.0	4910.0	8.6	8160.0	2.0	5490.0	8.1	1405.0	6.0	970.0
	MAX	8.9	1178.0	86.0	783.0	9.2	9790.0	51.0	6770.0	9.3	11850.0	89.0	8240.0	9.9	5360.0	478.0	3460.0
	SD	0.6	331.6	29.2	199.4	0.1	688.8	13.9	600.1	0.3	1173.6	23.5	813.3	0.6	1389.6	149.5	844.2
	ns= not sampled																

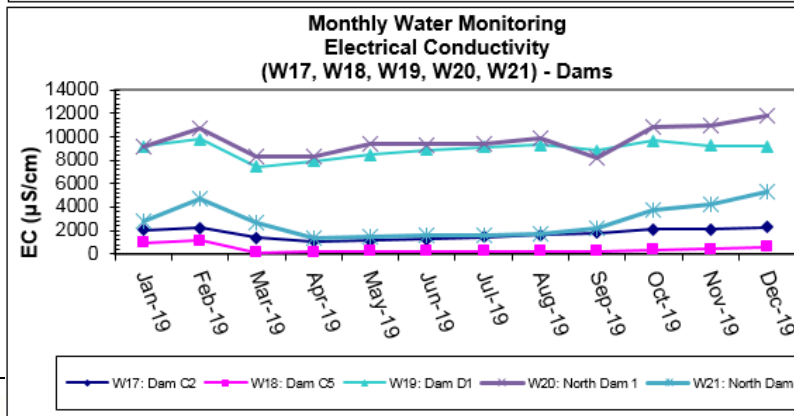
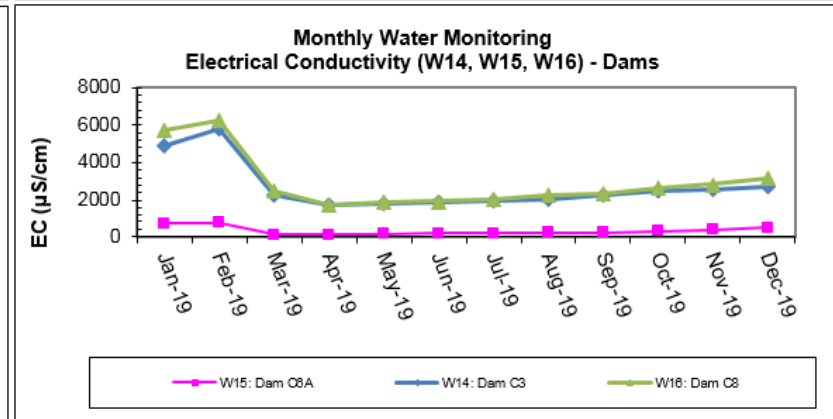
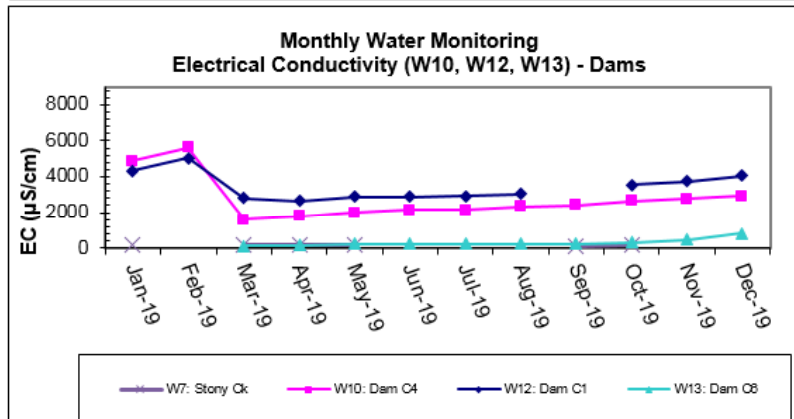
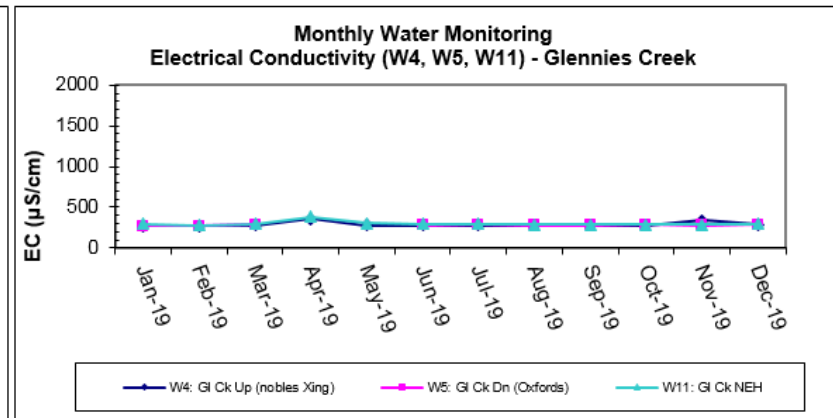
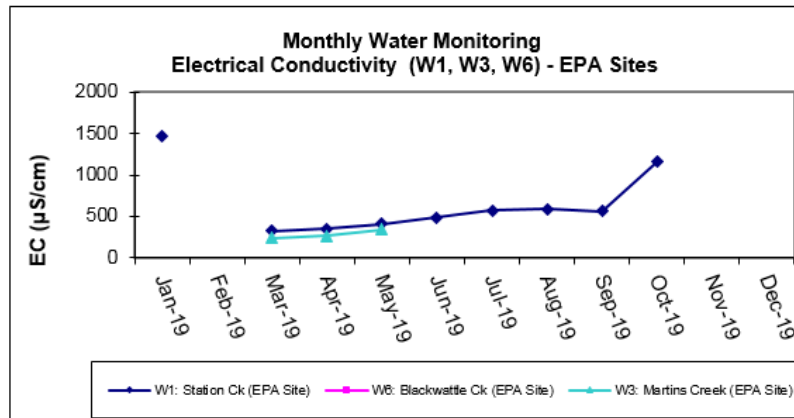
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



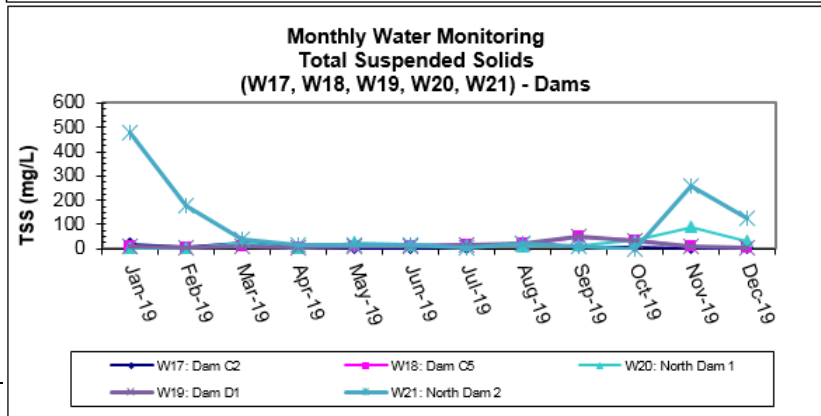
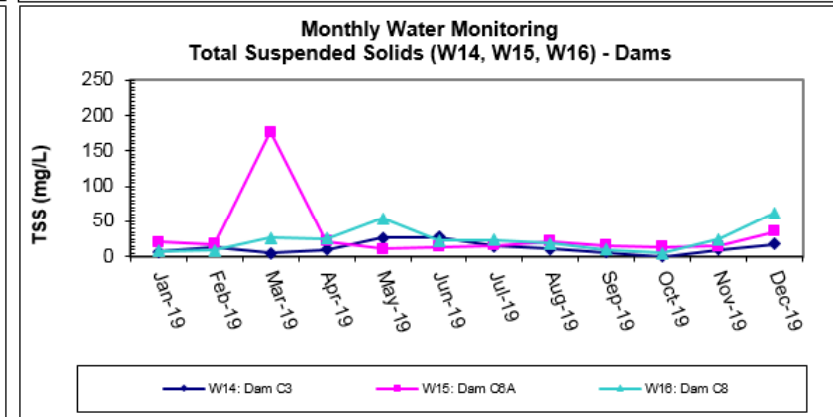
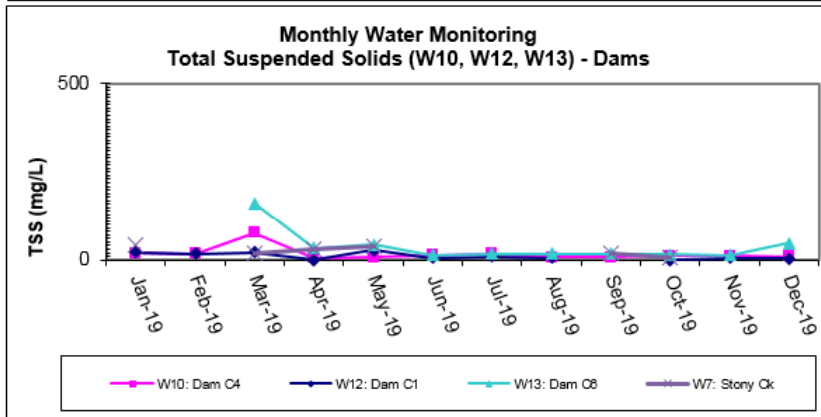
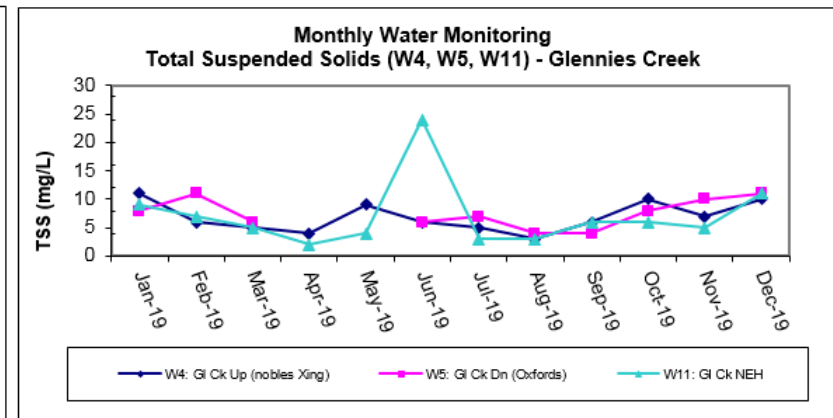
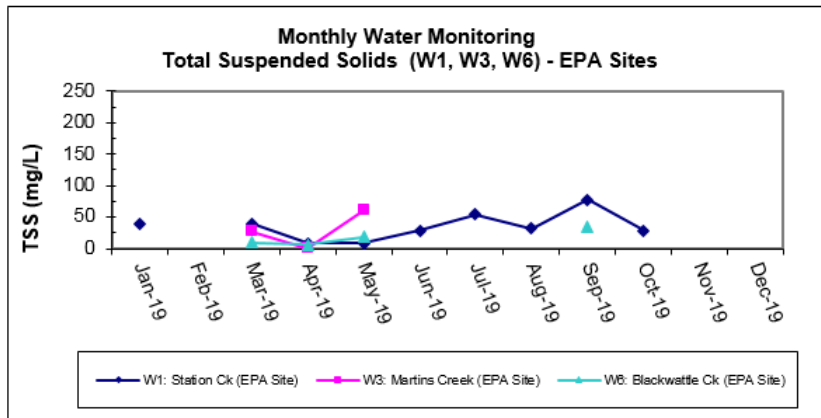
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



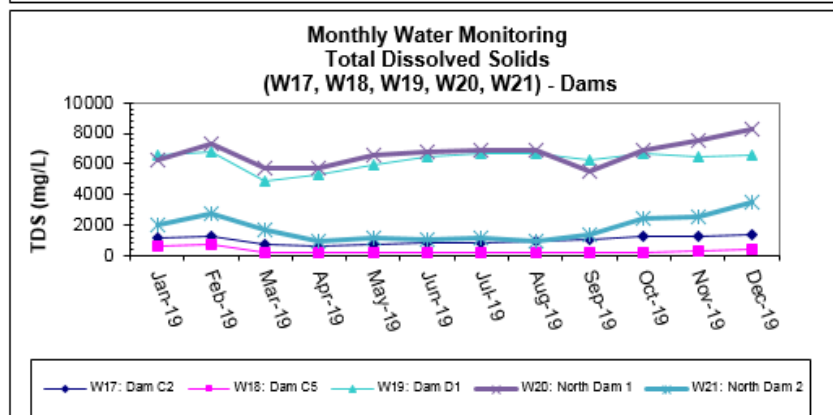
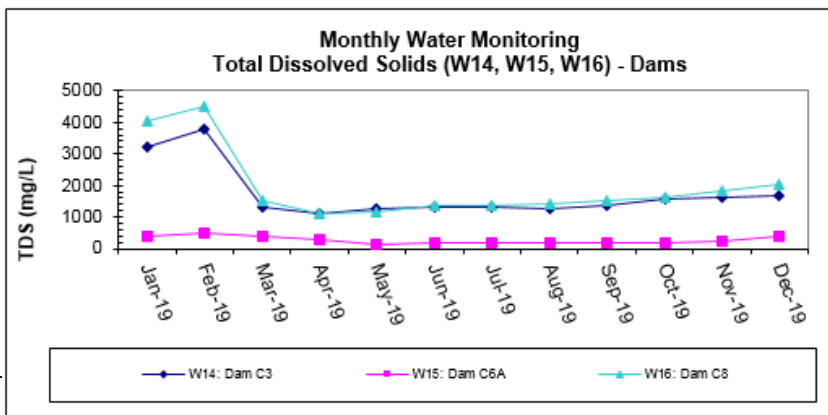
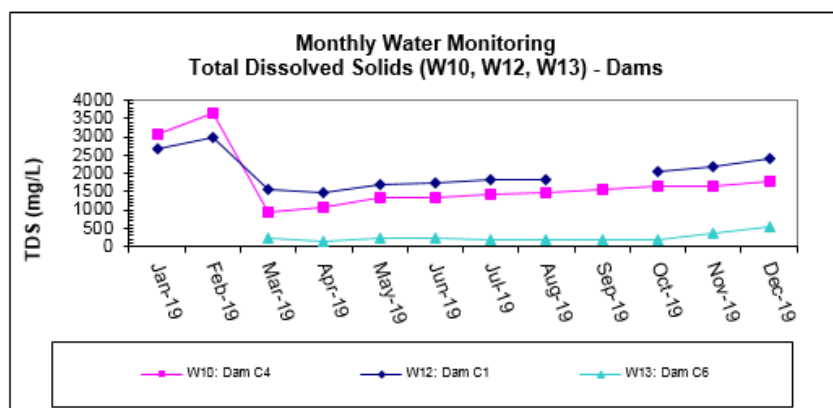
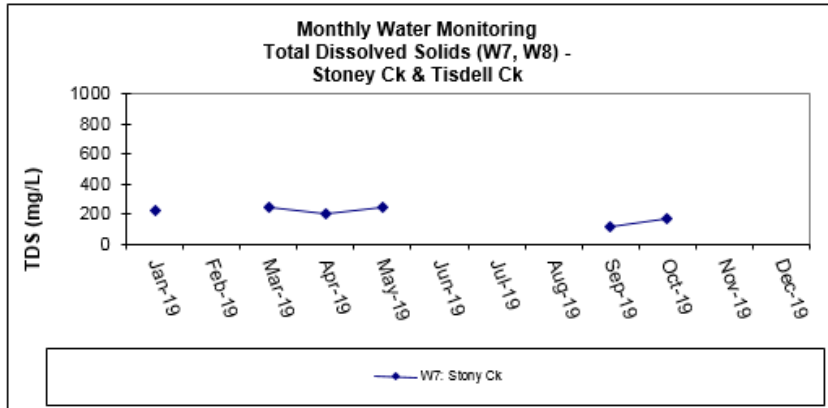
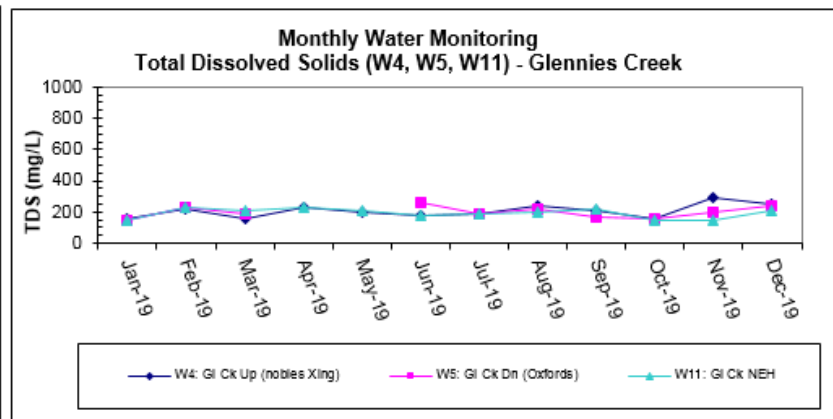
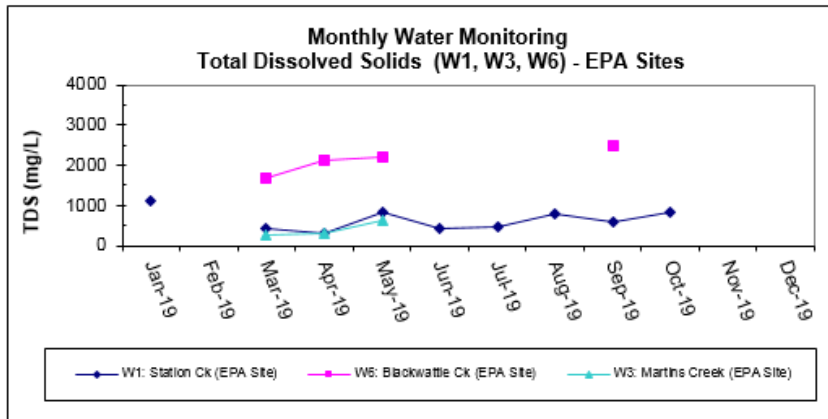
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



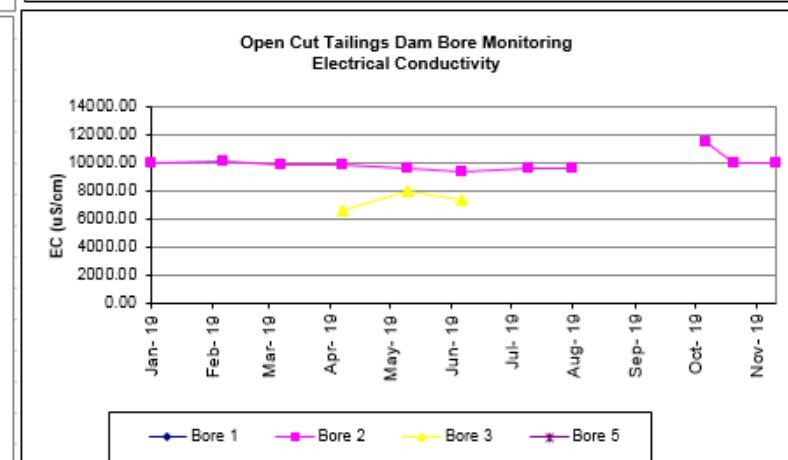
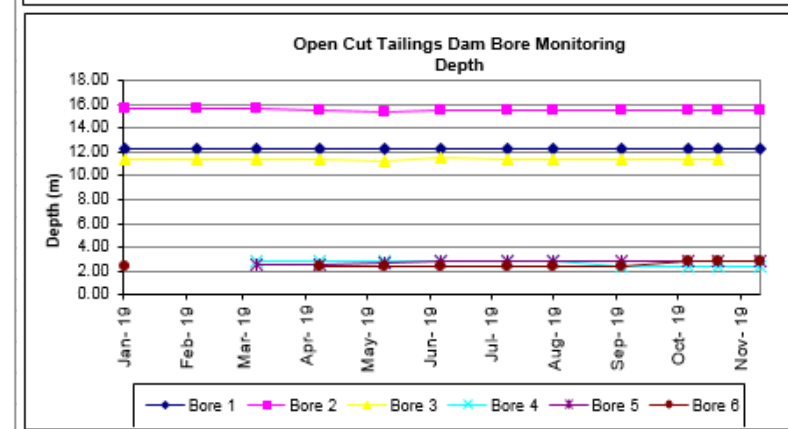
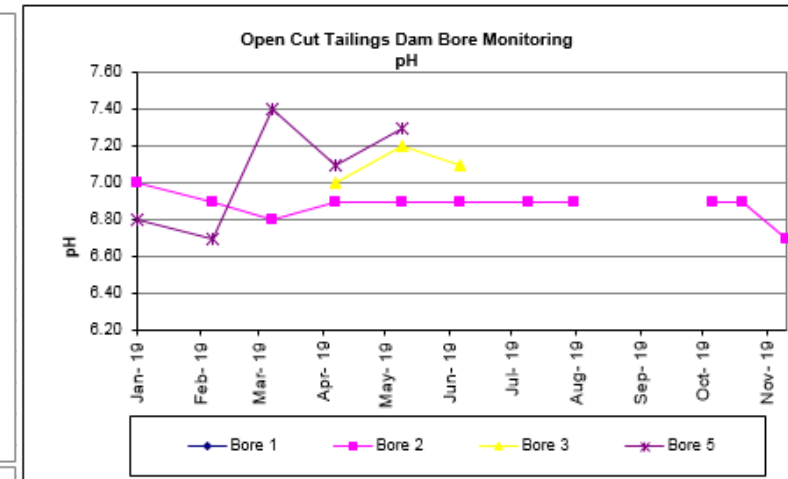
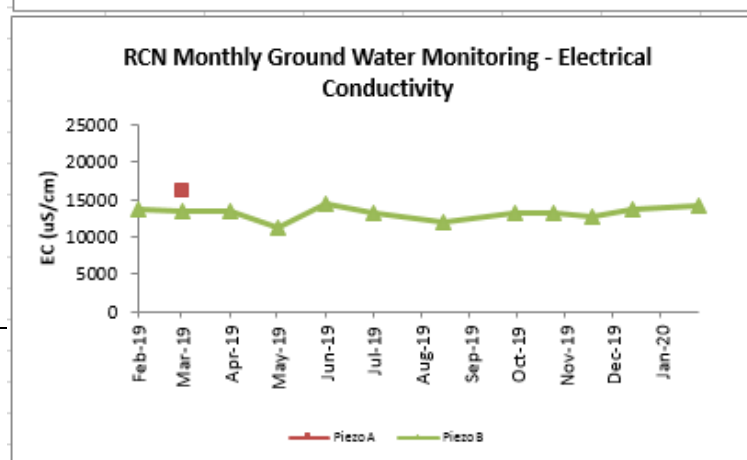
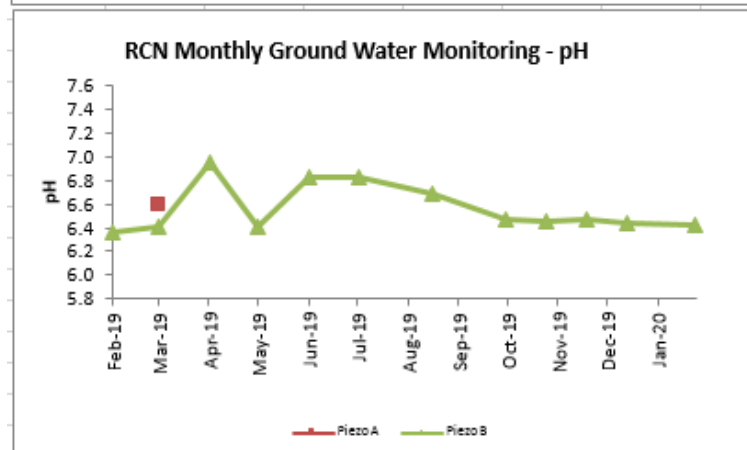
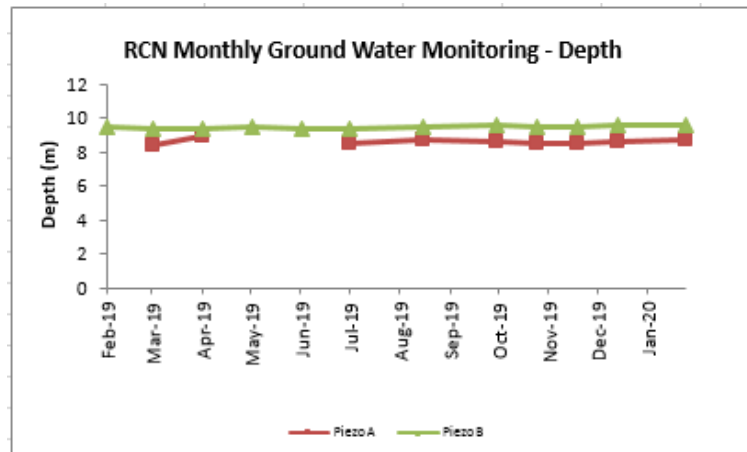
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



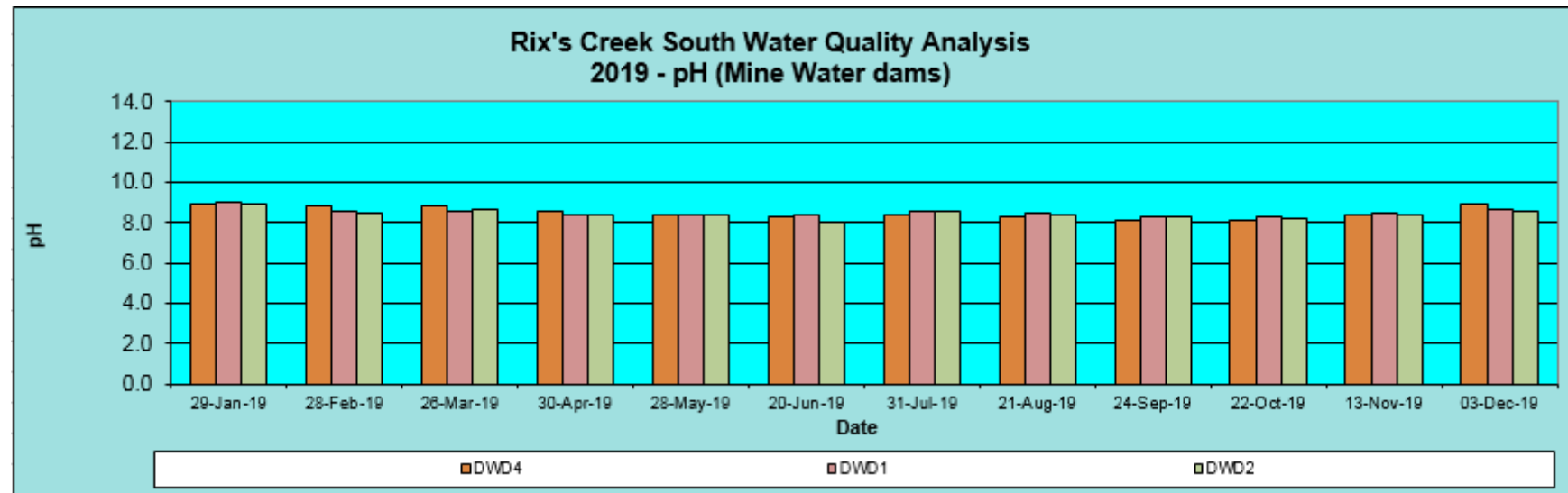
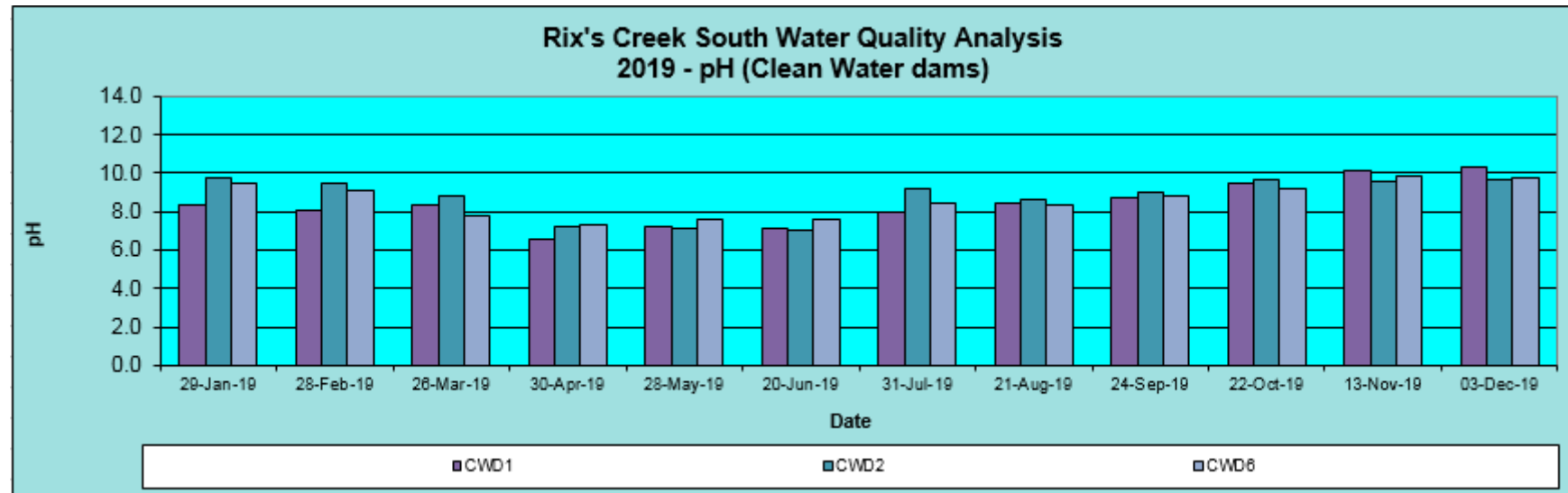
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



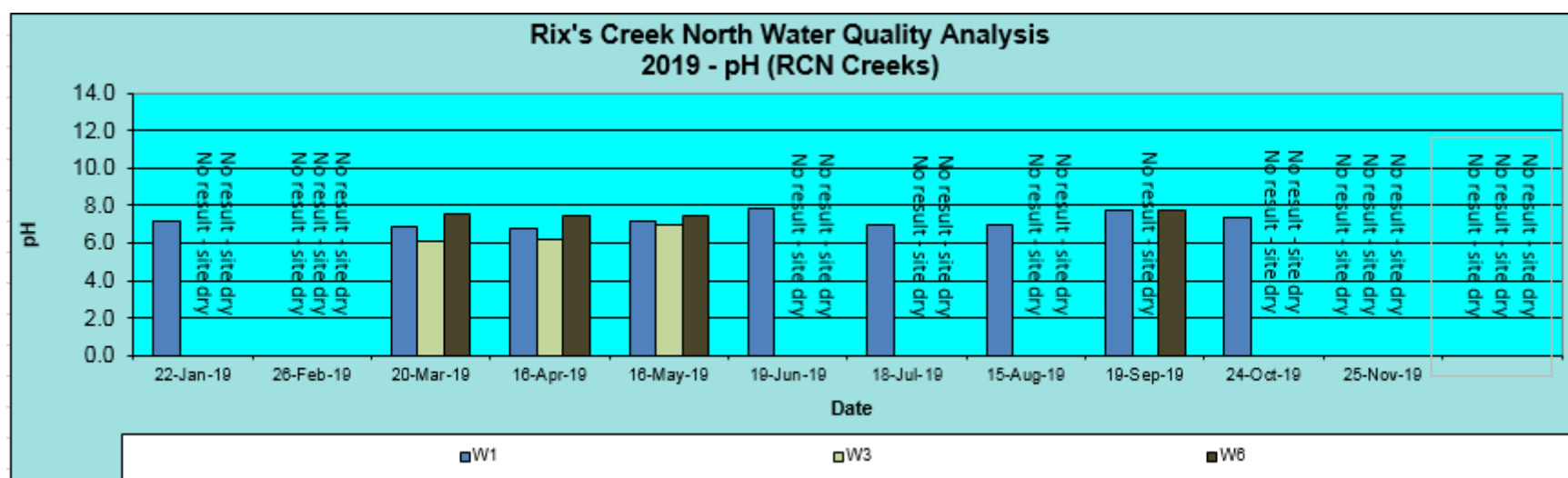
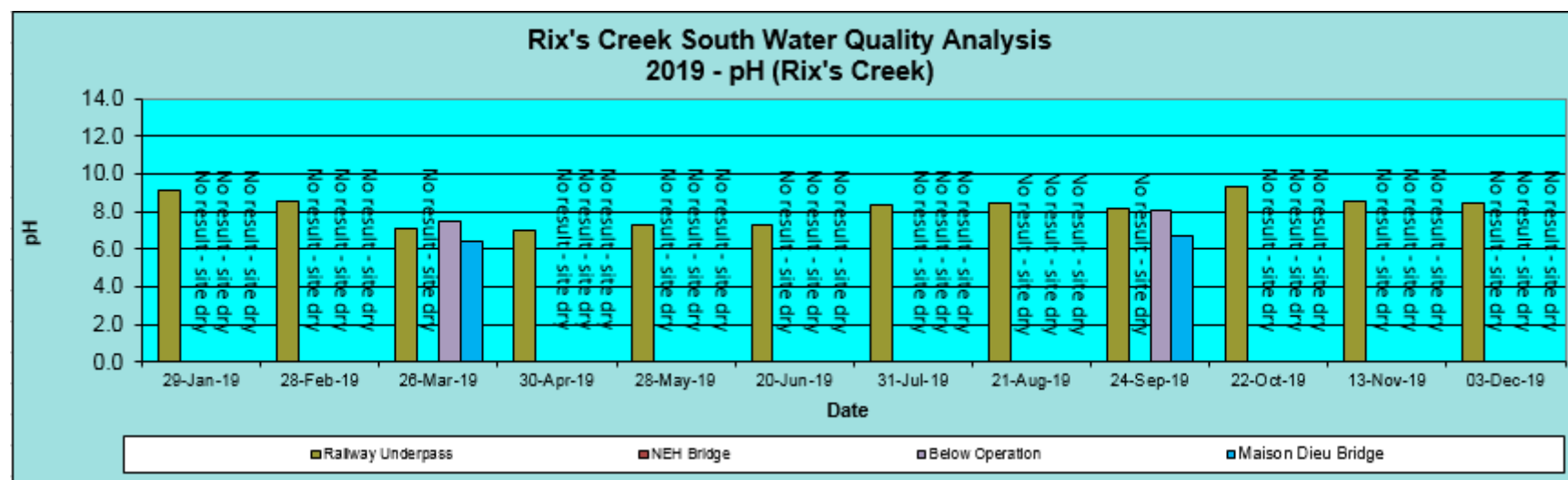
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



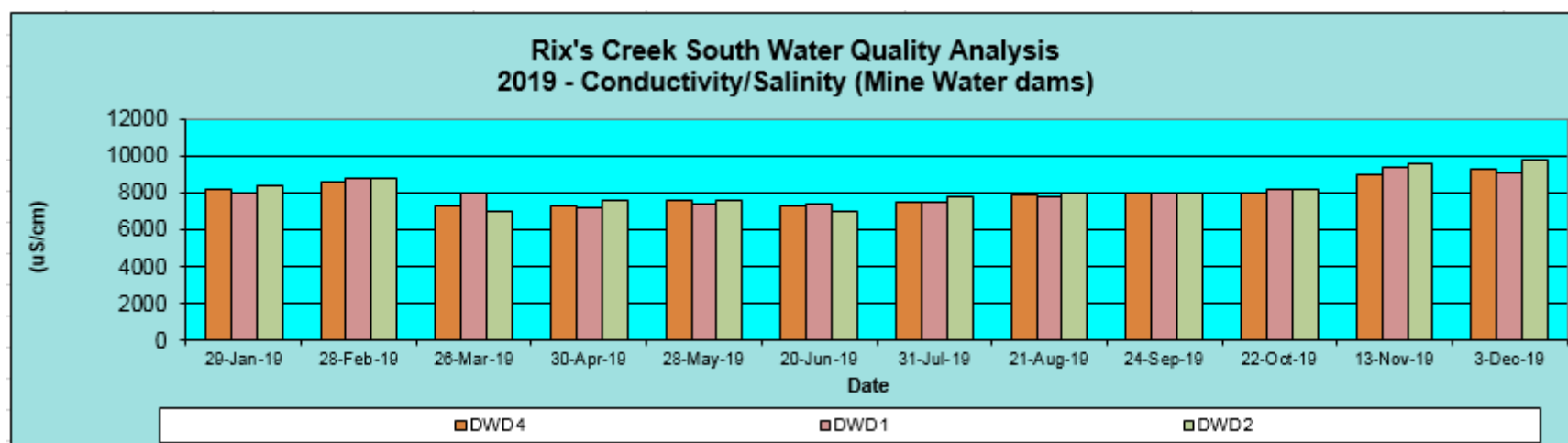
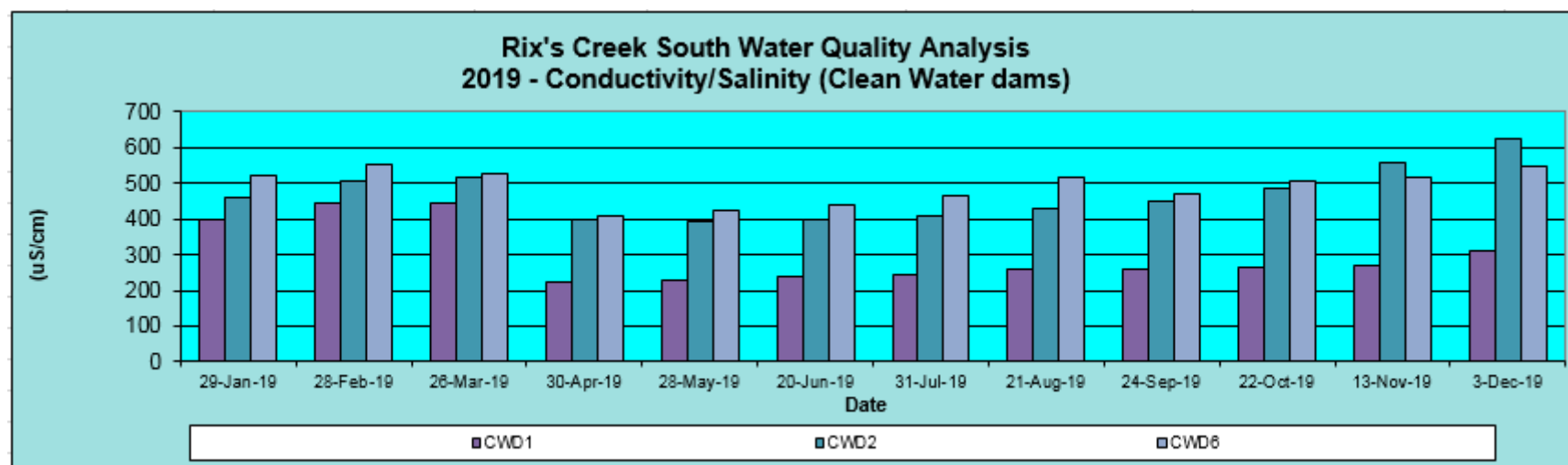
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



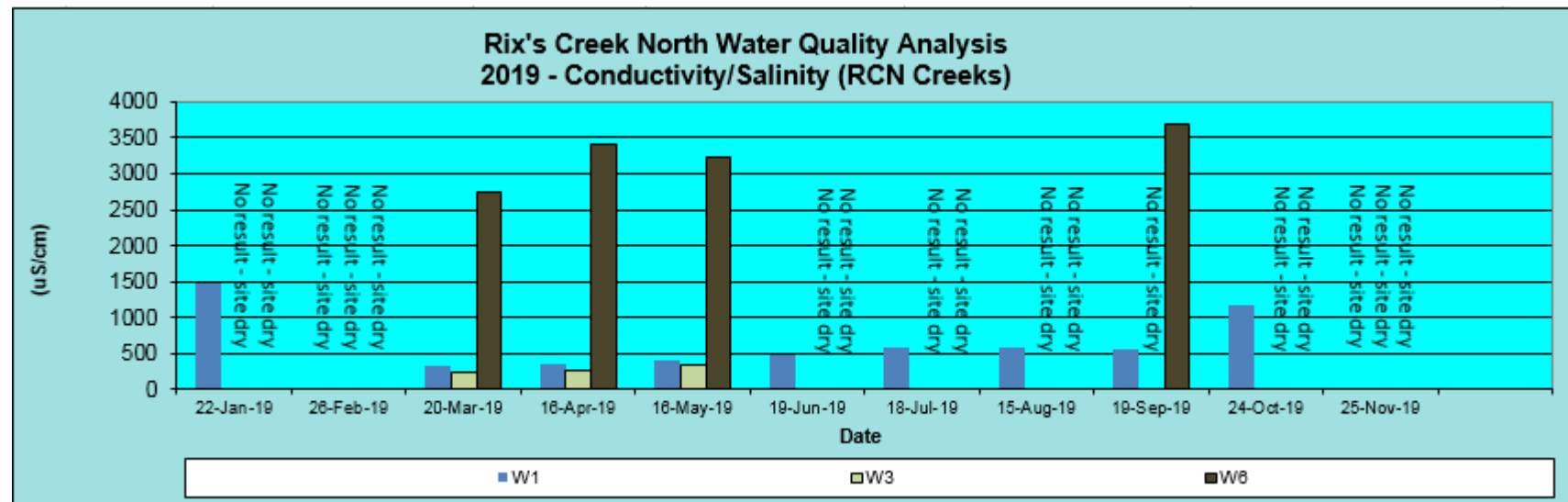
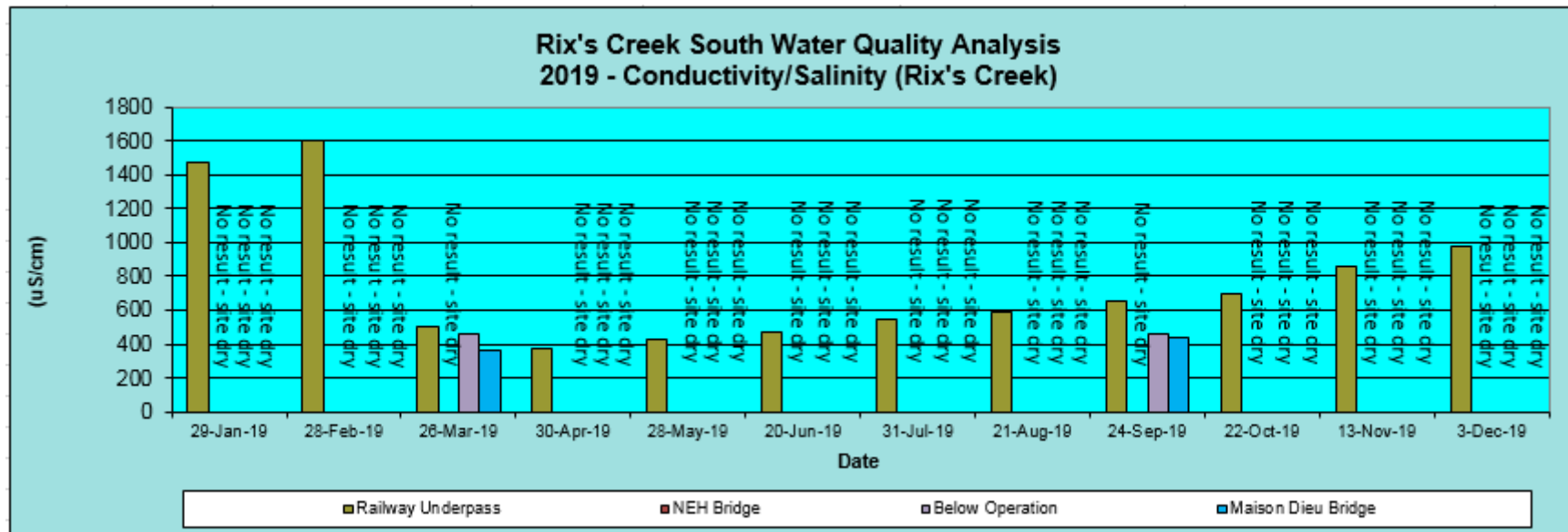
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



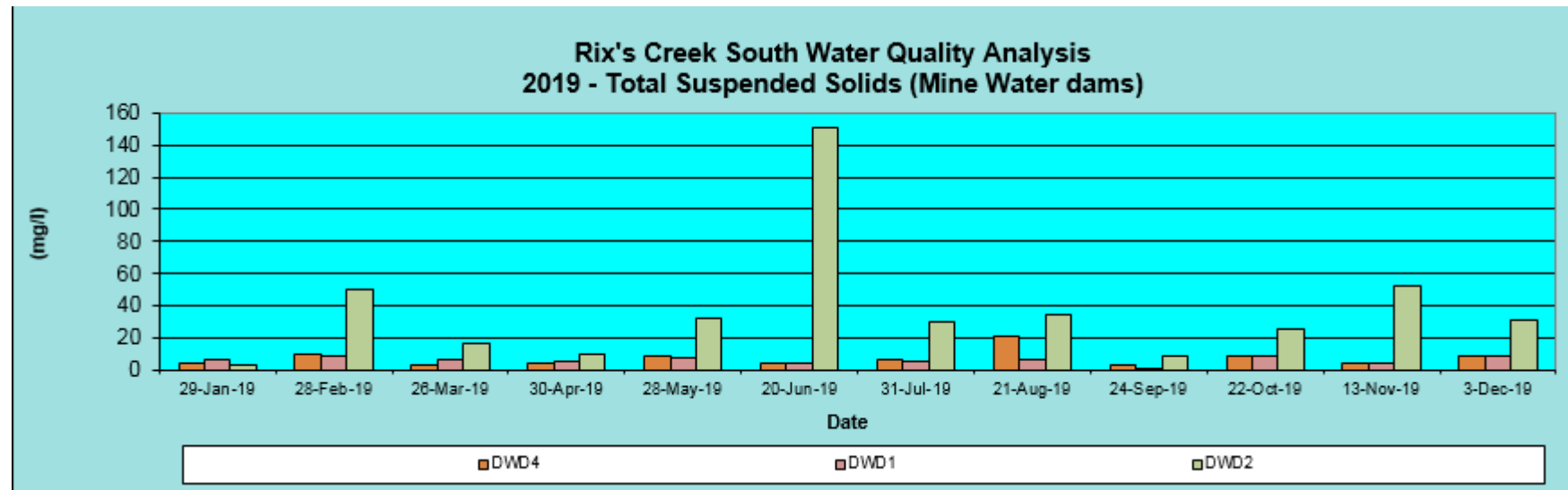
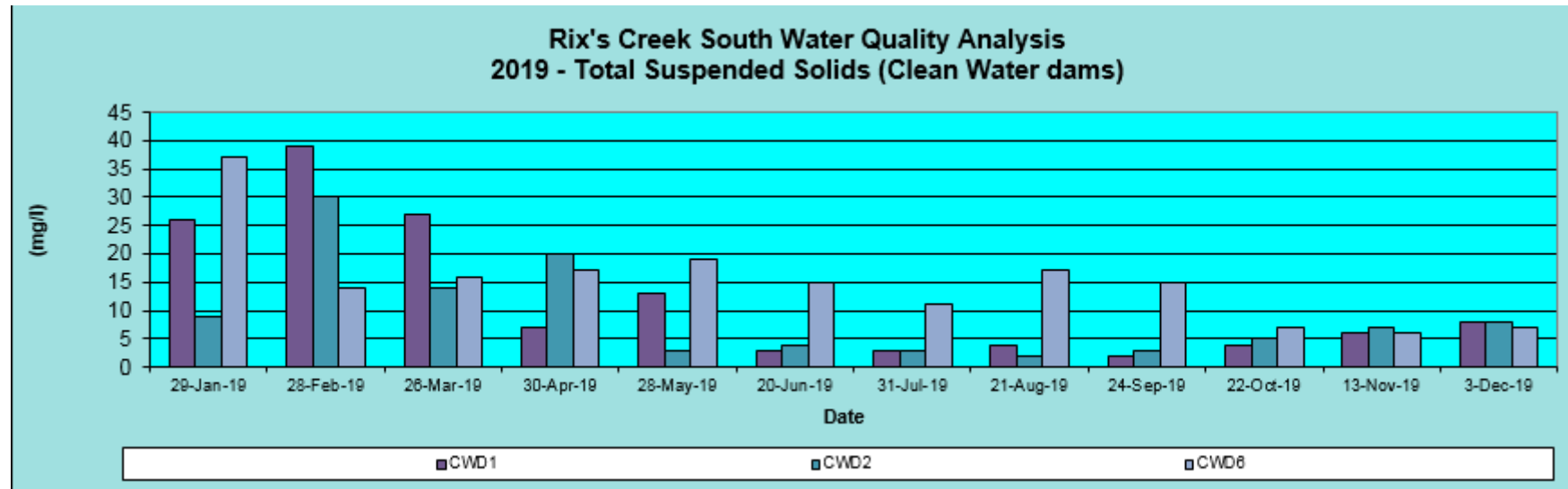
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



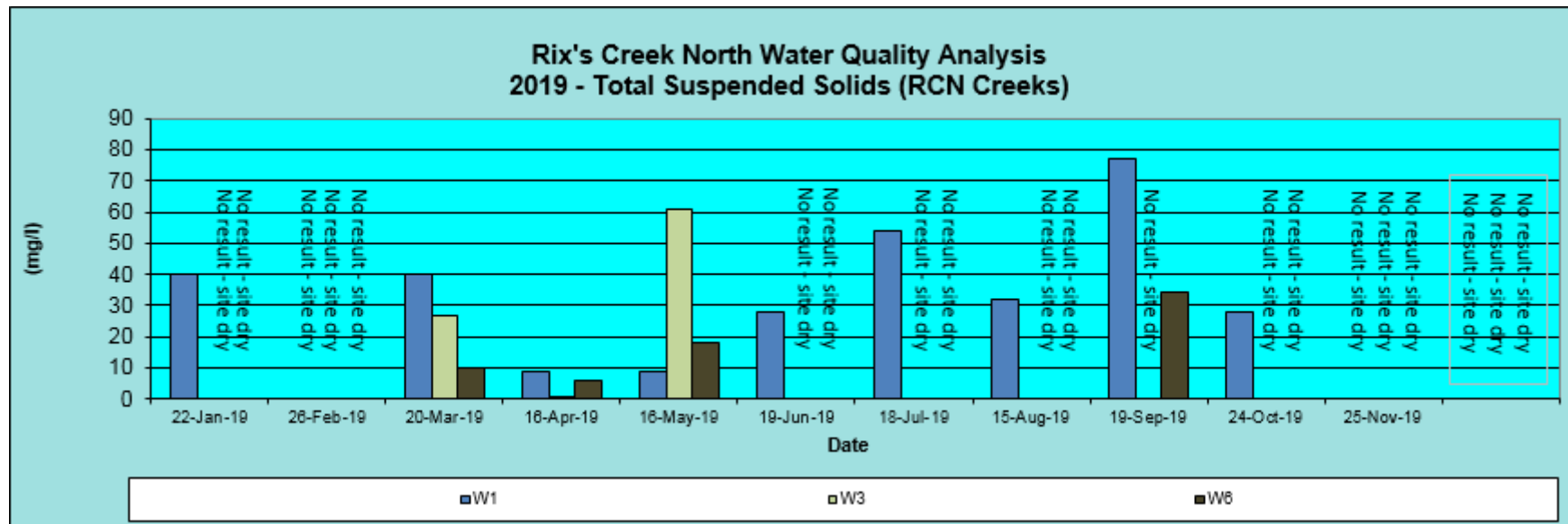
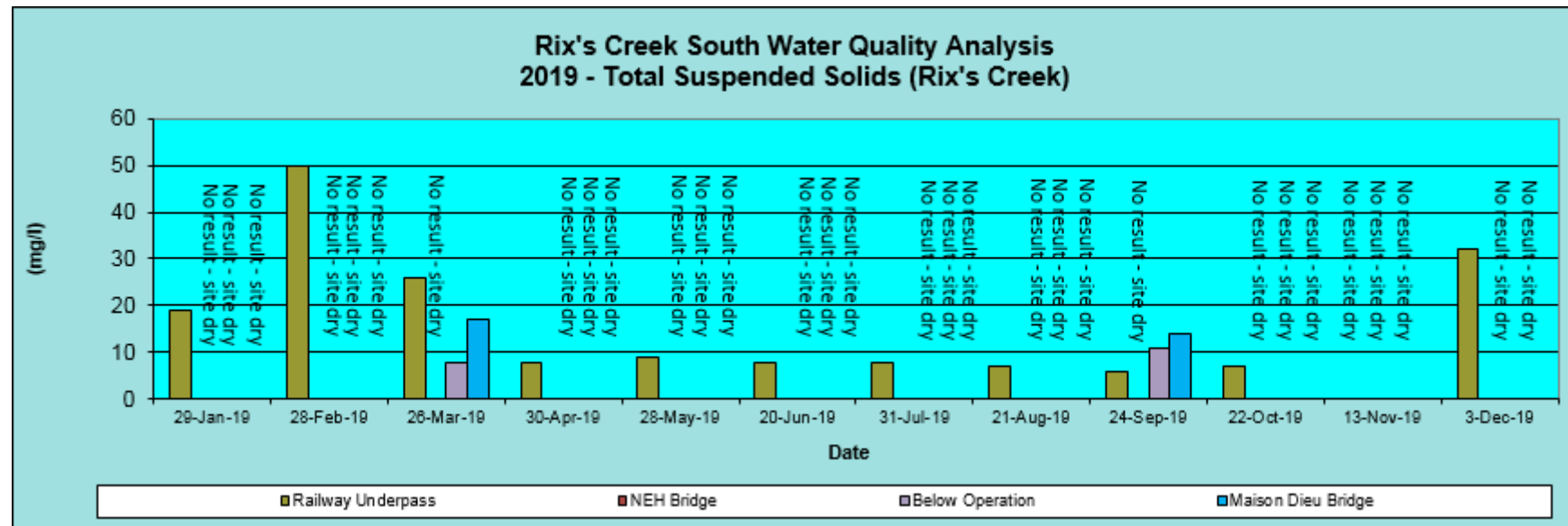
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



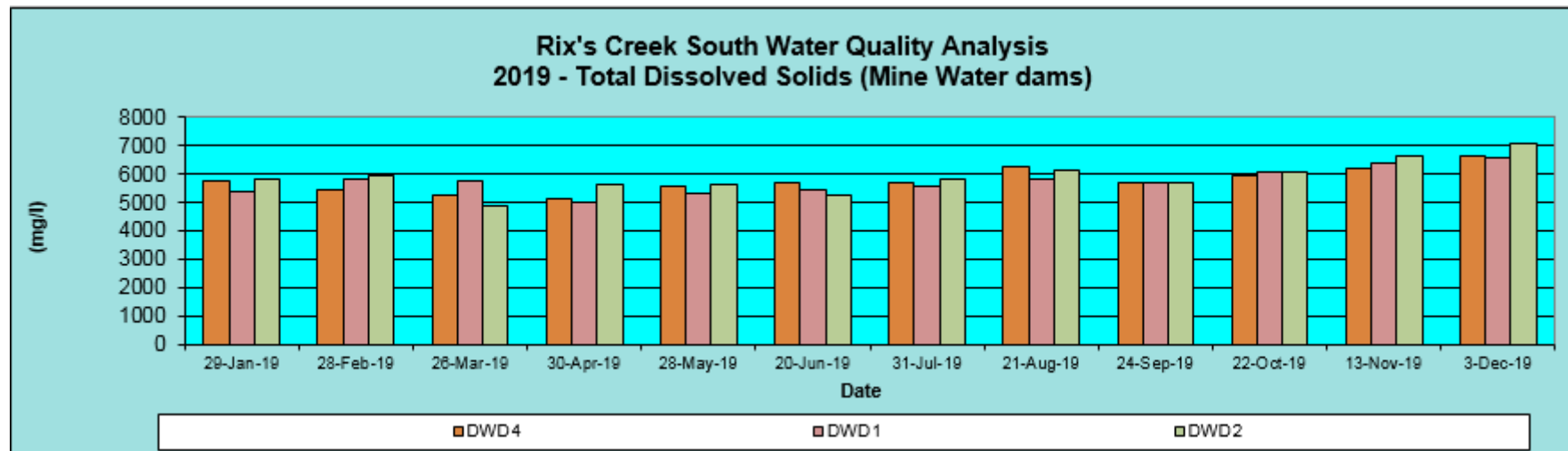
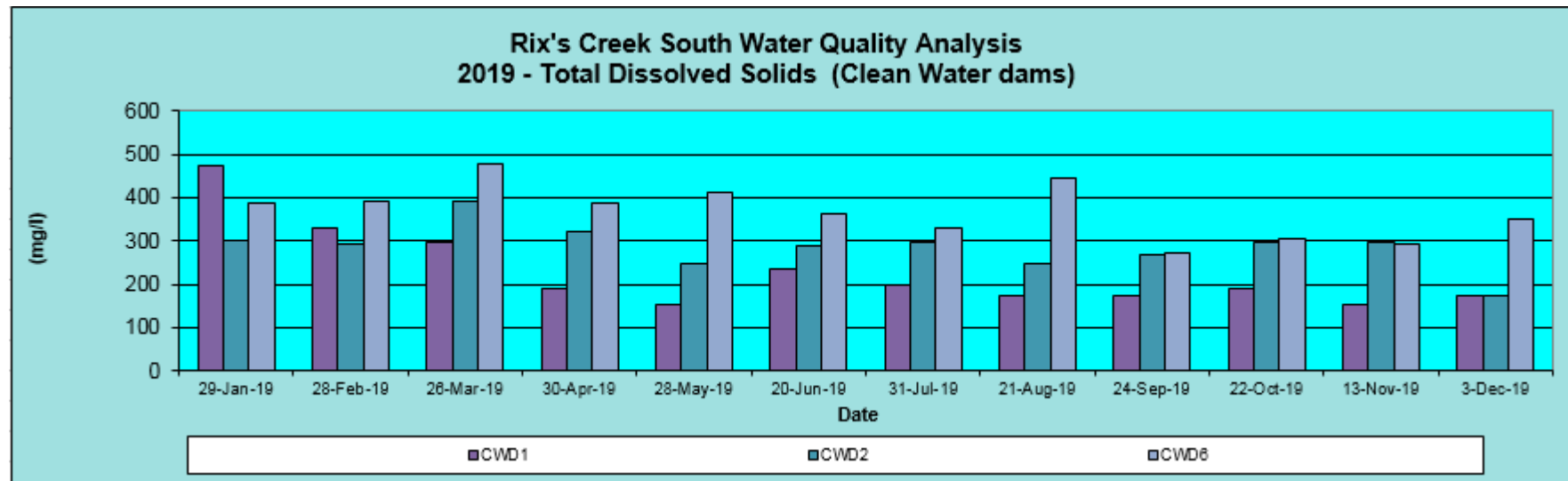
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



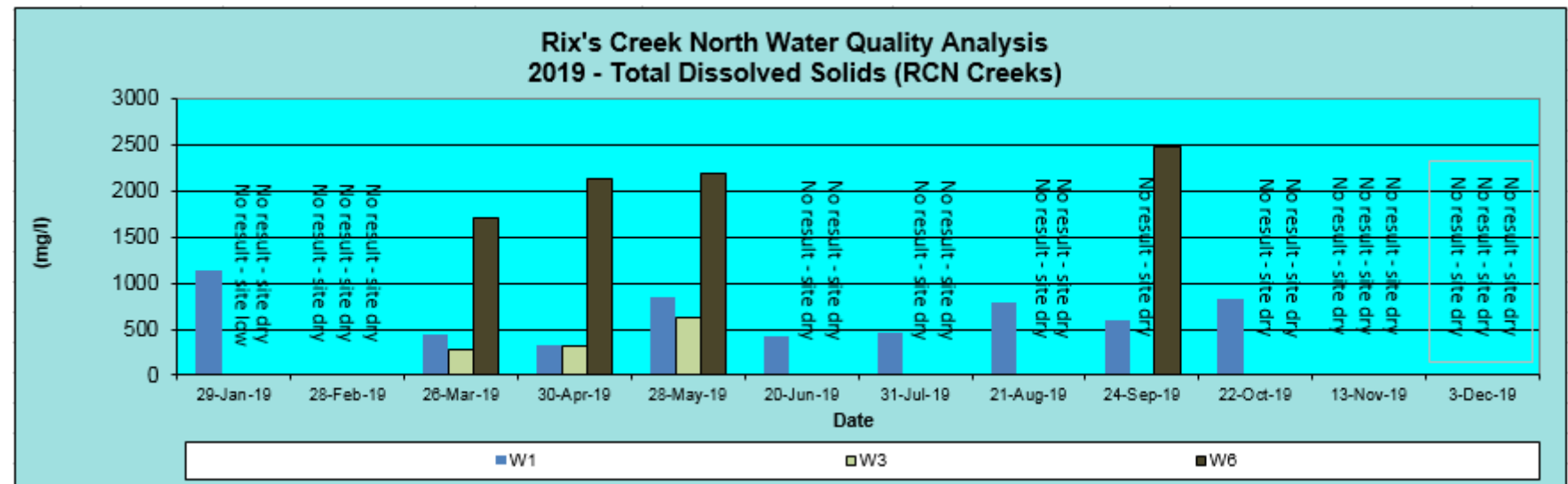
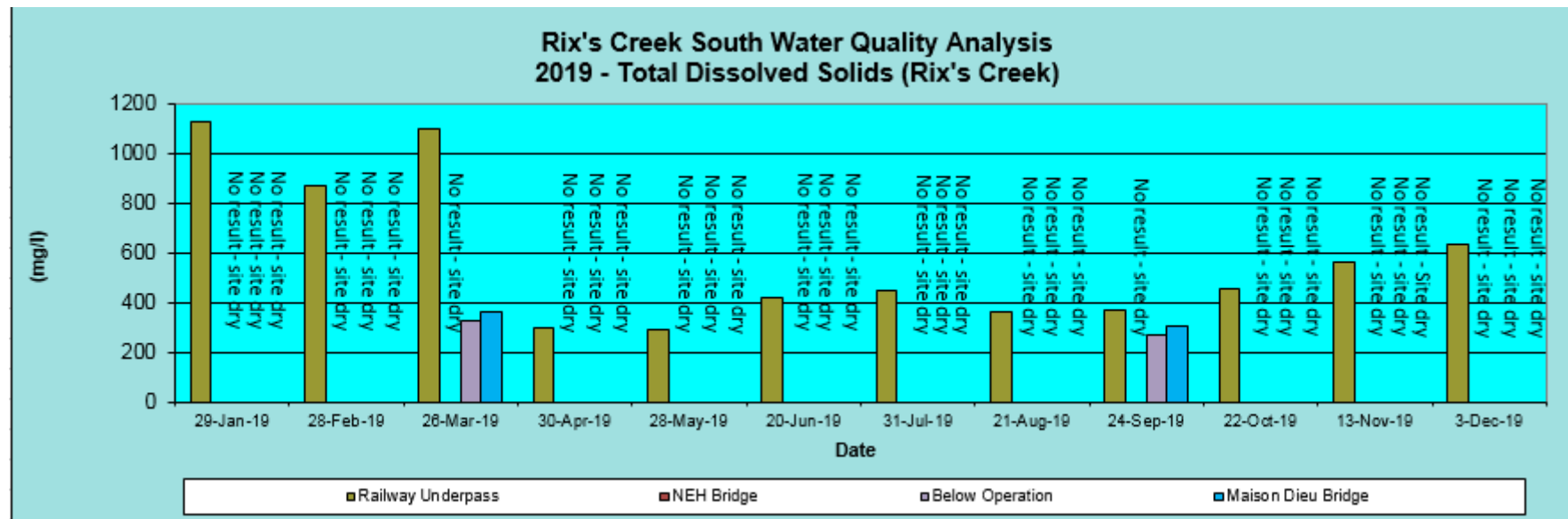
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2019 – RIX'S CREEK MINE

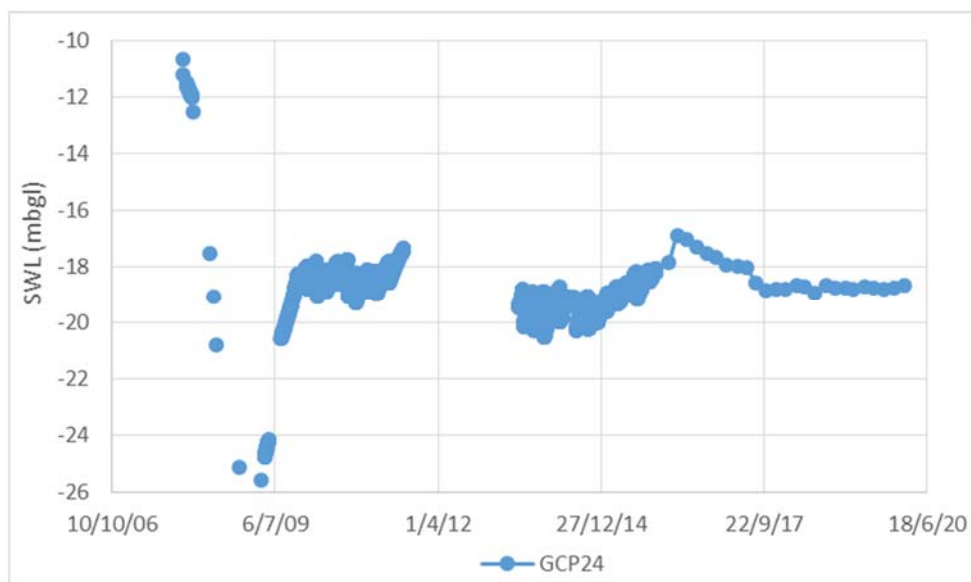
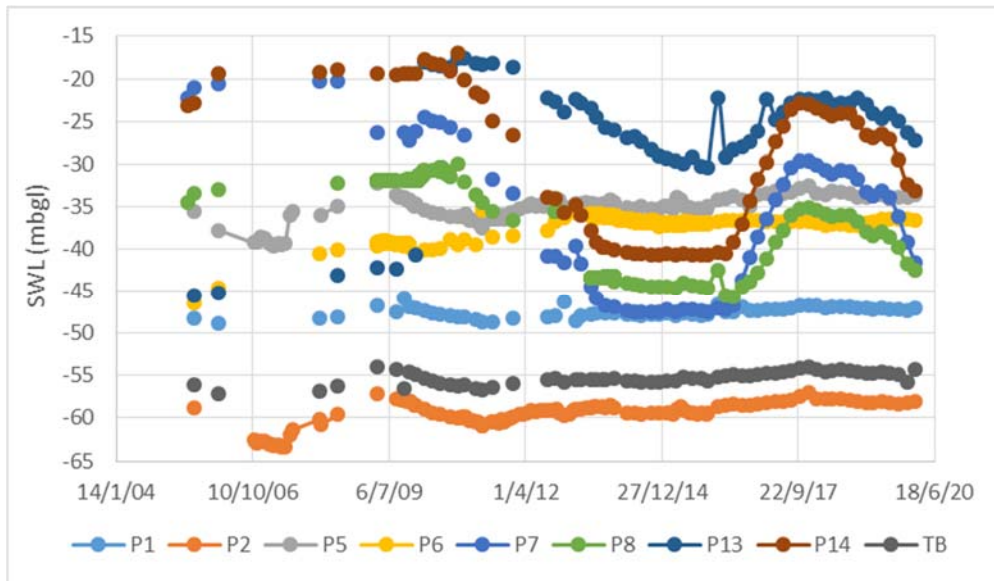
Rixs Creek North & Rixs Creek South

Appendix 2 Rix's Creek Mine Ground Water Sampling Results

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

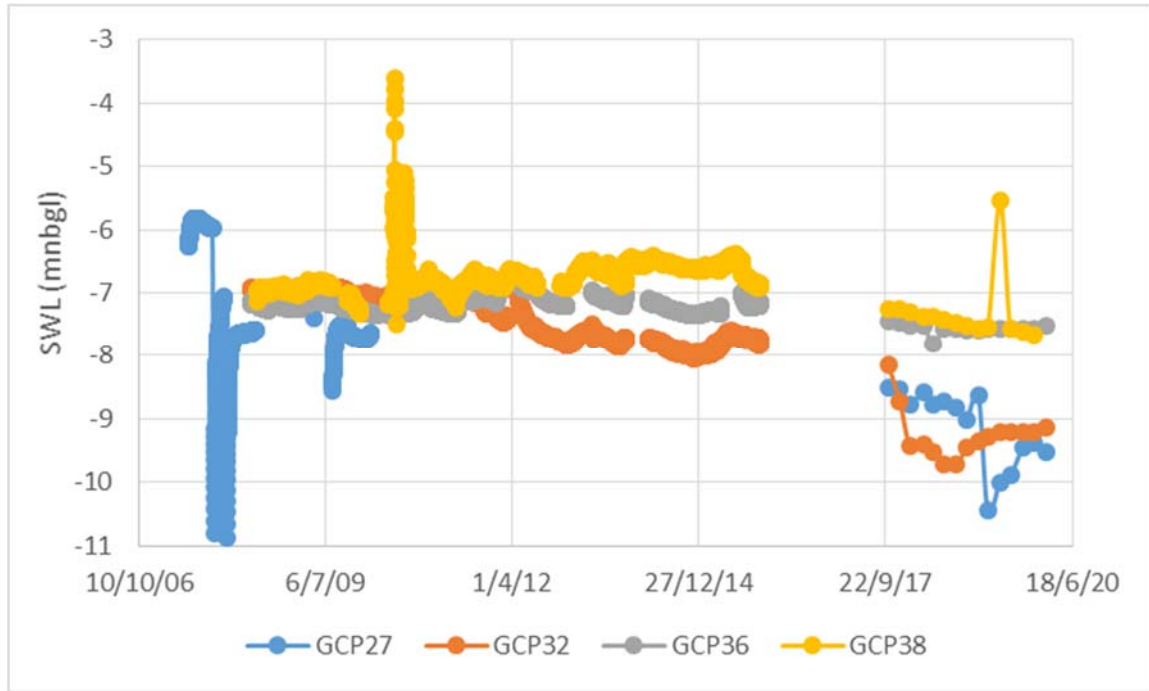
Rixs Creek North & Rixs Creek South

RCN Basement Ground Waters



ANNUAL REVIEW 2019 – RIX'S CREEK MINE

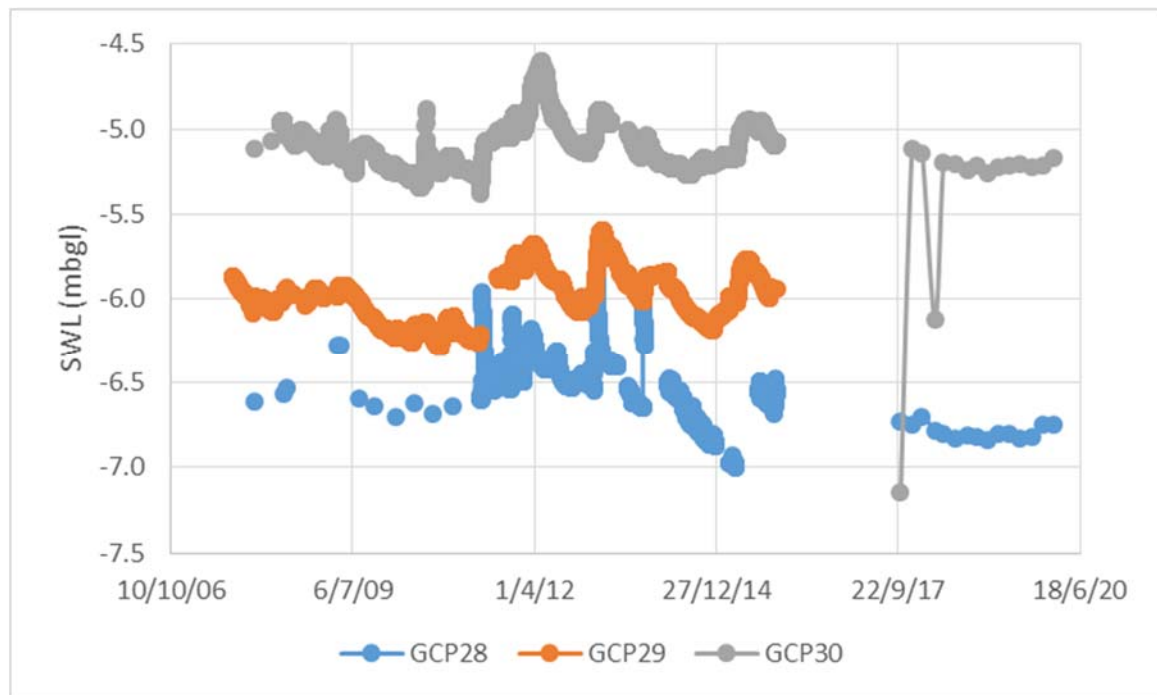
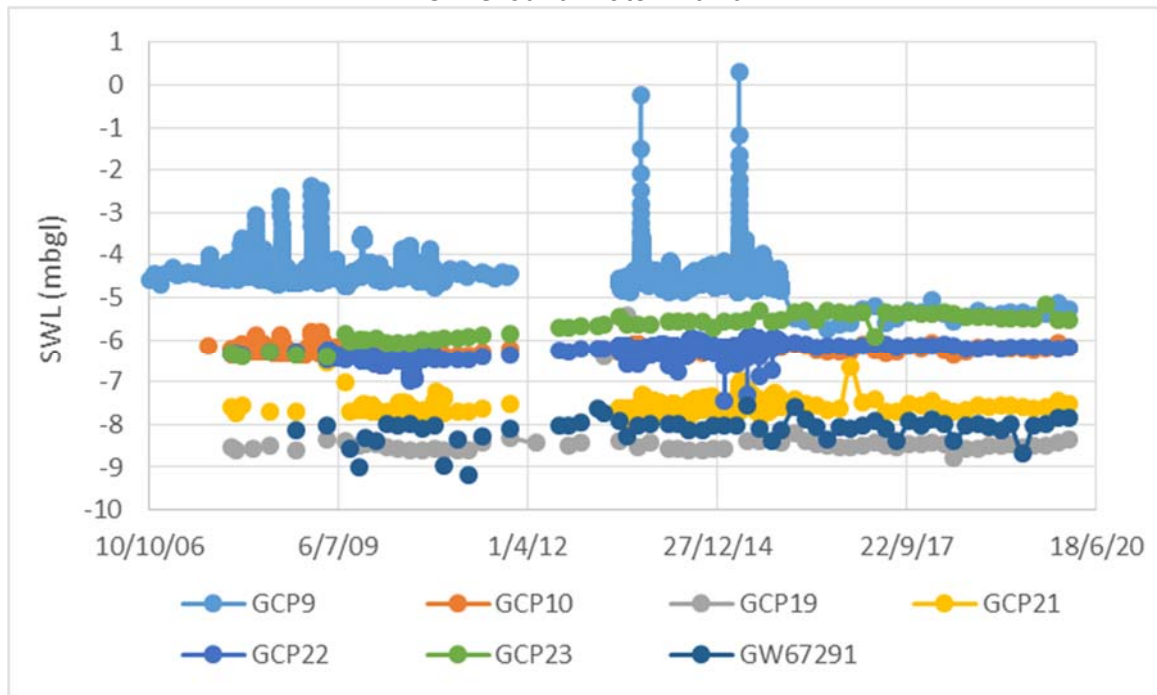
Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2019 – RIX'S CREEK MINE

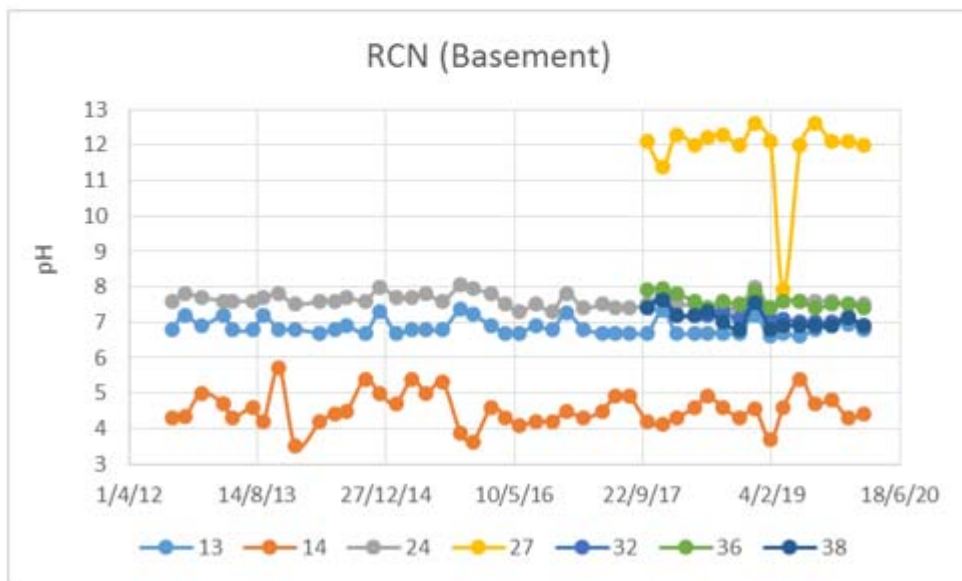
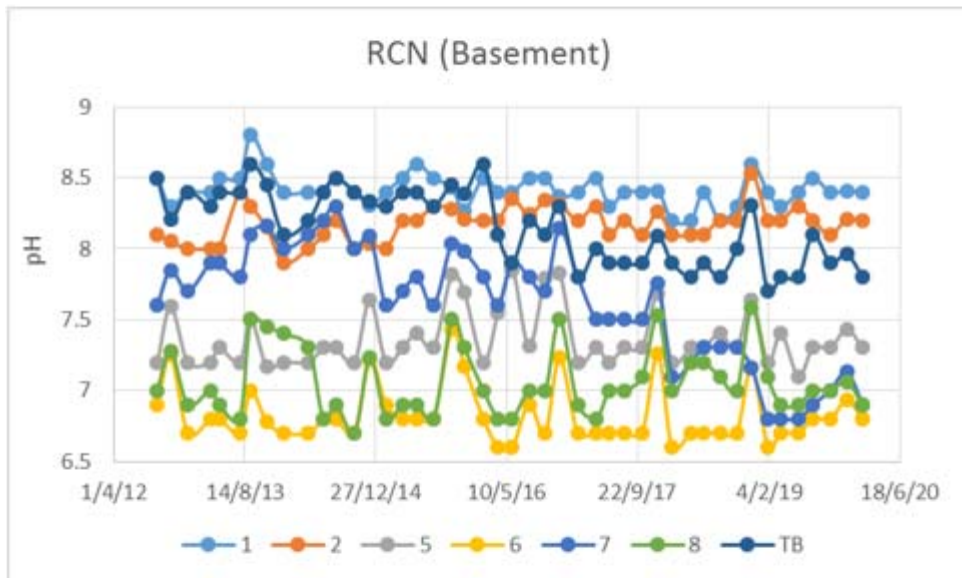
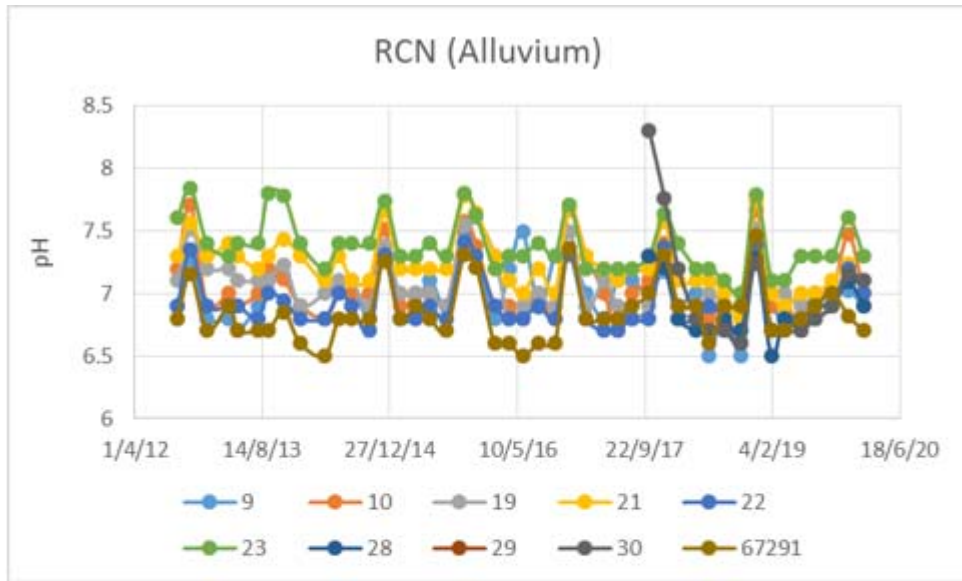
Rixs Creek North & Rixs Creek South

RCN Ground Water Aluvium



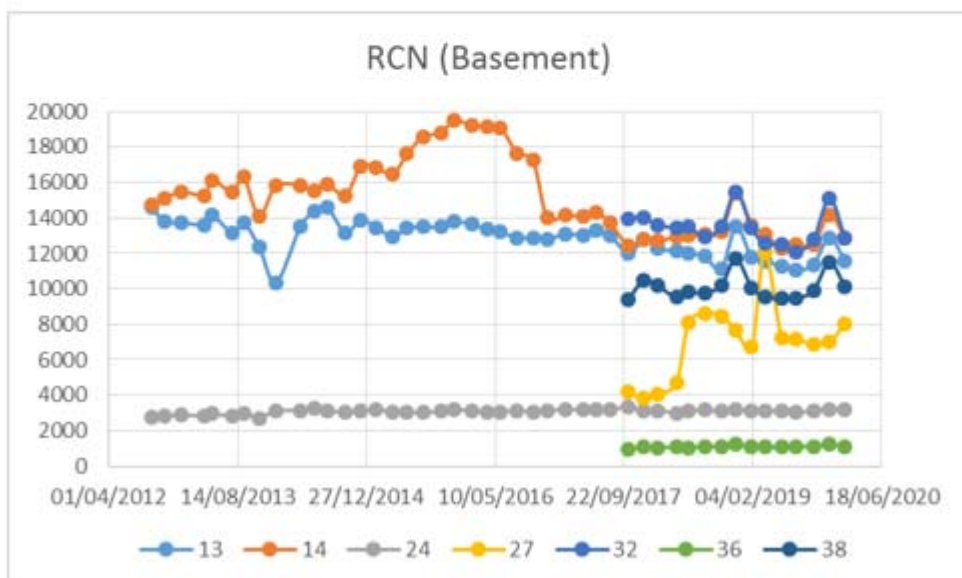
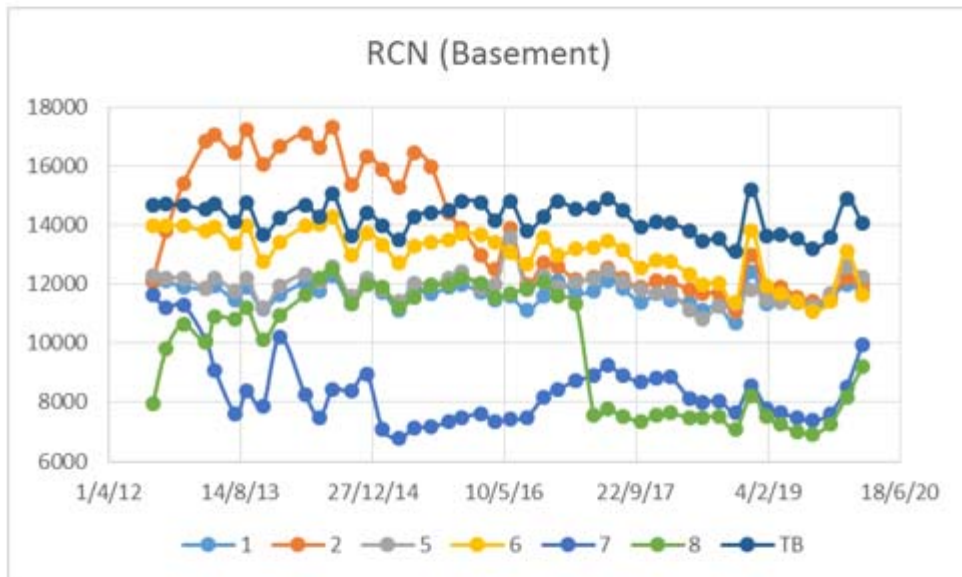
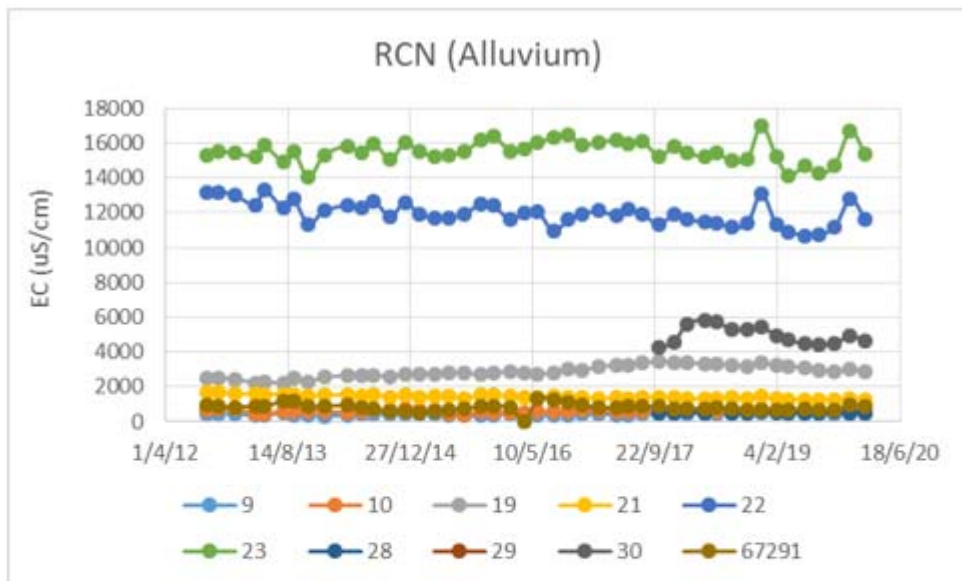
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



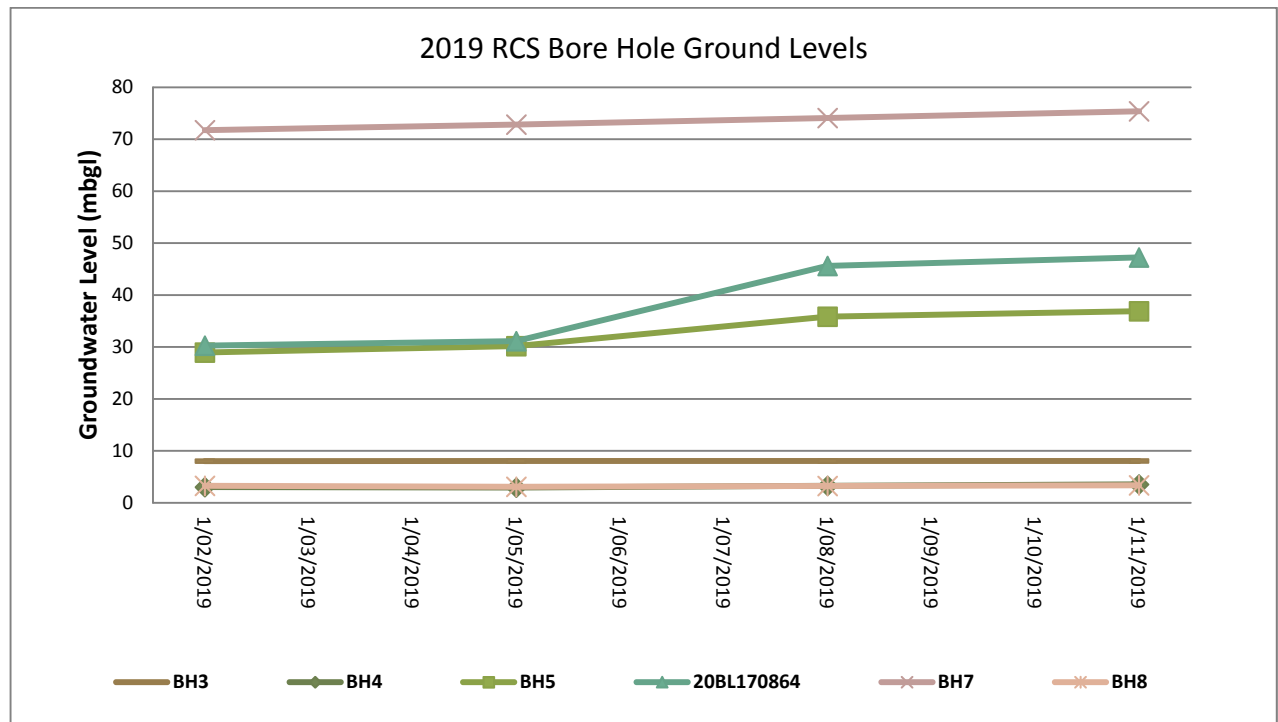
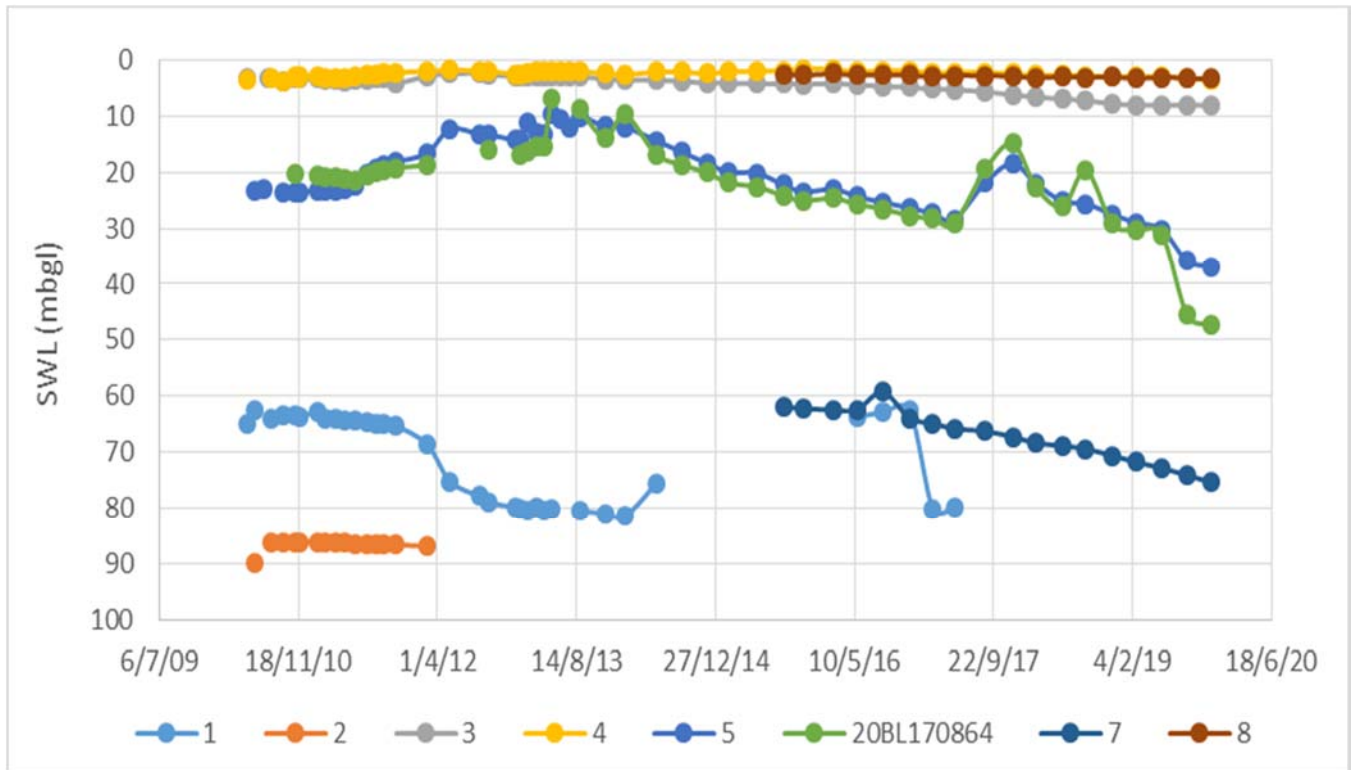
ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

RCS Ground Water Results



Appendix 3 Rix's Creek Mine Community Complaints 2019

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



WE CARE. WE DELIVER.

Rix's Creek Mine Complaints Register 2019

Number	Date Received	Site	Nature of Complaint	Location	How received	Action taken and findings
JANUARY						
1	15/01/2019	RCN	Blast	New England Highway	Rix's Hotline	Action Taken: Blast results reviewed Findings: All blast results found to be below compliance levels.
2	18/01/2019	RCN	Dust	Camberwell Village	Rix's Hotline	Action Taken: External site assessment conducted by Rix's Creek Personnel from the Camberwell Village and the New England Highway. TEOM and UHAQMN data was reviewed and found to show 'good' air quality. A report was prepared and provided to the complainant. Operational changes made RCN: 2 x drills shut down and increased water cart focus at active dig face. Findings: Very hot conditions and low wind speed causing a dusty and hazy environment across the Valley. Rix's Creek not found to be producing excessive visible dust.
3	18/01/2019	RCS	Noise	Rix's Creek	Direct to Mine	Action Taken: Communication to all shifts to ensure awareness of the access restrictions in place for use of the Turkey's Nest water fill point. Additionally, safety cones used to barricade the Turkey's Nest Fill Point from 6:30pm – 6:20am. Findings: Effective communication
FEBRUARY						
No complaints received						
MARCH						

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Rixs Creek North & Rixs Creek South

4	04/03/2019	RCN	Blast	New England Highway	Rix's Hotline	Action Taken: Blast results reviewed Findings: All blast results found to be below compliance levels.
APRIL						
5	18/04/2019	RCN	Dust	Wattle Ponds	Rix's Hotline	Action Taken: Dust inspection conducted by OCE's with watercarts already in the area watering active haul roads. Findings: Inspection post complaint identified no excessive dust from operations.
MAY						
<i>No complaints received</i>						
JUNE						
6	20/06/2019	RCN	Noise	Camberwell Village	Rix's Hotline	Action Taken: SentineX Repository remote noise monitoring data reviewed. Findings: Mine noise levels determined to be below compliance levels.
7	20/06/2019	RCN	Noise	Camberwell Village	Rix's Hotline	Action Taken: SentineX Repository remote noise monitoring data reviewed. Findings: Mine noise levels determined to be below compliance levels.
JULY						
<i>No complaints received</i>						
AUGUST						
8	18/08/2019	RCS	Noise	Maison Dieu	Direct to Mine	Action Taken: TARP activated. Rix's Creek Compliance Personnel conducted attended noise monitoring nearby complainants residence. Findings: Rix's Creek Mine noise found to be minimal and well below approved operational compliance levels. It was noted that a large and brief storm event was developing at time of complaint, potentially causing anomaly meteorological/ inversion conditions.

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

SEPTEMBER

9	2/09/2019	RCS	Noise	Maison Dieu	Rix's Hotline	<p>Action Taken: TARP Activated. Attended noise monitoring was conducted nearby the complainant's residence as per TARP. Monitoring personnel informed RCS OCE of the monitoring results and changes were made to the operation as necessary – equipment shut down. Follow up attended noise monitoring proved that the operational changes made were effective and operational compliance was achieved.</p> <p>Findings: During this night Rix's Creek Mine Noise TARP was activated and changes were made to the operation as necessary. Changes made to the operation included reducing truck speed, dozers locking in low gear, excavators lowering first pass, stopping mining operations. Rix's Creek Mine was made operational changes during the night of this complaint to maintain compliance with approved operational noise limits.</p>
10	20/09/2019	RCS	Noise	Maison Dieu	Direct to Mine	<p>Action Taken: TARP Activated. Attended noise monitoring was conducted nearby the complainant's residence as per TARP. Monitoring personnel informed RCS OCE of the monitoring results and changes were made to the operation as necessary – equipment shut down. Follow up attended noise monitoring proved that the operational changes made were effective and operational compliance was maintained.</p> <p>Findings: Attended noise monitoring confirmed that the complainants concerns about elevated mine noise were justified. Action taken proved effective in ensuring mine noise levels remained below operational compliance levels.</p>
11	24/09/2019	RCS	Lighting	Wattle Ponds	Direct to Mine	<p>Action Taken: RCS and RCN OCE's were notified of the complaint. Rix's Creek Compliance Technician (RP) drove into the vicinity of the complainant's residence and identified the light. RP was able to assist the OCE's in determining which light was causing the issue. On this occasion it was revealed to be a RCS CHPP light. This light was turned off. Follow up action included electricians adjusting the light the following day (25/09/2019) to prevent reoccurrence.</p> <p>Findings: From his off-site vantage point the Rix's Creek Compliance Technician was able to assist the OCE's in determining which operational light was causing the disturbance at the complainants</p>

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

						residence and moreover ensuring that corrective action was taken to resolve the issue as soon as practical.
12	30/09/2019	RCN	Noise, Dust	Camberwell Village	Rix's Hotline	<p>Action Taken: Sentinex Real-time noise monitoring data at Camberwell village monitor was reviewed as well as upstream / downstream Air Quality Data for Camberwell and Singleton NW UHAQMN monitoring stations. No follow up contact possible as complainant did not provide contact details.</p> <p>Findings: No Sentinex noise alarms received in the 24hrs prior to time complaint received.</p> <p>No Air Quality alarms received in the 24hrs prior to time complaint received.</p>
OCTOBER						
13	16/10/2019	RCS	Noise	Gowrie	Direct to Mine	<p>Action Taken: As requested by Complainant, Environment Manager sent an email to the complainant to confirm the complaint had been received.</p> <p>The previous nights attended mine noise monitoring and noise forecast models were reviewed.</p> <p>Complaint was communicated to Rix's Creek shift supervisors.</p> <p>Findings: No mine noise issues identified during the night of 15th-16th October 2019.</p>
14	30/10/2019	RCS	Noise	Gowrie	Direct to Mine	<p>Action Taken: Environment Manager contacted the Open Cut Examiner (OCE) to notify him of the noise complaint from the Maison Dieu area and confirm what equipment was currently operating at the West Pit operations. The OCE noted that the 5500 Excavator was operational, however the 6060 Excavator was not operational.</p> <p>Environmental Advisor completed additional attended noise monitoring at Llanrian Drive and Maison Dieu area from 8:15am to 9am with the Env. Manager in attendance.</p> <p>Rix's Creek operational mining noise was identifiable from the residence however mine noise levels were below compliance levels and therefore Rix's Creek Mine was operating within its noise criteria limits.</p> <p>Findings: Based on the attended monitoring and the noise assessment conducted after the complaint was received, Rix's Creek Mine was operating within its noise criteria limits at the time of the complaint. Noise contribution occurred from other Mining, Industrial and Highway traffic sources. No operational changes were made at the time of the complaint as operations were in accordance with the noise criteria.</p>
NOVEMBER						

ANNUAL REVIEW 2019 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

15	01/11/2019	RCS	Noise	Gowrie	EPA	<p>Action Taken: Environmental Advisor wrote letter (8th Nov 2019) to the NSW EPA Officer. Outlined the actions taken by Rix's Creek Environment personnel and operations staff, Meteorological data, Noise modelling, outlining noise monitoring conducted when original complaint was received on 30/11/2019. Copies of above mentioned data was supplied as appendix to the letter.</p> <p>Findings: Based on the attended monitoring and the noise assessment conducted after the complaint was received, Rix's Creek Mine was operating within its noise criteria limits at the time of the complaint. Noise contribution occurred from other Mining, Industrial and Highway traffic sources. No operational changes were made at the time of the complaint as operations were in accordance with the noise criteria. No further action required.</p>
16	26/11/2019	RCS	Dust	Maison Dieu Rd	Direct to Mine	<p>Action Taken: Environmental Officer attended residence and noted mine lights on. Spoke to OCE and was informed no dumping was taking place at the raised dump level that evening. From previous night's noise monitoring report, noise monitoring was conducted along Maison Dieu Rd with noise being below noise limits.</p> <p>Findings: As per the dust complaint, Rix's Creek was not operating in that area of the pit at the time so dust/noise was not considered an issue on this particular evening. As to noise from the previous evening. Attended Noise monitoring was undertaken at Maison Dieu Rd with all readings under limits. No further action required as operational noise was below noise limits.</p>
DECEMBER						
17	21/12/2019	RCN	Blast	Bridgman Rd	Direct to Mine	<p>Action Taken: Complainant was informed that the blast results were within compliance. Complainant was taken through the blast results, Rix's Creek use of ENVMET model and our blast considerations. The complainant has been supplied with the Bloomfield Complaints phone number, and the EPA number for any possible future occurrence.</p> <p>Findings: All result were within the range of compliance. Rix's Creek to review the blast and its results. No further action to be taken.</p>