

Rix's Creek Mine 2018 Annual Review



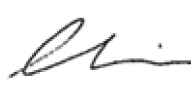
WE CARE. WE DELIVER.



Musk Lorikeet foraging in Angophora floribunda 2018

ANNUAL REVIEW 2018 – 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
MOP / RMP end date Rixs Creek North Rixs Creek South	31/12/2020 15/3/2020
Annual Review start date	1/1/2018
Annual Review end date	31/12/2018
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 1/1/2018 – 31/12/2018 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	29/3/2019

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Rixs Creek North & Rixs Creek South

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Rixs Creek North & Rixs Creek South

List of Abbreviations

AHD	Australian Height Datum
AR	Annual Review
BOA $\text{}$	Biodiversity Offset Areas
bcm	Bank cubic metre
CHPP	Coal Handling and Preparation Plant
CCC	Community Consultative Committee
DA	Development Application
dBL	Noise decibels (linear)
dBA	Noise decibels (A-weighted)
DDG	Depositional Dust Guage
DPE	Department of Planning 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
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 $\text{}$	Management Units
NAG	Noise Assessment Group
NRAR	Natrual 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 $\text{}$ Creek South
RCN	Rixs Creek North
RCM	Rix $\text{}$ 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
S/cm	Micro Siemens per centimetre
g/m ³	Micrograms per cubic metre

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Rixs Creek North & Rixs Creek South

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	YES
ML # CL 357, ML 1630, ML 1648-1651	YES

The non-compliances identified with PA 08_0102 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 19(f)	A cumulative protocol has not been developed in coordination with the nearby mines and included in the blast management plan as required.	Low	Section 6.3.1
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
Schedule 3, Condition 27(c)	A cumulative protocol has not been developed in coordination with the nearby mines and included in the air quality and greenhouse gas management plan as required.	Low	Section 6.4.1
Schedule 3, Condition 27 (d)	At RCN the NW TEOM malfunctioned from the 15/11/2018 to the 19/11/2018 as the TEOM filter was blocked. The SE TEOM didn’t record data on the 12/4/2018 to the 15/4/2018 due to vandalism of TEOM machine. SE TEOM malfunctioned from the 31/10/2018-2/11/2018 due to filter being blocked.	Low	Section 6.4.3 and Section 11.2.
EPL 3391 Cond L3.1	Rix’s Creek North exceeded the noise limit under Condition L3.1 at location NM5, 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).	Low	Section 11.4

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The non-compliances identified with DA49/94 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 2018 AR/ comments
Schedule 2, Condition 6(c)	No formal building maintenance program was implemented to specifically review the maintenance of buildings.	Administrative	To be addressed through the updating of the Landscaping Plan
Schedule 2, Condition 12	Approved blast monitors close to the site did not exceed compliance limits noted in DA 49/94 (Sch. 2, Cond 12), however a high overpressure result was measured at a non-approved (monitor not included in Blast Management Plan) at the Civic Avenue Monitor of 120.8 dB.	Low	Section 11.5
Schedule 2, Condition 16D	<ul style="list-style-type: none"> Sections of the Mine Closure Plan did not include the information required below: <p>objectives and criteria for mine closure for ML 1432 and completion criteria for each domain.</p>	Low	Landscape Management Plan to be submitted for approval June 2019.
Schedule 2, Condition 16(iii)	the 20m buffer zone of Rixs Creek Mine required to be maintained under Development Approval	low	Rixs Creek have buttressed the highwall along WE09 to minimise further movement and to reduce potential impact to Rixs Creek. Rixs Creek Mine will continue to monitor and assess movement along the area. Section 11.1

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Rixs Creek North & Rixs Creek South

SECTION 2 INTRODUCTION

This 2018 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 and Environment and the Resources Regulator (RR), The NSW Office of Environment and Heritage (OEH), the Environment Protection Agency (EPA) and the Natural Resources Access Regulator (NRAR). This reporting period extends from 1 January 2018 to 31 December 2018. This Annual Review has been prepared in accordance with the Post Approval Requirements for State Significant Developments . Annual Review Guideline (DPE 2015).

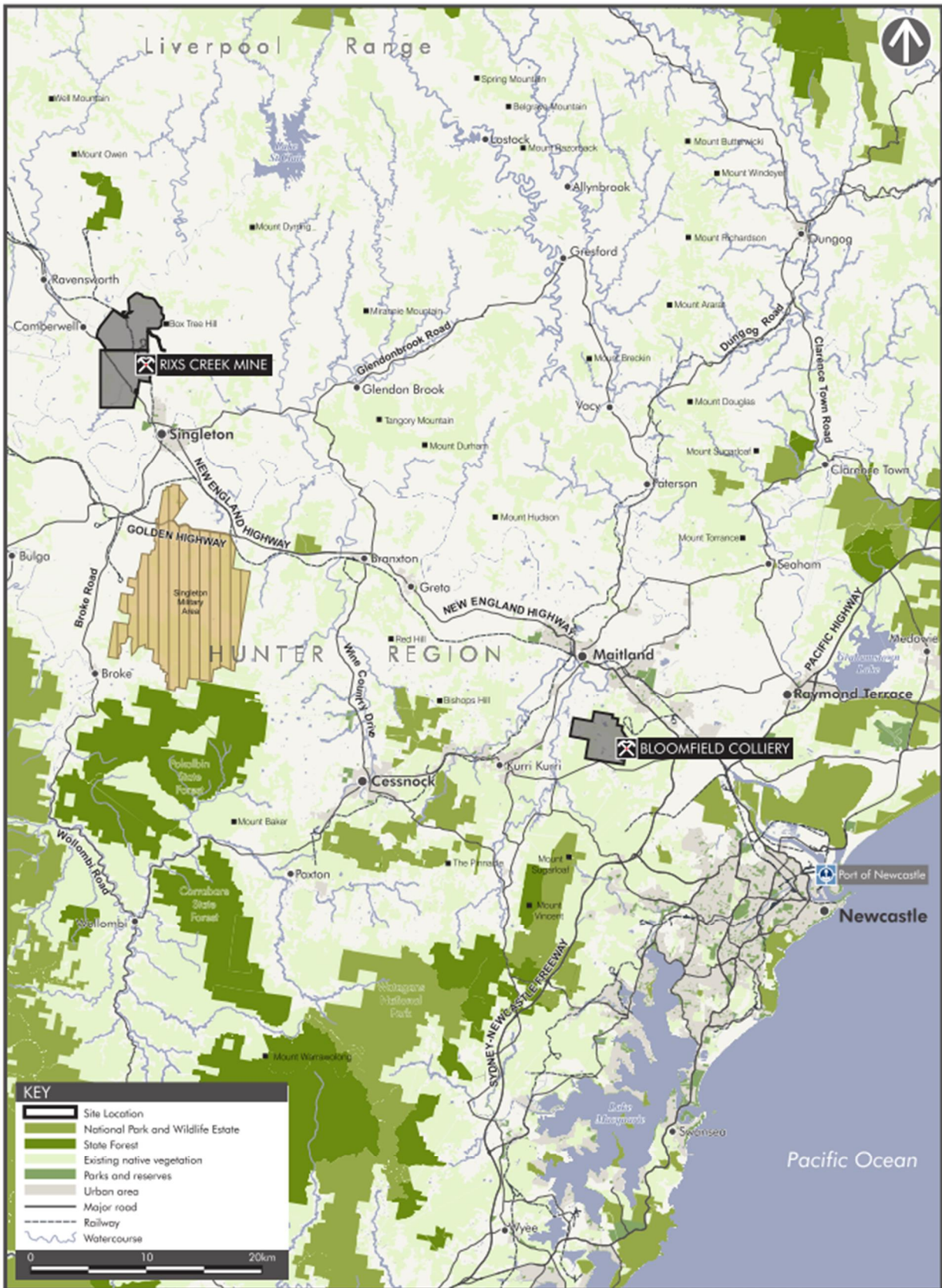
Rixs Creek Mine is wholly owned by Bloomfield Collieries Pty Limited (BCL) an Australian owned family company.

Rixs Creek Mine 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.

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 Rixs 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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Rixs Creek North & Rixs Creek South



BLOOMFIELD COLLIERIES -
CURRENT MINING OPERATIONS - LOCATION PLAN

Figure 1 Regional Context Plan

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Rixs Creek North & Rixs Creek South

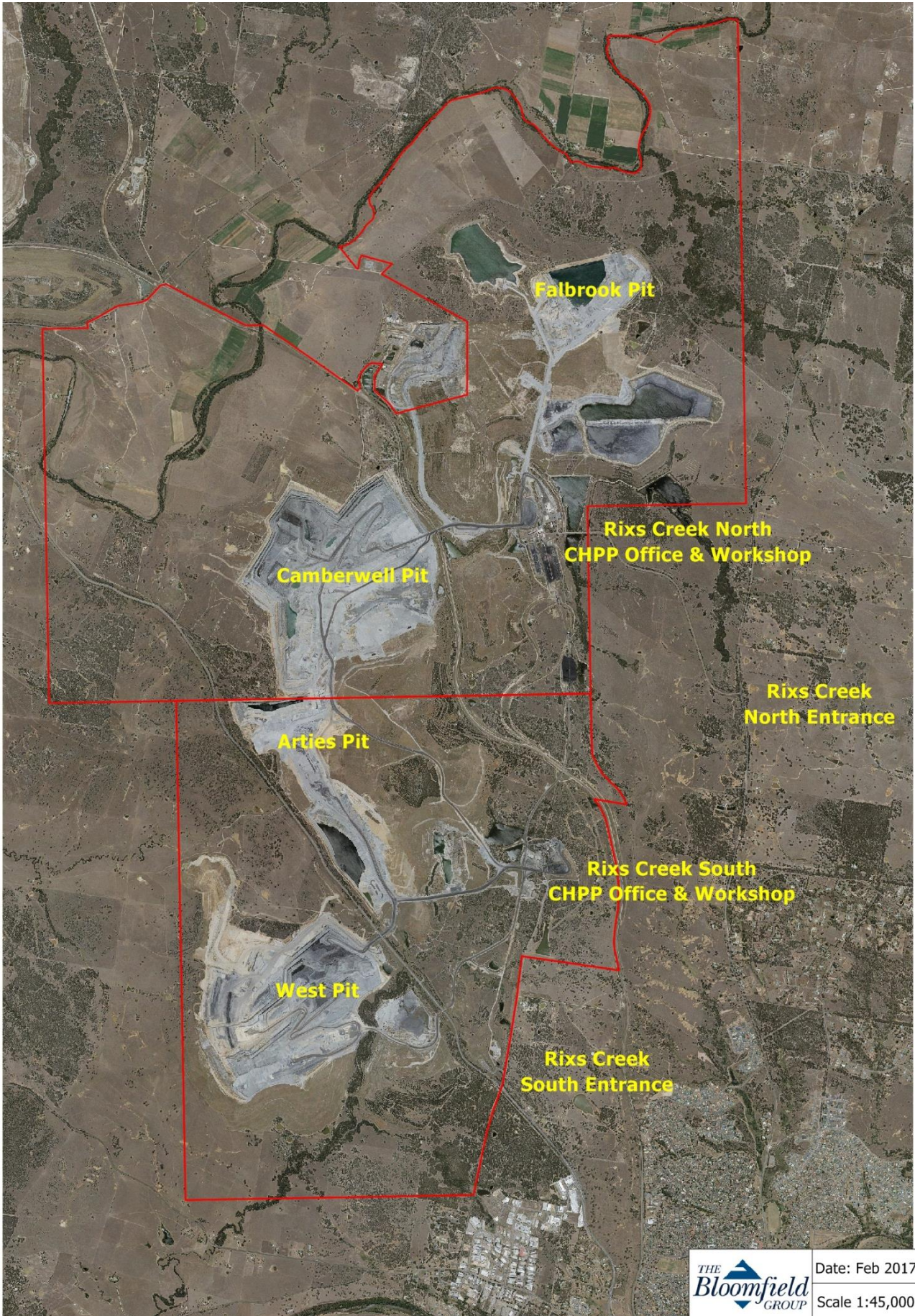


Figure 2 Site Layout and Locality Plan

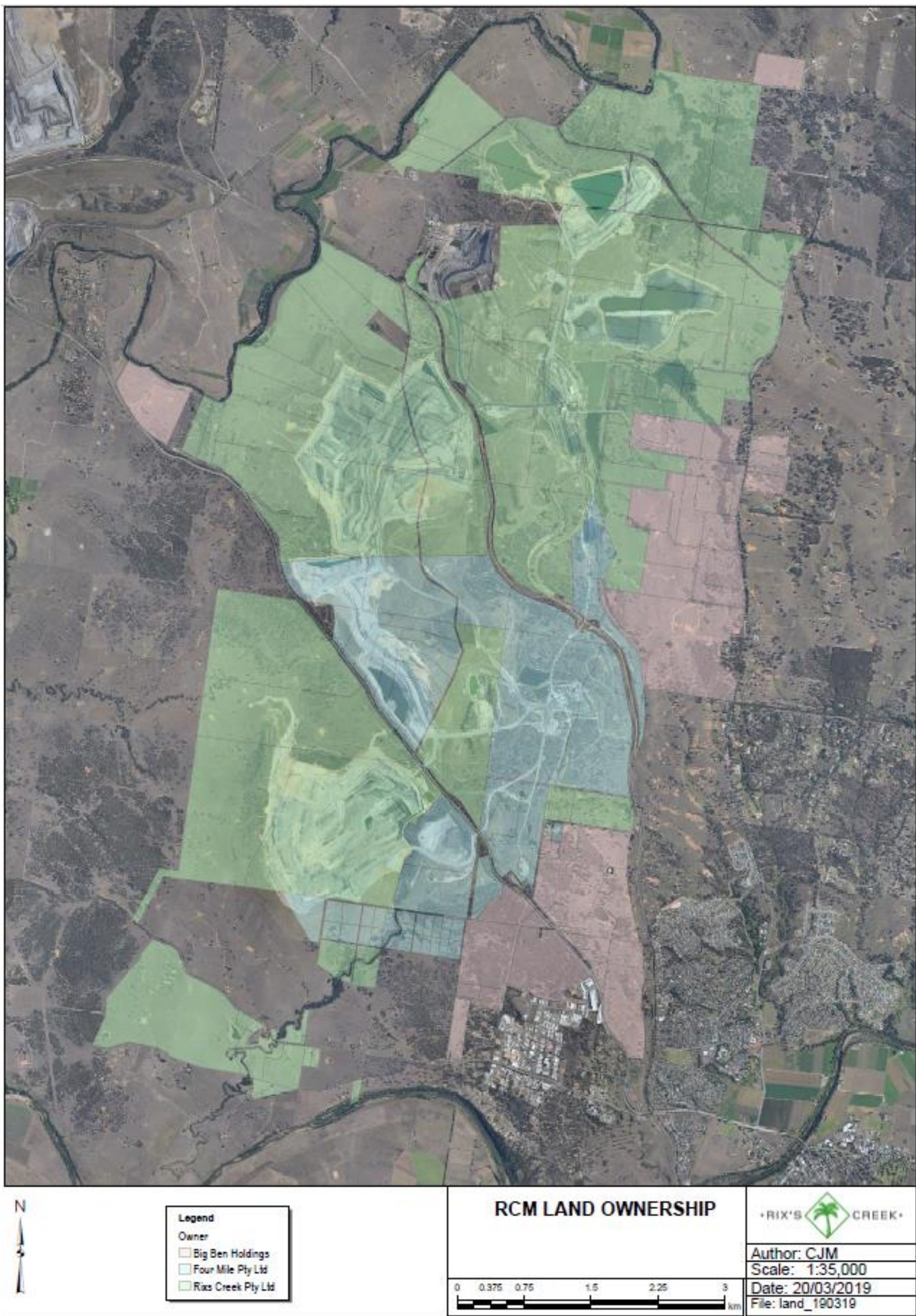


Figure 3 Land Ownership December 2018

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Rixs Creek North & Rixs Creek South

2.2 Mine Contacts

Rixs Creek Pty Limited

Site:-

Rixs Creek Lane
Singleton NSW 2330

Postal Address:-

P O Box 4
EAST MAITLAND
NSW 2323.

Telephone:-

02 65788800

Fax:-

02 65711066

Rixs 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 Rixs 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@rixs.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@rixs.com.au

Rix's Creek Environmental Officer:-

Hannah Lumsden

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

E-mail:- hlumsden@rixs.com.au

Bloomfield / Rixs Creek Website:-

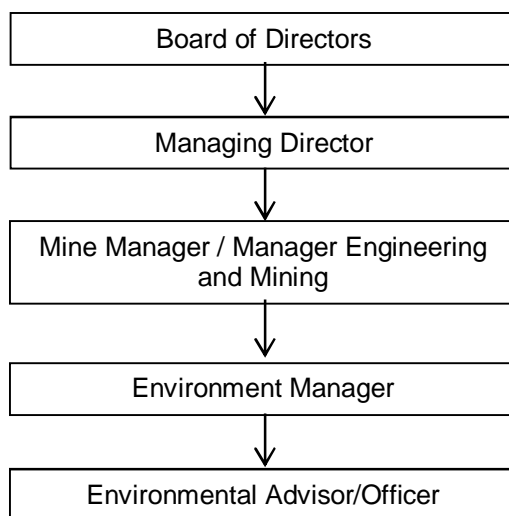
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Rixs Creek North & Rixs Creek South

2.3 Organisational Chart (Environment)

As per *Rix’s Creek Mine Management Structure Register* document:



2.4 Employment Demography

Rix’s Creek currently has 303 employees comprising of staff and operators. This is a significant increase from the 276 employees reported in the 2017 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 (33%), Maitland City Council (25%) and Cessnock City Council (13%). Rix’s Creek mine endeavour to employ local personnel and local contractors are preferentially engaged as required.

Table 4 Demographic Breakdown at Rix’s 2018

Council Area	Employees
Cessnock City Council	40
Dungog Shire Council	6
Lake Macquarie City Council	13
Maitland City Council	77
Mid-Coast Council	4
Muswellbrook Shire Council	16
Newcastle City Council	17
Port Stephens Council	11
Singleton Council	102
Upper Hunter Shire Council	11
TOTAL	303

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SECTION 3 – APPROVALS

A full list of consents, leases and licences held by Rixs Creek Mine is contained in Table 5.

Table 5 RCM Approvals, Leases and Licences.

APPROVAL	ORGANISATION	VALIDITY PERIODS
Project Approval 08_0102 as modified.	Planning NSW	26/11/2010 -31/12/2035
Development Consent DA 49/94	Planning NSW	24/6/2019
Development Consent DA 49/94 Modification 9, as modified	Planning NSW	Approved 1/9/2017
Coal Lease 357	Resources Regulator (RR)	18/06/2013 . 27/03/2032
Coal Lease 382	RR	10/10/2014 (renewed) . 11/11/2033
Coal Lease 352	RR	October 2031
Mining Operations Plan Rixs Creek Northern Operations	RR	1/12/2018 . 31/12/2020
Mining Operations Plan Rixs Creek Southern Operations	RR	15/3/2013 . 15/3/2020
Mining Lease 1437	RR	28/04/1999-27/03/2032
Mining Lease 1518	RR	14/06/2004-27/03/2032
Mining Lease 1630	RR	16/03/2009-13/03/2030
Mining Lease 1648	RR	04/01/2011-04/01/2032
Mining Lease 1649	RR	04/01/2011-04/01/2032
Mining Lease 1650	RR	04/01/2011-04/01/2032
Mining Lease 1651	RR	04/01/2011-04/01/2032
Mining Lease 1725	RR	6/03/2018-11/11/2033
Mining Lease 1432	RR	June 2019
Notification of Dangerous Goods NDG028098	Work Cover	16/12/2019
New England Highway Closure Approval. ROL 521873	RMS	Renewed 6 monthly. Current ROL until 30/6/2019
Licence No 20SL050160	NRAR	Renewed January 2018
Licence No 20SL049786	NRAR	Renewed October 2017
Licence No 20SL060625 Converted to:- Water Access Licence 20AL201498 WAL 11084, Works Approval 20WA201499	NRAR	Renewed June 2017
Licence No 20WA209900	NRAR	Renewed December 2016
Bore Licence 20AL 200940	NRAR	Issued 01/07/2004
Bore Licence 20AL 201041	NRAR	Issued 01/07/2004
Bore Licence 20AL 201231	NRAR	Issued 01/07/2004
Bore Licence 20BL 167917	NRAR	Issued 15/08/2000
Bore Licence 20BL 169571	NRAR	Issued 07/03/2005
Bore Licence 20BL 169513	NRAR	1/7/2016 . 30/6/2026
Bore Licence 20BL 169573	NRAR	Issued 07/03/2005
Bore Licence 20BL 169574	NRAR	Issued 07/03/2005

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APPROVAL	ORGANISATION	VALIDITY PERIODS
Bore Licence 20BL 169628	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 169629	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 169630	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 169631	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 169632	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 169862	NRAR	Issued 26/09/2005
Bore Licence 20BL 169864	NRAR	Issued 26/09/2005
Bore Licence 20BL 171507	NRAR	03/09/2007-Perpetuity
Bore Licence 20BL 171705	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 171707	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 171708	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 171710	NRAR	17/08/2007-Perpetuity
Bore Licence 20BL 171720	NRAR	16/02/2008-Perpetuity
Bore Licence 20BL 171721	NRAR	16/02/2008-Perpetuity
Bore Licence 20BL 171722	NRAR	16/02/2008-Perpetuity
Bore Licence 20BL 171813	NRAR	03/04/2008-Perpetuity
Bore Licence 20BL 171814	NRAR	03/04/2008-Perpetuity
Bore Licence 20BL 172277	NRAR	15/09/2009-Perpetuity
Bore Licence 20BL 172278	NRAR	15/09/2009-Perpetuity
Bore Licence 20BL 172289	NRAR	15/09/2009-Perpetuity
Bore Licence 20BL 009051	NRAR	Issued 20/04/1959
Bore Licence 20BL 012970	NRAR	Issued 10/12/1962
Bore Licence 20WA219698	NRAR	Renewed 28/02/2015
Bore Licence 20BL 171814	NRAR	Issued 03/04/2008
Bore Licence 20AL 200530	NRAR	Issued 01/07/2004
Bore Licence 20AL 200940	NRAR	Issued 01/07/2004
Bore Licence 20AL 201041	NRAR	Issued 01/07/2004
Bore Licence 20AL 201231	NRAR	Issued 01/07/2004
Bore Licence 20CA 200531	NRAR	01/07/2004-25/02/2028
Bore Licence 20CA 201042	NRAR	01/07/2004-30/06/2028
Bore Licence 20CA 201232	NRAR	04/07/2004-30/06/2028
License No. 20BL172457	NRAR	Perpetuity
License No. 20BL172458	NRAR	Perpetuity
License No. 20BL172459	NRAR	Perpetuity
License No. 20BL172460	NRAR	Perpetuity
License No. 20BL172461	NRAR	Perpetuity
License No. 20BL173812	NRAR	Perpetuity
License No. 20BL173733	NRAR	Perpetuity
License No. 20BL173734	NRAR	Perpetuity

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Rixs Creek North & Rixs Creek South

Table 6 Rix’s Creek North Mine Project Approval History

Year	Description	Approval Reference
1990	Original application for open cut mining at Camberwell Coal Mine for the North Open Cut (NOC) and South Open Cut (SOC), development and operation of a coal handling and preparation plant, train loader and associated facilities submitted in 1990.	DA 86/2889 (and subsequently modified) Approved open cut activities were incorporated into the Integra Open Cut Project (MP 08_0102) with DA 86/2889 subsequently surrendered.
2007	Construction of surface facilities at the Complex. This application was submitted in 2006.	Approved under MP 06_0057 in 2007. Approved open cut activities were incorporated into the Integra Open Cut Project (MP 08_0102)
2008	Northern open cut was assessed in the Glennies Creek Open Cut Coal Mine EA prepared by R.W. Corkery & Co. Pty Limited in 2007 (referred to as the NOC EA).	Approved under MP 06_0073 in 2008 (and subsequently modified)
2010	Western extension of the existing SOC (the western mining area) and incorporation of the approved NOC operations. An application and accompanying EA (URS 2009) (Open Cut Project EA) was lodged in 2009. This was supported by the Environmental Assessment titled <i>Integra Open Cut Project</i> , dated June 2009.	The combined project approval (08_0102) was granted in 2010 for the Integra Open Cut Project which incorporated the NOC Project (MP 06_003) and surface Facilities Project (MP 06_0057)
2012	Mod 1 . extension of the NOC out-of-pit emplacement area. This was supported by the <i>Integra Mine Complex Modification 1 Environmental Assessment</i> , prepared by EMGA Mitchell McLennan, dated 2 December 2011	PA 08_0102 MOD 1
2013	Mod 2 . amendment to overland conveyor and extension of timeframes to secure biodiversity offsets. This was supported by the <i>Integra Mine Complex Modification 2 Environmental Assessment</i> , prepared by EMGA Mitchell McLennan, dated September 2012	PA 08_0102 MOD 2
2012	Mod 3 . interim modification to timeframes in project approval.	PA 08_0102 MOD 3
2016	Mod 4 . in relation to altering the approved biodiversity offsets strategy. This was supported by the <i>Integra Mine Complex Modification 4 Environmental Assessment</i> , prepared by EMGA Mitchell McLennan and dated 16 May 2014.	PA 08_0102 MOD 4
2016	Mod 5 . allow ROM coal from Rix’s Creek to be processed at the Rix’s Creek North CHPP. This was supported by the <i>Environmental Assessment for Proposed Modifications to Rix’s Creek DA 49/94 N90/00356 (Mod 7) and Integra Open Cut Project 08_0102 (Mod 5)</i> , prepared by Bloomfield Collieries Pty Ltd, dated 4 February 2016	PA 08_0102 MOD 5

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Rixs Creek North & Rixs Creek South

Year	Description	Approval Reference
2016	Mod 6 . separate the combined Project Approval for the former Integra Mine Complex into two separate approvals for the underground (Glencore) and open cut operations (Bloomfield). This was supported by the <i>Application to Modify Project Approval for Integra Underground Project (MP 08_0101) and Integra Open Cut Project (MP 08_0102)</i> , prepared by HV Coking Coal Pty Limited and Bloomfield Collieries Pty Limited, dated February 2016	PA 08_0102 MOD 6
2017	Mod 7 . allow for overburden and dry tailings from Rixs Creek South Mine to be transported to Rixs Creek North Mine. This was supported by the <i>Environmental Assessment for Proposed Modifications to Rix’s Creek DA 49/94 N90/00356 (Mod 9) and Rix’s Creek North Open Cut Project 08_0102 (Mod 7)</i> . Modification to allow exploration drilling to be conducted in an approved undisturbed area.	PA 08_0102 MOD 7
2019	Mod 8 -Rixs Creek Mine is seeking consent to modify 08_0102 (RCN) to allow for mining to be undertaken within a 7.2 hectare area previously disturbed within the 08_0102, Camberwell South Pit consent area.	Under assessment at time of report

Table 7 Rix’s Creek South Development Consent History

Year	Description	Approval Reference
1995	Coal Mining within CL 352 and on land subject to Coal Lease Application No 17 Singleton, construction and operation of surface coal mine and infrastructure and equipment upgrades. Total mine production capped at 15 million bank cubic metres of material movement.	DA 49/94 . Minister for Urban Affairs and Planning
1999	Mod 1 . Modification to amend applicable potentially affected lands monitoring requirements.	DA 49/94 Modification 1 . Minister for Infrastructure and Planning
2003	Mod 2 . Modification to receive ROM coal from Glennies Creek underground mine, process the coal and transport by rail.	DA 49/94 Modification 2 . Minister for Infrastructure and Planning
2004	Mod 3 . Modification to receive process and transport bulk coal samples from the Bickham exploration project.	DA 49/94 Modification 3 . Minister assisting the Minister for Infrastructure and Planning
2009	Mod 4 . Modification to allow a cut and cover tunnel under the New England Highway.	DA 49/94 Modification 4 . Minister for Planning
2013	Mod 5 . Modification to enable the construction and operation of a rail loop and associated clean coal stockpile and rail loading facility on the Rixs Creek mine site.	DA 49/94 Modification 5 . Minister for Planning and Infrastructure

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Rixs Creek North & Rixs Creek South

Year	Description	Approval Reference
2014	Mod 6 . Modification of the total volume of material that can be moved annually from 15 million bank cubic metres to 16.1 million bank cubic metres.	DA 49/94 Modification 6 . Minister for Planning
2016	Mod 7 . Modification to allow ROM coal from Rixs Creek North (former Integra Open Cut) to be transported to the Rixs Creek CHPP for processing.	DA 49/94 Modification 7- Minister for Planning
2016	Mod 8 . Modification to construct and utilise two temporary ROM stockpile pads.	DA 49/94 Modification 8- Minister for Planning
2017	Mod 9 . up to 5 Million BCM of RCS overburden and 0.5 Million BCM of dried tailings from RCS CHPP per annum to be emplaced within the RCN overburden dumps.	DA 49/94 Modification 9- Minister for Planning
2019	Mod 10 . Rixs Creek have recently submitted a modification to the current Development Consent which seeks an extension in time to allow the continuation of the current operations for an extra 9 months. It is expected during this period the assessment of the Rixs Creek Continuation of Mining Project will be finalised.	Under assessment at time of report

The Company holds Environmental Protection Licence No. 003391 under the Protection of the Environment Operations Act, 1997. The license has also had variations for PRPs (Pollution Reduction Programs) in regard to *Coal Mine Particulate Matter Control Best Practise* as well as a noise assessment in accordance with the document, NSW Industrial Noise Policy (EPA 2000). The prescribed use classification is Coal Industry Works Class 1, and operational scale is more than 500 to 2,000 kilotonnes per annum. On the 18th December 2015 Environmental Protection 003391 was varied to include Rixs Creek Northern operations.

SECTION 4 – OPERATIONS SUMMARY

Table 8 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	11,564,760 BCM	10,402,073 BCM	8,532,250 BCM
ROM Coal / Ore	4.5 Million Tonne per annum (western OC)	1,804,652 t	2,979,572t	1,006,560 t
Coarse reject / Fine reject (Tailings)	N/A	118,964 t*	768,114t*	1,250,000t*
Saleable product	N/A	953,646 t	1,419,730t	478,284 t

* RCN CHPP washed Integra UG Coal with Tailings deposited in Tailings Dam 2.

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Rixs Creek North & Rixs Creek South

Table 9 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	9,266,678 BCM	8,343,078 BCM	9,602,848 BCM
ROM Coal / Ore	N/A	2,013,486 t	1,694,275t	3,257,252 t
Total Material Movement on Site . Overburden + Coal	16.1 Million BCM total material movement as per DA 49/94 Mod 6	10,609,002 BCM	9,472,595 BCM	11,774,349 BCM
Coarse reject / Fine reject (Tailings)	N/A	1,938,869 t *	2,740,806t*	2,287,872bcm*
Saleable product	N/A	999,519 t	656,991t	1,487,518 t

*Combined tailings from RCN and RCS Open Cut operations deposited at RCS emplacement Areas

During 2018, the Rix’s Creek North CHPP washed Glencores 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 of within the Rix’s Creek North open cut area.

Coal that was extracted from both the Rix’s Creek North and Rix’s Creek Southern 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.

Rix’s Creek South DA49/94 operated significantly below its maximum total material movement of 16.1Million BCM during 2018. 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.

Table 10 Rix’s Creek North Production

YEAR	ROM COAL PRODUCTION (tonnes)	OVERBURDEN REMOVAL (bank cubic metres)	APPROVAL LIMIT ROM Coal (Tonnes)
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*

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

Table 11 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		15,000,000
1998	1,800,000	7,052,000		15,000,000

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1999	1,888,900	7,635,000		15,000,000
2000	2,288,900	7,635,000		15,000,000
2001	1,679,400	7,460,000		15,000,000
2002	1,754,001	7,787,685		15,000,000
2003	1,943,095	8,768,068		15,000,000
2004	1,931,383	8,511,771		15,000,000
2005	1,628,753	9,567,000		15,000,000
2006	2,015,042	11,547,989		15,000,000
2007	2,096,320	11,150,416		15,000,000
2008	2,096,697	11,020,152		15,000,000
2009	2,338,424	10,698,123		15,000,000
2010	2,367,229	10,267,881		15,000,000
2011	2,212,703	10,589,386		15,000,000
2012	2,689,935	10,341,895		15,000,000
2013	2,747,880	11,502,321		15,000,000
2014	2,760,693	13,234,085		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

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

The tailings at Rixs 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.

The solid-bowl centrifuge system located at the RCS CHPP enables a lower amount of tailings to be transported by pipeline as the water removed during the tailings drying process allows for co-disposal of the dried tailings 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 tailings 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 Rixs Creek Norths 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 Rixs Creek North.

4.1 Exploration

Exploration drilling was conducted in 2018 at RCM with exploration holes being drilled to better determine the mining resources within the approved area.

The proposed drilling consisted of both open holes and cored holes. Some of the holes were relatively shallow boreholes to help delineate the seam subcrops, while the remaining boreholes were deeper through more of the coal measures. Above ground sumps were used where possible and the

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boreholes were positioned to minimise any disturbance to gain access to the proposed borehole location.

On completion, the exploration activity at each borehole location was rehabilitated. The aim of the rehabilitation is to return the area disturbed by exploration activities to a condition that is safe and stable and that allows the current land use. The rehabilitation of each borehole location included backfilling any sumps and sealing the borehole. The overall completion date for the drilling was the 5/11/2018.

4.2 Land Preparation

No land preparation or pre-stripping ahead of the existing open cut mining operations was carried during 2018.

4.3 Construction

Rixs Creek South Coal Handling Preparation Plant (CHPP) was upgraded with an additional 3 Solid Bowl Centrifuges for tailings disposal being constructed and commissioned during the reporting period. Solid Bowl Centrifuges (SBCs) are used to dewater the tailings sufficiently to allow it to be transported by truck. The cake consists of approximately 30% moisture (w/w) and is discharged from the SBCs onto a conveyor where it is stockpiled for haulage. This infrastructure was constructed within the existing disturbance footprint of the RCS CHPP area. The upgrade of the SBCs ensures that Rixs Creek Mine moves away from depositing fine tailings into tailings emplacement areas, with the drier tailings material being dumped in overburden areas at Rixs Creek Mine.

Construction of the RCS CHPP acoustic wall is planned to commence during 2019.

4.4 Mining

Rixs Creek Mine, which includes both Southern and Northern operations operated three shifts a day, 15 shifts a week for 48 weeks during 2018. 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 Rixs Creek Northern operations. The Liebherr R9800 excavator (EX9800) continued to operate at Rixs Creek North. The two Hitachi 3600 excavators continued operation in the Camberwell Pit. The Caterpillar 6060 (EX6060) was relocated from Camberwell Pit operations to Rixs Creek South West Pit in April 2018.

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

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 2018 the main operation areas includes mining of the Rixs Creek North Camberwell Pit. Rixs 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 12 is a list and number of the major pieces of equipment utilised on site for the mining operation.

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Table 12 Equipment List 2018

Equipment List 2017	
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
Caterpillar 777 Water Cart (80,000 l)	3
ACCO Water Cart (10,000 l)	1

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4.6 Waste Management

In 2018 the RCS CHPP underwent significant structural upgrades, plant replacement, a large general clean up program and the installation of two additional 1m SCB cylinders. These improvements to the RCS CHPP ensured structural compliance, improved performance and housekeeping, increased SBC capacity and commenced the transition of Rix's Creek mine away from the use of tailings dam facilities. These upgrades largely influenced an increased amount of scrap metal, recycled timber and general waste required to be taken offsite during 2018.

Waste Water: Grey water generated on site consisting of domestic waste water from the bathhouse facility, associated amenity areas and administration areas pass through septic systems approved by the local authorities. RCS: OSSM Approval No: 2820/2002 expiry 30/06/2019. 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 was carried out in 2018, 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 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 2018.

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 13 2018 Waste Volumes

Description	2018 Total	2017 Total
Concrete Waste (kg)	43,540	
Liquid Waste	10,838	
Metal Recycling	247,984	373,364
Batteries recycling (kg)	*	2,428
Oil Filters	7,400	20,230
Oily Water	20,000	
Waste Oil (L)	412,470	388,300
Paper and Cardboard (kg)	10,831	15,171
Timber Recucling	7,380	
General Waste (kg)	154,636	134,809
Oily Rags (kg)	1,800	
Hydraulic hoses (kg) and Oil Filters	7,400	20,230
E-waste (kg)	500	641
Fluro recycling(kg)	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 and rear dump trucks (Caterpillar 789 and 793) to the 30,000 tonne capacity run of mine (ROM) stockpile at the coal preparation plant 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.	110,000 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

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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
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 was renewed in June 2012 until 5/7/2019. 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 Rixs Creek mining operation. This has included painting of assorted buildings and substations sheds across site.

Rixs Creek has ownership of the former Vale owned rail loop to transport product coal to the port of Newcastle for export. The rail loading facility and clean coal stockpile is located within the RCN lease area. In 2017 maintenance and access of the rail loop areas was improved and vegetation was removed off the ballast section of the rail loop.

During 2018, planned maintenance work was completed on the Rixs Creek North CHPP for washing of Integra UG ROM coal during 2018.

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SECTION 5 – ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 Actions Required at Previous Annual Review

The Rixs Creek South (DA: 49/94) and Rixs Creek North (PA 08_0102) annual environmental inspection took place on the 18 August 2017 and was undertaken by Resources Regulator (RR). Generally the Annual Review was accepted subject to the following items:

Table 14 Actions Required at Previous Annual Review

Description of Items	Addressed in 2018 AR
<p>1. The Department notes that the justification for the variances between Mining Operations Plan (MOP) forecasted figures and actual figures presented in the 2017 Annual Review has only been provided for rehabilitation. Furthermore, the Department notes that the classification of the rehabilitated areas may require revision following the implementation of Acacia Saligna control measures.</p> <p>The Department requests justification for variances between MOP forecasted and actual figures (including active mining and waste rock emplacement) accompanied by a review of staging of operations as presented in the Environmental Impact Statements (EIS) for Rixs Creek North and Rixs Creek South. The review is to determine whether actual figures are consistent with staging as presented in the Rixs Creek North and South EIS documents and consider potential reclassification of area associated with Acacia Saligna management works and any impact this may have on staging timeframes.</p>	Correspondence sent to the RR on the 3/12/2018
<p>2. Clarification of variances between Figure 26 2017 Rixs Creek Mine Rehabilitation presented in the 2017 Annual Review and Plan 3B Mining and Rehabilitation . 2017 included in the MOP for Rixs Creek North, specifically phases of rehabilitation is required to be submitted to the Department by the 3 November 2018.</p>	Correspondence sent to the RR on the 3/12/2018
<p>3. The Annual Review reports that the majority of the rehabilitation monitoring sites met baseline requirements of 70% groundcover. The Department requested clarification as to whether weed abundance has been considered when assessing groundcover. Please provide additional information by the 3 November.</p>	Correspondence sent to the RR on the 3/12/2018
<p>4. The establishment of additional rehabilitation monitoring sites, as committed to in the MOPs for Rixs Creek North and South is to be reported in future Annual Reviews. Should no additional sites be established during the reporting period, a statement to this effect is to be included.</p>	Section 8
<p>5. Sheet and rill erosion was observed at Tailings Dam 2 (volcano) rehabilitation area and Arties Pit Pin Dump rehabilitation (Plates 2 and 3). Bloomfield are to investigate the cause of sheet and rill erosion, implement remedial actions and report the findings and results of remediation in the 2018 Annual Review.</p>	Section 8.7
<p>6. A number of areas of rehabilitated pasture were observed with large rocks maintained on the surface (outside of fauna refuges) which is generally not consistent with pasture landuse. Bloomfield are to</p>	Section 8.7

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<p>demonstrate the presence of rocks within the pasture landuse are consistent with proposed final landform and completion criteria. If outside of these parameters, undertake remedial action as required. The results of the review including any required remedial action is to be reported in the 2018 Annual Review.</p>	
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The Department of Planning and Environment (DPE) conducted a desk top audit for both the Rixs Creek South and the Rixs 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.

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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, vibration over pressure and noise.

6.1 Meteorological

The RCS and RCN mine operates a meteorological station on the site. The RCS 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. There is also a meteorological station at the RCN mine located near the entry lane / main administration office. This station has real-time capabilities and is accessed via the site Environmental Monitoring system (SCADA network). Both meteorological stations record the following environmental parameters:-

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

In the Rixs Creek South DA 49/94 independent audit it was found that the real time temperature lapse rate (sigma theta) was not calculated at the RCS meteorological station. Rixs Creek Mine uses the Rixs Creek North Met station that calculates the real time temperature lapse rate across Rixs Creek Mine. A new weather station will be installed at RCM which will provide real time inversion stability information which will cover both Rixs Creek North and Rixs Creek South sites.

These parameters are recorded at 10-minute intervals and downloaded on a monthly basis. To complement this, Rixs 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 Rixs 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 507 mm over 64 days, which was 191 mm below average for the year - compared to 2017 where total rainfall was 560 mm and 138 mm above average. The yearly average for Singleton is 698 mm. The monthly rainfall data is provided in Table 15 and Figure 4 shows the results graphically.

February, March October and December were the only months to receive above average rainfall. Prolonged drought conditions were experienced during the reporting period, with the winter season recording only 56.75 mm rainfall, 93.25 mm below average winter rainfall for Singleton which is 150 mm.

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Table 15 Annual Rainfall

RIX’S CREEK ANNUAL RAINFALL 2018													
Month	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Total Rainfall	7.6	79	100.5	40.5	5	41.25	0.5	15	17	64.9	58.25	77.5	507
Average Rainfall	75	72	71	56	46	57	51	42	45	51	58	74	698
Wet days (>0.5 mm rainfall)	4	7	7	7	1	7	1	5	4	7	5	9	64

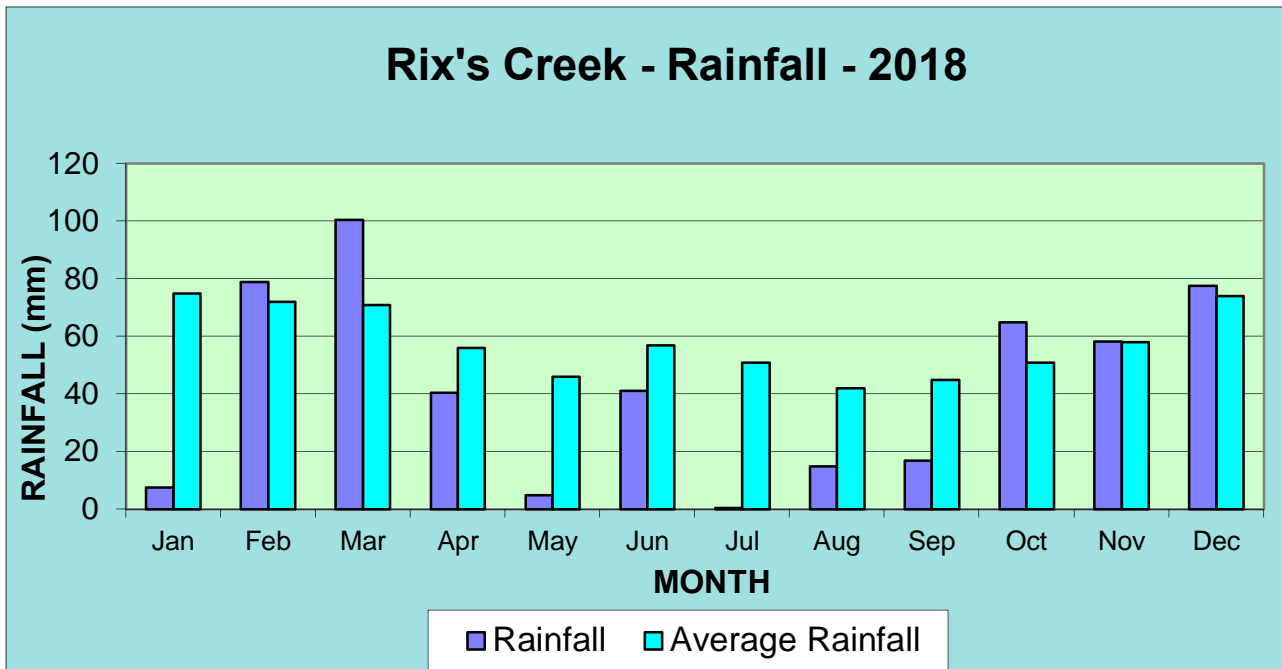


Figure 4 Annual Rainfall 2018

6.1.2 Temperature

The maximum temperature of 41.5°C occurred on 7th January and the minimum temperature of 2.8°C was recorded on 23rd July. 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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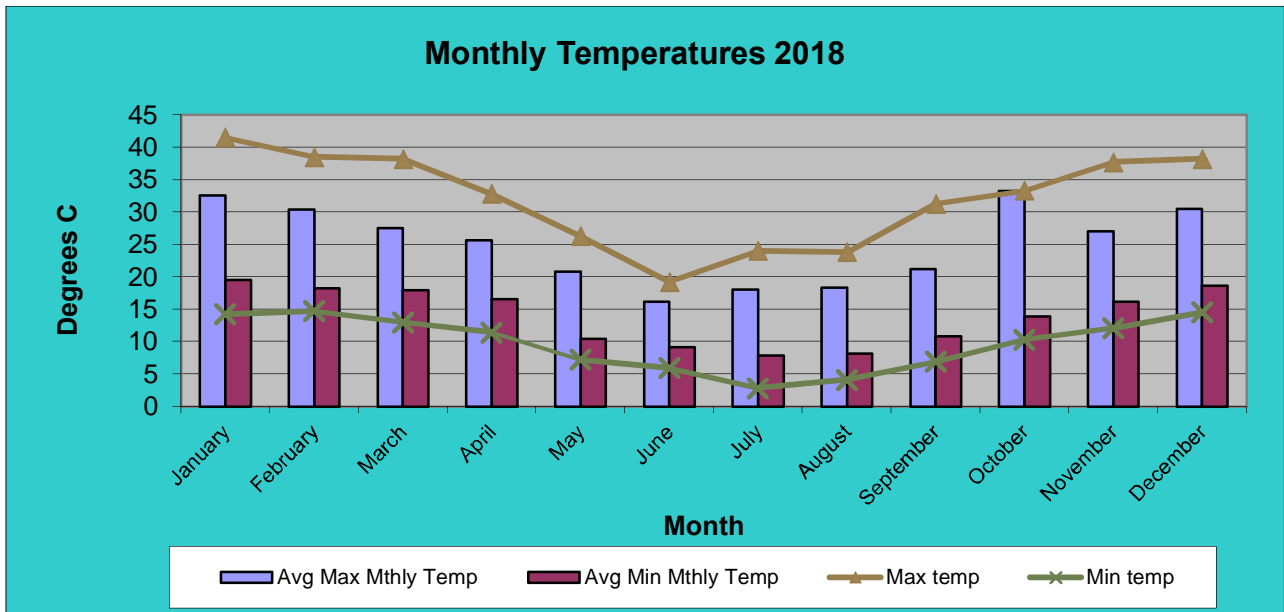


Figure 5 Average Monthly Maximum & Minimum Temperature 2018

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 2018 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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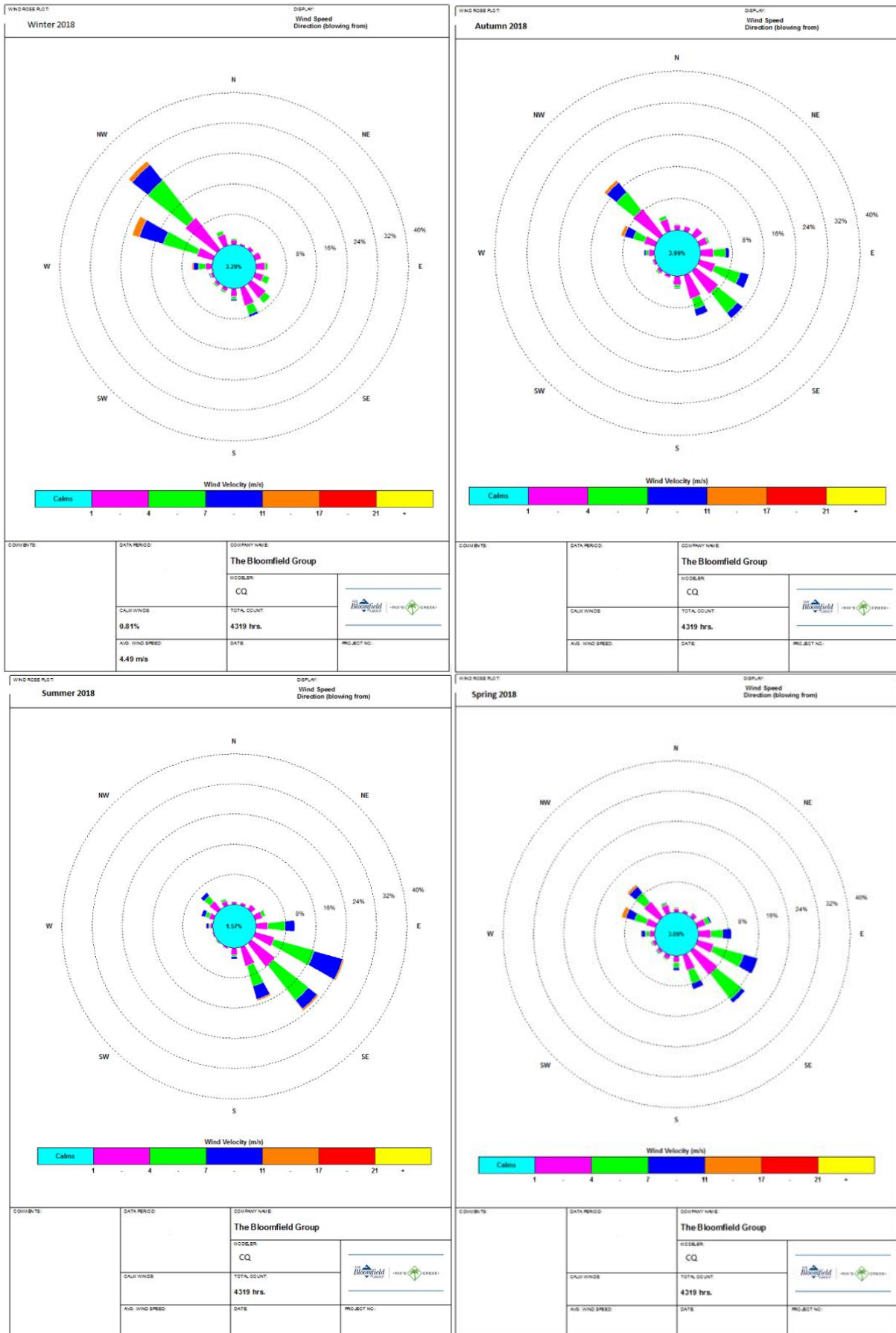


Figure 6 Windrows for Rix's Creek 2018

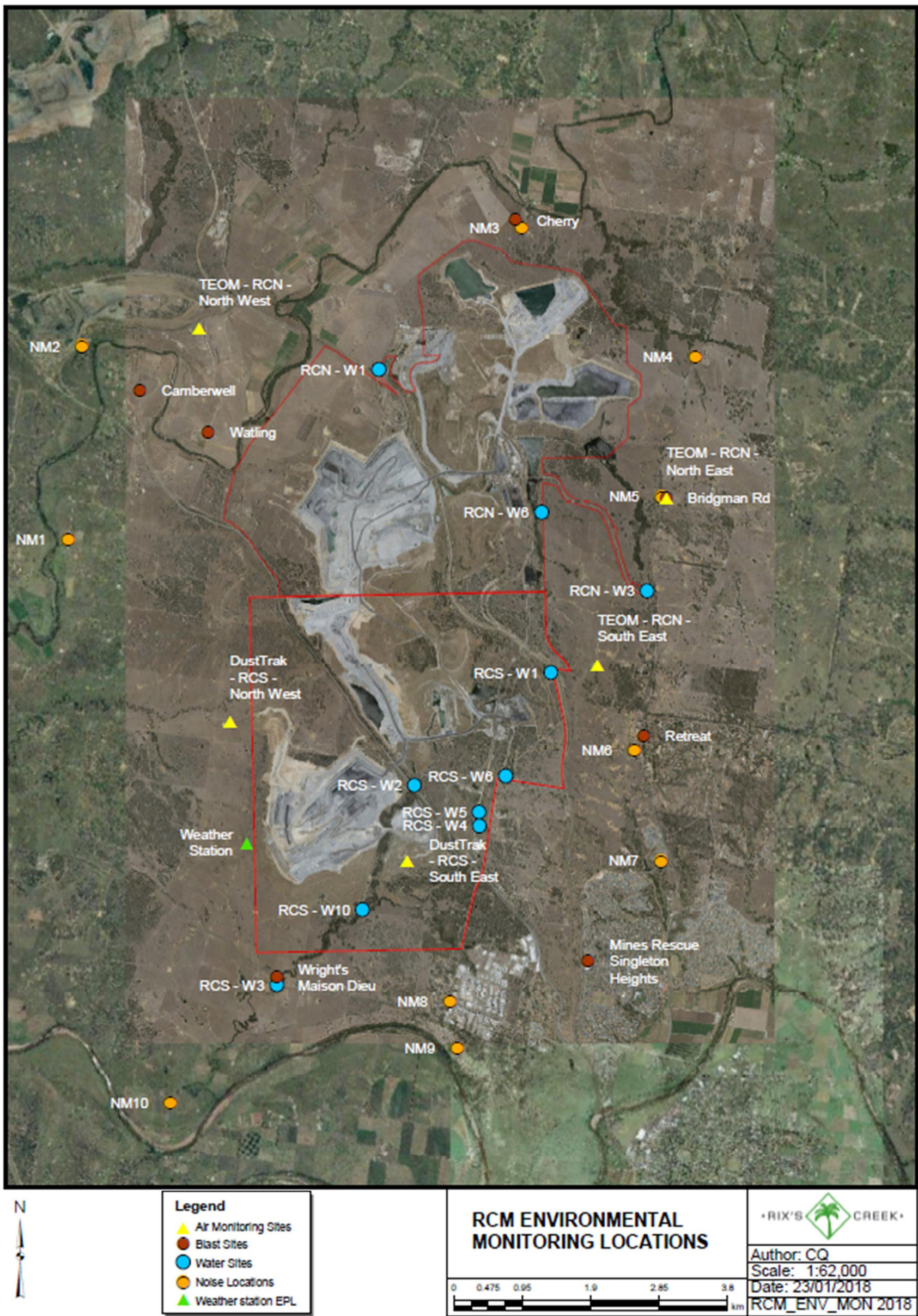


Figure 7 Rix's Creek Mine Compliance Environmental Monitoring Locations

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6.2 Operational Noise

6.2.1 Environmental Management

A variation of EPL 3391 was approved on the 31 August 2017. The variation updated the noise monitoring toward industry best practice of LAeq 15min average for both Rixs Creek Southern and Rixs Creek Northern operations.

The Rixs Creek Mine Noise Management Plan, which includes both Rixs Creek Southern and Rixs Creek Northern mining operations was approved by Department of Planning & Environment on the 19 December 2017. The approved Noise Management Plan included a noise protocol that was developed in consultation with nearby mines and updated in the Noise Management Plan.

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 the Mine 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).

Rixs Creek EPL section states that Rixs 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. Rixs Creek Mine has actively ensured that, as per ARTC's Environmental Protection Licence (EPL no. 3142), the locomotives accessing the Rixs Creek rail spur are approved for use on the ARTC network.

6.2.2 Environmental Performance

The Environmental Protection Authority issued an official caution to RCM in relation to a low frequency exceedance of attended noise compliance monitoring for June 2018. Consequently, weather station upgrades are planned to commence in 2019 to ensure that personnel conducting noise monitoring have the ability to determine when periods of low frequency penalties apply to the operation.

In November 2018 EPA requested information in regard to noise compliance monitoring since January 2018 as they believed that the independent third party noise consultant had not been conducting Rixs Creek's monthly compliance monitoring in accordance with the EPL, specifically that 6 of the EPL sites were not being monitored monthly for compliance as required by the EPL.

In August 2018 RCM requested the relocation of NM06 noise monitoring location under EPL 3391 due to an unnecessary impact on the resident of the property. The EPL 3391 was varied on the 12 March 2019.

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

<http://www.bloomcoll.com.au/Environment/RixsCreek/EnvironmentalReports/tabid/251/Default.aspx>

6.2.3 Incidents and Complaints

As discussed in section 6.2.2 one official caution was issued to RCM from the EPA in relation to a low frequency exceedance of attended noise compliance monitoring for June 2018.

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Thirteen (13) complaints were recorded for noise during 2018, a significant decrease compared to Thirty Four (34) recorded in the 2017 calendar year. Rixs Creek Mine investigate all complaints.

RCM employ an Environmental Technician that conducts noise monitoring during afternoon and night shifts when Rixs 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. All equipment is fitted with broad band reversing alarms to minimise offsite noise impacts. Sound suppression will continue for any new pieces of equipment prior to commencing work/s on-site.

Further noise attenuation work is also anticipated for the CHPP (eastern and southern walls) to minimise noise travelling south-east from this area. This work is dependent on the approval of the Rixs Creek Continuation project.

In 2018, ten (10) Caterpillar 793 Haul Trucks were fitted with sound suppression packages which include sound attenuated mufflers, radiator sound attenuated louvres and engine closures. All 793 Haul Trucks operational at RCM now have sound suppression packages fitted.

During 2014 Rixs 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 Rixs 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 Rixs 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 Rixs 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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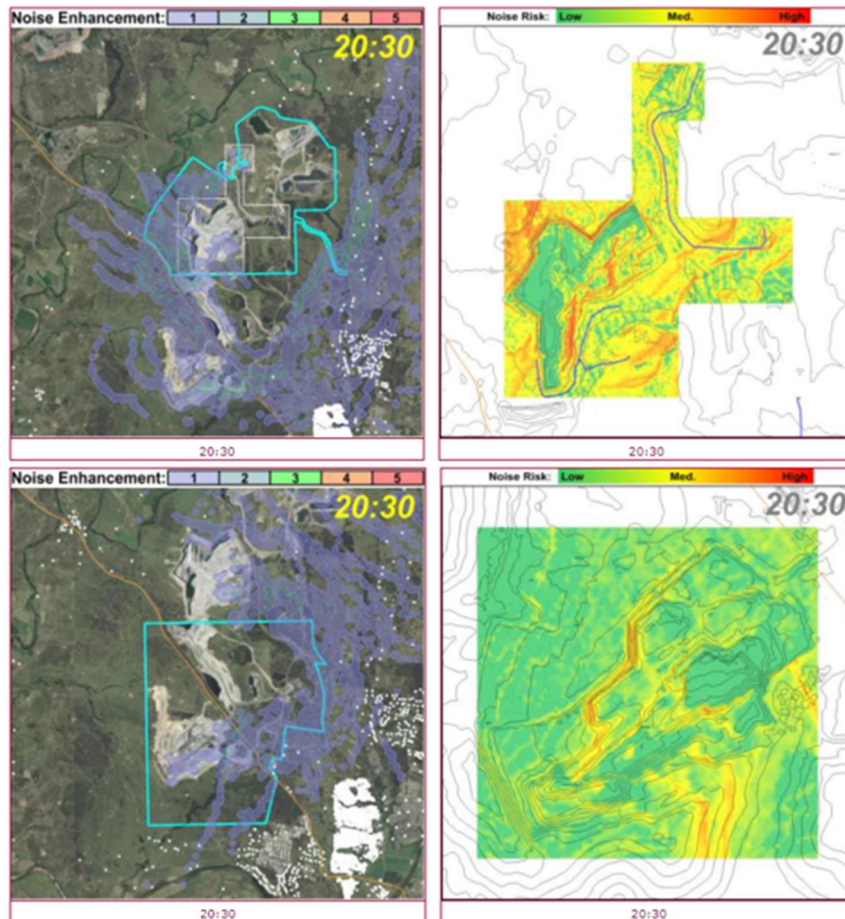


Figure 8 RCS and RCN predictive mine noise forecast models

*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 Rixs 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

Blasting criteria for mining at Rixs Creek is specified in the Development Consent conditions and Environmental Protection License. The conditions state that blasting is to be carried out in accordance with the recommendations of Australian Standard 2187-1993 and in terms of ANZECC Guidelines and to the satisfaction of the EPA.

Blasting is not to be carried out within 500 m of the New England Highway. During the year blasting in the West Pit has taken place within the 500 m 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 695092) . This approval is renewed every six months.

The Rixs Creek Mine Blast Management Plan combines Rixs Creek Southern and Rixs Creek

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Northern operations. A cumulative protocol has been developed in coordination with the nearby mines and included in the approved Blast Management Plan as required.

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 reporting period.

Real-time wind speed and direction information is available to management to be 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 Rixs Creek daily EnvMet and NOx emissions predictive modelling. The NOx modelling shows various predicted outcomes and has continued to provide an integral part of Rixs Blast regime during 2018 and can be seen in Figure 9. The pink dots on the model are the closest residences/receptors that can potentially be impacted via blasting. During 2018 App-Tek OdaLog gas monitors were 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. Rixs 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. Rixs 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. Rixs Creek Mine generally fires within the operator crib window (11:00am . 11:30am) and shift change out (2:00pm . 2:30pm). This blast protocol forms part of the Rixs Creek Mine Blast Management Plan that was approved by DPE on the 19 December 2017.

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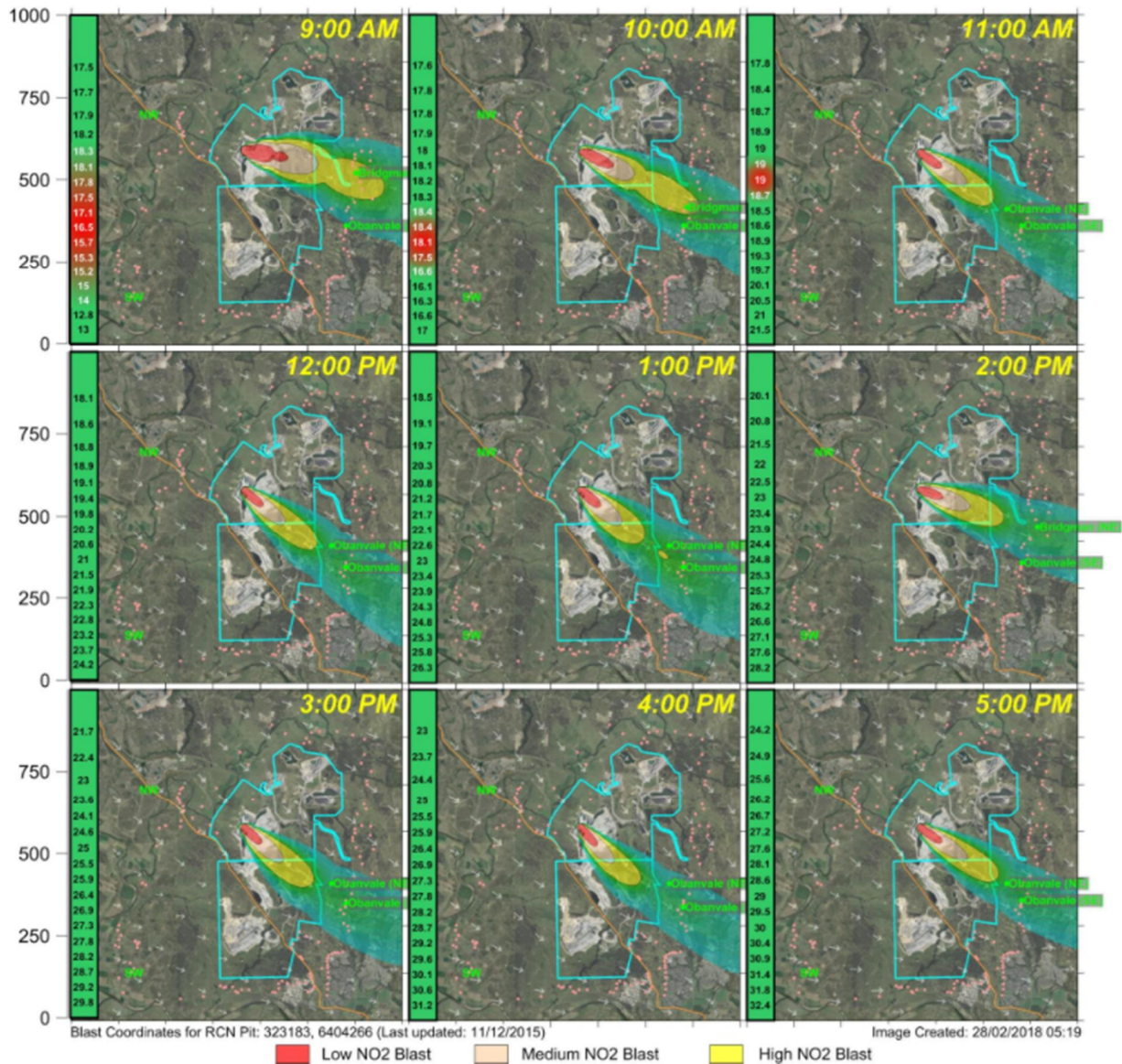


Figure 9 Blast Dust / Fume 'Plume' Model incorporated into the RCN site in 2018.

6.3.2 Environmental Performance

During 2018 a total of 124 production blasts were initiated into overburden. 59 blasts were fired in the Camberwell Pit at Rix's Creek Northern operations and 65 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 2018 are shown on the Bloomfield website:

<http://www.bloomcoll.com.au/Environment/RixsCreek/EnvironmentalReports/tabid/251/Default.aspx>

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Of the 124 blasts the fume ratings recorded were as follows:

Rating		A	B	C
0	79	-	-	-
1	-	29	11	2
2	-	1	2	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-

6.3.3 Incidents and Complaints

Of the 124 blasts, no blasting receptors within EPL 3391 recorded vibration over 5 mm/sec. Two (2) blasts (1.6% of total blasts) did record overpressure above 115 dB_{Linear}.

Wright residence recording 115.1 dB on the 12/07/2018
Watling residence recording 119.6 dB on the 1/03/2018

Rixs Creek Mine remained below the 5% of total blasts exceeding an air blast overpressure of 115 dB_(Linear) over a period of 12 months. Blasts were cancelled and rescheduled due to unfavourable weather conditions, this included rainfall, windspeed, wind direction, dust potential, fume potential and overpressure potential.

Rixs Creek South Mine initiated a blast at 11:10 am on Thursday 12 July 2018. Blast monitors used to determine compliance limits in accordance with DA 49/94 (Sch. 2, Cond 12) and EPL3391 did not exceed the blast criteria, however a high overpressure result, which exceeded the blast criteria limit, was measured at an operational monitor (monitor not included in Blast Management Plan or EPL3391) at the Civic Avenue Monitor of 120.8 dB.

As per DPEs request, Rixs Creek Mine have amended the Blast Management Plan to include the Civic Avenue Blast Monitor as a compliance monitor.

During 2018, five (5) complaints were received in relation to blasting at Rixs Creek Mine. A significant decrease compared to ten (10) complaints received in relation to blasting during the 2017 reporting period.

6.3.4 Further Improvements

The Company is part of the Terrock EnvMet Research Project. This allows access to the 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 undertaking blasting during ideal weather conditions. The models have also been updated to include nearest receptors which are likely to be affected by blasting activities.

Rixs Creek have access to several predictive weather models in which products are selected for 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.

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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 utilised 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 Rixs Creek Mine Air Quality and Greenhouse Gas Management Plan (AQGGMP) was approved by DPE on the 19th December 2017 and addresses dust management practices and the air quality monitoring network at both Rixs Creek South and Rixs Creek North operations. This program involves monitoring air quality for dust particulates.

The air quality assessment criteria are listed in Table 16.

In April 2017 Rixs Creek Mine received from the EPA a Licence Variation Notice 1550914 to EPL3391 Optimisation of Air Quality Monitoring issued under section 58(5) of the *Protection of the Environment Operations Act 1997* to improve the air quality monitoring methodologies utilised. Rixs Creek Mine shifted from the primary use of Hi Volume Air Sampler (HVAS) and Deposition Dust Gauge (DDG) methods of air quality analysis and instead aligning with the EPA requirements for optimised real time air quality monitoring at both upstream and downstream receptors of the Rixs Creek Mine, to determine Rixs Creek Mines cumulative air quality contribution.

TEOM and Dust 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 TEOMs equipped 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	90 g/m ³	Annual average	EPA/DPE/
PM10	50 g/m ³	24 hour maximum (contribution)	EPA/ DPE
	30 g/m ³	Annual average	EPA/ DPE
	50 g/m ³	24 hour average; 5 exceedances permitted a year	National Environment Protection Measure (NEPM)
Depositional Dust	4g/m ² /month	Annual maximum total deposited dust level	EPA/ DPE
	2g/m ² /month	Annual maximum increase in deposited dust level	EPA/ DPE

Dust Deposition Gauges

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

The dust deposition gauges conform to Australian Standard 2724.1- 1984 Ambient Air - Particulate

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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 Rixs 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 Rixs 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 monitors 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 at the office for staff to make informed decisions regarding the prevailing weather conditions when scheduling blasts. This data is available real time from Rixs 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 and which receptors that may be affected by the blast which in turn can alter the timing of the blast being initiated.

Rixs Creek is an active participant of the Upper Hunter Air Quality Monitoring Network. The network consists of Industry and Government. The aim is to establish a network of air quality monitors located throughout the valley from Singleton to Muswellbrook to monitor air quality. There are currently 14 monitoring sites operational. One of the monitoring sites is located between the Rixs Creek mine and Singleton town ship on land owned by the Company. This monitoring site was commissioned in August 2011 and is currently displayed on the OEH website known as Singleton NW and displays wind speed, wind direction and PM10 data on a continuous basis. Rixs Creek has an annual data agreement to access data from this station for a fee.

During 2018 a site-specific dust forecasting tool was used to predict the potential for dust emissions 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-

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down equipment, activate water sprays on stockpiles, where required.

Rixs Creek - PM₁₀ Time Series Forecast For Tuesday 6th Of March 2018

[Print this page](#)

6/03/2018																									
	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)	5.1	5.9	5.3	6.3	6.2	6.2	5.1	6.2	8.7	7.1	7.5	8.1	Wind Speed (m/s)	8.6	8.0	8.5	10.5	7.3	8.2	6.3	4.9	5.2	4.4	4.6	4.4
Wind Direction	SE	SE	SE	SE	SE	SSE	SSE	SSE	SSE	S	SSE	SSE	Wind Direction	SE	SE	ESE	SE	SE	SE	SE	SSE	SSE	SSE	SE	SE
Max 1-hour average PM ₁₀ concentration (µg/m ³)																									
North-West	2	4	5	2	2	10	10	4	1	2	2	1	North-West	1	1	1	2	2	2	1	8	9	4	5	7

7/03/2018													8/03/2018											
	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)	5.4	5.1	4.4	5.0	6.7	7.5	7.8	8.7	8.3	5.2	3.8	3.7	Wind Speed (m/s)	3.4	3.1	2.4	3.9	6.2	6.2	6.6	7.2	7.1	5.0	3.7
Wind Direction	SE	SE	SE	SE	SE	ESE	SE	SE	SE	SE	SE	SE	Wind Direction	SE	SSE	SSE	SSE	SSE	SSE	SE	SE	SE	SE	SSE
Max 2-hour average PM ₁₀ concentration (µg/m ³)																								
North-West	4	9	11	7	2	1	1	1	2	1	10	7	North-West	6	14	16	25	3	1	1	1	1	2	10

Forecast Date: 6 Mar 2018 - 8 Mar 2018

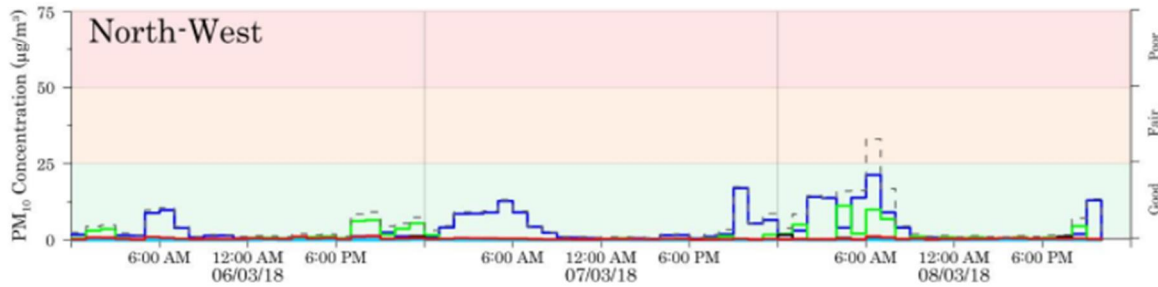


Figure 10 Example of dust forecasting tool to assist operations during 2017

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 2018 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 2018 average of DDG28 was 2.3 g/m²/month while 2018 average of DDG32 was 2.6 g/m²/month.

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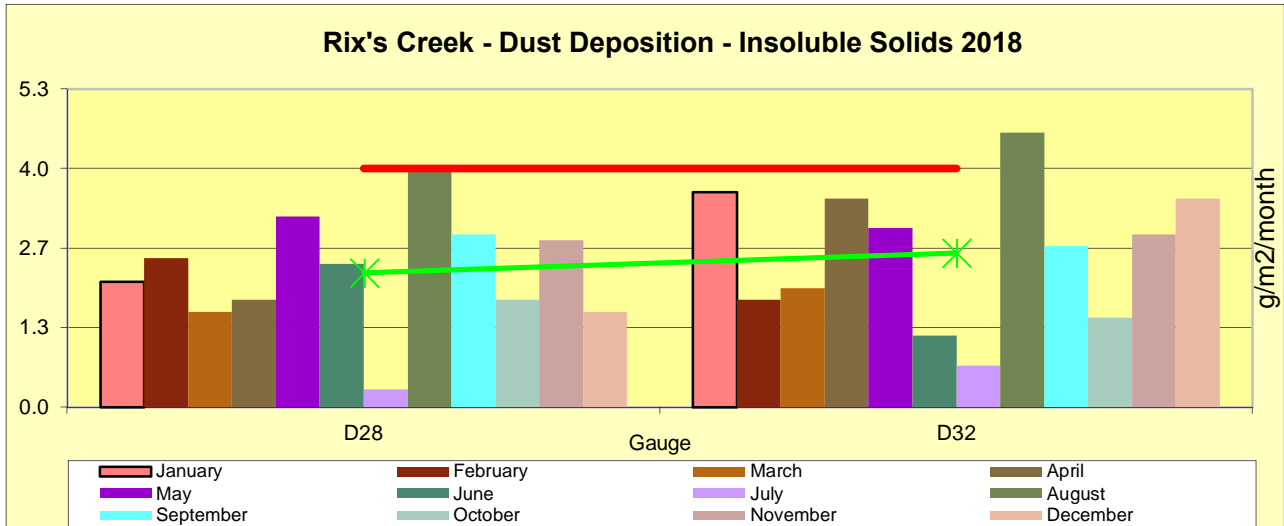


Figure 11 Rix's Creek Insoluble Solids Dust Deposition 2018

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 2018.

In August 2018 DDG32 recorded 4.6 g/m²/month and therefore exceeded the average result of 4 g/m²/month. Also in August 2018, DDG28 recorded 4.0 g/m²/month but did not exceed 4.0 g/m²/month. Location of the depositional dust gauges are referred to in Table 19.

Particulates Less Than 10 Micron

During the 2018 reporting period, the NW RCN TEOM exceeded the 24hour PM10 contribution on 89 occasions, the NE RCN TEOM exceeded the 24 hour PM10 contribution on 12 occasions and the SE RCN TEOM exceeded the 24 hour PM10 contribution on 26 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 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 17. The RCN TEOM recorded elevated monthly average PM10 samples for February (33.4 ug/m³), April (31.8 ug/m³), May (54.1 ug/m³), June (45.2 ug/m³), July (56.0 ug/m³), August (39.0 ug/m³) and November (65.0 ug/m³).

In comparison the SE RCN TEOM (which recorded an annual average of 25.05 ug/m³) recorded monthly averages of 20.6 ug/m³ in February, 24.3 ug/m³ in April, 30.6 ug/m³ in May, 18.4 ug/m³ in June, 36.3 ug/m³ in July, 35.0 ug/m³ in August and 31.3 ug/m³ in November. The NE RCN TEOM recorded 30.2 ug/m³ in July and 30.5 ug/m³ in November and an annual average of 23.1 ug/m³.

April to September period recorded higher monthly averages due to significant and prolonged below average rainfall and elevated NW winds.

When the Rix's Creek North air quality results for 2018 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 (38.46 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.

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This was due to significantly low rainfall over the April to September period, which coincided with elevated regional air quality levels. The South East TEOM and North East TEOM PM10 averages were consistent with 2009 EA predictions for year 6 part pit extent operations.

During the 2018 reporting period both Dust Trak RCS NW and Dust Trak RCS SE recorded average monthly results below 50 ug/m3. The annual average for Dust Trak RCS NW in 2018 was 14.3 ug/m3 and Dust Trak RCS SE recorded an annual average result of 13.7 ug/m3.

The Camberwell Upper Hunter Air Monitoring Network (UHAQMN) monitor recorded an annual average of 31.1 ug/m3 for the 2018 reporting period, an increase from 27.4 ug/m3 recorded for the 2017 reporting period. The Singleton NW Hunter Air Monitoring Network (UHAQMN) monitor recorded an annual average of 26.9 ug/m3 for the 2018 reporting period, an increase from 22.7 ug/m3 recorded for the 2017 reporting period.

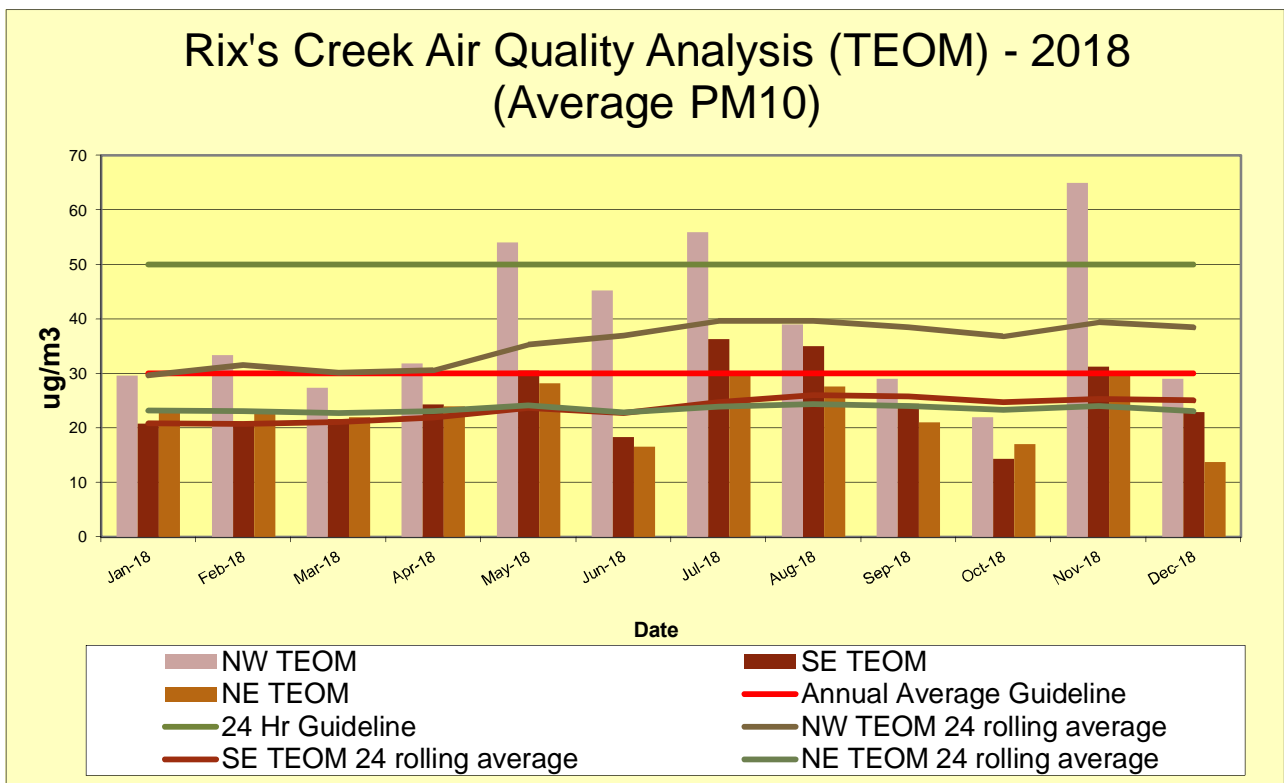


Figure 12 Particulate Matter less than 10 Micron Monthly Average and 12 Month Rolling Averages 2018 - TEOM

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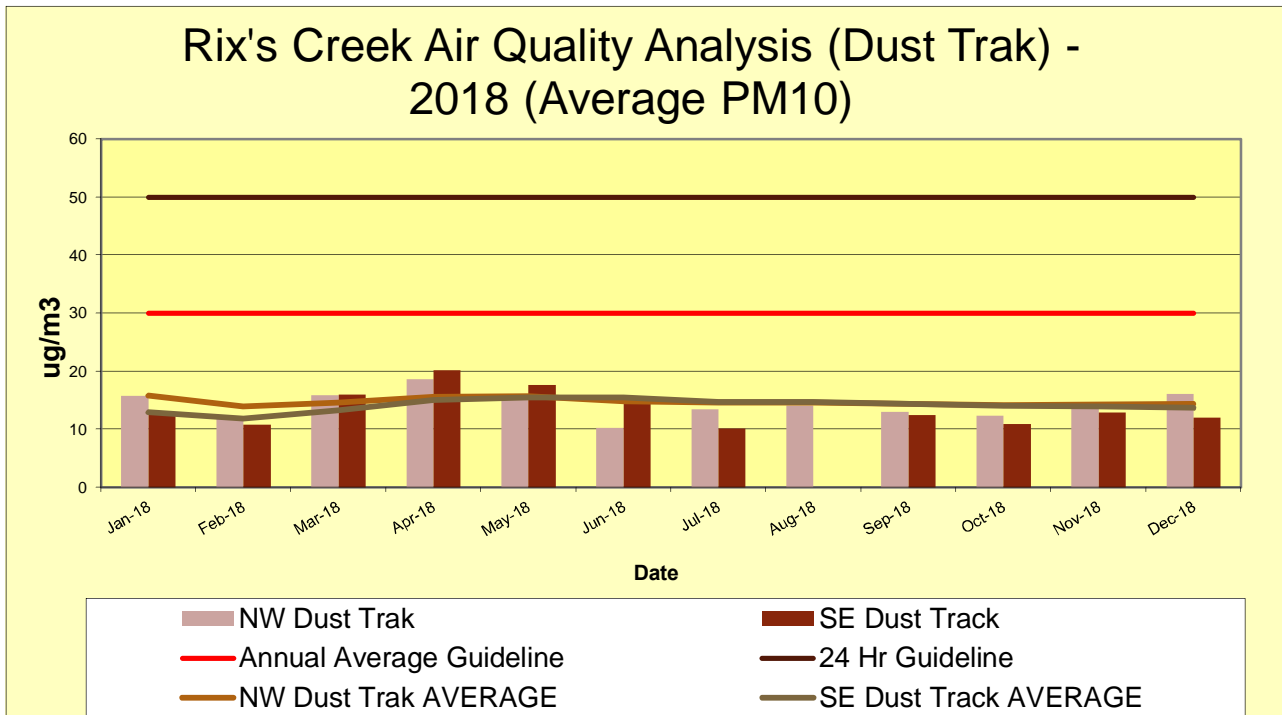


Figure 13 Particulate Matter less than 10 Micron Monthly Average and 12 Month Rolling Averages 2018 – DustTrak

Table 18 Analysis of Air Quality under adverse weather conditions upstream, downstream air quality difference.

Date	RCN NW TEOM 24 hr Av (ug/m3)	RCN SE TEOM 24 hr Av (ug/m3)	Upstream downstream Differential (RCM Contribution)	Predominant Wind Direction	Max Wind Speed (m/s)
11/02/2018	55.0	38.3	-16.7	North Westerly	14.3
12/02/2018	65.5	28.6	-36.9	North Westerly	11.3
14/02/2018	59.7	22.9	-36.8	North Westerly	11.5
15/02/2018	74.6	66.8	-7.8	North Westerly	9
16/02/2018	54.3	52.2	-2.1	North Westerly	12.5
15/03/2018	51.8	33.4	-18.4	North Westerly	10.5
18/03/2018	50.8	40.8	-10	North Westerly	11.5
19/03/2018	80.6	70.3	-10.3	North Westerly	6.8
20/03/2018	52.8	38.3	14.5	South Easterly	11.5
9/04/2018	50.4	18.3	-32.1	North Westerly	12.3
12/04/2018	50.9	48.6*	-2.3	North Westerly	8.3
13/04/2018	58.8	51.1*	-7.6	North Westerly	12.8
15/04/2018	87.0	74.4*	-12.6	North Westerly	15.5
16/04/2018	56.5	17.3	-39.2	North Westerly	10.5
1/05/2018	50.5	56.3	-5.8	North Westerly	5.3
2/05/2018	52.3	23.9	-28.4	North Westerly	3.5
3/05/2018	52.4	30.9	-21.5	North Westerly	5.5
4/05/2018	74.5	53.1	-21.4	North Westerly	12.8
5/05/2018	55.0	30.6	-24.4	North Westerly	6.0

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7/05/2018	51.7	19.7	-32	North Westerly	4.0
8/05/2018	57.5	43.8	-13.7	North Westerly	4.3
9/05/2018	54.8	29.2	-25.6	North Westerly	4.8
10/05/2018	73.0	22.1	-50.9	North Westerly	11.8
11/05/2018	71.2	44.6	-26.6	North Westerly	14.8
12/05/2018	59.1	28.9	-30.2	North Westerly	14.5
15/05/2018	53.5	32.7	-20.8	North Westerly	5.5
18/05/2018	61.4	46.1	-15.3	North Westerly	9.3
19/05/2018	52.1	30.9	-21.2	North Westerly	4.3
20/05/2018	53.8	39.8	-14	North Westerly	8.8
21/05/2018	73.2	51.1	-22.1	North Westerly	11
22/05/2018	58.3	56.4	-1.9	North Westerly	10.3
23/05/2018	54.2	35.4	-18.8	North Westerly	4.8
24/05/2018	52.8	36.3	-16.5	North Westerly	5.5
25/05/2018	50.5	21.6	28.9	South Easterly	7.8
28/05/2018	53.5	22.8	-30.7	North Westerly	3.8
29/05/2018	52.5	31.0	-21.5	North Westerly	6.5
14/06/2018	52.9	35.3	-17.6	North Westerly	9.8
15/06/2018	56.3	42.2	-14.1	North Westerly	13
16/06/2018	52.5	23.4	-29.1	North Westerly	12.5
6/07/2018	59.4	33.7	-25.7	North Westerly	15.8
7/07/2018	52.6	30.2	-22.4	North Westerly	15.0
10/07/2018	58.0	29.2	-28.8	Northerly	4.5
11/07/2018	56.2	25.2	-31	North Westerly	3.8
12/07/2018	54.1	34.1	-20	North Westerly	6.8
13/07/2018	54.5	40.8	-13.7	North Westerly	7.8
14/07/2018	50.0	25.9	-24.1	North Westerly	6.3
16/07/2018	59.8	45.5	-14.3	North Westerly	11.5
17/07/2018	62.1	55.6	-6.5	North Westerly	11.3
18/07/2018	71.5	72.6	1.1	North Westerly	9.8
19/07/2018	60.0	61.9	1.9	North Westerly	9.5
20/07/2018	60.8	50.4	-10.4	North Westerly	16
21/07/2018	54.5	25.2	-29.3	North Westerly	7.3
22/07/2018	53.7	36.1	-17.6	North Westerly	4.0
23/07/2018	54.2	39.5	-14.7	North Westerly	8.3
24/07/2018	77.4	63.8	-13.6	North Westerly	12.0
25/07/2018	70.35	52.7	-17.65	North Westerly	8.8
26/07/2018	65.4	50.6	-14.8	North Westerly	8.0
27/07/2018	55.65	26.2	-29.45	North Westerly	4.8
28/07/2018	61.0	37.6	-23.4	North Westerly	4.5
29/07/2018	58.8	36.1	-22.7	North Westerly	15.0
30/07/2018	61.9	44.07	-17.83	North Westerly	11.0
31/07/2018	65.05	52.8	-12.25	North Westerly	12.0
1/08/2018	56.5	42.3	-14.2	North Westerly	7.8
4/08/2018	66.2	54.1	-12.1	North Westerly	10.5

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7/08/2018	65.0	50.6	-14.4	North Westerly	12.5
15/08/2018	65.9	56.2	-9.7	North Westerly	15.0
16/08/2018	57.1	49.4	-7.7	North Westerly	13.5
18/08/2018	59.1	49.8	-9.3	North Westerly	13.0
15/09/2018	70.35	56.02	-14.33	North Westerly	15.3
19/09/2018	67.1	55.9	-11.2	North Westerly	13.8
22/09/2018	52.7	36.3	-16.4	North Westerly	7.5
31/10/2018	55.4	53.2**	-1.2	North Westerly	9.0
2/11/2018	51.3	55.1**	3.8	North Westerly	12.8
6/11/2018	78.0	65.7	-12.3	Westerly	13.8
7/11/2018	50.2	48.1	-2.1	North Westerly	13.8
15/11/2018	30.4***	33.8	3.4	South Westerly	13.5
16/11/2018	13.3***	11.5	1.6	South Easterly	8.0
17/11/2018	15.1***	15.3	0.2	South Easterly	10.0
18/11/2018	10.2***	9.6	0.6	South Easterly	10.3
19/11/2018	13.9***	10.9	3.0	South Easterly	9.3
21/11/2018	56.9	57.75	1.15	North Westerly	14.3
2/12/2018	66.0	48.2	-17.8	North Westerly	17.5
4/12/2018	51.2	50.0	1.2	South Easterly	11.8

*12/4/2018 – 15/4/2018 – SE TEOM malfunction filter blocked (Upper Hunter Air Quality Monitoring Singleton Network NW data used in absence).

**31/10/2018 – 2/11/2018 – SE TEOM malfunctioned (Upper Hunter Air Quality Monitoring Network Singleton NW data used in absence).

***15/11/2018 – 19/11/2018 – NW TEOM malfunction filter blocked (Upper Hunter Air Quality Monitoring Network Camberwell data used in absence).

6.4.3 Reportable Incidents

There were no externally reportable incidents occurring during the 2018 period with regard to air quality.

As is depicted in figure 17.2, Dust Trak RCS SE did fail during August 2018 recording zero only values. The issue was identified and the unit recommenced functional sampling for September 2018. During the timeframe Dust Trak RCS SE was recording continued zero values monthly calibration and inspection and download of data was completed by an independent third party consultant with no errors or issues identified.

At RCN, the NW TEOM malfunctioned from the 15/11/2018 to the 19/11/2018 as the TEOM filter was blocked. The SE TEOM didn't record data on the 12/4/2018 to the 15/4/2018 due to the TEOM being vandalised. The SE TEOM malfunctioned from the 31/10/2018-2/11/2018 due to a filter being blocked. A contracting company was engaged to change out the filters and complete a calibration on the machines to ensure they were operating in accordance with their designed intent.

6.4.4 Further Improvements

Improvements to the Rixs Creek Real time SCADA system were completed in 2018 to assist mining operation to make informed decisions under adverse weather conditions. This involved the integration of existing real-time Dust Trak monitors situated around the Rixs Creek South operations into the SCADA network. Further improvements to be completed in 2019 include the integration of both met stations onto one real time system to form a complex wide real time monitoring system.

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6.5 Contaminated Polluted Land

6.5.1 Environmental Management

No contaminated or polluted land has been identified at Rixs Creek. No significant hydrocarbon or chemical spills occurred requiring special response, clean-up or ongoing management.

6.5.2 Environmental Performance

Regular inspections of hydrocarbon storage facilities are completed as part of the site environmental procedures and no land contamination or significant pollution incidents were reported during these inspections.

6.5.3 Reportable Incidents

No reportable incidents relating to land contamination occurred during the 2018 reporting period.

6.5.4 Further Improvements

The inspection regime is ongoing and management practises are in place to identify and control leaks or spills before they become contamination issues. The Hydrocarbon Management Procedure was updated and will be regularly monitored and reviewed as necessary.

6.6 Threatened Flora and Fauna

6.6.1 Environmental Management

The Rixs Creek North Biodiversity Management Plan (BMP) was approved by DPE on the 21 December 2017. 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 Rixs 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 . Rixs Creek Coal Mine, November 1994.

6.6.2 Environmental Performance

The ecological monitoring of Rixs 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 Rixs 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.

In 2018, fauna monitoring prescriptions include components of the BMP, but also included new monitoring sites within biodiversity offset areas.

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Comparison of nest box usage between 2015 - 2018 increased slightly for the phascogale / glider style box, in which 62% of boxes were utilised, compared to 60% in 2017, but lower than occupations rate of 72% in 2015. In 2018, only one (1) individual of the Brush-tailed Phascogale was recorded compared to the 2017 monitoring period. One individual Squirrel Glider was also detected in 2018, despite a number of additional boxes containing the characteristic leaf nest of the species.

The microbat boxes have been poorly utilised, with many boxes in various states of disrepair. The issue of very low usage of the microbat boxes is the design and quality of materials utilised in their construction. Since monitoring commenced in 2009, only one (1) box in 2012 recorded individual bats (n = 4).

Bird census counts conducted at each of the 6 monitoring sites in 2018 recorded species diversity of forty eight (48) native and two (2) introduced species. An additional thirty one (31) native and one (1) introduced bird species were recorded by opportunistic observations whilst undertaking other duties in 2018.

The trapping surveys resulted in the captures of one (1) native small mammal, the Yellow-footed Antechinus and eight (8) individual microbats, including the Lesser Long-eared Bat *Nyctophilus geoffroyi*. This species cannot be detected by Anabat recording due to its similarity to other microbat species.

Monitoring of feral predators by remote cameras revealed low abundance, with Fox and Dog detected. However, the abundance of these predators is low, with only a small number of images recorded of the species over the monitoring period (68 continuous nights per camera). In 2018, the northern offset experienced prolonged grazing by neighbouring cattle and horses, with both species recorded by remote cameras. Both species were present in 50 of the 68 monitoring days. Additional signage was placed on fences around the Northern BOA to deter unauthorised access and discussions were held with nearby residences that outlined that any future unauthorised grazing within the BOA could result in prosecution.

The monitoring of microbat species detected ten (10) species in 2018. No bats were detected utilising nest boxes within the offsets. The mid to upper Hunter Valley region experienced very dry conditions in 2018, with rainfall significantly below the annual average. Total rainfall recorded in 2018 at Singleton was 405.7 mm (389.9 mm in 2017), well down on the average 2002-2018 value of 649.3 mm (BOM, 2018). Frog activity was significantly influenced by the extended dry period, with no frog species detected in 2018. Very limited standing or flowing water was present at any of the fauna monitoring sites, with no frog species heard calling during nocturnal spotlight searches.

A total of nine (9) threatened species were recorded during surveys in the Rixs Creek Biodiversity Offset areas in 2018. Threatened species recorded include three (3) bird species and six (6) mammals.

The revised Biodiversity Management Plan (2017) prescribes annual comprehensive fauna surveys for the period 2018 - 2020, then every 3 years after that. 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 annual and cumulative trends. This is evidenced by the increased bird species diversity recorded at Rixs 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.

Flora monitoring has been undertaken across six Biodiversity Offset Areas (BOAs) within the Rixs Creek North Coal Complex, located 12km north of Singleton in the upper Hunter Valley of New South Wales. These six offset properties (Bridgeman, Martins Creek, Northern, Southern, Supplementary, Western), were established to offset land disturbances associated with the former Integra Open Cut (now owned by and operated as Rixs Creek North). Much of the land comprising the BOAs supports remnant stands of the Central Hunter Ironbark - Spotted Gum - Grey Box Forest Endangered Ecological Community, and grasslands derived from it. This report presents the findings of monitoring undertaken during Spring 2018, which have been compared with previous data collected annually from 2013 to 2015.

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- Based on transect data, the following key points summarise changes in floristics and structure since the 2015 monitoring period:
- overall species diversity has decreased across all Management Units (MUs), almost certainly due to the prolonged drought conditions prevailing over the past two years. The proportion of native species in nearly all MUs has increased since 2015, but those for weed species have decreased due to improved targeted weed management campaigns within the BOAs;
- basal area of canopy species has varied across all MUs, some increasing and some decreasing. The most dramatic increases were evident in Ironbark, Apple and Grey Box MUs, while notable decreases occurred in Bulloak and Swamp Oak. All Grassland MUs (with one exception) showed increases in canopy basal area in 2018;
- mean Diameter of Breast Height (DBH) of canopy species has also been variable across MUs, although the majority have remained stable;
- Grassland MUs have shown increases where canopy species are beginning to colonise grassland areas after removal of cattle grazing pressure. A single canopy seedling within the Grassland (Grey Box) MU, first observed in 2015, is no longer present there;
- woody shrub density has shown a decrease across most MUs, although slight increases are evident in Grey Box and Swamp Oak MUs. The density of Acacia stems has remained stable, and most MUs support no Acacia individuals; estimated weed cover decreased for all MUs, consistent with the dry conditions; estimated leaf litter cover increased significantly in 2018, but much of this will be attributable to leaf fall and wilting from drought conditions;
- estimated bare ground increased across nearly all MUs, again in response to drought and the limited ground layer growth. A decrease was shown only in the Swamp Oak MU.

6.6.3 Reportable Incidents

No reportable incidents relating to flora and fauna management occurred during the 2018 reporting period.

6.6.4 Further Improvements

Enhancement of the Martins Creek Biodiversity Area is planned for the 2019 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. Flora and Fauna monitoring in line with the Biodiversity Management Plans performance indicators is also planned to be conducted in the 3rd Quarter of 2019.

6.7 Weeds & Pests

6.7.1 Environmental Management

Ongoing weed control management programs are undertaken on site each year. During 2018 many widespread areas were targeted to control African Boxthorn, Mother of Millions, Prickly/Creeping/Tiger Pear, Blue Heliotrope, Galenia, 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 2018 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 resprouting 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 November 2018. Green Cestrum within the Glennie’s Creek riparian zone was targeted during November and December 2018. Coolatai Grass across the Rix’s Creek Northern and Southern operations was the focus during September and October 2018. Targeted areas including the RCN rail infrastructure area, Martin’s Creek Biodiversity area, Rix’s Creek South rehabilitation.

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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 wort, Lantana, Castor Oil, Bitou bush, Pampas grass, African Olive often occur in isolated outbreaks. During 2018 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.

In the 2018 reporting period vertebrate pest management was undertaken across site to control wild dog, fox, rabbit, hare and kangaroo populations, further details provided in section 6.7.2.

During the 2018 reporting period a qualified pest control contractor sprayed amenities and infrastructure across site with odourless chemical to control insects.

6.7.2 Environmental Performance

The following weed species have been identified and treated on-site during 2018:-

- 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 plantagineum* (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).

Weed management at RCM in 2018 is shown in Figure 18.

In Autumn 2018, 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:

- 44 ground meat baits injected with Sodium monofluoroacetate (1080 poison). Each station was checked weekly for four weeks and taken baits replaced.
- 10 Soft Jaw Traps. Each station was checked daily for eight days before being removed.

In February 2018 pest management for the common European Hare ‘*Lepus*’ and the common European rabbit ‘*Oryctolagus cuniculus*’ was conducted. Diced carrots containing Pindone concentrate were distributed by a licensed pest controller.

From February to April and October to December 2018, qualified open range shooters conducted a Kangaroo culling program across site. The shooting was undertaken during night time with Eastern Grey Kangaroo (‘*Macropus giganteus*’) culled and tagged with tags supplied by National Parks and

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Wildlife Service (NPWS).

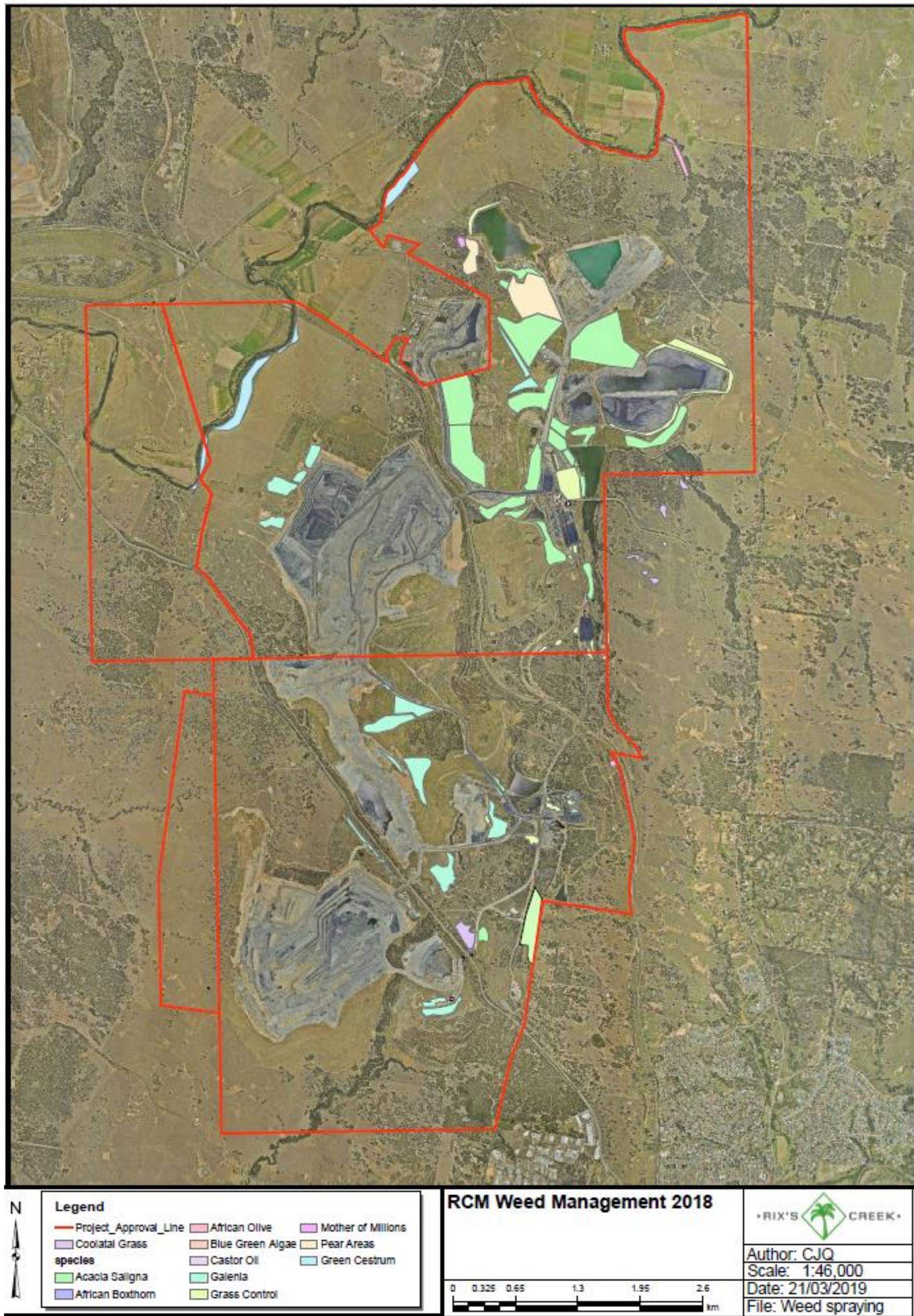


Figure 14. Weed Management Plan

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6.7.3 Reportable Incidents

No reportable incidents relating to weed and/or pest management occurred during the 2018 reporting period.

6.7.4 Further Improvements

A weed spraying program is undertaken throughout the year to control the weeds listed in section 6.6.2. The following weed species have been identified on-site and will be managed as practicable in 2019:-

- Prickly pear, *Cylindropuntia* spp. (class 4);
- Coolatai Grass, *Hyparrhenia hirta*, (class 4);
- Galenia, *Galenia pubescens* (non noxious . class 4 Tamworth); and
- African Olive, *Olea europaea subspecies Africana* (class 4).

Kangaroo culling program will be undertaken in 2019. A wild dog aerial baiting program for Upper Hunter and Wild Dog Associations (WDA) requirements will also continue during 2019. Due to recent wild dog sightings, Rix's Creek Mine is also investigating opportunities to complete smaller 1080 baiting programs throughout 2019 to target specific wild dog communities and reduce the number of wild dogs coming into the Rix's Creek Mine land holdings and neighboring properties.

6.8 Visual, Stray Light

6.8.1 Environmental Management

It is a Development Consent requirement to implement all reasonable and feasible measures to mitigate visual and off-site lighting impacts of the project.

Progressive rehabilitation of mining disturbed land is the main strategy for minimising visual impacts from Rix's Creek. As well as providing a safe and stable landform, one of the key objectives of rehabilitation planning is to provide vegetated landforms that blend with the surrounding landscape.

A number of management techniques are used to minimise the impacts of stray lighting and are employed across both sites which include:

- Visual bunds established to improve visual amenity and block light;
- Light positioning and orientation for mobile lighting plant;
- Positioning mine entrance and exit roads to prevent headlights shining towards adjacent residences; and
- Awareness training to educate employees regarding the sensitivity of the operations proximity to local residents.
- Routine offsite visual light inspection undertaken by trained personnel when mine is operational.

6.8.2 Environmental Performance

There is a standard operational procedure for lights not to be directed towards the New England Highway, main northern railway line or towards local residences. The Environmental Technician that conducts operational noise testing on afternoon and night shift also undertakes lighting inspections from various locations around the mine site. If visual lighting is deemed intrusive, the Environmental Technician contacts the Shift Supervisor and ensures the light is adjusted to eliminate the lighting issue.

The Environmental Technician identified two off-site lighting issues during the 2018 reporting period. On the 26th March at 23:00 one (1) light in the West Pit was visible from the NEH and the 26th August at 21:30 1 light in the West Pit was visible from the NEH. On both occasions the OCE was notified and the lighting plant was adjusted to redirect the light.

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A visual amenity assessment was conducted on the green modular wall located on the New England Highway, with the recommendations from the assessment advised to remove the wall and complete infill tree planting. DPE accepted the recommendations of the visual assessment report with works to commence on the removal of the visual wall and infill planting in 2019.

6.8.3 Reportable Incidents

There were no complaints received relating to stray light during the 2018 reporting period.

6.8.4 Further Improvements.

There has been an ongoing maintenance program replacing existing older lights with new modern LED lighting that shields and directs light more directly to towards the ground surface rather than outwards. The lighting infrastructure that were replaced were reviewed against *AS4282 Control of the obtrusive effects of outdoor lighting 1997*.

6.9 Aboriginal Heritage

6.9.1 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 Rixs 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.

6.9.2 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 2018 fencing of these areas was maintained.

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6.9.3 Reportable Incidents

No artefacts were identified during operations during the 2018 reporting period.

6.9.4 Further Improvements.

It was decided to replace the collected artefacts under the Section 90 Consent to Destroy to an area protected from mining adjacent to Rixs Creek. This area was initially identified as a potential artefact site. The area is in the bend of the Creek and has been fenced to exclude access. When the study of the artefacts has concluded then they will be placed in this area in consultation with Aboriginal communities.

6.10 Natural Heritage

6.10.1 Environmental Management

The Rixs Creek Coke Ovens and associated works adjacent to Rixs 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 Rixs 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 Rixs 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.

Rixs 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.

6.10.2 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 2018.

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6.10.3 Reportable Incidents

There were no reportable incidents in relation to natural heritage during the 2018 reporting period.

6.10.4 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.

6.11 Spontaneous Combustion

6.11.1 Environmental Management

The coal seams mined at the site are not susceptible to spontaneous combustion. All stockpiles are however inspected regularly to check for heating of the material. Any coal mined and not able to be washed is stockpiled at deisgnated stockpile areas where no combustible materials surround it.

6.11.2 Environmental Performance

Nil.

6.11.3 Reportable Incidents

There were no reportable incidents relating to spontaneous combustion during the 2018 reporting period.

6.11.4 Further Improvements.

Monitoring of stockpiles will continue as an ongoing operational procedure.

6.12 Bushfire

6.12.1 Environmental Management

Fuel reduction programs are undertaken on an as needed basis and done in conjunction with the local Rural Fire Service (RFS).

6.12.2 Environmental Performance

A slashing program was undertaken regularly to reduce fuel loads. As well as reducing fuel loads mulching this material into the surface will enhance the rehabilitation through improved nutrient recycling as the material decomposes over time. Excessive grass and weeds were sprayed around site infrastructure to further reduce fuel loads. Rixs Creek and AusGrid also conducted spraying and mulching of power line easements across site throughout the year.

Proactive management was undertaken which included clearing 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.

Grazing of cattle was undertaken around mining activities to apply grazing pressure to land ahead of the West Pit during 2018 and on the rehabilitation area adjacent the RCN CHPP. This will continue in 2019.

During 2014 Rixs 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 2018.

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6.12.3 Further Improvements.

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 lessees to graze cattle in a bid to minimise fuel loads across site.

6.13 Mine Subsidence

6.13.1 Environmental Management

Areas of the Rixs Creek mine site are undermined by historic underground workings. Sink holes associated with shallow workings are infrequent. If identified, the standard management procedure is to flag off and isolate the sink holes from access, back fill the holes and monitor for further subsidence. Once deemed stable, the area will then be rehabilitated and periodic inspections will continue.

6.13.2 Environmental Performance

There were no reportable incidents in relation to mine subsidence during the 2018 reporting period.

6.13.3 Reportable Incidents

Nil.

6.13.4 Further Improvements

Identified sink holes will be remediated and the heritage areas will be protected. No other improvements to subsidence management are planned.

6.14 Hydrocarbon Contamination

6.14.1 Environmental Management

Hydrocarbon storages at Rixs Creek southern operations consist of 3 bulk storage areas. Rixs Creek Northern operations consists of a fuel farm which consists of 2 bulk storage areas. The fuel farms located at site are equipped fill machinery with diesel, hydraulic, transmission and engine oils.

At Rixs Creek Northern operations, the open cut wash down area has a sump to collect the oil/water mix. Drains at the workshop are directed to the wash down bay area sump where a loop tube surface skimmer removes the majority of hydrocarbons before the remaining water is passed through a plate separator. Recovered oil is transferred to a storage tank and a licensed waste transport contractor collects the separated waste oil from the storage tank. Water post hydrocarbon recovery then flows to mine water dam D1. At Rixs Creek Northern operations, concrete bunds have been constructed around major hydrocarbon infrastructure.

At Rixs Creek South hydrocarbon storage areas have the storage tanks located within a bunded area capable of containing greater than 110 % of the largest storage tank. The bunded area is lined with a Claymax product barrier. Any fluids including water and hydrocarbons drain to a sump where the water is decanted and processed through an oil arrestor to remove any hydrocarbons. The hydrocarbons are directed to a waste oil tank for recycling. The water goes into the contaminated water system for recycling through the CHPP.

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All machinery is fitted with quick fill mechanisms. The inlets and outlets, at the refuelling bay and mobile tanker are positively closed with an automatic cut off when full. This refuelling method is quick and minimises any potential for spillage during the refuelling operation.

The hydrocarbon management procedure was updated to include Rixs Creek Northern operations during the reporting period.

6.14.2 Environmental Performance

There were no major hydrocarbon spills during the year. Rixs Creek has developed a Hydrocarbon Management procedure to align both sites with a standardised process for minimising hydrocarbon and chemical spills or management and reporting requirements if a spill occurs.

6.14.3 Reportable Incidents

There were no external reportable incidents related to hydrocarbon management during the reporting period. The hydrocarbon spills that occurred during 2018 were contained using spill kits, or earth moving equipment was used to form a temporary bund. Material contaminated from hydrocarbon spills was relocated via a small front end loader to the bioremediation areas at Rixs Creek North or Rixs Creek South.

6.14.4 Further Improvements

The use of S200 / Micro-blaze for minor hydrocarbon spills to assist in the breaking down of hydrocarbons via bacteria will continue during 2019. This technique has proven effective and was used several times throughout the year to clean up minor spot stains around the fuel farm, oil/water sumps, and equipment.

The site remediation area is regularly turned over via backhoe within each cell. Soil material from the bioremediation area is tested and if below 1000 parts per million (PPM) total petroleum hydrocarbon (TPH) concentration is placed back into the Open Cut. Once results are below this criteria it can be placed back into the open cut pit. Generally after the soil has been stored for a long period and has grassed over it is a good indication to conduct soil sampling.

6.15 Public Safety.

6.15.1 Environmental Management

Fences along the New England Highway, Bridgman Road, Stoney Creek Road and Falbrook Road were checked during the year and repaired as necessary. No Trespassing signs are located every 100 m along the fences on both sides of the New England Highway in which the lease intersects. Gates along the New England Highway as well as bordering rehabilitation areas were chained secure during the 2018 period to prevent unauthorised access.

6.15.2 Environmental Performance

There was one externally reported incident reported to Police in the 2018 period, whereby illegal entry from unauthorised people was gained on site and theft occurred. In October 2018 Rixs Creek experienced a break and enter and theft. Rixs Creek reported the theft of copper cabling and one light vehicle to Singleton Police and cooperated fully with police investigations. Follow up action from these events included Rixs Creek appointing additional security to site, especially around periods of extended shut down or reduced operations including long weekends and public holidays.

Fences and gates were inspected on Rixs Creek Lane, Bridgman Road, Stoney Creek Road, Falbrook Road and the New England Highway during 2018 and repaired where required.

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6.15.3 Reportable Incidents

There was one externally reportable incident reported to the Police for illegal entry from unauthorised personnel during 2018.

6.15.4 Further Improvements

No other overall improvements are planned to manage public safety, however Rixs Creek Mine will continue to maintain and improve existing fencing, gates, barriers and signage. Rixs Creek Mine may use specialist security personnel over long weekends, Christmas and Easter periods to deter unauthorised entry on site.

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 bedded units is impeded by the low permeability interburden units.

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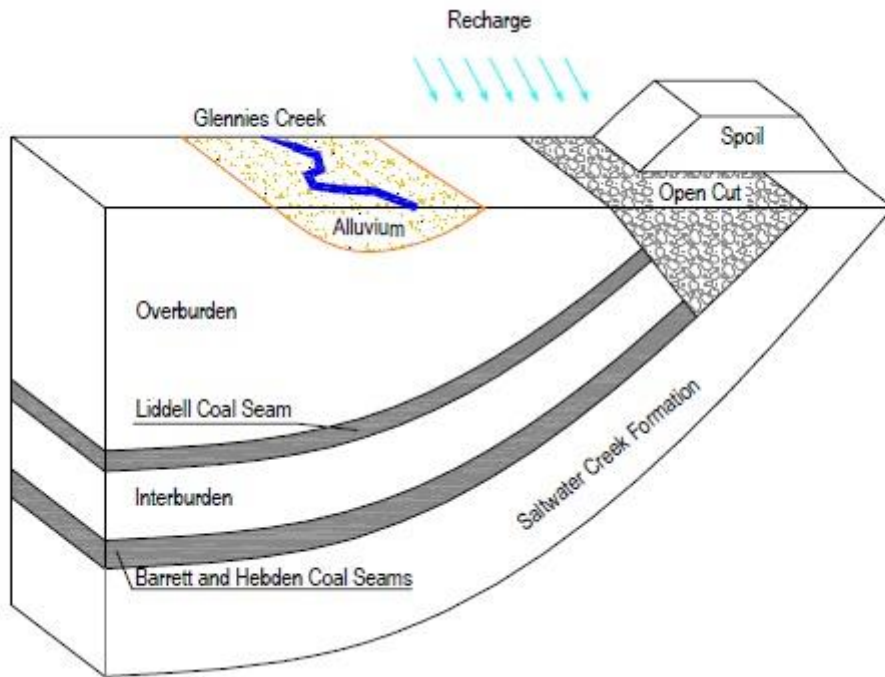


Figure 15 Conceptual Hydrogeological Model of the Rix's Creek Syncline area

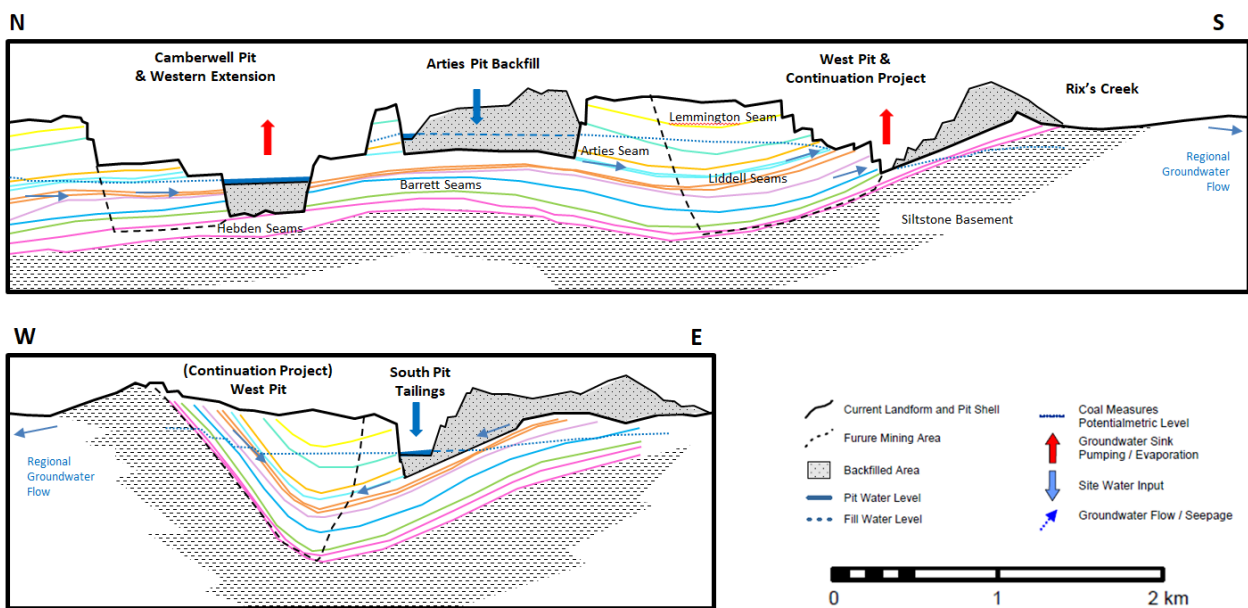


Figure 16 Conceptual Hydrogeological Cross Section

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 to 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 Rixs 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 Arties 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 Glennies Creek or Rixs 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 Rixs 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

Rixs Creek has the following active groundwater licences:

Table 19 Rix's Creek Water Licences

Water License #	Water sharing plan, sources and management zone (as applicable)	Entitlement
Rix's Creek North - Water Licences		
20AL201231	Hunter Regulated River . Zone 3A Glennies Ck - High Security	230 ML
20AL200940	Hunter Regulated River . Zone 3A Glennies Ck - General Security	54 ML
20AL200530	Hunter Regulated River . Zone 3A Glennies Ck - General Security	102 ML
20AL200818	Hunter Regulated River . Zone 3A Glennies Ck	23 ML
20CA200847	Hunter Regulated River . Zone 3A Glennies Ck - General Security	14 ML
20AL201041	Hunter Regulated River . Zone 3A Glennies Ck - General Security	240 ML

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20AL200846	Hunter Regulated River . Zone 3A Glennieꝯ Ck - Supplementary Water	1.2 ML
20WA207397	Hunter Unregulated and Alluvial Water Sources - Unregulated River	6 ML
20CA207373	Hunter Unregulated and Alluvial Water Sources - Aquifer	5 ML
20CA200041	Hunter Regulated River Water Source	-
20CA200041	Hunter Regulated River . Zone 3A Glennieꝯ Ck - General Security	51 ML
20BL169513 WAL 41500	Mining	100 ML
20BL172249	Mining	100 ML
20BL169513	Irrigation	5 ML
Rix's Creek South - Water Licences		
20AL203407	Regulated River (General Security)	159 Units
20AL203406	Regulated River (General Security)	49.5 Units
20AL203405	Regulated River (General Security)	49.5 Units
20AL203405	Domestic & Stock	24 Units
20AL209899	Water sharing plan . Hunter unregulated and alluvial water sources 2009	150 Units
20AL207389	Water sharing plan . Hunter unregulated and alluvial water sources 2009	5 Units
20WA209901	Water sharing plan . Hunter unregulated and alluvial water sources 2009	300 Units
20BL170863	Open Cut (dewatering groundwater) Hard Rock	100 ML
20BL170864	1 x Bore (dewatering groundwater)	100 ML
20BL168734	1 x Bore (monitoring bore)	1 ML
20AL209919	Water sharing plan . Hunter unregulated and alluvial water sources 2009	91 Units
20WA201499	Water sharing plan . Hunter unregulated and alluvial water sources 2009	1 Units

7.21 Water Management

During 2018 Rix's Creek mine operated under two Water Management Plans (WMPs) that outline surface water and ground water management practices including monitoring requirements, performance indicators and response plans. The Rix's Creek South Water Management Plan was developed for the site during the year (2010) as part of the development consent (DA 49/94) modification approval requirements for the cut and cover tunnel. Rix's Creek North Water Management Plan was approved by The DPE on the 16th February 2016 covering conditions of Schedule 3, Condition 36 of Project Approval 08_0102.

In January 2019 a new WMP was approved combining both RCN and RCS to rationalise and combine the monitoring programme. This 2018 water review uses the monitoring programme outlined in RCN: 08_0102 and RCS: DA 49/94 WMPs.

A static water balance was calculated for 2018 providing information on inputs and outputs for both the RCN and RCS operations and the results are shown in Table 24 and Table 25.

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Rix’s Creek South Results

Table 20 shows that in 2018 the strategy was to manage water levels in the open cut at Rix’s Creek South operations 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 to the Arties Pit void from west pit open cut operations.

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.

In 2018, 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

Approximately 10 megalitres (ML) of potable water was sourced from the Singleton town water supply in 2018 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

Evaporation from site process water dams totalled 421 ML in 2018. The major evaporation occurred at:

- The Process Dams, approximately 155 ML;
- The Tailings Dams 178 ML.

Groundwater

There was an estimated 83 ML of groundwater inflow into the open cut voids during the reporting period.

Site Inventory

Site inventory decreased at RCS from 6,068 ML to 5,110 ML during 2018, a nett loss of 958 ML.

Rix’s Creek North Results

In 2018, Rixs Creek North CHPP processed coal from the Integra Underground (Glencore). The strategy remained to manage water levels in the open cuts by pumping water to surface dams to maximise evaporation. Water was pumped from the Integra Underground off site to the Mount Owen Complex during 2018. 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.

The main loss or consumption of water at Rixs Creek North was via moisture retained in the product coal or waste reject material; water utilised for dust suppression and evaporation of water storage dams. The RCN Water Balance is shown in Table 21.

Dust Suppression

Water carts consumed 403 ML from Rixs Creek North storages for dust suppression on roads. An estimated 39 ML was used for coal stockpile dust suppression.

Fresh Water Use

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Approximately 10 megalitres (ML) of potable water was sourced from the Singleton town water supply in 2018 for potable supply and bathhouse facilities.

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 an offline storage for excess mine water and the inventory fell from 4540 ML to 4040 ML over the year.

Possum Skin Dam inventory ranged from 320 ML (about 20% of capacity) in January, closing the year at 380 ML.

DWD 1 was mostly steady around 450 ML over the year.

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

Hunter River Salinity Trading Scheme

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

Evaporation

Evaporation from site process water dams totalled 1,314 ML in 2018. The major evaporation occurred at:

- The tailings dams, approximately 433 ML;
- The Possum Skin Dam, approximately 195 ML;
- The in-pit voids, approximately 199 ML;
- Dirty Water Dams 1 & 3; approximately 206 ML.

Groundwater

There was an estimated 100 ML of groundwater inflow into the 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 796 ML. The estimate is based on modelling in 2015 based on reference to an average flow of 1.4 ML/day determined from detailed measurements taken in 2007-2008.

Site Inventory

Estimated site inventory decreased from 5,866 ML to 5,164 ML during 2018, a nett loss reduction of 702 ML..

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Table 20 Sample Static Water Balance Rix’s Creek South 2018

Water Stream	2018 (ML)
Inputs	
Imported Fresh Water	
Imported Potable	10
Groundwater Seepage To Open Cuts	83
Underground Dewatering	0
Rainfall Runoff – Into Dirty Water System	599
Recycled to CHPP from Tails & Storage (not included in total below)	(1,089)
Water from ROM Coal	456
Total Inputs	1,148
Outputs	
Groundwater Seepage Out (Down dip losses and high wall evaporation)	165
Dust Suppression – Water Carts	398
Exported to Other Mines – Dirty Water	0
Evaporation Fans & Sprays	0
Evaporation - Mine Water & Tailings Dams	421
Entrained in Process Waste	916
Water in Product Coal	196
Potable Usage	10
Total Outputs	2,100
Estimated Change in Pit Storage (decreased)	-958

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Table 21 Sample Static Water Balance Rix’s Creek North 2018

Water Stream	2018 (ML)
Inputs	
Imported Fresh Water	0
Imported Potable	10
Groundwater Seepage To Open Cuts	657
Underground Dewatering	0
Rainfall Runoff – Into Dirty Water System	1,004
Recycled to CHPP from Tails & Storage (not included in total below)	283
Water from ROM Coal	152
Total Inputs	1,823
Outputs	
Groundwater Seepage Out – to Integra & Down Dip	417
Dust Suppression – Water Carts	403
Dust Suppression – Stockpile Sprays	39
Evaporation - Mine Water & Tailings Dams	1,314
Entrained in Process Waste	271
Water in Product Coal	109
Potable Usage	10
Total Outputs	2,563
Estimated Change in Pit Storage (decreased)	-740

7.2.1 Climate/Rainfall

Daily rainfall is measured at Rix’s Creek West Pit weather station at the site-specific rain gauge. Rainfall data is summarised in Table 22 and Figure 21.

Table 22 Monthly Rainfall Data and Long-Term Average

Date	Rix’s Creek Site Specific Rain Gauge (mm)	Long Term Average (mm) 1999-2018
January 2018	7.6	75
February 2018	79	72
March 2018	100.5	71
April 2018	40.5	56
May 2018	5	46
June 2018	41.25	57
July 2018	0.5	51
August 2018	15	42
September 2018	17	45
October 2018	64.9	51

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November 2018	58.25	58
December 2018	77.5	74
Total	507	698

Specific climate data from 2018 are as follows:

- “ Over the review period, the highest rainfall events at all stations occurred in February and March 2018 which were the result of storm events.
- “ 2018 annual rainfall at Rixs Creek was 507mm, which is significantly lower than the long-term average of 698mm.

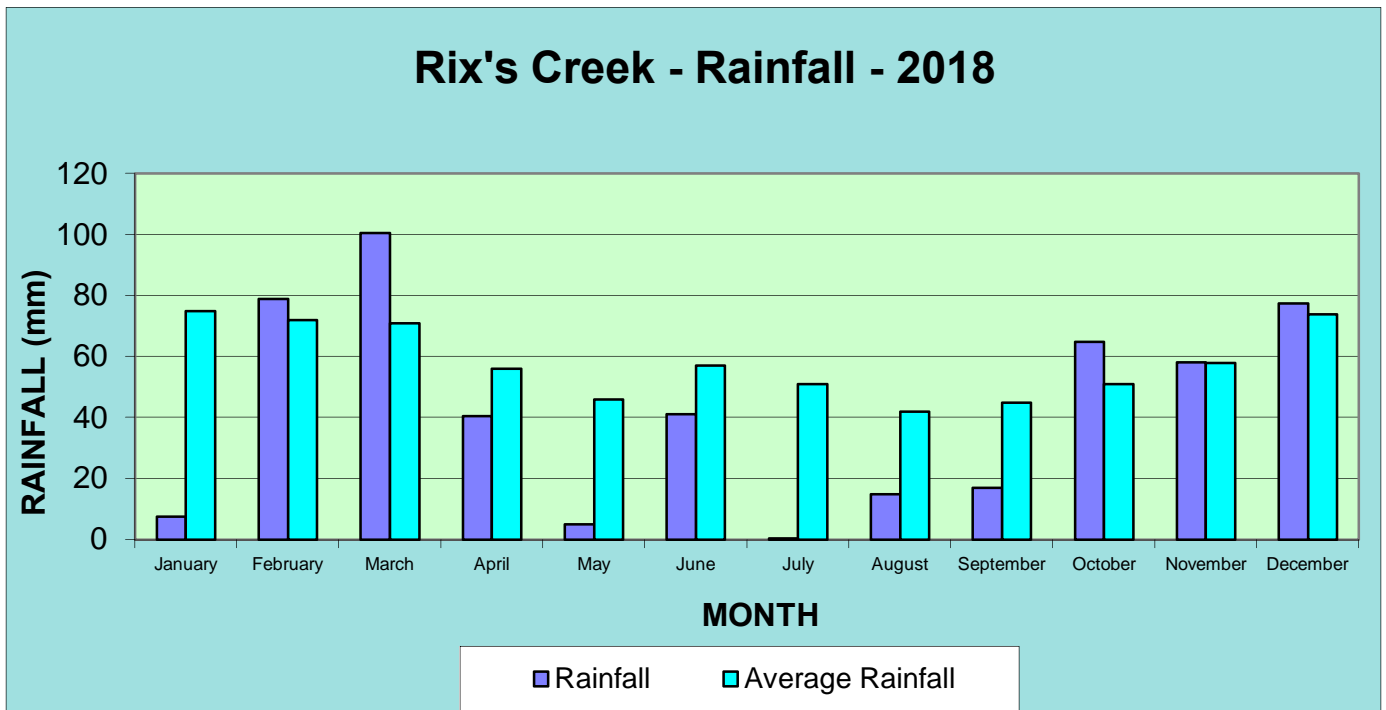


Figure 17 Annual Rainfall at Rix’s Creek 2018

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

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

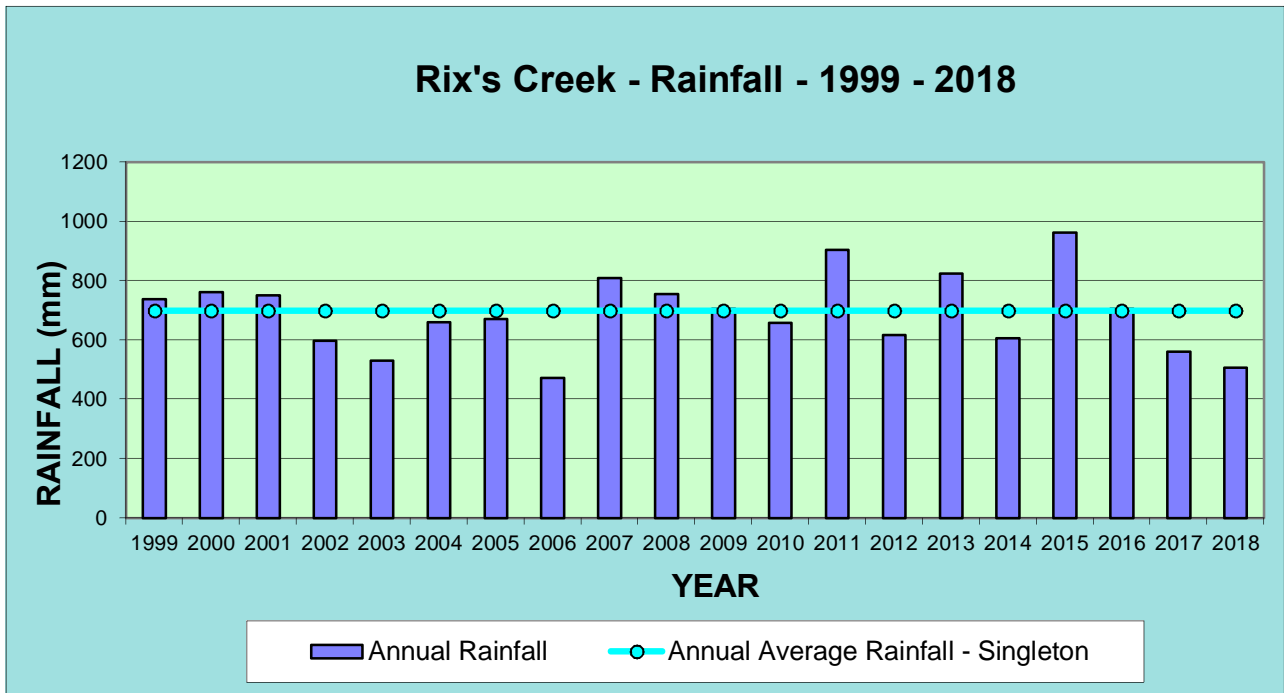


Figure 18 Annual rainfall at Rix’s Creek 1999-2018

ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

7.3 Surface Water

7.3.1 Environmental Management

The water management system at Rixs 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 Rixs 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 Rixs 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 Rixs Creek is an ephemeral stream. Water quality is also monitored in a smaller creek north of the operation labelled Deadman Creek.

For Rixs 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.

Contaminated 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 tailings dam surface is recycled through the coal handling and preparation plant.

First priority is given to the use of contaminated water in mine operations. Contaminated 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 Rixs 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, Rixs Creek is unable to discharge and EPA has subsequently revoked the discharge component of the Environmental Protection Licence.

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

Grab samples are taken from Rixs 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 Rixs 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 Rixs 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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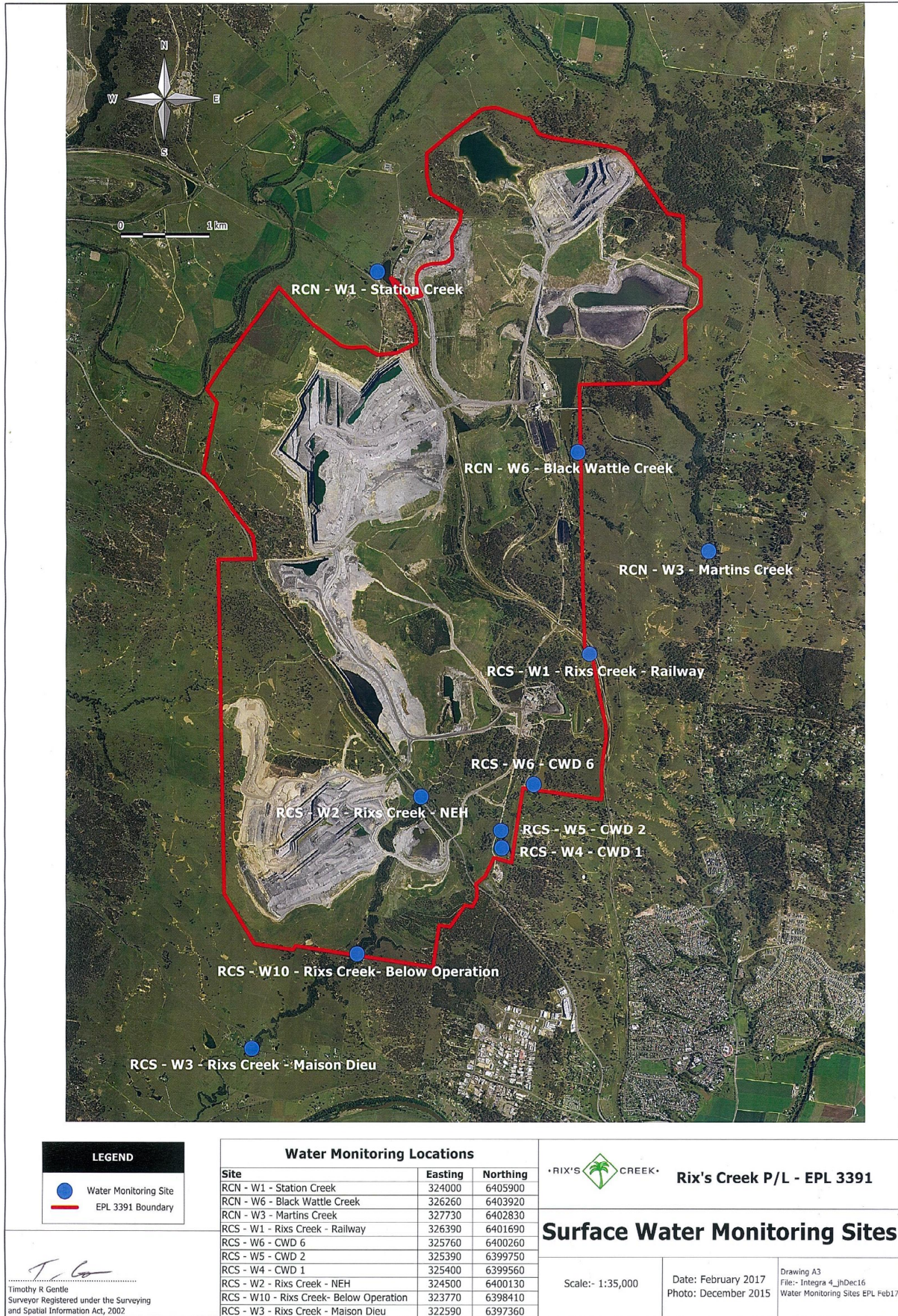


Figure 19 EPL 3391 water monitoring sites

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Table 23 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 20. 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 South results

During the 2018 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 7.1 to 10.2 throughout 2018. The trends and results are generally consistent with 2017 results.

Electrical Conductivity (Salinity)

The Electrical Conductivity results are presented in **Appendix 1**. Salinity levels at RCS generally fluctuated in correlation with variations in rainfall and flowing vs non-flowing conditions, ranging from 221µS/cm to 7,740µS/cm during the 2018 reporting period.

Results ranged from 221 µS/cm at the Clean Water Dam 1 to 10,400 µS/cm at the Dirty Water Dam 1. The high November result at the Turkey Dam Site occurred due to the dry and hot conditions, which increased evaporation and minimal to no creek flow in the November period.

Total Dissolved Solids

The Total Dissolved Solids (TDS) results for Rix’s Creek South are presented in **Appendix 1**. TDS ranged from 126 mg/l . Clean Water Dam 1 to 4,840 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.

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

pH

During the 2018 surface water assessment the pH of upstream ephemerals W6 (Black Wattle Creek) ranged between 7.0 and 7.6 and W3 (Martins Creek) ranging between 5.9 and 7.3. W1 (Station Creek) monitoring site is located downstream of mining operations and recorded slightly acidic to neutral pH during the reporting period ranging between 4.7 and 6.8. W17 (Dam C2) recorded pH levels ranging between 7.4 (February) to 9 (November) and W18 (Dam C5) recorded pH ranging

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between 7.3 (April) to 9.0 (November). The pH levels at dam sites in the series W12 - W21 remained slightly alkaline historically.

The general pH trend in the Creeks and site dams decreases under flow conditions and increases in times of limited to no flow. The decrease in pH under flow conditions reflects the slightly acidic nature of rainfall. The trends and results in 2018 are generally consistent with the historical pH results.

Electrical Conductivity (Salinity)

The EC results for RCN are presented in **Appendix 1**. The EC results under flow conditions typically decrease down the catchment reflecting a flushing of the Creeks with clean runoff water. During times of no flow as the water becomes stagnant and concentrated by evaporation the salinity levels generally rise. In 2018 there were prolonged periods of dry weather, coinciding elevated salinity levels, similar to the 2017 trends. Black Wattle Creek (W6) was too low to sample on nine (9) occasions during 2018 with samples ranging between 1,194 μ S/cm (December) and 3,550 μ S/cm (February) when samples were taken. Due to prolonged dry periods throughout 2018 Black Wattle Creek's water flow was usually stagnant in drier periods with lower to no rainfall.

The EC of upstream ephemeral W3 (Martins Creek) ranged between 140 μ S/cm (June) and 278 μ S/cm (February), 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 623 and 1,821 μ S/cm. W1 was too low to get a water sample on nine (9) W10 (Dam C4) recorded EC levels ranging between 2,690 to 3,410 μ S/cm and W16 (Dam C8) recorded EC ranging between 4,070 to 6,130 μ S/cm.

Total Dissolved Solids

The TDS results for RCN are presented in **Appendix 1**. TDS ranged from 146 mg/l (February) . W5 Glennies Creek Downstream to 4890 mg/l (November) . W16 Dam C8. The higher results during April to November reflect typically dryer conditions in Rix's Creek. Total dissolved solids at monitoring site W6 (Black Wattle Creek) ranged between 689 mg/l in December and 2210mg/l in March. W6 (Black Wattle Creek) water flow is usually stagnant in drier periods with low rainfall.

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.

7.3.4 Further Improvements

A Rix's Creek Complex Water Management Plan has been approved on the 16/01/2019, which standardised water management across both Rix's Creek North and Rix's Creek South Mine sites.

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7.4 Groundwater

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

Table 24 Rix's Creek Ground Water Monitoring Sites

Bore ID	License	Easting	Northing	Screened Interval (mgb)	Stick Up (m)	Surface Elevation (mAHD)	Total Depth (mgb)
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
GW67291	(stock well)	326264	6408139	Unknown	Unknown	Unknown	90
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
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
GCP31	(20BL171720)	322930	6404424	8.5 - 14.0	0.77	70	14
GCP33	(no piezo)	322586	6404181	5m total depth	n/a	n/a	n/a
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
GCP35	(VWP)	323149	6404757	72, 147, 195	n/a	71	197
GCP36	(20BL171722)	322915	6405320	14.5-16.0	0.85	70.5	16
GCP37	(VWP)	324156	6405612	70, 125	n/a	80	127.5
GCP38	(20BL171878)	323468	6405626	17.0-24.3	0.98	71	24.3
Richards Bore		321110	6405184	18-24	0.4	47.87	30
SGD644 (VWP)		325143	6406526	77.6, 83.6, 94.4	n/a	104.6	104
SGD645 (VWP)		325815	6406509	57.6, 66.6, 75.2	n/a	96.6	96
GCP17		323803	6409986	5.5-7.5			7.5
GCP24		323421	6407105	46-48			48
GCP40		321112	6409047	5-6			6

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Bore ID	License	Easting	Northing	Screened Interval (mgb)	Stick Up (m)	Surface Elevation (mAHD)	Total Depth (mbgl)
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 2018 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 NRAR 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;
- 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 in Table 25 and shown on Figure 21.

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 but this bore was destroyed in 2011.

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BH1 was damaged in the second half of 2017 and BH2 was destroyed in early 2012.

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 2018 in accordance with the Rixs Creek Water Management Plan 2011 (WMP) approved by DPI Water.

Groundwater levels for Rixs 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 BH5, BH7 and 20BL170864 in response to ongoing Coal Measures dewatering in the broader Rixs 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 2018 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 25 Rix's Creek South 2018 Groundwater Monitoring Network

Bore ID	Type	Depth (mbgl)	Location	Change in Water Levels during 2018 (m)
BH1	Standpipe Piezometer	130	Middle of basin - Upper / Lower Arties	Bore Damaged Aug 2017
BH2	Standpipe Piezometer	90	West of basin, close to outcrop- Lower Barrett	Bore Destroyed March 2012
BH3	Standpipe Piezometer	11	East of waste dump / backfill area- Regolith and shallow coal seams	-2.14
BH4	Standpipe Piezometer	10	Rix's Creek south of Pit 3- Regolith	-0.59
BH5	Standpipe Piezometer	66.5	East of Rix's Creek / tailings emplacement area- Lower Barrett	-4.70
20BL170864	Production bore	~70	Above underground Workings- All coal seams	-14.25
BH7	Standpipe Piezometer	200.5	Bottom of basin- Hebden	-3.31
BH8	Standpipe Piezometer	20	Dead Man's Creek wet of coal outcrop . regolith	-0.10

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Figure 21. Rix's Creek South Groundwater Monitoring sites

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Pit Inflows

The potential proposed groundwater inflows are licenced at 100ML/year at Rixs Creek South mine (20BL170863).

The 2018 static water balance calculated ground water seepage from Rixs Creek South mine at 83 ML during 2018.

Rix's Creek South Groundwater Quality

The salinity in the coal seam (BH5) ranged between 4,130 to 6,450 mg/L.

Salinity within BH3 and BH4 ranged from 5,510 to 18,550mg/L which is consistent with the parameters outlined in the Rixs 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

The Rixs Creek North Water Management Plan which operated during the 2018 period was approved by DPE on the 16th February 2016.

Piezometers, bores and private wells included in the Rixs Creek North groundwater monitoring program include the Foybrook Formation basement coal measures as well as the Glennies 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 2009 groundwater assessment model was focused on obtaining correlation between known and modelled mine inflow rates, as opposed to matching observed and modelled groundwater levels.

The Rixs Creek North Groundwater monitoring program is referred to in Table 26. The results are presented in **Appendix 2**.

Piezometers GCP32 . GCP37 recorded partial data. Richards Bore was not monitored during 2018 as its monitoring has shifted to the underground operations and will be removed from future sampling by RCM and GCP20 was dry throughout 2018.

Alluvium

From the 2009 Environmental Assessment, the model indicated that groundwater within alluvial aquifers associated with Glennies 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 (based on the Case 1 groundwater model hydraulic conductivity of 7.9×10^{-2} m/day) near the Mine Area until the pit excavation was completed.

Results from 2018 reporting period compared to the 2009 Ground Water Environmental Assessment show alluvium water levels have maintained relatively constant water levels 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

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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 26 Rix’s Creek North Ground Water Monitoring Network

Bore ID	Type	Total Depth (mbgl)	Formation	Change in Water Levels during 2018 (m)
GCP09	Standpipe Piezometer	9	Glennies Creek Alluvium	-0.07
GCP10	Standpipe Piezometer	11.5	Glennies Creek Alluvium	+0.01
GCP 19	Standpipe Piezometer	12	Glennies Creek Alluvium	-0.02
GCP20	Standpipe Piezometer	8.2	Glennies Creek Alluvium	Dry
GCP21	Standpipe Piezometer	8.2	Glennies Creek Alluvium	-0.02
GCP22	Standpipe Piezometer	12	Glennies Creek Alluvium	-0.04
GCP23	Standpipe Piezometer	8	Glennies Creek Alluvium	-0.09
GCP28	Standpipe Piezometer	12	Glennies Creek Alluvium	-0.07
GCP29	Standpipe Piezometer	10	Glennies Creek Alluvium	0.00
GCP30	Standpipe Piezometer	12	Glennies Creek Alluvium	-0.10
GCP32	Standpipe Piezometer	55.56	Camberwell Pit Basement	-0.72
GCP34	Standpipe Piezometer	56.26	Camberwell Pit Basement	Incomplete data
GCP35	Vibrating Wire Piezometer multi depth	195	Camberwell Pit Basement	Incomplete data
GCP36	Standpipe Piezometer	15.98	Camberwell Pit Basement	-0.11
GCP37	Vibrating Wire Piezometer multi depth	127.50	Camberwell Pit Basement	Incomplete Data
SGD644	Vibrating Wire Piezometer multi depth	104	Camberwell Pit Basement	Incomplete Data
SGD645	Vibrating Wire Piezometer multi depth	96	Camberwell Pit Basement	Incomplete Data
GCP38	Standpipe Piezometer	24.31	Camberwell Pit Basement	-0.27
GCP02	Standpipe Piezometer	105	Falbrook pit Basement	-1.08
GCP05	Standpipe Piezometer	108	Falbrook pit Basement	-1.25
GCP06	Standpipe Piezometer	126	Falbrook pit Basement	-0.54
GCP07	Standpipe Piezometer	120	Falbrook pit Basement	-2.10
GCP08	Standpipe	120	Falbrook pit Basement	-1.70

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Bore ID	Type	Total Depth (mbgl)	Formation	Change in Water Levels during 2018 (m)
	Piezometer			
GCP13	Standpipe Piezometer	66	Falbrook pit Basement	+0.06
GCP14	Standpipe Piezometer	123	Falbrook pit Basement	-2.13
GCTB	Standpipe Piezometer	90	Falbrook pit Basement	-0.60

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

Basement

The basement monitoring data in the 2018 reporting period indicated;

- Recovery of GCP7, 8, 13 and 14 during 2017 associated with water storage in the Falbrook Pit, along with normal climatic variability with the remaining piezometers within the Falbrook Open Cut in 2018; and
- All other basement bores at RCN continued to maintain relatively constant water levels associated with regional depressurisation influences.

The 53.75m below surface intake in SGD645 indicates a gradual depressurisation during 2018, a relatively static water level in the middle sensor, while the deep sensor was continuing to depressurise during 2018, which is potentially in response to ongoing dewatering in the Integra underground workings to the northwest.

GCP37 showed a minor gradual, ongoing depressurisation in the 70mbgl sensor and a relatively stable pressure at 125mbgl during 2018 within its historic range.

Pit Inflows

The potential proposed 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 2018.

Table 21 refers to the 2018 static water balance, which estimated groundwater seepage from RCN mine at 100ML for 2018, which is close to the model predicted volumes based on timing and range.

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 2018 (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 Glennies 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. It should be noted that all of the last readings (1/12/2018) appear to be out of calibration

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

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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.

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

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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 2018 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 22 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.

Rixs 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 Rixs 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 Rixs Creek South and Rixs 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 2018 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 an as needs basis throughout the year. Throughout 2018 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. Rixs Creek North infrastructure will remain the non-intrusive beige colour.

8.2 Post Landform Land Use

Land capability at Rixs 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 Rixs 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 to in Tables 27 and 28 and demonstrated in plates in section 8.5.

8.3 Resources Regulator Signoff on Rehabilitation

In 2018 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 Rixs 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. Rixs 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.

The rehabilitation is undertaken to meet the following objectives.

General

- Land will be rehabilitated in accordance with relevant NSW Department of Industry . Resource Regulators . DPE standards applicable at the time of rehabilitation i.e. Mining Operations Plan (MOP) guidelines, September 2013.
- Rehabilitated land will represent a minimal source of offsite environmental impacts, such as dust, water pollution, visual amenity and weeds.
- Rehabilitated land will require ongoing management inputs no greater than similar adjacent land.

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- Rehabilitation will be compatible with the proposed post-mining land-use.
- Landform*
- Rehabilitated land will be safe and stable.
 - Land capability will be returned to a class similar to that existing prior to the commencement of mining.
 - Mined land will be re-contoured to a landform compatible with the surrounding natural landscape.
 - Reinstate a stable drainage network.

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.
 - An example of a species mix that may be used as per Rix’s Creek MOP is:-
 - **Pasture mix #1** - Rhodes Grass, Couch, Rye, Sub. Clover, Wolly Pod Vetch, Green Panic, Sirosa Phalaris, Sephi Barrel Medic, Lucerne, and Kikuyu. All summer / winter active.

Pasture mix #1 was amended in the 2013 Rix’s Creek MOP with Rhodes grass being restricted from previously used rates of 5 kg/ha back to 1 kg/ha to minimise potential for monocultures of Rhodes grass being dominant in the pasture rehabilitation area.

- Tree areas will be established with native species by either direct seeding or tubestock planting techniques.
 - An example of a native species mix that may be used as per Rix’s Creek MOP:-
 - **Tree mix #1** - *Eucalyptus crebra*, *E. fibrosa*, *E. mollucana*, *E. melliodora*, *Corymbia maculate*, *Acacia decora*, *A. falcata*, *A. implexa*, *A. paradoxa*, *A. salicina*, *Casuarina luehmannii*, *Hardenbergia violacea*, and hybrid *Eucalyptus* spp. suitable for plantations.

Rehabilitation is generally carried out on a seasonal basis in spring and autumn. Cover crops used in pasture rehabilitation may be adjusted to suit the climatic conditions at time of sowing. Preferred species may also require adjustment due to availability.

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 31 and 32.

Table 27 2018 Rehabilitation Summary RCN

Locator	Site Name	Type	Date Sown	Species mix	Area (ha)
Camberwell Pit	Rail Corridor Rehab	Pasture	August	Pasture #2	6.8
Falbrook Pit	Stony Creek	Pasture	January	Pasture #1	2.6
Camberwell Pit	RL150	Pasture	September	Pasture #1	0.9
TOTAL 2018 @ RCN					9.3
CUMULATIVE TOTAL INCLUDING 2018 @ RCN					423.7

Table 28 2018 Rehabilitation Summary RCS

Locator	Site Name	Type	Date Sown	Species mix	Area (ha)
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West Pit	West Pit South Batter	Pasture	March	Pasture #2	2.1
West Pit	West Pit South Batter	Pasture	September	Pasture #1	5.4
TOTAL 2018 @ RCS					7.5
CUMULATIVE TOTAL INCLUDING 2018 @ RCS					436.3

West Pit South Batter

The West Pit South Batter rehabilitation was commenced in March 2018, where 2.1 ha was completed at the toe of the shaped area. This area was direct seeded via a tractor using pasture species (Pasture mix #2). The additional 5.8ha of the West Pit South Batter was completed in September 2018 as the upper limits of the batter was shaped to final landform design. 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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Plate. 1 West Pit South Batter

Camberwell Pit RL150

The Camberwell Pit RL150 Drainage Line site was rehabilitated in August 2018 totalling 0.9 ha. This area was direct seeded via a tractor using pasture species (Pasture mix #2).

The area was created using overburden from the Camberwell Pit operation previously shaped by Vale. It was shaped onto the 2 degree undulating landform. This undulating landform was overlaid with clay and subsoil approximately 300-500mm capping material and covered with approximately 100-200 mm of topsoil stockpiled within the rehabilitation area using a D10 dozer. The topsoil came from the cleared area from the South West of the Camberwell Pit. Prior to seeding the area was spread with biosolids at a rate of 100 tonnes / hectare and ripped into the soil with a tractor with rip lines running across the contour to minimise erosion from surface run-off.

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. A cover crop was also applied to stabilise the landform and minimise the weed potential. Early indications also show some weeds 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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Falbrook Pit Stoney Creek Batter - Tree Area

The Falbrook Pit Stoney Creek Road site was rehabilitated in January 2018. In March 2018 2.6 ha of the area was direct tree seeded using a tractor using Tree Seed #1 species.

The area was created using overburden from the Falbrook Pit operation previously dumped by Vale. It was shaped from a free-fall (~37 degree slope) into a 10 degree slope. This slope was overlaid with approximately 100-200 mm of topsoil stockpiled within the rehabilitation area using a D10 dozer. Prior to seeding the area was spread with biosolids at a rate of 60 tonnes / hectare and ripped into the soil with a tractor with rip lines running across the contour to minimise erosion from surface run-off.

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. A cover crop was also applied to stabilise the slope and minimise the weed potential. 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.

Camberwell Pit Rail Corridor

The Camberwell Pit Rail Corridor site was rehabilitated in November and December 2018 totalling 5.8 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.

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. Due to the dry conditions, the rehabilitated area has not shown significant signs of vegetation. More rainfall is required to promote vegetation growth at this rehabilitated site.

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As shown in Table 29, 7.5 ha was rehabilitated in 2018 at RCS giving RCS a cumulative area rehabilitated of 436.3 ha since 1990. This cumulative area is 11.3 ha above the 2018 RCS MOP cumulative total of 424.8 ha. In 2018 Rixs Creek Mine concentrated the majority of operational efforts at the Rixs Creek Northern operations and subsequently reduced operations at Rixs Creek South. There is a concerted effort to shape overburden dumps as soon as they reach final landform height and this will continue across Rixs Creek Mine in 2019.

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 17.4 ha remains as non-caped tailing emplacement area compared to the 2018 MOP Emplacement Area total of 5ha.

Table 30 shows 9.3 ha was rehabilitated in 2018 at RCN giving RCN a cumulative area rehabilitated of 423.7 ha. This cumulative area is 11.6 ha behind the cumulative total of 435.3 ha in 2018 MOP requirements as seen in Table 34. An additional area of 5.5ha has been shaped to final landform and spread with topsoil at the rail corridor rehab site, however, due to availability issues with biosolids, this area was not ameliorated and seeded during the 2018 period and is planned to be completed early 2019, when Biosolids become available. The Falbrook Pit landform has been partially shaped, however the batter requires further shaping to the east to reach the final landform design. This is anticipated to be completed during the 2019 reporting period to ensure RCM adhere to the cumulative rehabilitation totals in the RCN MOP. Areas to be rehabilitated in 2019 are shown in figure 27.

Mining operations are actively progressing in Rixs Creek North with material moved now progressing towards final landform designs which will make available significant areas for reshaping and rehabilitation from 2019 onwards.

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Table 29 RCS Rehabilitation and Disturbance Areas (ha) compared to MOP

Domain / Phase	2017 Actual	2018 MOP	2018 Actual	2019 MOP
Infrastructure Area	60.7	62.4	63.8	60.1
Tailings Emplacement Area . RCS	20.6	5.0	17.4	0
Active Mining Area RCS	153.6	138.3	143.6	128.7
Overburden Emplacement Area -RCS	308.6	343.3	310.4	244.5
Rehabilitated Lands . Pasture phase . Ecosystem and landuse establishment	5.4	60.6	7.5	30.6
Rehabilitated Lands . Pasture; Ecosystem and Landuse Sustainability	113	104.6	118.2	195.8
Total Rehabilitation . Ecosystem and Landuse Sustainability (incl. pre MOP rehabilitation)	426.5	424.8	436.3	485.4

Table 30 Rehabilitation and Disturbance Areas (ha) compared to MOP

Domain / Phase	2017 Actual	2018 MOP	2018 Actual	2019 MOP
Infrastructure Area	109.8	109.8	109.8	107.5
Tailings Emplacement Area . RCN RCS	67.7	67.7	67.7	67.7
Active Mining Area RCN	98.8	84.6	98.2	91.6
Overburden Emplacement Area _RCN	369.0	366.0	358.1	353.3
Rehabilitated Lands . Pasture; Ecosystem and Landuse Establishment	17.2	19.4	9.3	14.8
Rehabilitated Lands . Pasture; Ecosystem and Landuse Sustainability	66.3	81.8	88.6	81.8
Total Rehabilitation . Ecosystem and Landuse Sustainability (incl. pre MOP rehabilitation)	415.9	435.3	423.7	450.0

Figure 22 outlines the progression of rehabilitation during the 2018 reporting period. All areas rehabilitated during 2018 across Rixs 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. The rehabilitation monitoring is scheduled to be completed in 2019 with areas depicted in Figure 23. The high calcium in the biosolids material aids in the reduction of soil dispersibility due to the stabilisation of sodic topsoil.

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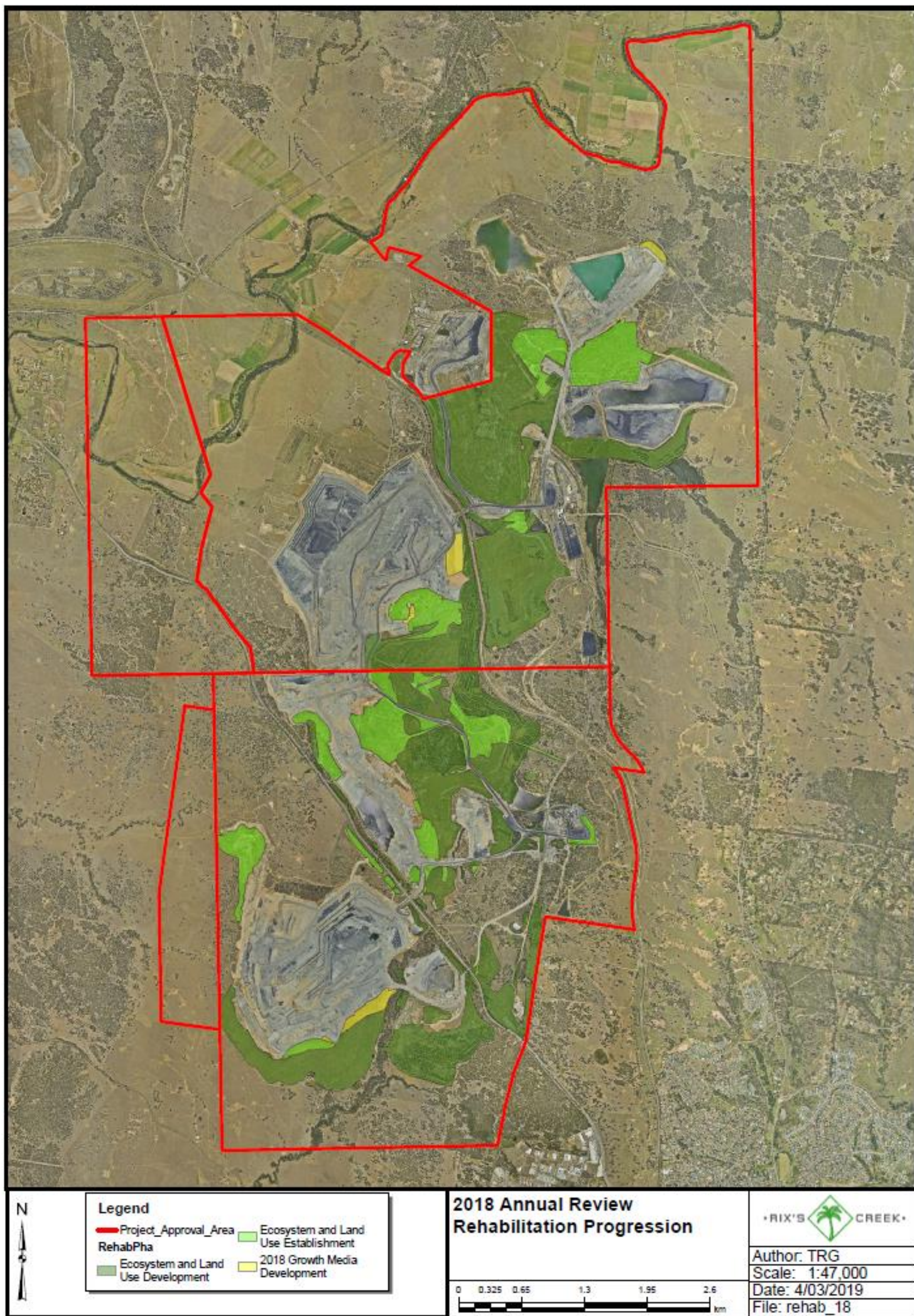


Figure 22 2018 Rix's Creek Mine Rehabilitation

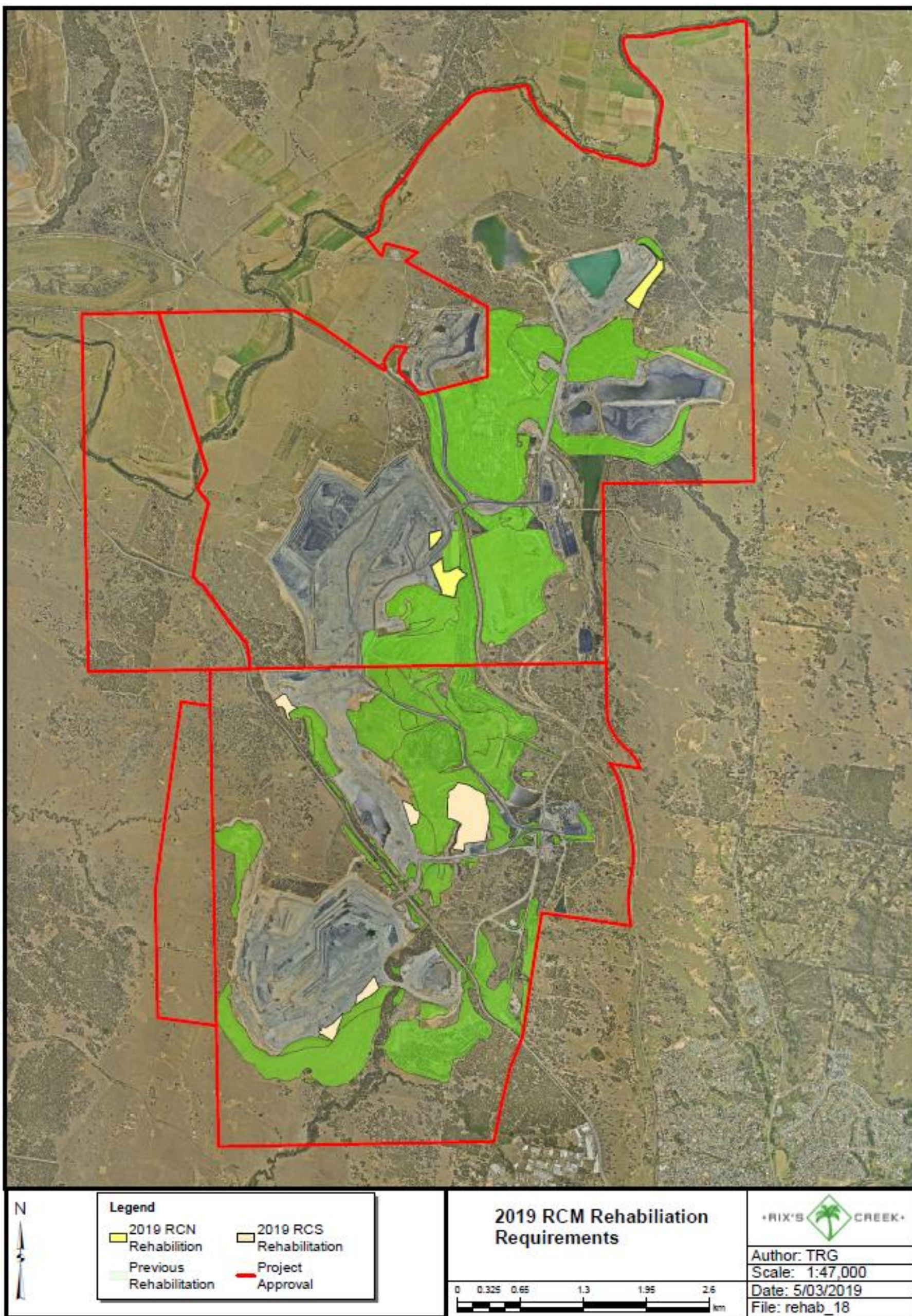


Figure 23 2019 Rehabilitation Areas

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8.4 Other Infrastructure

Rixs Creek South Coal Handling Preparation Plant (CHPP) was upgraded with an additional 3 Solid Bowl Centrifuges for tailings disposal being constructed and commissioned during the reporting period. Solid Bowl Centrifuges (SBCs) are used to dewater the tailings sufficiently to allow it to be transported by truck. The cake consists of approximately 35% moisture (w/w) and is discharged from the SBCs onto a conveyor where it is stockpiled for haulage. This infrastructure was constructed within the existing disturbance footprint of the RCS CHPP area.

8.5 Rehabilitation Trials and Research

The growth medium trial conducted at Rixs Creek Mine from August 2013 was finalised in October 2017. The research highlighted the benefits of the use of biosolids in rehabilitation to boost pasture productivity for grazing.

In late 2018 a new trial commenced for monitoring the productivity of rehabilitated pasture through grazing. The aim of Rixs 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.

The outcomes of the trial aims to:

- Demonstrate that rehabilitated land can sustain a viable cattle grazing enterprise post-mining, while maintaining stable land and vegetation.
- Demonstrate to key stakeholders the suitability of this rehabilitated land for cattle enterprises in the future.
- Develop guidance material for best practice grazing management for the site.

8.6 Rehabilitation Monitoring

Rehabilitation monitoring is undertaken on a bi-annual basis (every 2 years) with the last rehabilitation monitoring conducted at Rixs Creek Mine in spring 2017. Rehabilitation monitoring is scheduled to be completed in 2019 and will take into account additional monitoring sites required as committed in the RCN and RCS Mine Operation Plans.

8.7 Key Issues that may Affect Rehabilitation

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 *Acacia Saligna* from previously rehabilitated areas during the 2018 period, with secondary weed spraying conducted on areas where *Acacia Saligna* 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 Rixs Creek Mine.

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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 Artes 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.

During the 2018 rehabilitation inspection, it was noted by the Resources Regulator that rocks were identified in the Rixs Creek Mine rehabilitation. Within the growth medium development stage, rocks are pushed up via a tractor into piles after the topsoil and clay material has been ripped via a tractor. Rixs Creek has a rock roller that can break up silt stone and mud stone rocks that protrude to the surface after an area has been rehabilitated. Further pushing up of these rocks for use as habitat mounds or using the rock roller to break up these rocks are the processes currently in place to ensure that small to moderate size rocks are reduced on rehabilitated sites that are progressing toward a final landuse of grazing.

8.8 Rehabilitation Status

RCN as follows:

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Year 2017 (ha)	Year 2018 (ha)	Year 2019 (ha)
Total mine footprint	1917	1917	1917
Total active disturbance	645.3	633.9	620.1
Land being prepared for rehabilitation	5	10.1	13.2
Land under active rehabilitation	17.2	9.3	1.6
Completed rehabilitation	415.9	423.7	450.0

RCS as follows:

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Year 2017 (ha)	Year 2018 (ha)	Year 2019 (ha)
Total mine footprint	1823.3	1823.3	1823.3
Total active disturbance	569.6	535.1	433.3
Land being prepared for rehabilitation	9.0	4.8	39.7
Land under active rehabilitation	5.4	7.5	9.2
Completed rehabilitation	427.5	436.3	485.4

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SECTION 9 COMMUNITY

9.1 Community Engagement.

Rixs 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. Rixs Creek was the first mine in the Hunter Valley to have a CCC which has operated for 28 years.

During 2019 Department of Planning and Environment developed the Community Consultative Committee Guideline for State Significant Projects. This Guideline brought about changes to the current Rixs Creek CCC including Lisa Andrews replacing Councillor Sarah Lukeman as Chairperson.

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:-	General Manager Mining Development - Garry Bailey
	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 29th January 2018 for an Extraordinary CCC Meeting to explain the revised response to submissions and update all CCC members on the Rixs Creek South Continuation Project.

Once on the 22nd May 2018 to present the 2017 Annual Review.

Once on the 17th October 2018 the final meeting of the year was held and covered the environmental monitoring and performance results of the Rixs Creek operation since the previous meeting. This meeting also was the first meeting of the new CCC structure and the new Rixs Creek CCC Independent Chair Lisa Andrews and facilitated introductions of Rixs Creek CCC representatives, the new Chair and all committee members present. The Chair provided an explanation of the new CCC Guidelines and how the CCC will be run moving forward covering expectations and responsibilities of committee members.

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

- É Rixs Creek Continuation of Mining Project Project Newsletter Number 5 dated December 2017 and distributed in January 2018.

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

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Monthly 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 Rixs 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:

- Cancer Council NSW - Singleton Office operating expenses including rent
- 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

Rixs 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 and environmental practices.

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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.

During 2018 there was a total of 25 complaints received. This is a significant reduction (52%) compared to the 48 complaints received in 2017.

Of the twenty-Five (25) complaints received by the Company in 2018, 5 were related to blasting, 13 were related to noise, 4 were related to dust and 3 were related to odour.

Refer to **Appendix 3** for the Rixs Creek Mine Community Complaints Register.

Table 31 Complaints 2018

No	Date Received	Site	How received	Complaints Breakdown					
				Blast	Noise	Dust	Water	Lights	Odour
1	18/01/2018	RCN	Direct to mine			X			
2	23/01/2018	RCN	EPA			X			
3	24/01/2018	RCN	Rixs Hotline			X			
4	29/01/2018	RCN	Rixs Hotline	X					
5	05/02/2018	RCN	Direct to mine	X					
6	08/02/2018	RCN	Rixs Hotline	X					
7	10/02/2018	RCN	Rixs Hotline		X				
8	11/02/2018	RCN	Rixs Hotline			X			
9	13/02/2018	RCN	Direct to mine		X				
10	13/02/2018	RCN	Rixs Hotline	X					
11	04/03/2018	RCN	Direct to mine		X				
12	27/06/2018	RCN	Direct to mine		X				
13	02/07/2018	RCS	Rixs Hotline		X				
14	03/07/2018	RCN	Rixs Hotline		X				
15	12/07/2018	RCS	Rixs Hotline						X
16	19/07/2018	RCS	EPA		X				
17	27/07/2018	RCS	Direct to mine		X				
18	27/9/2018	RCS	Direct to Mine		X				
19	3/10/2018	RCS	Direct to mine		X				
20	18/10/2018	RCS	Rixs Hotline						X
21	23/10/2018	RCN	Direct to mine	X					
22	25/10/2018	RCS	Direct to mine		X				
23	7/11/2018	RCS	Direct to mine						X
24	9/11/2018	RCS	Direct to mine		X				
25	14/12/2018	RCS	Direct to mine		X				

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

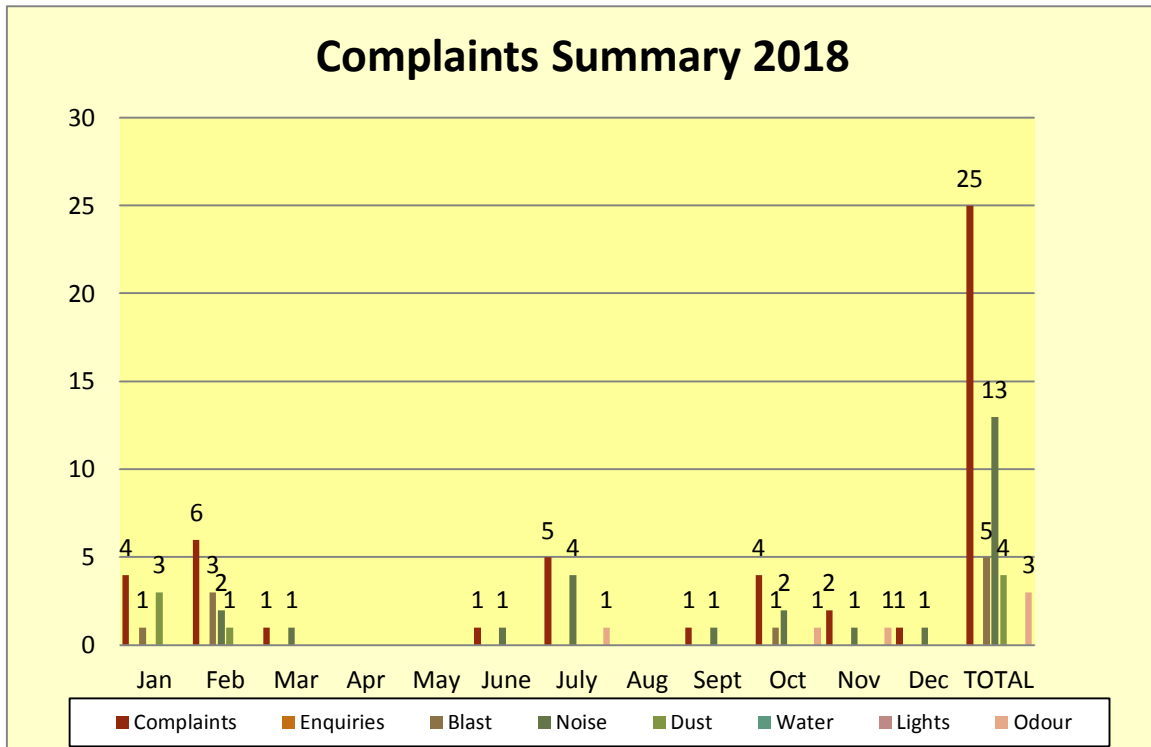


Figure 24 2017 RCM Complaints Summary

Forty-eight (48) complaints were received by the Company in 2017. 37 were made via direct contact/calls to the mine, 5 were direct from Environmental Protection Authority (EPA) and 6 were direct from Planning and Environment (DPE). Ten (10) operational enquiries were made directly to the mine in 2017.

Of the twenty-five (25) complaints received by the Company in 2018 13 were made via direct contact/calls to the mine, 2 were direct from Environmental Protection Authority (EPA) and 10 were direct from The Department of Planning and Environment (DPE).

Ten (10) operational enquiries were made directly to the mine in 2018.

Five (5) blast complaints were received by RCM on four separate days, however, all of these occasions Rixs Creek had not initiated blast and therefore these complaints were not registered as complaints rather they were recorded internally as Complaint Received . not Rixs Creek+.

ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

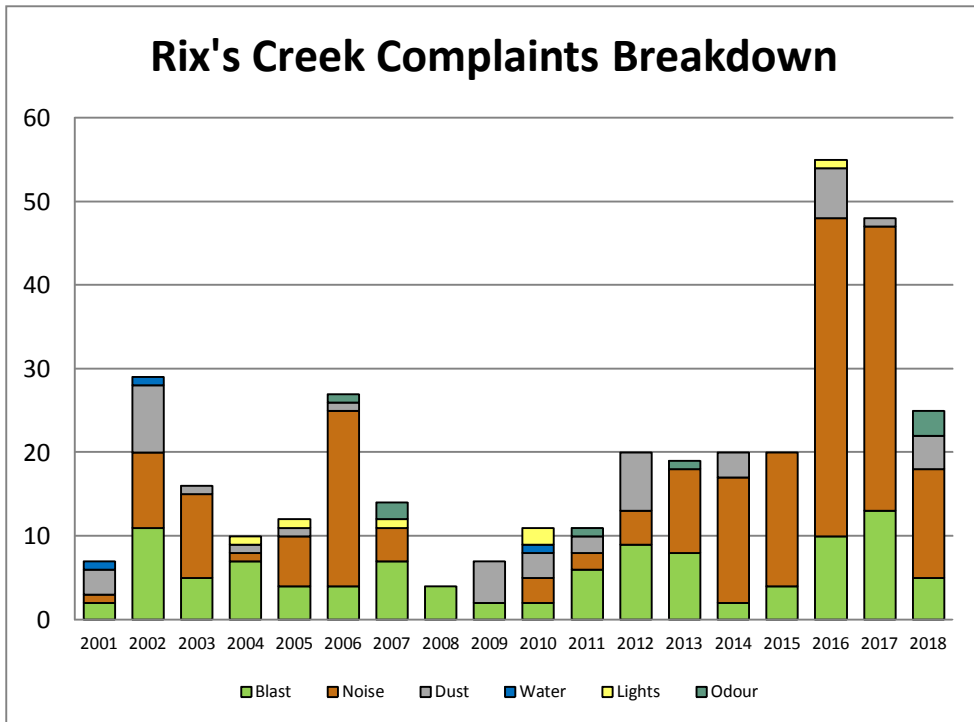


Figure 25 Summary of Rix's Creek Complaints 2001-2018

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Rixs Creek North & Rixs Creek South

SECTION 10 – INDEPENDENT AUDIT

An independent audit of the Rixs Creek North project approval PA 08_0102 was completed in October 2017 by Umwelt. The last independent audit of the Rixs Creek South approval was carried out in 2016 by Umwelt required under the approval DA49/94. The Rixs Creek South Independent Environmental Audit is scheduled to be completed in 2019.

10.1 Development Consent

A summary of the compliance assessment against Rixs Creek Mine Development Consents is included below.

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

The status of proposed actions from the Rixs 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 Rixs 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.

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Rixs Creek North & Rixs Creek South

Table 32 RCN Audit Response to Auditors Recommendations

Condition / Issue	Identified Non- Compliance	Non Compliance	Recommendation	Rix's Creek's Response	Progress/ Timeline
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 19 (f)	A cumulative protocol has not been developed in coordination with the nearby mines and included in the blast management plan as required.	Low	A formal protocol should be developed in consultation with the owners of the nearby mines as required and that it be included in the blast management plan for the Departments approval.	A draft protocol will be developed and sent to Ashton and the Mount Owen Complex for consultation. Comments received from other mines during the consultation period will be used to prepare a protocol to minimise and manage the cumulative blast impacts of the mines. The requirements of the protocol will be included in the Rix's Creek Mine Blast Management Plan.	30 June 2019
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
Schedule 3, Condition 27 (c)	A cumulative protocol has not been developed in coordination with the nearby mines and included in the air quality and greenhouse gas management plan as required.	Low	A formal protocol should be developed in consultation with the owners of the nearby mines as required and that it be included in the AQGGMP management plan for the Departments approval.	A draft protocol will be developed and sent to Integra Underground, Ashton and the Mount Owen Complex for consultation. Comments received from other mines during the consultation period will be used to prepare a protocol to minimise and manage the cumulative air quality impacts of the mines. The requirements of the protocol will be included in the Rix's Creek Mine Air Quality and Greenhouse Gas Management Plan.	30/6/2019

ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

Table 33 RCS Audit Response to Auditors Recommendations

Condition	Non-Compliance	Risk Level	Action Plan
Schedule 2, Condition 6(c)	No formal building maintenance program was implemented to specifically review the maintenance of buildings.	Administrative	To be addressed through the updating of the Landscaping Plan
Schedule 2, Condition 16D	<ul style="list-style-type: none"> Sections of the Mine Closure Plan did not include the information required below: objectives and criteria for mine closure for ML 1432 and completion criteria for each domain. 	Low	Landscape Management Plan to be submitted for approval June 2019.
Schedule 2, Condition 28	Not all management plans / programs were revised following the submission of an incident report under Condition 19 or modifications of the Development Consent to the satisfaction of the Secretary.	Low	Procedure to be developed to address this requirement to revise strategies, plans and programs.

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Rixs Creek North & Rixs Creek South

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

Incidents that occurred during 2018 are detailed in this section.

11.1 Highwall cracking near disturbance area

During 2016 initial cracking was observed on the light vehicle access track along the crest of the WE09 area. The crack at the time was limited and did not extend into the 20m buffer zone required to be maintained under Development Approval DA 49/94 Schedule 2, Condition 16 (iii). Following the discovery of the initial cracking an external geotechnical engineer was engaged to provide reassessment of mining designs and establish a monitoring program. Monitoring of the wall continued throughout 2016 and 2017.

Following the 2017 Christmas and New Year period, it was noted during inspection that further movement had occurred which propagated the existing crack and allowed a second crack to form within the 20 m buffer zone along Rixs Creek. It was noted at the time of inspection that the creek bed was dry and not cracked..

Rixs Creek have buttressed the highwall along WE09 to minimise further movement and to reduce potential impact to Rixs Creek. Rixs Creek Mine will continue to monitor and assess movement along the area. During this time Rixs Creek Mine have prepared an action plan for the West Pit Highwall crack remediation area. The Plan includes a Trigger Action Response Plan (TARP) which outlines the remediation required and the expectations to achieve a long term safe, stable and non-polluting landform.

11.2 TEOM damaged by vandals

Rixs Creek South West TEOM is located at near the Telstra Tower off Bridgman Road Singleton. The RCS SE TEOM forms part of the Rixs Creek Air Quality Monitoring Network and is a requirement under Project Approval PA 08_0102, associated Air Quality and Greenhouse Gas Management Plan and under EPL 3391.

Vandalism of the TEOM Unit occurred during the evening of 26 April 2018. Time of incident was established through the SCADA real time network due to failure of the TEOM at 11:49 PM.

The vandalism of the RCN SE TEOM unit has caused the unit to be non- functional, causing non-compliance with the real time monitoring of PM 10 requirement of the Project Approval and EPL3391. A consultant was engaged to assess and repair the damage to the unit to re-establish real time PM10 monitoring at the site.

11.3 Historical mining outside approved area Rix’s Creek North.

A revised Mine Plan was completed in April 2018 to access a part of the approved western extension under Project Approval 08_0102. This revision included use of an existing road to access the western extension area. As part of this process the area was assessed to ensure operations were in accordance with current Project Approval.

The area was determined to be outside the approved open cut mining limit as shown in the 1989 Camberwell EIS, including subsequent modifications and more recent Project Approvals. Rixs Creek mine conducted an internal review of previous mining by others to determine when the area had been originally disturbed and subsequently mined. The total area disturbed outside the project approval Camberwell DA86/2889 was 7.2ha.

Rixs Creek Mine is seeking consent to modify 08_0102 (RCN) to allow for mining to be undertaken within a 7.2 hectare area previously disturbed within the 08_0102, Camberwell South Pit consent area.

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

11.4 Noise exceedance low frequency penalty

Rixs Creek North exceeded the noise limit under Condition L3.1 at location NM5, 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). 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.

Rixs Creek mine has reviewed the Noise Management Plan to allow increased attended management monitoring of other areas where enhancement may be occurring and submitted this plan to NSW EPA and NSW DPE for review. One official caution was issued to RCM from the EPA in relation to a low frequency exceedance of attended noise compliance monitoring for June 2018.

11.5 Blast exceedance

Rixs Creek South Mine initiated a blast at 11:10 am on Thursday 12 July 2018. Blast monitors used to determine compliance limits in accordance with DA 49/94 (Sch. 2, Cond 12) and EPL3391 did not exceed the blast criteria, however a high overpressure result, which exceeded the blast criteria limit, was measured at an operational monitor (monitor not included in Blast Management Plan or EPL3391) at the Civic Avenue Monitor of 120.8 dB.

As per DPEs request, Rixs Creek Mine have amended the Blast Management Plan to include the Civic Avenue Blast Monitor as a compliance monitor.

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Rixs Creek North & Rixs Creek South

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

The operations for the coming year will be similar to 2018. Mining will be focussed in the West Pit (Pit 3) at Rixs Creek South and Camberwell Pit operations at Rixs 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 overburden placement will be dumped from the eastern section of Camberwell pit and transition to the west in 2018 as per the Mining Operation Plan.

Further improvements to the Rixs Creek Real time SCADA system will be completed in 2019. An upgrade to the Rixs Creek Mine weather station is anticipated with an upgrade to site environmental monitors onto a standalone webhosting platform that will improve data reliability.

Environmental management is an ongoing process at Rixs Creek with continual improvement being made to the existing systems already in place. Management plans will require updating in 2019 to standardise processes across both Rixs Creek North and Rixs Creek South operations. Table 34 refers to the Environmental Performance Improvement Activities for the 2018 period.

Table 34 Environmental Performance Improvement Activities

Environmental Performance Improvement Activities	Target Date
Rixs Creek Mine Rehabilitation Progression	Q1-Q4 2019
Continued upgrades/ validation to the Environmental Forecasting Tools used at Rixs Creek Mine.	Q4 2019
Flowmeter upgrades around Rixs Creek Mine. Flowmeter data to be integrated into SCADA network.	Q3 2019
The Target date for the Surrender of DA49/94 is June 2019 or sooner depending if SSD_6300 Rixs Creek Mine Continuation Project is approved.	June 2019

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Rixs Creek North & Rixs Creek South

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.

Table 35 Environmental Management Plans

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

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

DPE	Approved 16/1/2019	Water Management Plan
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Appendix 1 Rix’s Creek Complex Surface Water Sampling Results

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Rixs Creek North & Rixs Creek South

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			
		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
25/01/2018	Jan-18									7.5	259	12	136	7.5	262	16	178				
27/02/2018	Feb-18	4.7	854	140	619	5.9	278	179	405	7.3	258	7	173	7.4	265	8	146	7	3550	16	2210
20/03/2018	Mar-18									7.6	260	9	211	7.6	269	13	202				
19/04/2018	Apr-18	3.4	1821	33	1180	6.7	236	80	692	7.6	347	6	190	7.7	360	6	208				
22/05/2018	May-18									8.1	450	3	260	8	362	4	206				
21/06/2018	Jun-18					6.2	140	144	673	6.7	322	3	260	7.2	344	3	247	7.3	1160	62	734
24/07/2018	Jul-18					7.3	184	23	449	7.6	323	3	163	7.8	346	2	209				
30/08/2018	Aug-18									7.8	355	2	225	7.8	300	3	240				
24/09/2018	Sep-18									8.0	355	5	232	7.9	266	6	209				
25/10/2018	Oct-18									7.54	325	17	194	7.63	343	18	200				
28/11/2018	Nov-18									7.9	342	9	189	7.8	261	12	152				
20/12/2018	Dec-18	6.8	623	154	523	6.5	157	194	1010	7.2	297	7	170	7.5	325	23	197	7.6	1194	139	689
	HISTORICAL AVERAGE	5.0	1099.3	109.0	774.0	6.5	199.0	124.0	645.8	7.6	324.4	6.9	200.3	7.7	308.6	9.5	199.5	7.3	1968.0	72.3	1211.0
	MIN	3.4	623.0	33.0	523.0	5.9	140.0	23.0	405.0	6.7	258.0	2.0	136.0	7.2	261.0	2.0	146.0	7.0	1160.0	16.0	689.0
	MAX	6.8	1821.0	154.0	1180.0	7.3	278.0	194.0	1010.0	8.1	450.0	17.0	260.0	8.0	362.0	23.0	247.0	7.6	3550.0	139.0	2210.0
	SD	1.7	635.6	66.2	354.9	0.5	57.2	71.5	241.0	0.4	54.0	4.4	38.5	0.2	42.0	6.8	29.8	0.3	1370.2	62.1	865.5
Dry = No sample, site was dry																					

Date Sampled	Month Sampled	W7: Stony Ck				W10: Dam C4 (EPA Site)				W11: GI Ck NEH				W12: Dam C1				
		pH	EC	TSS	TDS	Disch.	pH	EC	TSS	TDS	pH	EC	TSS	TDS	pH	EC	TSS	TDS
			uS/cm	mg/l	mg/l	Flow		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l		uS/cm	mg/l	mg/l
25/01/2018	Jan-18						9.4	3410	10	2070	7.4	265	10	154	8.8	2560	3	1430
27/02/2018	Feb-18	5.6	162	8	153		9.3	3550	16	2210	7.6	261	7	160	8.6	2650	1	1510
20/03/2018	Mar-18	6.4	209	32	252		9.4	3680	13	2500	7.6	284	8	199	8.9	2780	2	1750
19/04/2018	Apr-18	7	256	34	214		9.4	3650	10	2260	7.9	340	6	175	8.9	2880	2	1650
22/05/2018	May-18	7.2	249	32	186		9.2	3750	26	2340	7.9	366	7	191	8.7	3010	2	1760
21/06/2018	Jun-18						9	3720	39	2370	8.1	360	4	263	8.2	2980	15	1830
24/07/2018	Jul-18						8.9	3810	30	2390	7.9	361	2	228	8.3	3190	7	1900
30/08/2018	Aug-18						8.9	3910	24	2480	7.8	301	5	154	8.4	3360	9	2030
24/09/2018	Sep-18						8.9	4030	34	2650	8	286	6	201	8.6	3490	3	2210
25/10/2018	Oct-18	6.56	195	32	257		8.82	4760	40	2680	7.83	352	12	205	8.63	4260	13	2160
28/11/2018	Nov-18	6.9	220	26	231		9.1	4430	41	2890	7.7	274	10	176	8.7	3780	4	2300
20/12/2018	Dec-18	6.5	128	102	266		9.1	4370	27	2760	7.6	340	3	242	9.1	3920	25	2000
	HISTORICAL AVERAGE	6.6	202.7	38.0	222.7	#DIV/0!	9.1	3922.5	25.8	2466.7	7.8	315.8	6.7	195.7	8.7	3238.3	7.2	1877.5
	MIN	5.6	128.0	8.0	153.0	0.0	8.8	3410.0	10.0	2070.0	7.4	261.0	2.0	154.0	8.2	2560.0	1.0	1430.0
	MAX	7.2	256.0	102.0	266.0	0.0	9.4	4760.0	41.0	2890.0	8.1	366.0	12.0	263.0	9.1	4260.0	25.0	2300.0
	SD	0.5	45.9	29.6	41.4	#DIV/0!	0.2	403.3	11.5	241.7	0.2	41.0	3.0	34.9	0.3	534.8	7.3	274.2

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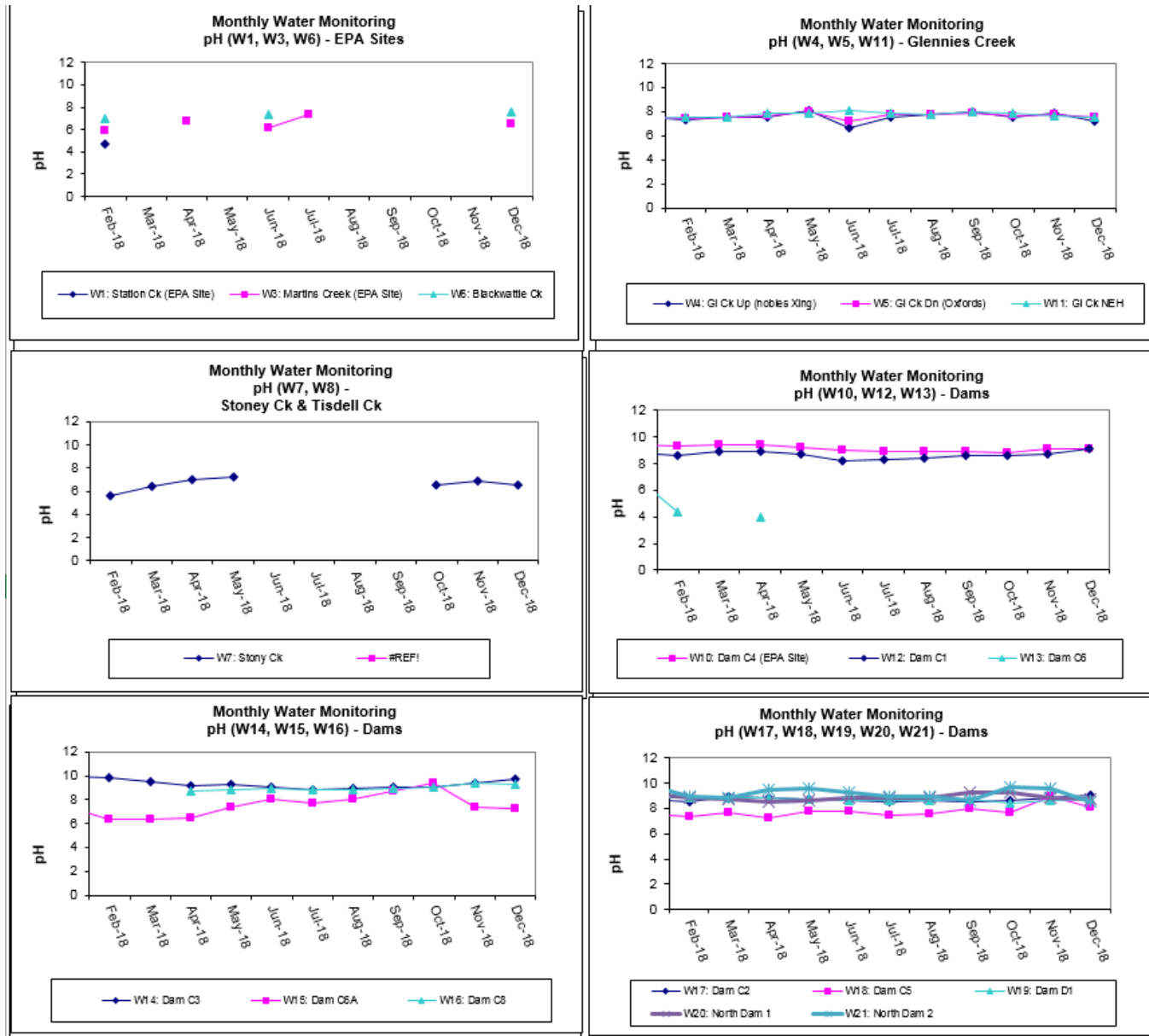
Rixs Creek North & Rixs Creek South

Date Sampled	Month Sampled	W13: Dam C6				W14: Dam C3				W15: Dam C6A				W16: Dam C8			
		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
25/01/2018	Jan-18	6.9	870	101	591	9.9	3380	7	2080	7.4	592	23	330	9.5	6020	9	4340
27/02/2018	Feb-18	4.4	904	53	642	9.8	3500	9	2180	6.4	491	252	382				
20/03/2018	Mar-18					9.5	3560	10	2280	6.3	724	26	562				
19/04/2018	Apr-18	4	1026	38	598	9.18	3910	8	2120	6.5	435	10	280	8.7	5970	<5	3190
22/05/2018	May-18					9.3	3910	14	2650	7.4	471	9	334	8.8	5700	11	4340
21/06/2018	Jun-18					9.1	3820	15	2490	8	469	6	297	8.9	5460	8	4180
24/07/2018	Jul-18					8.8	4090	17	2690	7.7	504	7	323	8.8	5980	14	4310
30/08/2018	Aug-18					8.9	4200	20	2870	8	570	10	327	8.8	6190	19	4890
24/09/2018	Sep-18					9.1	4420	20	2940	8.7	576	16	402	8.9	6500	11	4790
25/10/2018	Oct-18					9.1	4500	20	3000	9.35	604	16	352	9.1	6660	20	4990
28/11/2018	Nov-18					9.42	5050	17	3180	7.4	684	89	442	9.43	7190	19	5460
20/12/2018	Dec-18					9.7	4230	2	2800	7.2	528	13	389	9.3	5150	9	3940
HISTORICAL AVERAGE		5.1	933.3	64.0	610.3	9.3	4047.5	13.3	2606.7	7.5	554.0	39.8	368.3	9.0	6082.0	13.3	4443.0
MIN		4.0	870.0	38.0	591.0	8.8	3380.0	2.0	2080.0	6.3	435.0	6.0	280.0	8.7	5150.0	8.0	3190.0
MAX		6.9	1026.0	101.0	642.0	9.9	5050.0	20.0	3180.0	9.4	724.0	252.0	562.0	9.5	7190.0	20.0	5460.0
SD		1.6	82.0	32.9	27.6	0.4	474.8	6.0	372.5	0.9	88.4	70.5	76.4	0.3	594.1	4.8	631.1

Date Sampled	Month Sampled	W17: Dam C2				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	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
25/01/2018	Jan-18	8.7	1502	2	828	7.6	491	22	272	8.8	9880	11	6600	9.2	11400	24	7890	9.8	5000	14	3100
27/02/2018	Feb-18	8.5	1489	5	891	7.4	496	33	344	8.9	9120	6	6440	8.9	8550	34	5700	9	4890	42	3110
20/03/2018	Mar-18	9	1535	4	1010	7.7	570	21	443	8.8	9310	10	6540	8.7	5300	24	3430	8.9	3130	16	1900
19/04/2018	Apr-18	8.9	1562	4	893	7.3	455	15	281	8.8	8930	15	5990	8.49	9720	24	6690	9.49	3660	18	1980
22/05/2018	May-18	8.7	1597	5	935	7.8	511	32	321	8.7	9020	10	6260	8.6	9760	8	7070	9.6	3650	60	2330
21/06/2018	Jun-18	8.6	1627	4	940	7.8	508	13	298	8.6	8780	48	6320	8.9	9020	4	6390	9.3	3400	61	2100
24/07/2018	Jul-18	8.5	1680	7	957	7.5	554	24	325	8.6	9220	10	6800	8.8	9590	13	6730	9	3760	88	2370
30/08/2018	Aug-18	8.6	1734	7	1080	7.6	607	49	355	8.6	9390	19	6620	8.9	9620	4	7080	9	4050	97	2620
24/09/2018	Sep-18	8.5	1791	4	1110	8	648	52	416	8.7	9610	6	7210	9.3	9750	12	6880	8.6	4530	77	2850
25/10/2018	Oct-18	8.69	2100	<5	1040	7.71	751	54	438	8.38	11400	<5	5670	9.3	8840	27	6220	9.7	3690	28	2400
28/11/2018	Nov-18	8.9	1875	29	1060	9	850	98	571	8.6	9200	33	6510	8.81	9850	180	7160	9.56	4270	168	2800
20/12/2018	Dec-18	9.1	1894	2	1120	8.1	686	29	427	8.7	8880	3	6120	8.7	5150	45	3380	8.5	1983	37	1290
HISTORICAL AVERAGE		8.7	1698.8	6.6	988.7	7.8	593.9	36.8	374.3	8.7	9395.0	15.5	6423.3	8.9	8879.2	33.3	6218.3	9.2	3834.4	58.8	2404.2
MIN		8.5	1489.0	2.0	828.0	7.3	455.0	13.0	272.0	8.4	8780.0	3.0	5670.0	8.5	5150.0	4.0	3380.0	8.5	1983.0	14.0	1290.0
MAX		9.1	2100.0	29.0	1120.0	9.0	850.0	98.0	571.0	8.9	11400.0	48.0	7210.0	9.3	11400.0	180.0	7890.0	9.8	5000.0	168.0	3110.0
SD		0.2	186.8	7.6	95.0	0.4	119.7	23.7	87.1	0.1	704.1	13.5	397.3	0.3	1844.9	47.8	1420.6	0.4	820.0	44.5	535.9

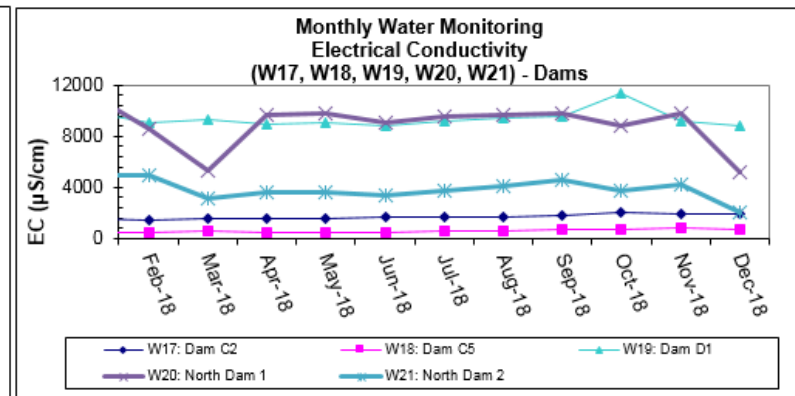
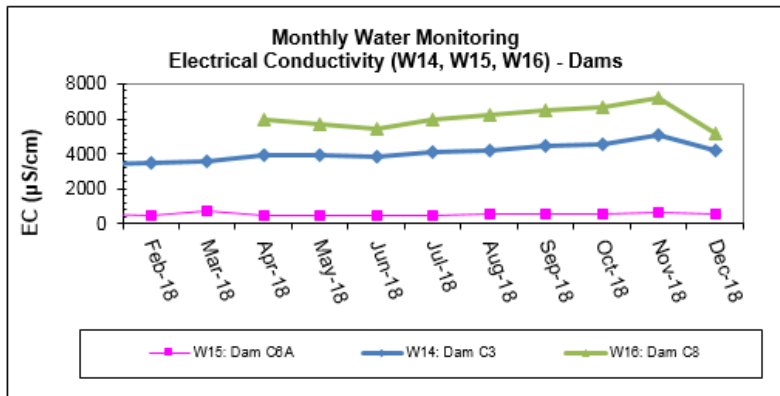
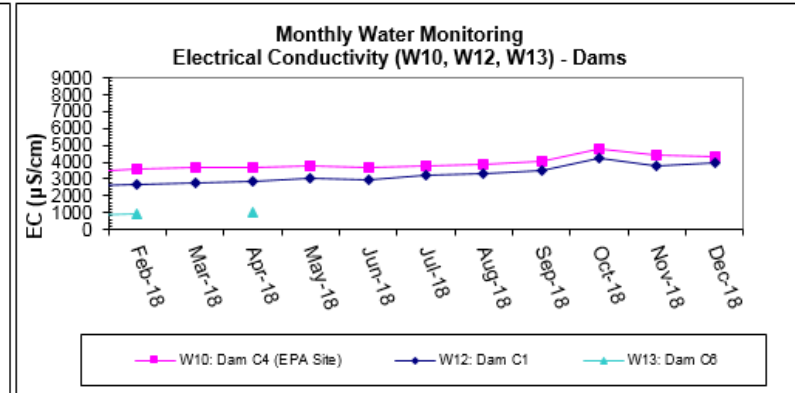
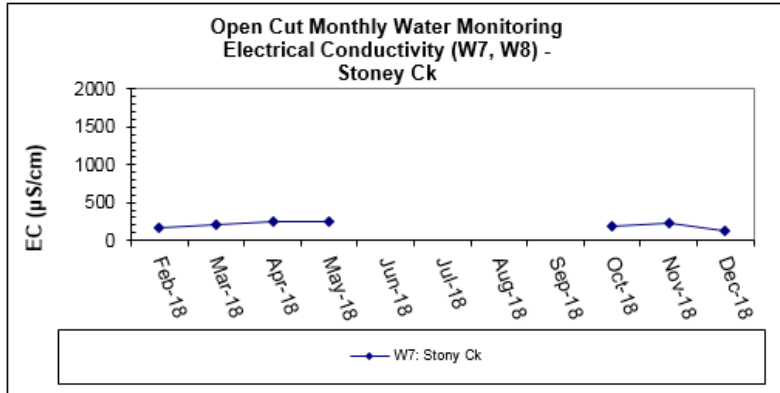
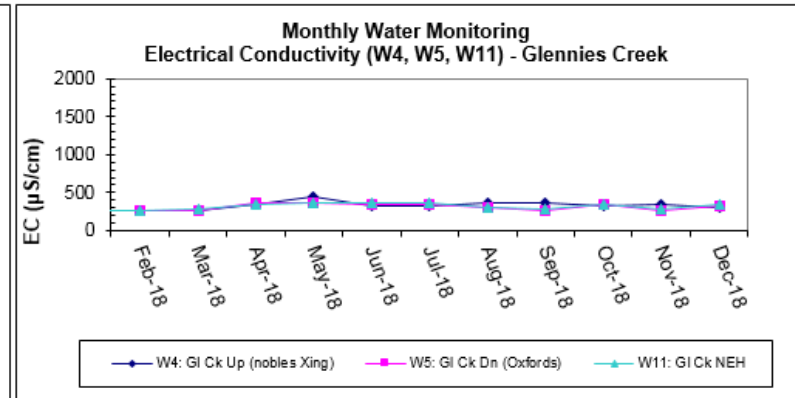
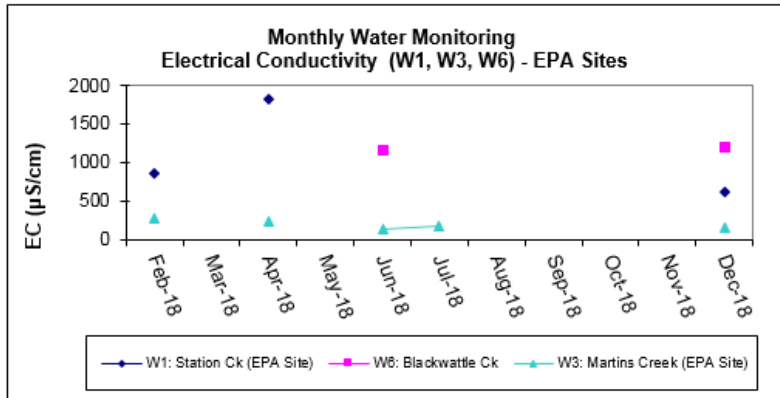
ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



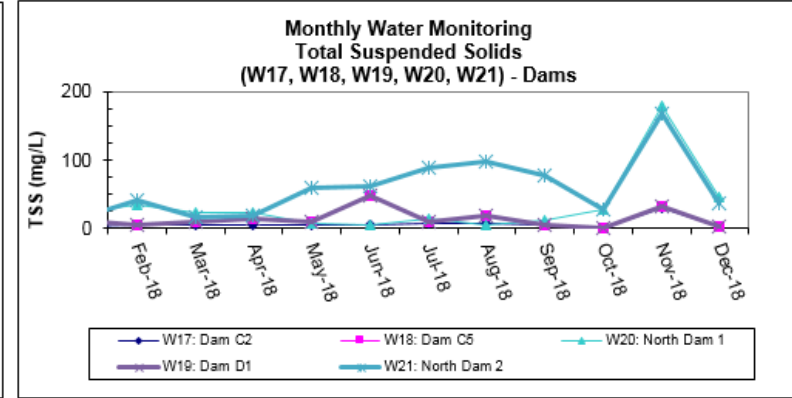
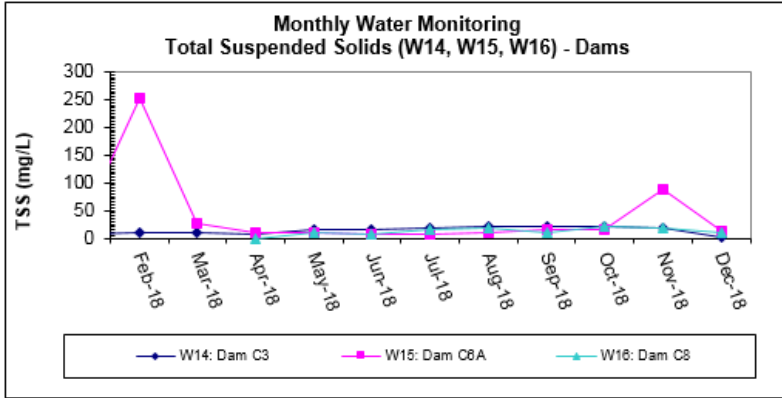
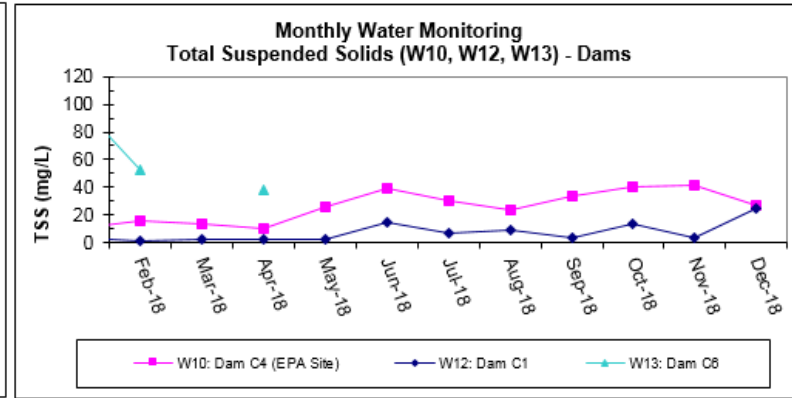
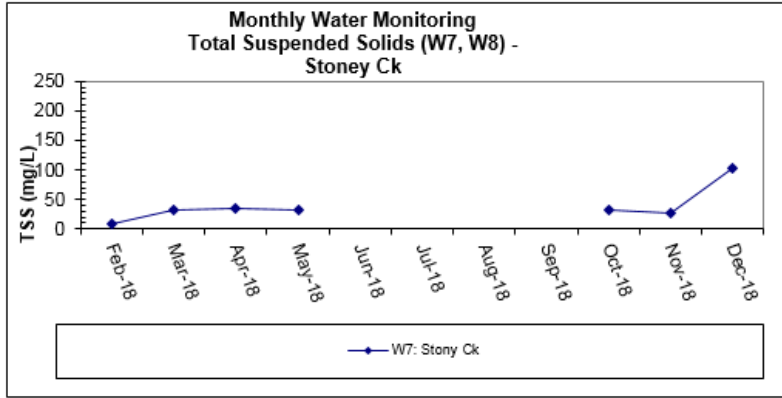
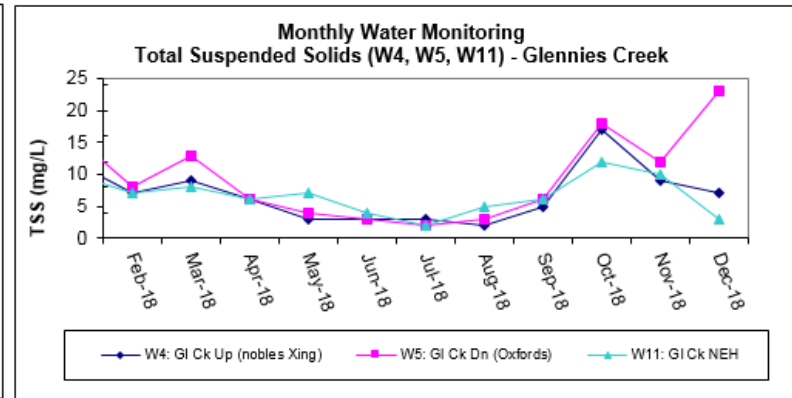
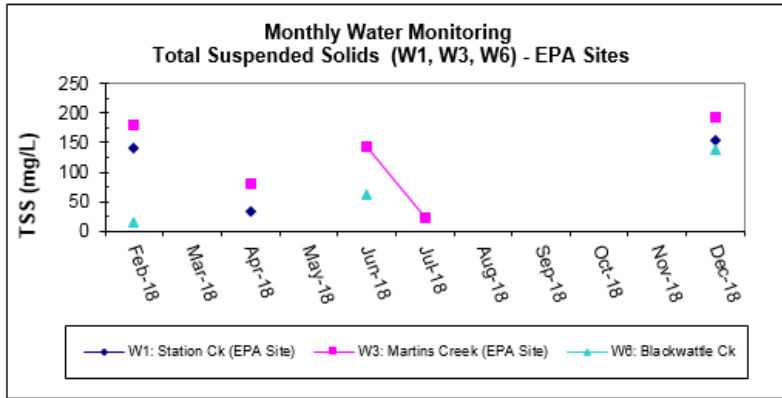
ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



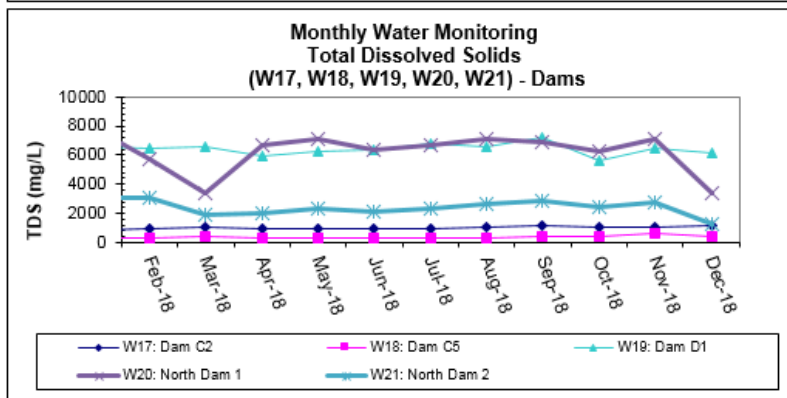
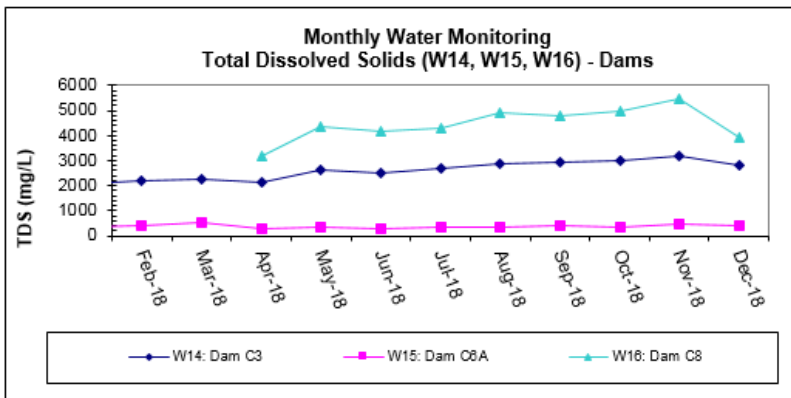
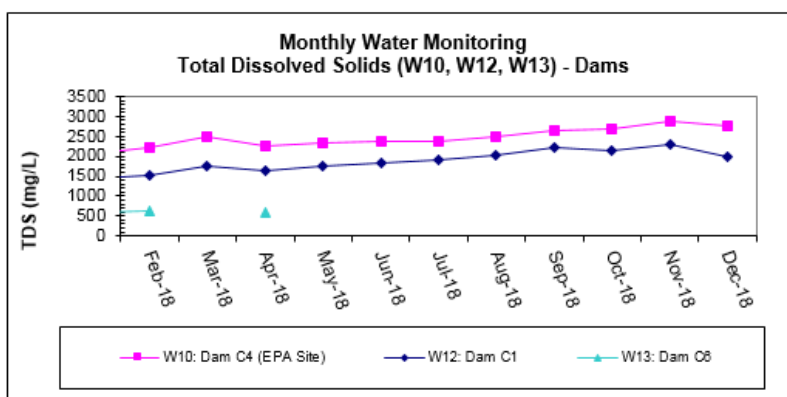
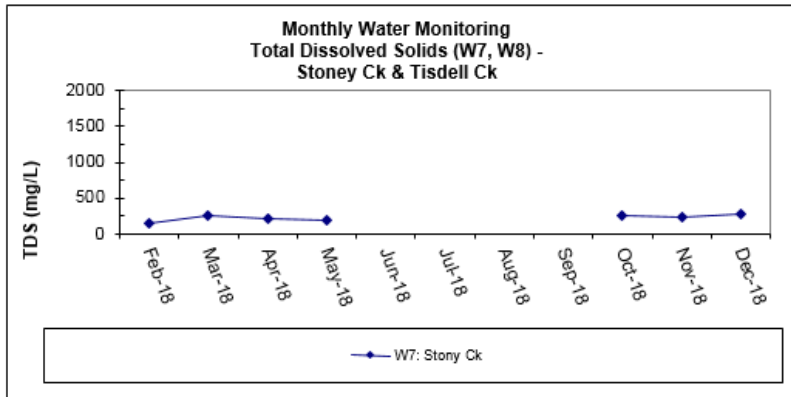
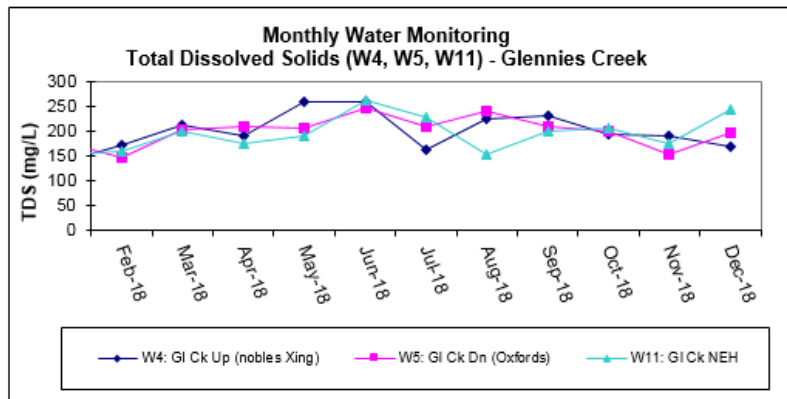
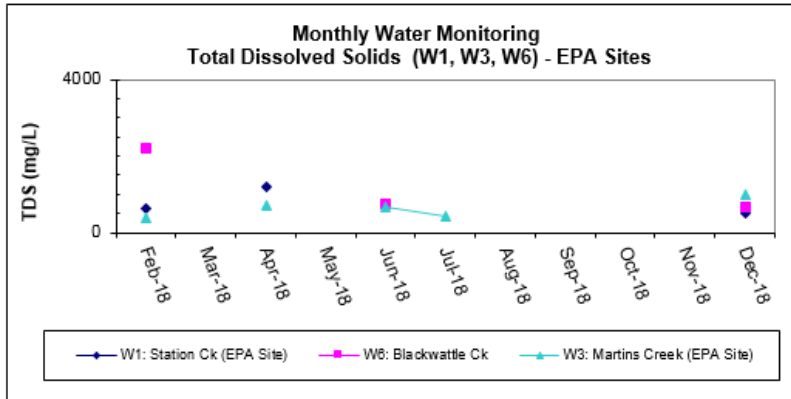
ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



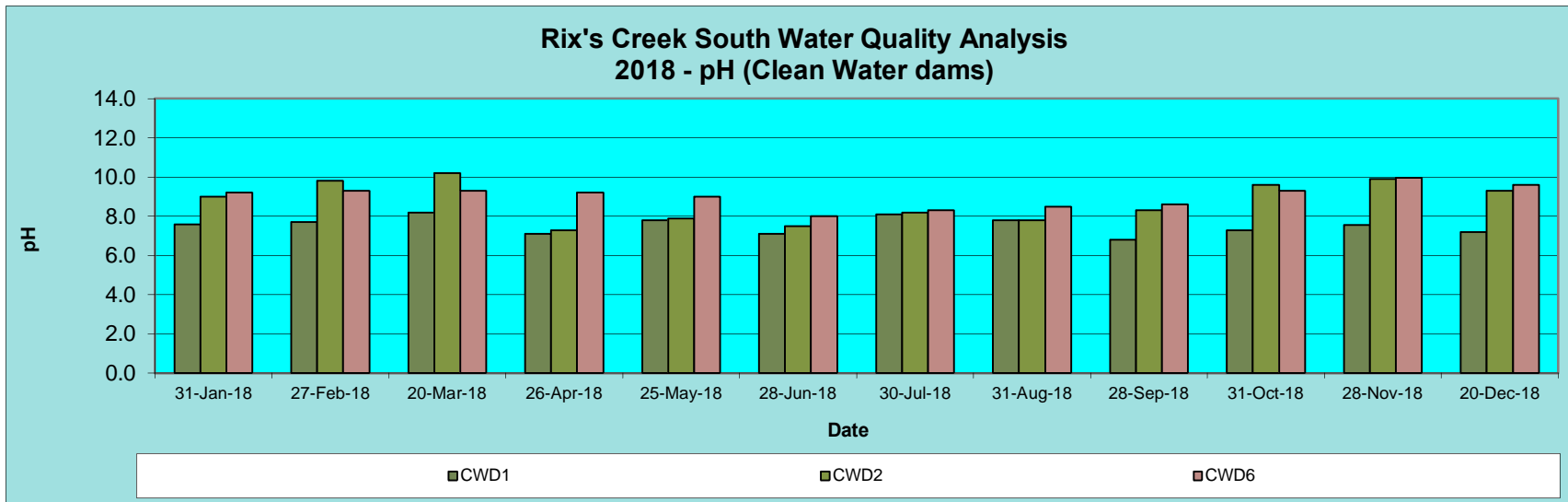
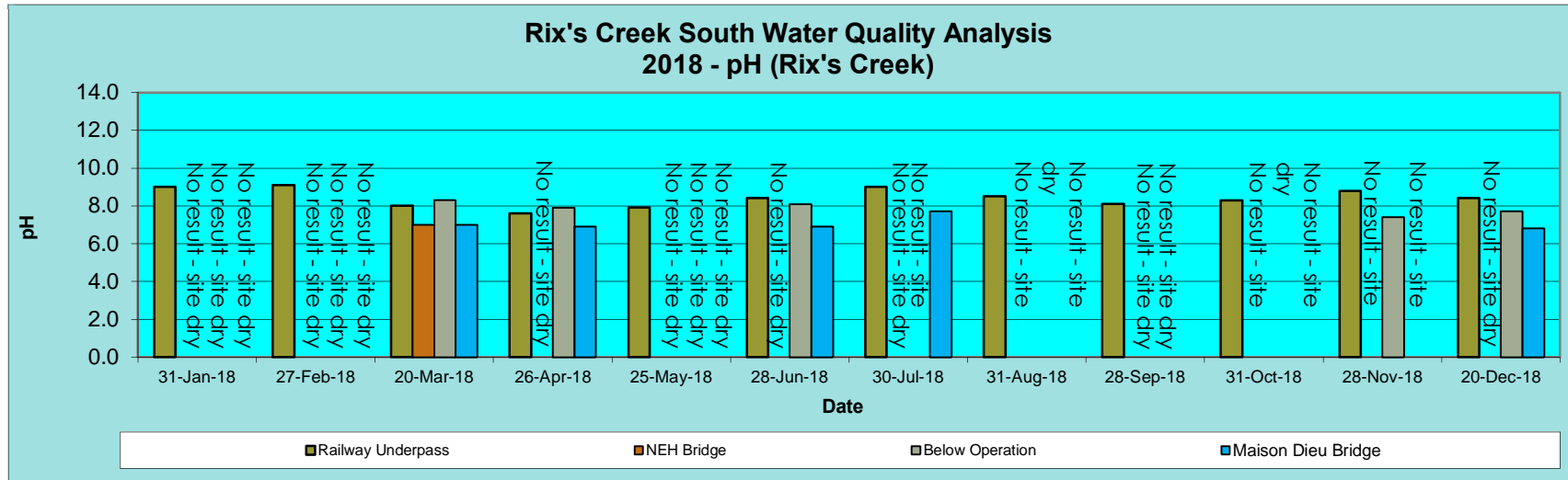
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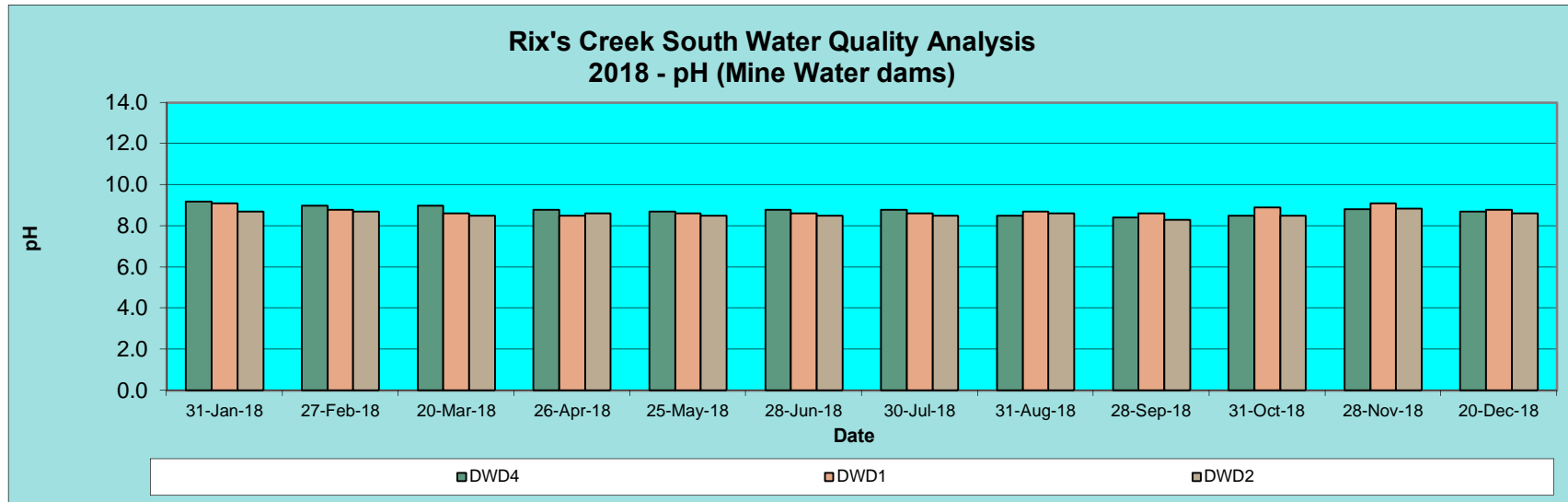
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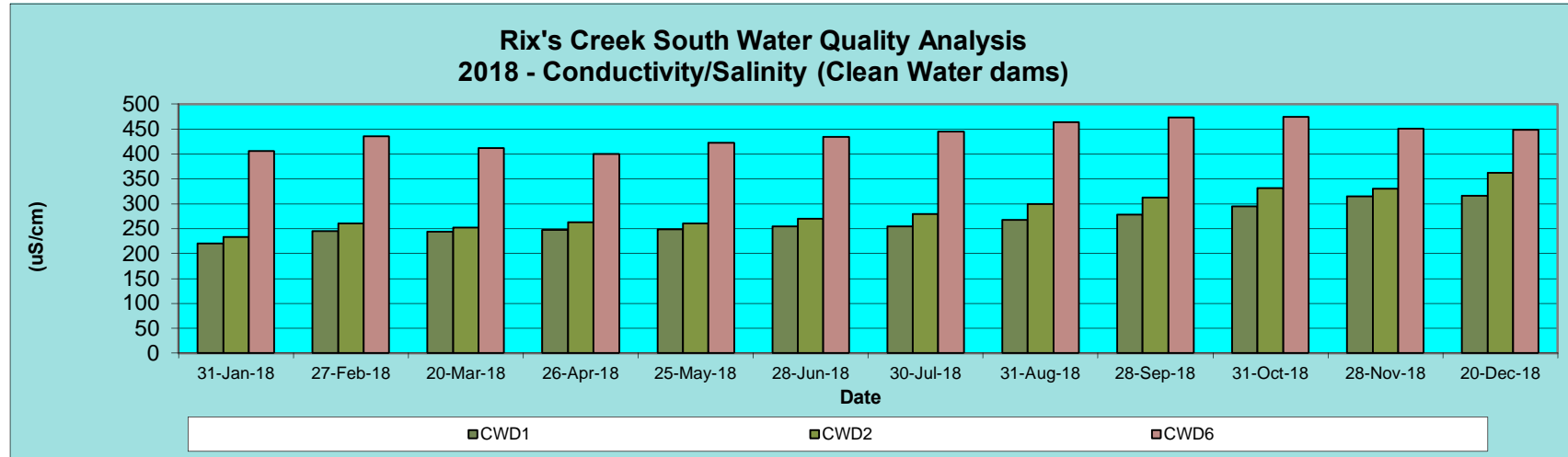
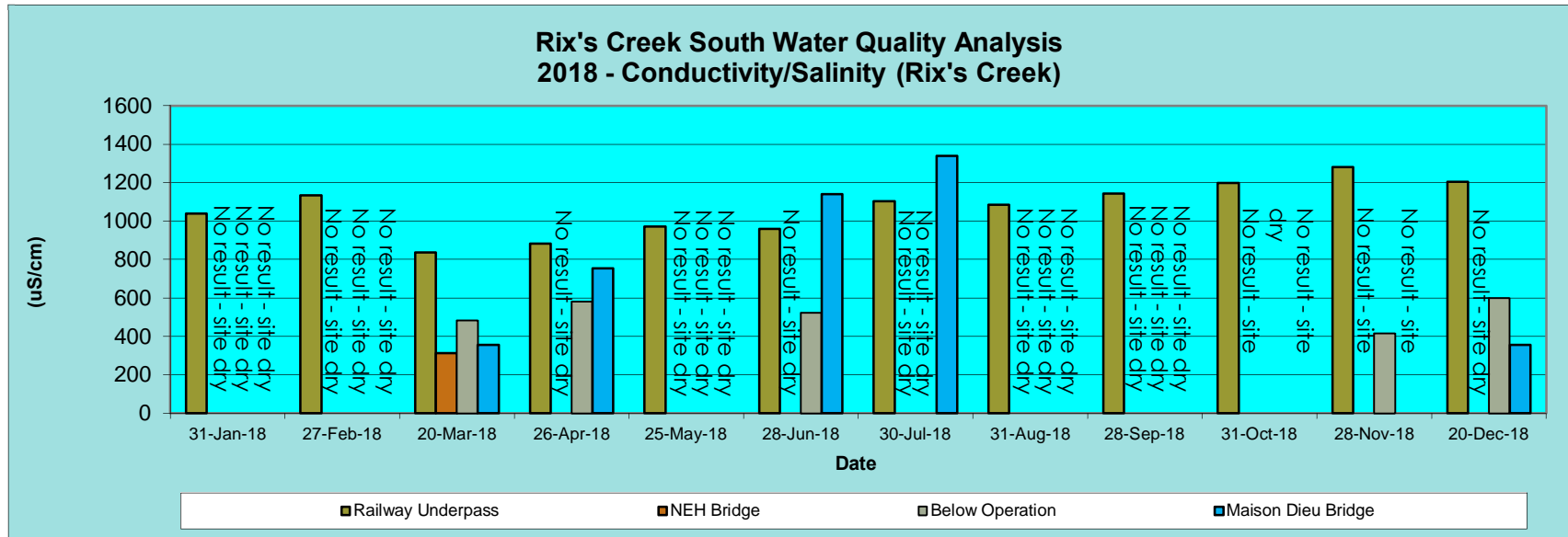
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Rixs Creek North & Rixs Creek South



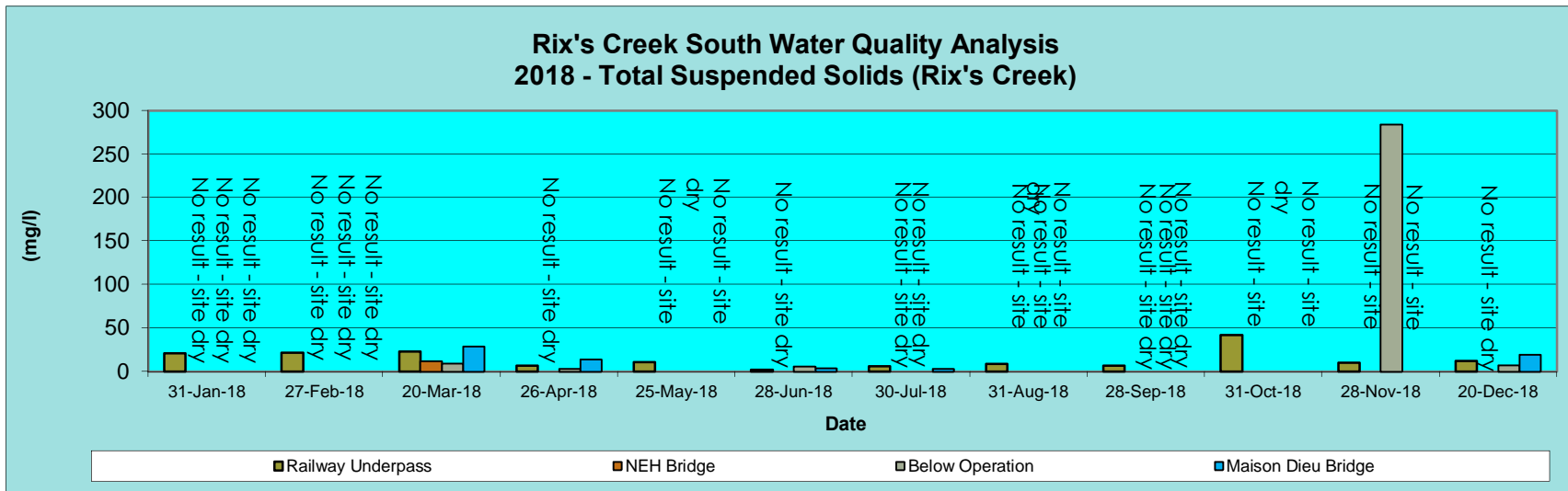
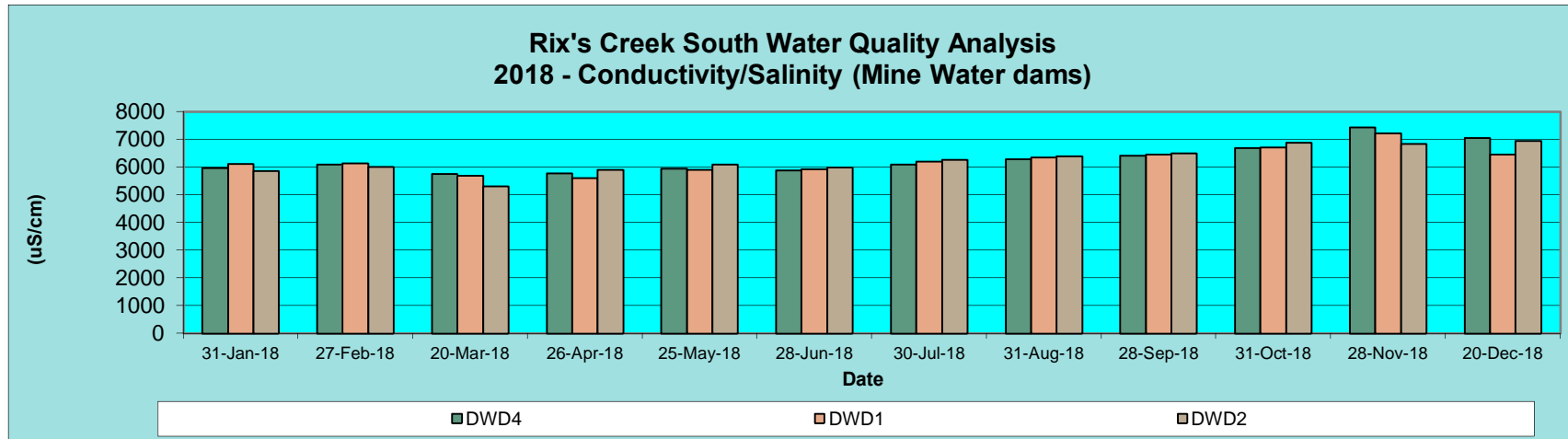
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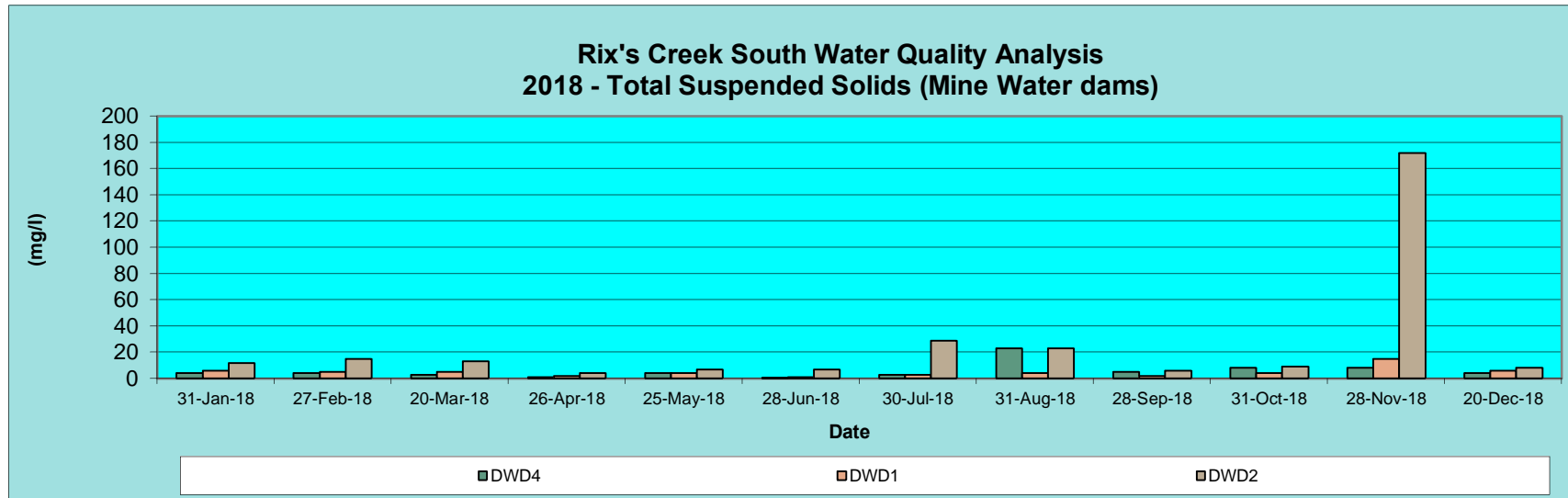
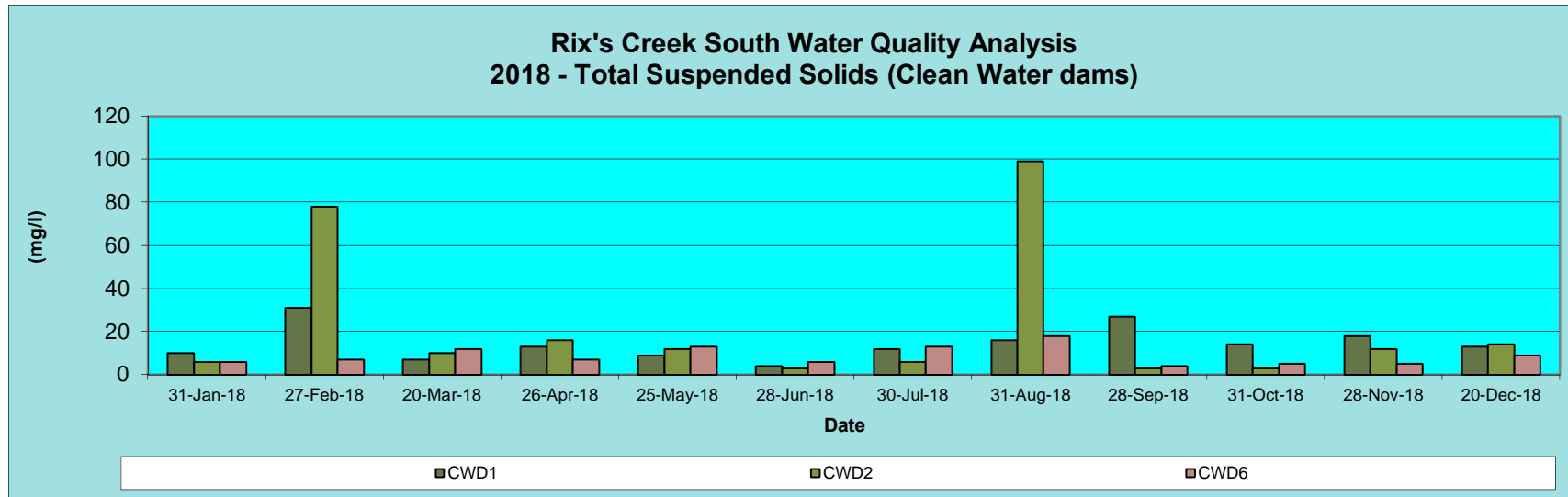
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Rixs Creek North & Rixs Creek South



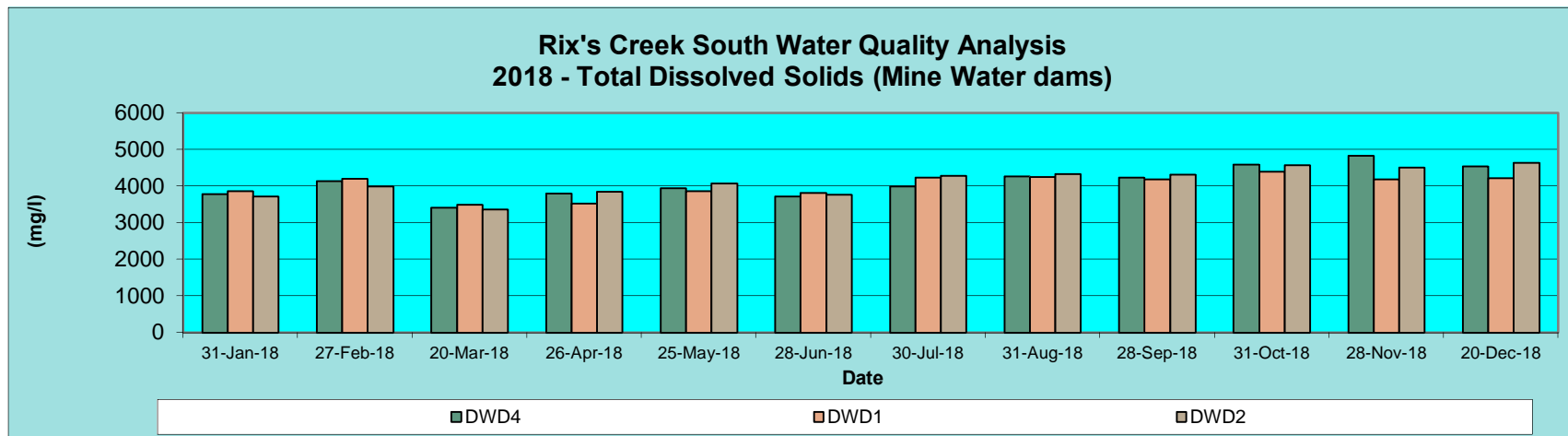
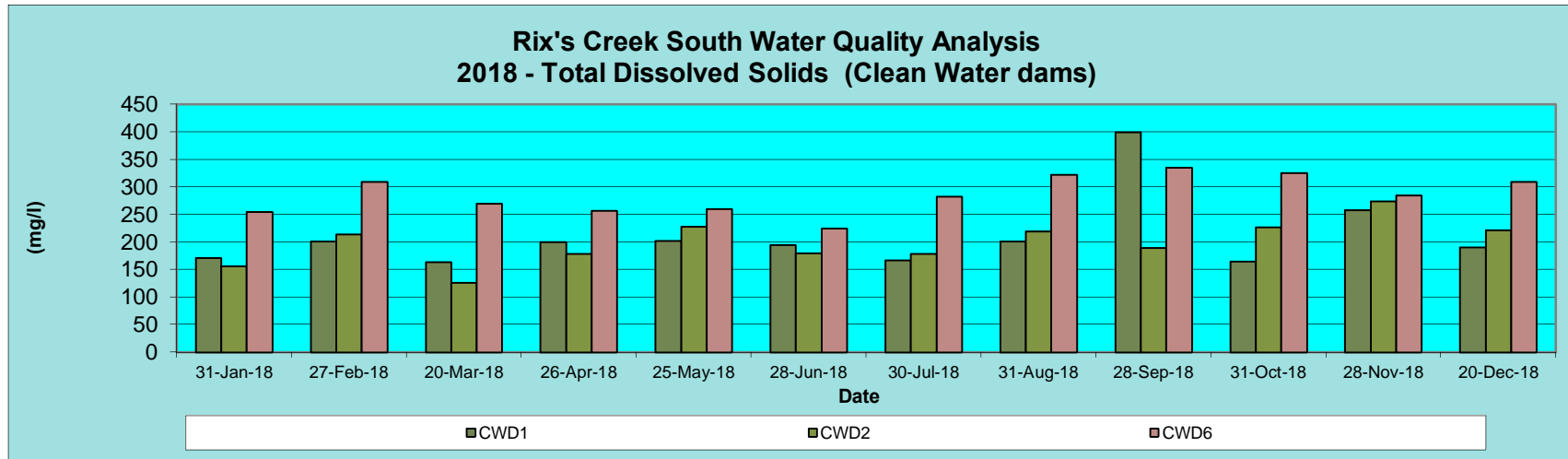
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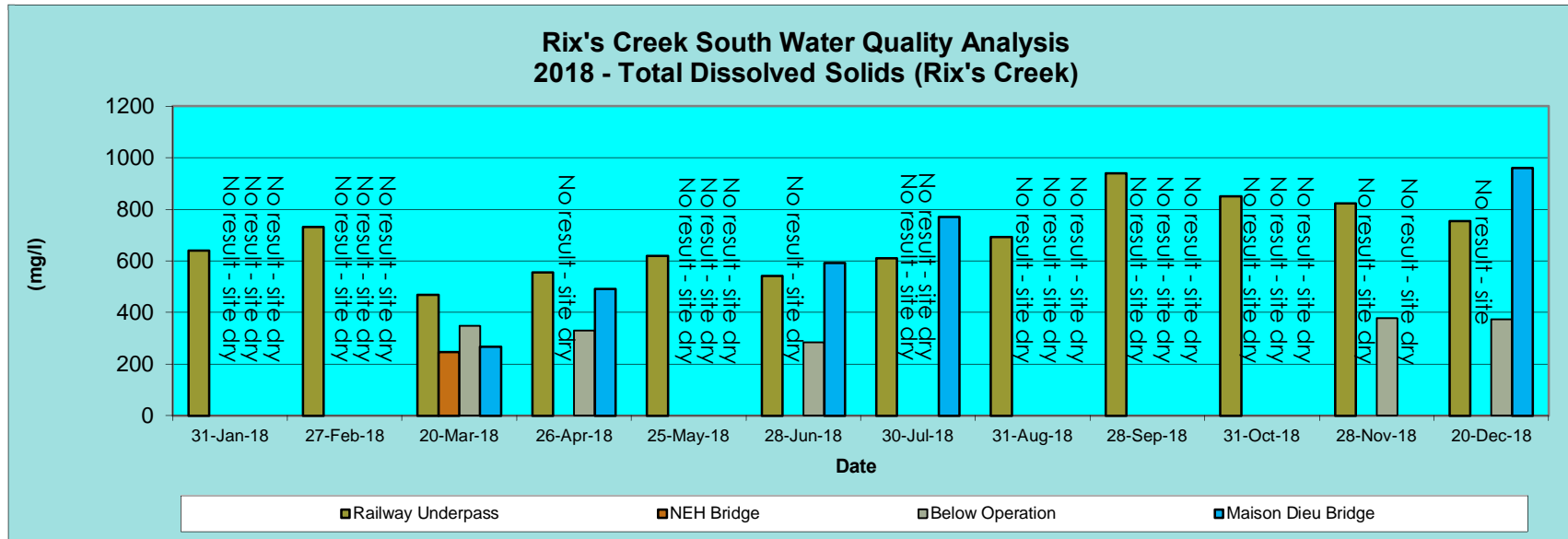
ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

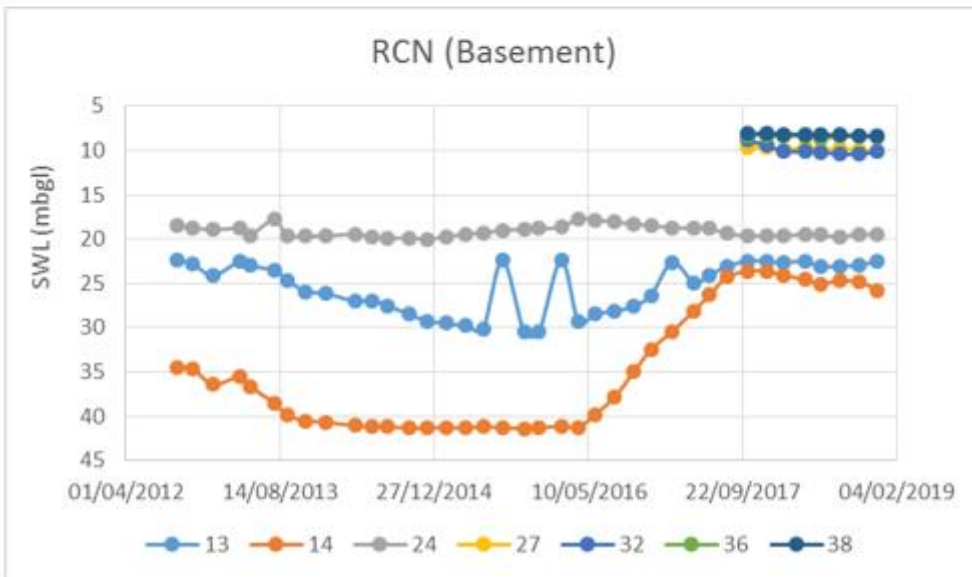
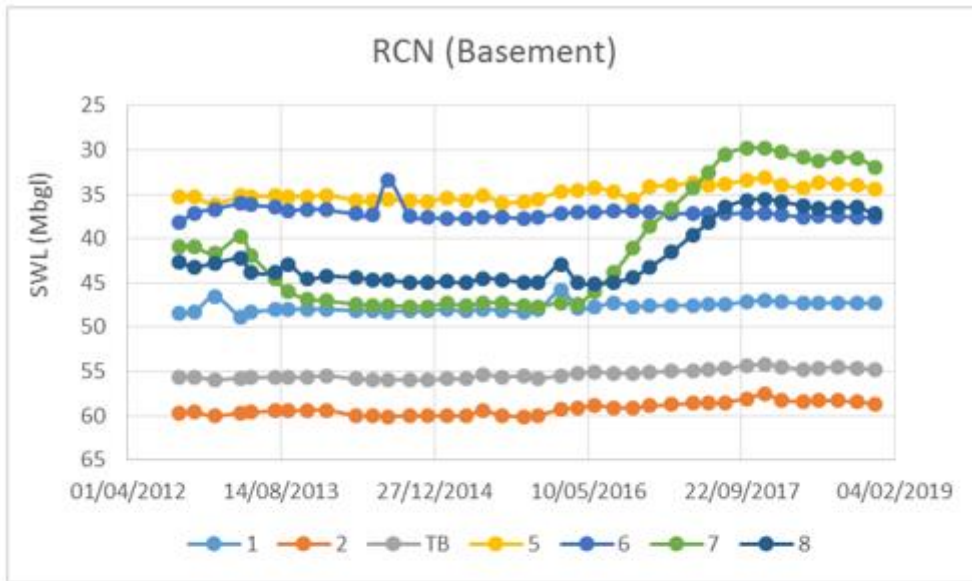


Appendix 2 Rix's Creek Mine Ground Water Sampling Results

ANNUAL REVIEW 2018 – RIX'S CREEK MINE

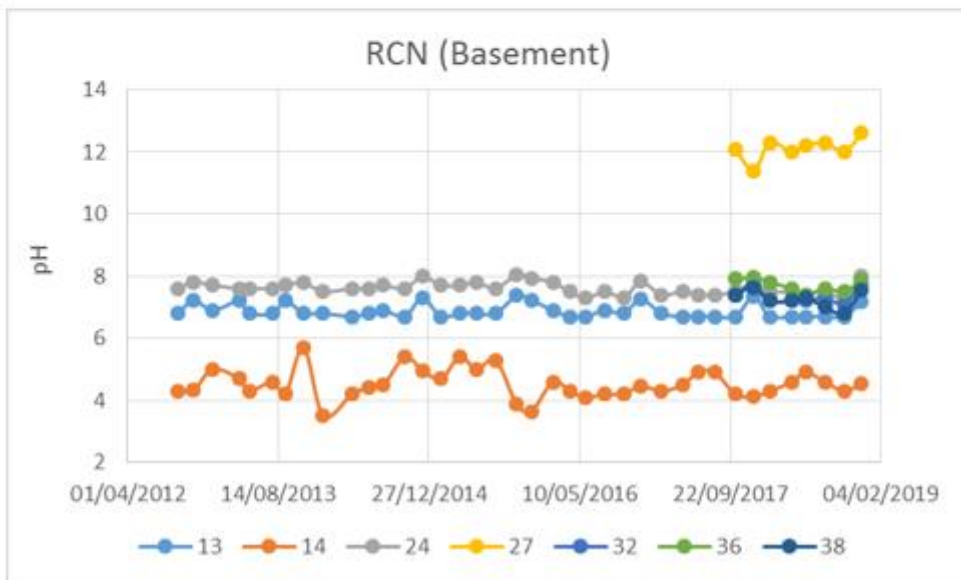
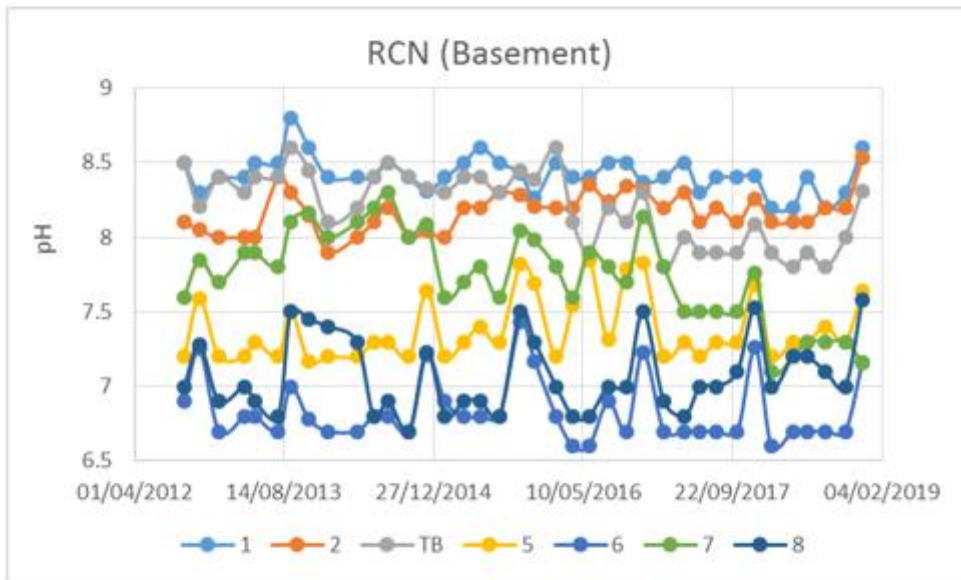
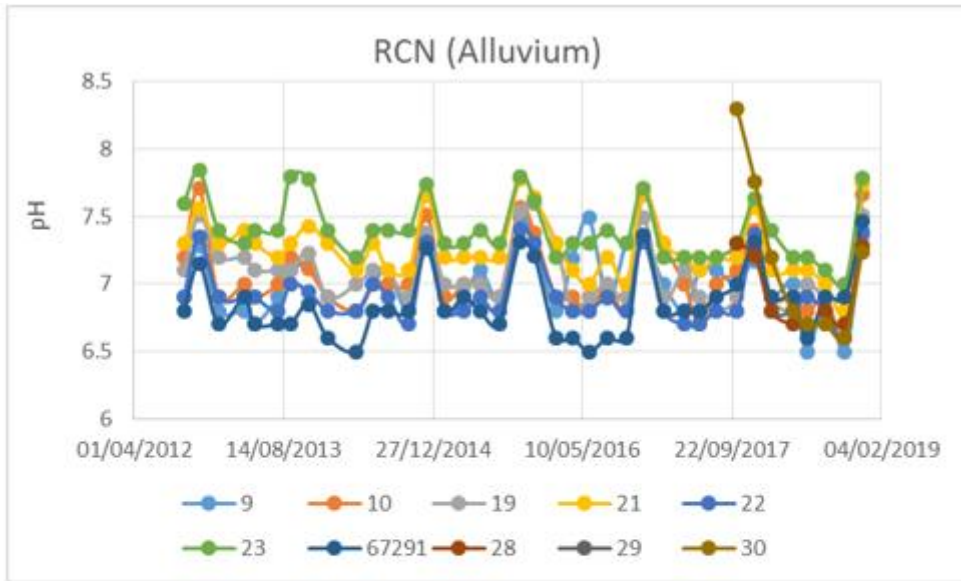
Rixs Creek North & Rixs Creek South

RCN Ground Waters



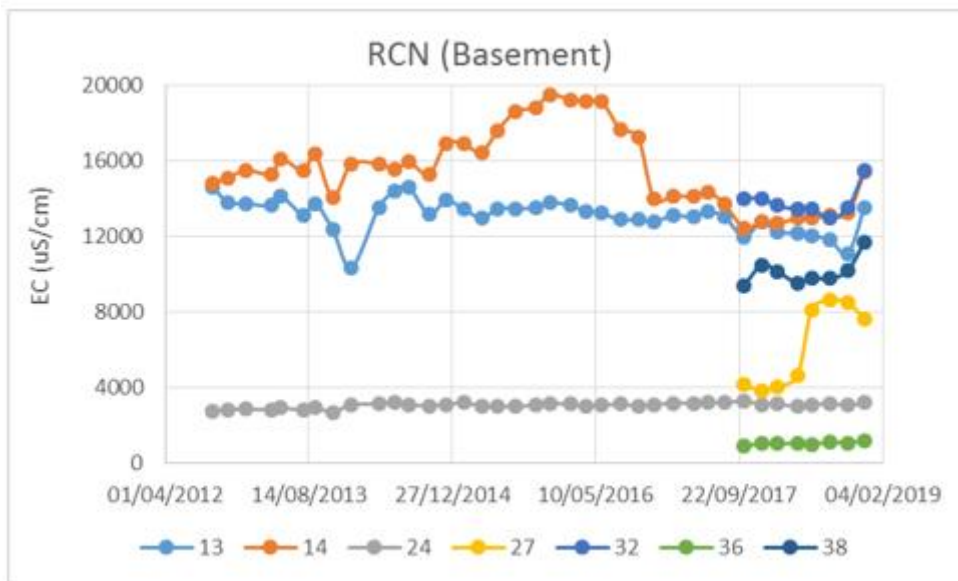
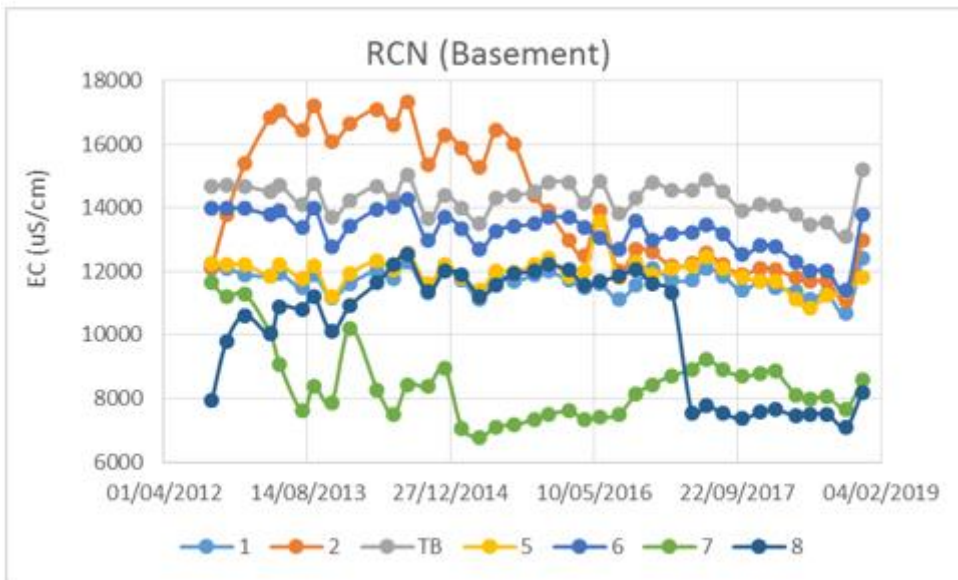
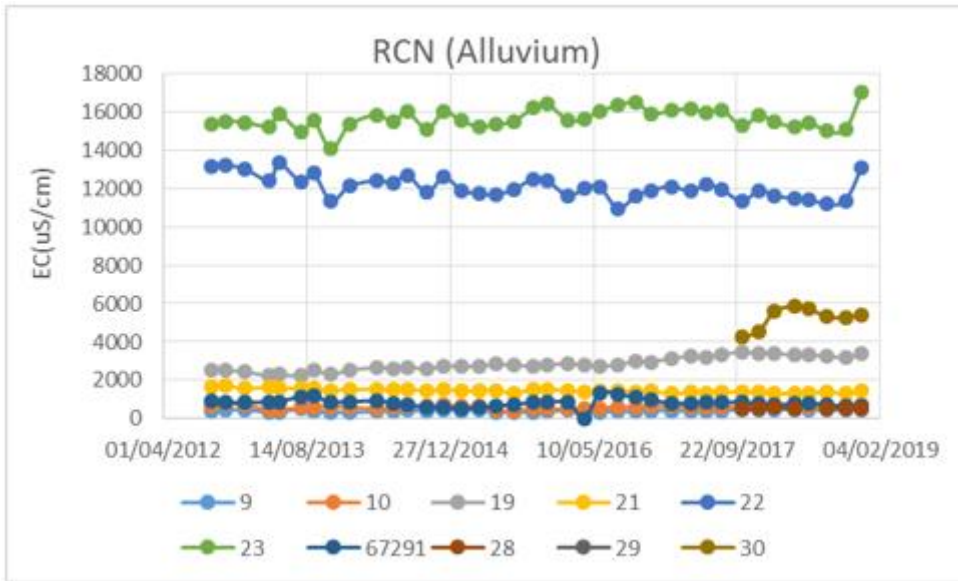
ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2018 – RIX’S CREEK MINE

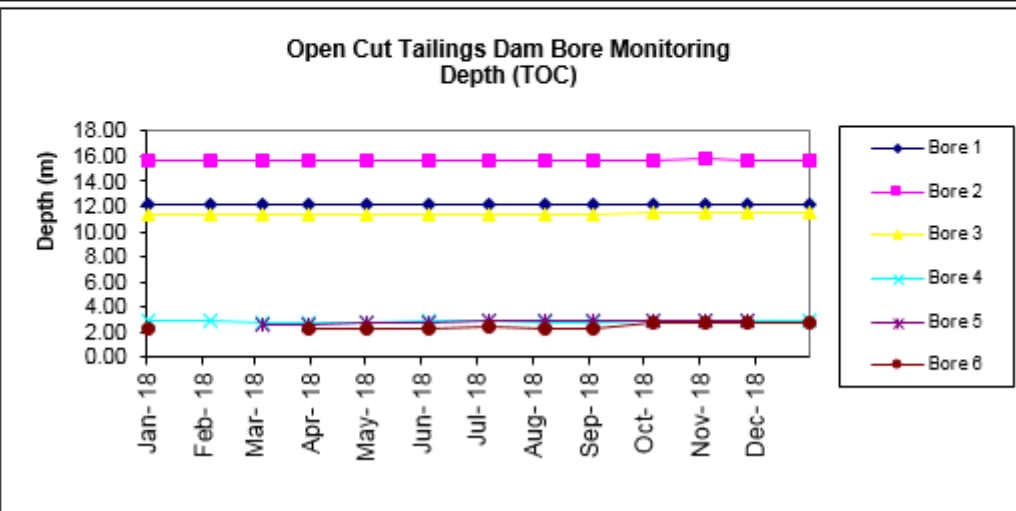
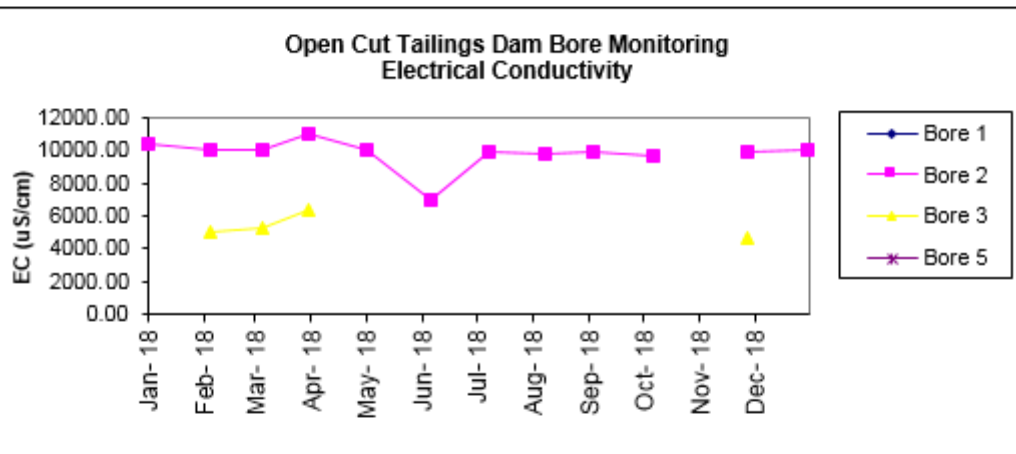
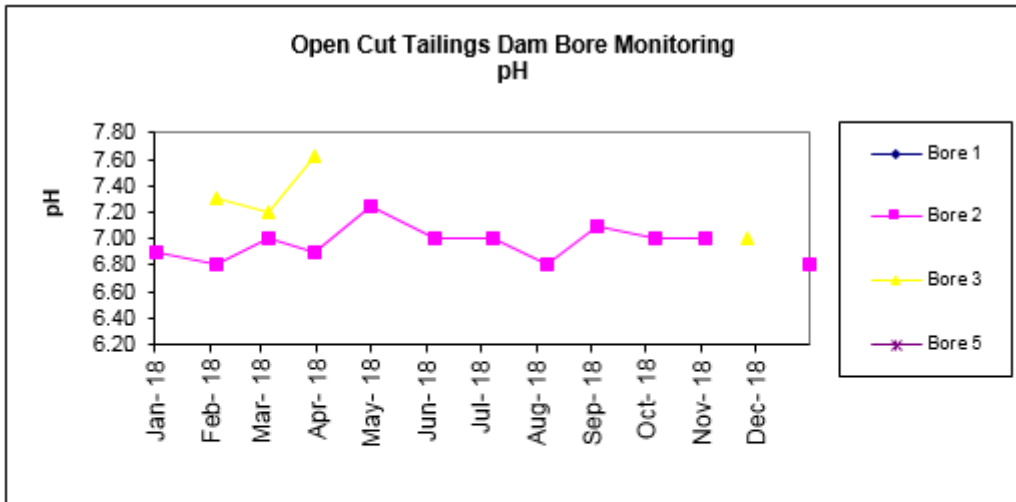
Rixs Creek North & Rixs Creek South

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

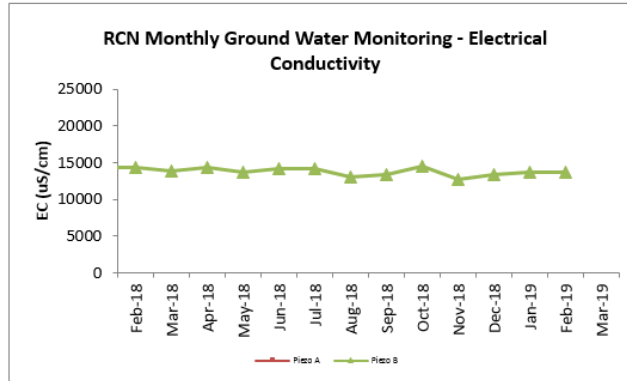
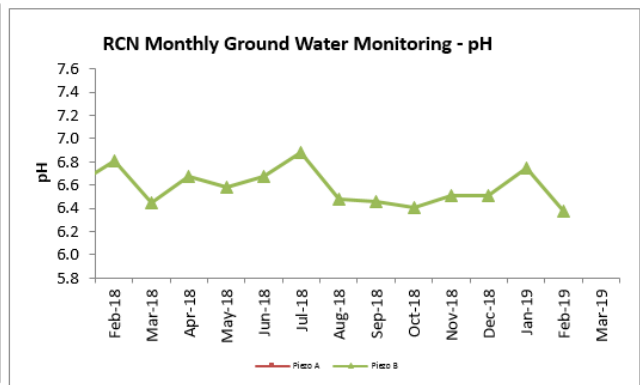
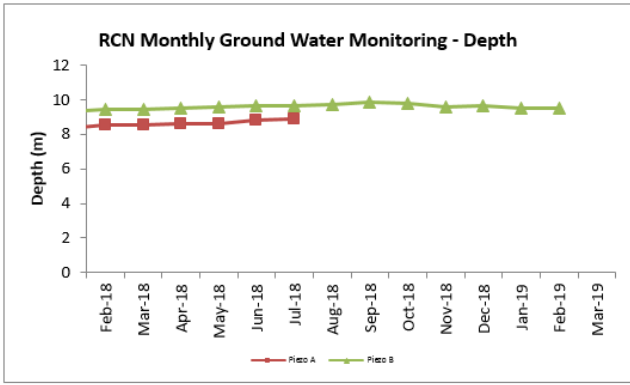
ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

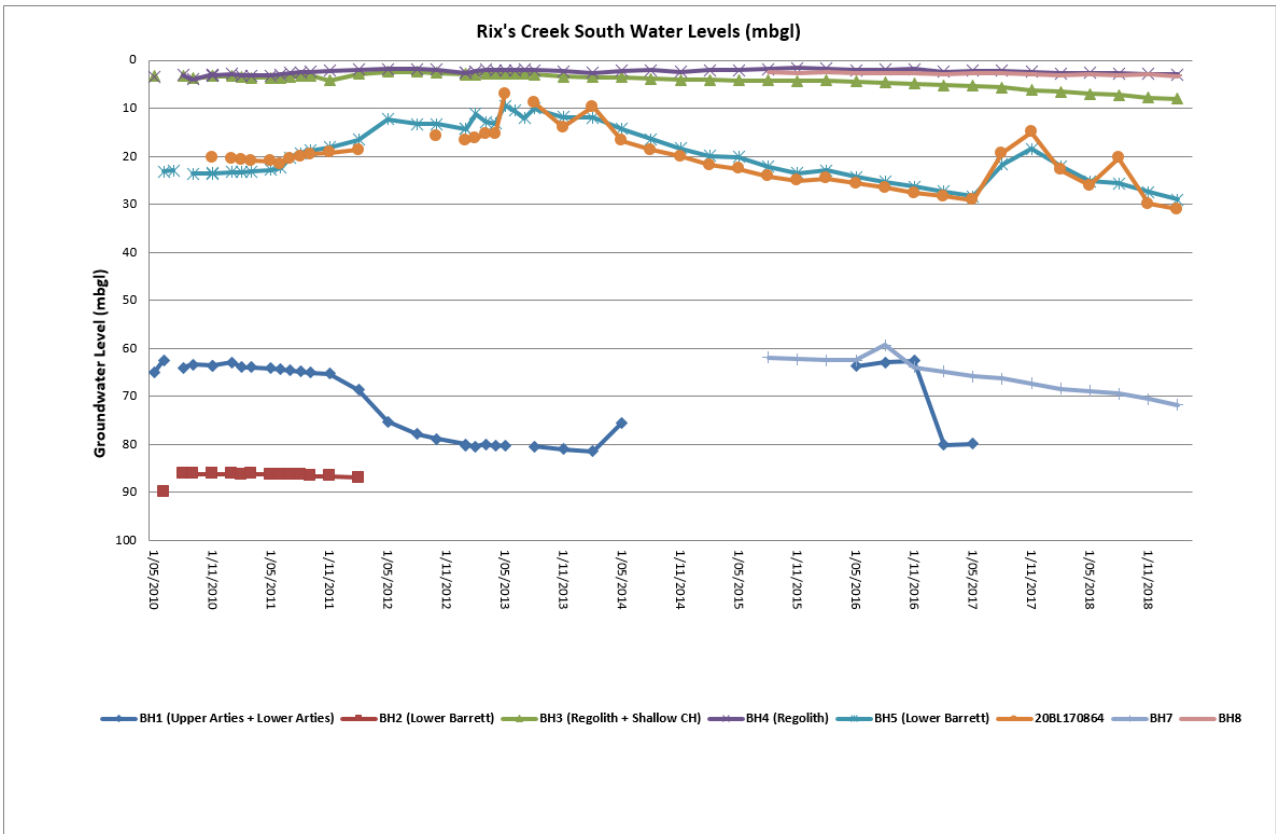


ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

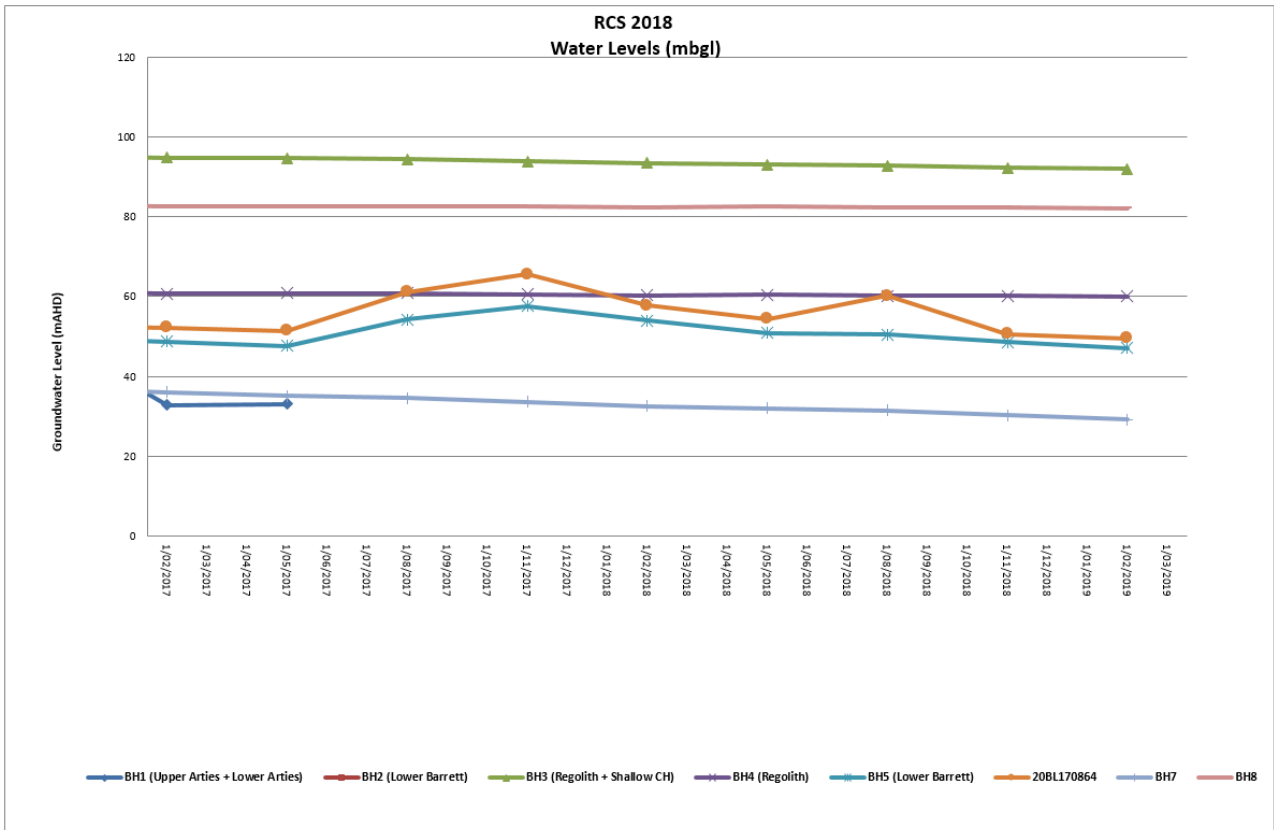
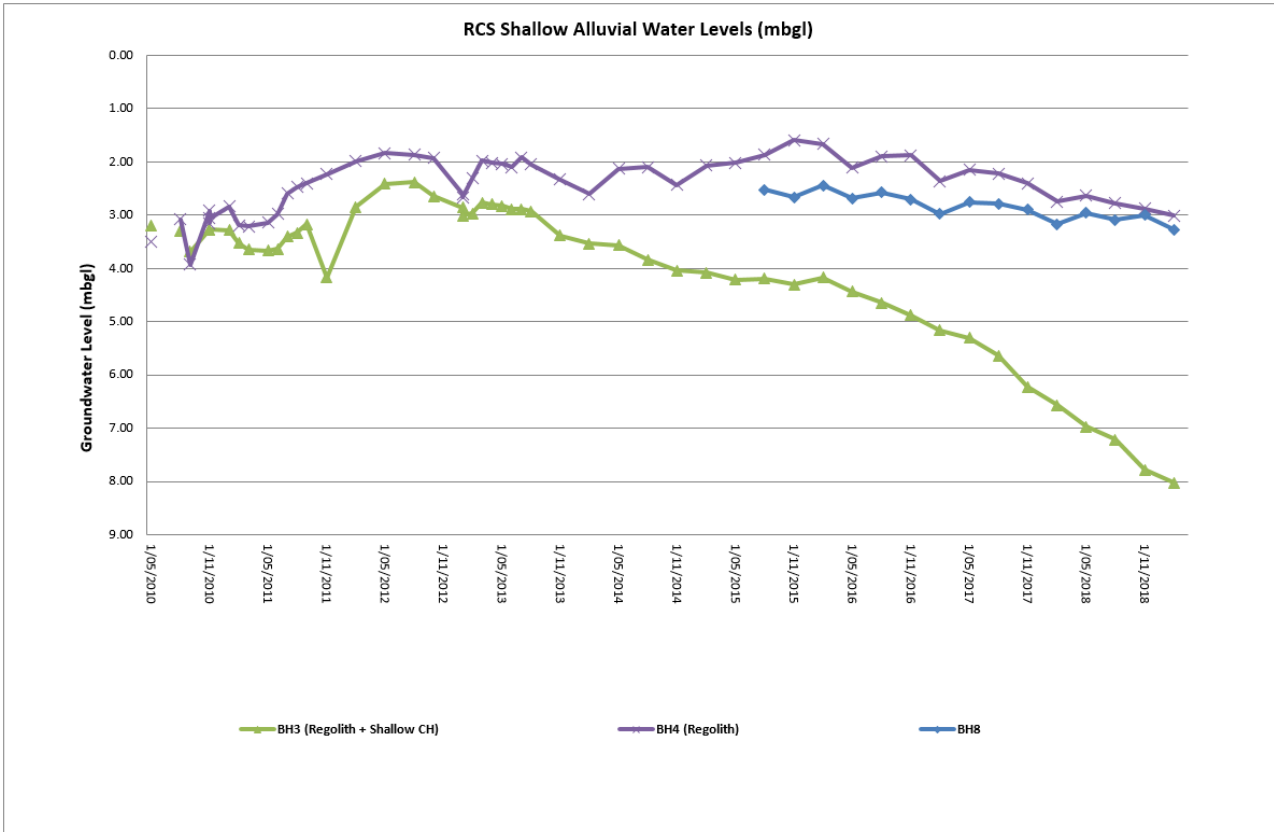


RCS Ground Water Results



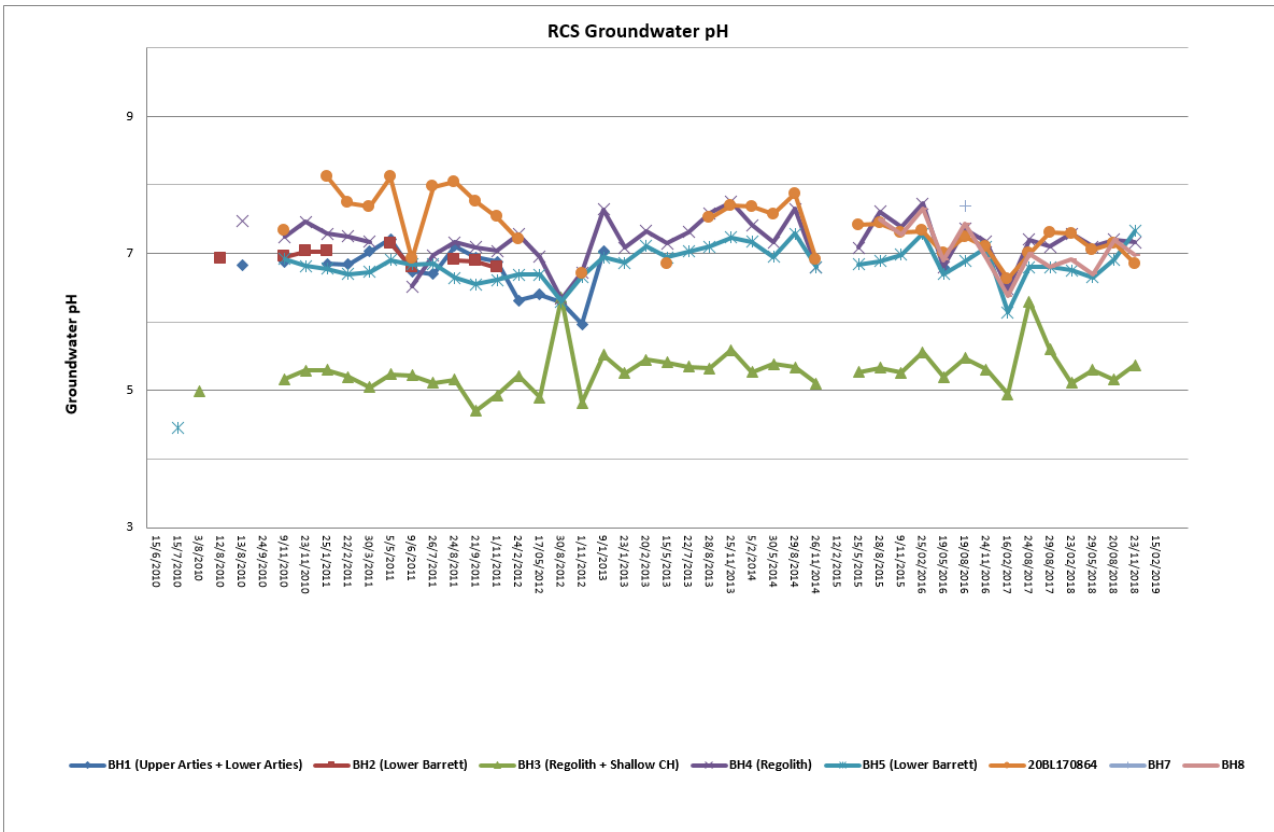
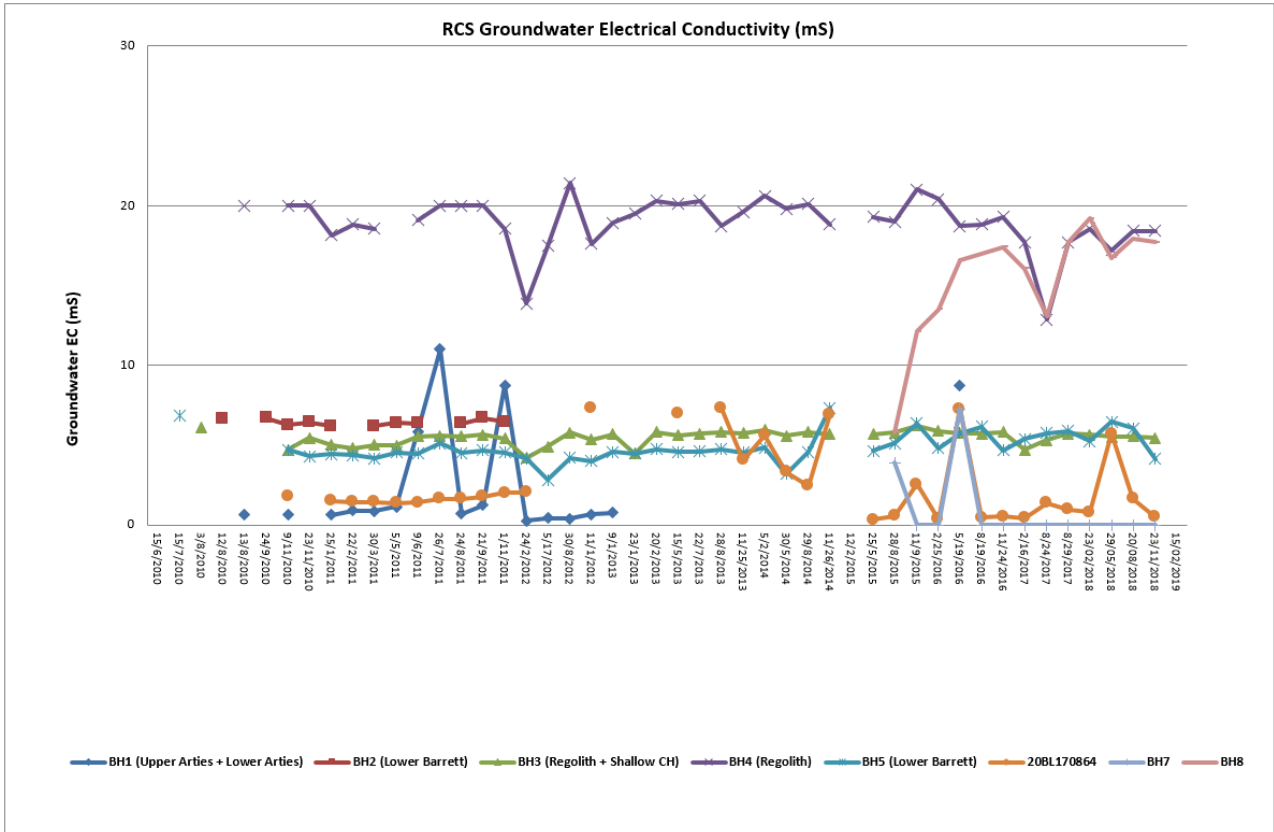
ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2018 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



Appendix 3 Rix's Creek Mine Community Complaints 2018

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

No.	Date	Time	Mode of Complaint	Primary Nature of Complaint	Additional complaints	Complaint Comments	Action taken	Findings
1	18/01/2018	8:38am	Direct to mine	Dust	Blast	Complainant emailed Environmental Manager regarding dust from operations from 5:30am onwards. Also, included in the email was an additional complaint regarding dust from the previous days blast fired at 11:07am.	A report was prepared and provided the resident in response to this complaint.	Images of the blast show that the blast dust plume dissipated mostly within the pit. Air quality results from both the Rix's Creek TEOMs and the Upper Hunter Air Quality Monitoring Network station at Camberwell showed that the air quality remained good to very good.
2	23/01/2018	9:12am	EPA	Dust	No	Complaint through EPA regarding dust coming from western extent Camberwell Pit. EPA officer said that dust was visible however not leaving site.	RCN OCE notified. R9800 not operational. EO (H Bowe) conducted visual inspection of the area from the Camberwell Village. UHAQMN and Rix's Creek AQMN data reviewed and provided.	EPA officer said that dust was visible however not leaving site. Quality Monitoring Network station at Camberwell and Singleton NW showed that the air quality was good. The OCE's were notified and an inspection was conducted of operation. All water carts were operational.
3	24/01/2018	5:46am	Phone	Dust	Noise	Anonymous caller complained about dust and noise.	Investigated dust monitoring results. Checked directional noise levels recorded by Camberwell Sentinex and internal attended noise monitoring results for Camberwell on the night of 23/01/2018.	No Sentinex alarms received in previous 24hrs. McInerney Sentinex Results 24/01/2018 @ 5:45am AOI2 26.5 dB (A). Attended noise reading conducted at McInerneys Rd Camberwell at 00:08 am returned result total LAeq POA (filtered mine noise) 38.5 dB (A). ~37 dB (A) was attributed to Rix's Creek operations.
4	29/01/2018	2:38pm	Phone	Blast	No	Blast shook house.	Meteorological conditions, footage of blast and blast results reviewed.	Meteorological conditions found suitable. All blast results satisfactory: Camberwell EPA = 2.23 mm/s 94 dB Dulwich = 1.69 mm/s 107.2 dB Watling = 2.17 mm/s 98.8 dB
5	5/02/2018	2:37pm	Direct to mine	Blast	No	Resident stated that a large vibration was felt at residence and noted dust from the blast so knew where it came from.	Reviewed blast results. Complainant was added to the blast notification of local residents who receive a text message.	Blast results satisfactory: Watling Residence = 0.66 mm/s 98.9 dB Camberwell UHAQMN = 1.09 mm/s 94.8 dB Cherry Residence = 0.36 mm/s 83.5 dB
6	8/02/2018	3:51pm	Phone	Blast	Dust	Blast had shaken house and produced elevated dust.	Blast results and met conditions were reviewed. Resident was added to the RCN resident's blast notification text group as requested. Environmental manager made follow up contact with complainant to discuss results.	The air quality results from the NW and SE TEOM units remained consistent prior to, during, and after the time of the blast. Camberwell UHAQMN average PM10 results increase at the time of the blast 2pm to 4pm, however this is unlikely attributed to a blast due to continued increase of PM10 from 4pm to 5pm.

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

No.	Date	Time	Mode of Complaint	Primary Nature of Complaint	Additional complaints	Complaint Comments	Action taken	Findings
7	10/02/2018	8:36am	Phone	Noise	No	Complained about noise from Rix's Creek North operations.	Reviewed noise prediction models, met conditions and Sentinex Noise Monitor results. Mine operations and detailed noise levels were provided to complainant.	Results from Camberwell Sentinex unit showed satisfactory noise levels from RCM. No noise alarms for evening , night and morning leading up to complaint.
8	11/02/2018	8:25am	Phone	Dust	No	Complained about dust from Rix's Creek North operations.	Provided response email to complainants wife explaining that there were NW winds and Rix's Creek Mine was not operational at the time of complaint.	At the time of the complaint RCM was not operating and had not operated since 10am the previous day. Also, the Upper Hunter air quality monitor at Camberwell showed that at the time of complaint the wind direction was not from the direction of RCN.
9	13/02/2018	6:57am	Direct to mine	Noise	Dust	Complainant stated that the dust in the village is acceptable when you can taste it. Also the noise is unacceptable.	Air quality and noise assessed and this information was provided to complainant via email.	Air quality in Camberwell according to the Upper Hunter Air Quality Monitoring Network was good (1 hour average at 6am) and the 24h rolling avg was fair. No alarms were received from the Sentinex unit at Camberwell Village during last evening, night or this morning. The directional noise at around 7:10 am from Rix's Creek North was at 31.5 db. Attended noise monitoring conducted in Camberwell Village this morning showed a level of 34.2 db.
10	13/02/2018	2:56pm	Phone	Blast	Odour	Resident provided contact information via hotline. Complaint was about dust and odour from a blast.	Met data, blast results and OdaLog recordings were reviewed. Environmental Manager phoned the resident to hear their concerns and provide results collected by RCM.	At the time of the complaint RCM was operating in accordance with required criteria.
11	4/03/2018	7:05am	Direct to mine	Noise	No	Email stated that noise levels were extremely high. The concern was that operations didn't act accordingly and that the noise monitoring equipment had not picked up the levels.	Rix's Creek Mine operations and Sentinex directional noise data were investigated. A return email was sent and the Rix's Creek Hotline number provided.	No Sentinex directional noise alarms received. Rix's Creek operations not running for the majority of the stated time of complaint.

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

No.	Date	Time	Mode of Complaint	Primary Nature of Complaint	Additional complaints	Complaint Comments	Action taken	Findings
12	27/06/2018	6:30am	Direct to Mine	Noise	No	Mine noise complaint. Trucks running and horn noise. Particularly as sun comes up in early morning.	Environmental Manager contacted and confirmed that Rix's Creek operations utilise internal horn system.	confirmation that Rix's Creek Mine use internal horn system when loading haul trucks.
13	2/07/2018		Phone	Noise	No	The complainant stated that vehicle used for noise monitoring "roared up the street, with high beam on, and slammed the door when the person got out to monitor." The noise woke the complainant.	Complainant was contacted and confirmed that it was a our noise technician that was monitoring in the area at the time of complaint. We apologised and committed to talking to the Noise Technician about the complaint.	Noise Technician and operators that conduct operational attended noise monitoring briefed to drive at an acceptable speed with lights on low beam in residential areas and be aware of shutting doors and any noise you may be creating.
14	3/07/2018		Direct to Mine	Noise	No	Last couple of weeks noise from machine horn and CAT trucks running on the road, particularly as sun comes up.	A follow up call was made to the complainant and we advised that we would conduct monitoring near their residence the following evening.	Monitoring at location of complainants residence occurred the following night with Rix's Creek Mine operating in accordance with required criteria. No further action taken.
15	12/07/2018		Phone	Odour	No	Complainant from Maison Dieu resident stating that odour was identified at residence after a blast was fired by Rix's Creek Mine.	A follow up call was provided and a commitment was made to provide a report to the resident in relation to odour issue at time of complaint.	A detailed report was provided to the resident of the odour complaint. As a precautionary measure Rix's Creek Mine monitors blasts for blast fumes and other residual blast gasses. On the 12th July the below results were recorded at the gas monitor located nearest the blast (only 400 metres from blast). As noted the results were from a gas monitor located only 400m from the blast. This monitor did not detect Carbon Monoxide or Methane, and levels of Nitric Oxide and Nitrogen dioxide were well below exposure guidelines.
16	19/07/2018	11:28am	EPA	Noise	No	Noise complaint received from anonymous Llanrian Drive resident.	Noise monitoring was conducted near the location of EPA received complaint. Independent report sent to EPA for July 2018 compliance attended monitoring, with no exceedances determined	Noise monitoring was conducted near the general location of the complaint, with RCM operating within the noise criteria.
18	27/09/2018	8:41pm	Direct to Mine	Noise	No	Resident finding operations very loud, dozer tracks clanging, trucks revving. It's as if the worksite was adjacent to the property" "other neighbours have noted the noise as well	Noise Technician conducted noise monitoring near complainants residence. Operational changes were made to reduce noise from operations. OCE restricted speed of dozers and trucks to low speed. OCE shut down EX5500 and associated haul trucks. OCE shutdown EX6060 and trucks at 23:50.	Operational changes were made to reduce noise on this night.

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

No.	Date	Time	Mode of Complaint	Primary Nature of Complaint	Additional complaints	Complaint Comments	Action taken	Findings
19	3/10/2018	am	Direct to Mine	Noise	No	Complainant stated that he could hear dozer tracks and an excavator bucket banging on the ground both during the night and early this morning.	Noise Technician conducted noise monitoring near complainants residence to determine if Rix's Creek Mine are impacting the residence.	Noise technician conducted noise monitoring near location of the residence. Noise was near to limit, operational changes were made to reduce noise on the night of the complaint. OCE restricted haul trucks to low gear and requested operator of loading units to lower bucket when loading haul trucks to reduce noise.
20	18/10/2018	11:54am	Direct to Mine	Odour	No	Environment Manager returned call from hotline at 11:57am. complainant "Are you spreading that smelly material again, I'm glad I'm not working outside today and it is very strong". Environment Manager replied that we are currently doing a rehab campaign at Rix's Creek South and we are using low odour biosolids, I'm not sure if we are spreading today due to last night's rain but I will get back to you and let you know.	Environment Manager and Environmental Advisor drove near complainants residence to determine if source of odour was from Rix's Creek Mine.	Environment Manager provided second call at 12:08 pm. I confirm that we are not spreading the biosolids today and the spreading that was done yesterday has been incorporated into the topsoil. The rain last night and today's humidity is contributing to the smell. We do not intend to cause this issue, however unfortunately the rain and wind direction change has caught us this time. We will endeavour going forward to have a look at the met forecasts when spreading, but again the rain has caught us out .
21	23/10/2018	2:38pm	Direct to Mine	Blast	No	Complainant contacted the Environmental Advisor and complained that the blast released in the Camberwell Pit shook her house. Complainant said that she is not usually home that time of day and that the blast was very strong.	Environmental Advisor reviewed blast results at the nearest blast receptor. The blast results were within RCM's compliance limits, therefore no further action taken.	Complainant was satisfied with response, no further action required.
22	25/10/2018	9:57pm	Direct to mine	Noise	No	SMS Text was sent to Environment Manager stating that the noise was unacceptable tonight. Complainant stated that he would notify the relevant departments and that noise has become a real problem for them again.	Noise Monitoring was undertaken within locality of the complainants residence, Noise was identified from coming from another mining operation and Rix's Creek mine was complaint with the noise criteria at the monitoring location. Environment Manager contacted the complainant the next morning and provided the details of the noise monitoring results conducted near their residence.	Noise monitoring was conducted near the general location of the complaint, with RCM operating within the noise criteria.
24	9/11/2018	9:20pm	Direct to mine	Noise	No	the complainant said he could hear a watercart at the water fill point and wondering what it's going to take to get the message through to us . I apologized for the noise and assured him I would look into this straight away. He was quite up set at the start of the conversation but seemed ok at the end.	Water Cart removed from Area. Environmental Advisor went to the residence and had a discussion about operational noise.	I called the watercart operator (705) and asked him for his location, he was driving back from the bridge so we met at the contractors pad. The operator of 705 assured me he had not filled up there after crib (crib was at 7 pm) but we had been watering the road from the contractors pad to the bridge and back. We did a low speed pass maximizing water into the haul road (second Gear). Possibly why he thought us to be at the fill point.

ANNUAL REVIEW 2018 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

No.	Date	Time	Mode of Complaint	Primary Nature of Complaint	Additional complaints	Complaint Comments	Action taken	Findings
25	14/12/2018	1:05am	Direct to mine	Noise	No	The complainant called the OCE and complained of excessive mine noise. Complainant also sent a text message to Environment Manager explaining that he had made a Noise Complaint to the OCE.	OCE instructed Noise Monitoring to be conducted near the residents home with Rix's Creek noise level well under required limit. Rix's Creek noise was less than 36.7 dB (A) and dominant noise source was identified to be industrial noise.	Attended noise monitoring conducted at the residents location found the source identifiable noise to be industrial noise.

Rix's Creek Mine
Bloomfield Collieries Pty Ltd
Four Mile Creek Road
ASHTONFIELD NSW 2323

Contact: Ann Hagerthy
Phone: 02 6575 3407
Email: compliance@planning.nsw.gov.au
Our Ref: DA 49/94, MP 08_0102 (#16744)

Attention: Chris Quinn, Environment Advisor

Dear Mr Quinn,

**Rix's Creek Mine Complex DA 49/94, MP 08_0102
Annual Review 2018**

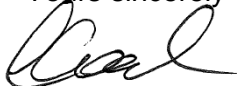
Reference is made to the revised Annual Review (AR) for the period 1 January 2018 to 31 December 2018 for the Rix's Creek Mine Complex (the Project), submitted by Bloomfield Collieries Pty Ltd (Bloomfield) to the Department of Planning and Environment (the Department) on 4 June 2019.

The Department has reviewed the revised AR and considers it to generally satisfy the requirements of the approval. Please note that acceptance of this AR is not endorsement of the compliance status of the project.

Please ensure that the approved AR is uploaded to website in accordance with Schedule 5, Condition 10 of PA 09_0176 and Schedule 4, Condition 9 of DA 104/96.

Should you need to discuss the above, please contact Ann Hagerthy as per the details provided above.

Yours sincerely



6/6/19

Leah Cook

Team Leader - Compliance

As Nominee of the Secretary