

Rix's Creek Mine


2021 Annual Review



Wedgetail Eagles roosting at the Arties 'Woodlands' area.

ANNUAL REVIEW 2021 – 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 SSD6300 & DA49/94
Name of holder of development consent / project approvals	Bloomfield Collieries Pty Ltd
Mining Lease #	CL357, ML1630, ML1648, ML1649, ML1650, ML1651, CL352, ML1432, ML1725 & ML 1803
	Bloomfield Collieries Pty Ltd
Water License #	WAL41500, WAL41555, WAL40777, 20BL170864
Name of holder of water license	Bloomfield Collieries Pty Ltd
MOP / RMP start date Rixs Creek Mine	1/12/2019 – 30/11/2022
Annual Review start date	1/1/2021
Annual Review end date	31/12/2021
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 1/1/2021 – 31/12/2021 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 Superintendent
Signature of authorised reporting officer	
Date	31/3/2022

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List of Abbreviations

AHD	Australian Height Datum
AR	Annual Review
BCL	Bloomfield Collieries Pty Limited
BOA’s	Biodiversity Offset Areas

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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 Gauge
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
IBC	Intermediate Bulk Container
IEA	Independent Environmental Audit
ISO	International Standard
l/s	Litres per second
LHPA	Livestock Health and Pest Association
LGA	Local Government Area
MBGL	Meters Below Ground Level
MCM	Monthly Communication Meetings
MEG	Mining, Exploration and Geoscience.
MIC	Maximum Instantaneous Charge
mm/s	Millimetres per second
MOD	Modification
MOP	Mining Operations Plan
MI	Megalitre
ML, MPL, CCL & CL	Mining Leases
Mt	Million tonnes
MU's	Management Units
NAG	Noise Assessment Group
NRAR	Natural Resources Access Regulator
OC	Open Cut
OLC	Over Land Conveyor
PA	Project Approval
PIRMP	Pollution Incident Response Management Plan
PM ₁₀	Particulate matter (dust) with a diameter of less than 10 microns
PPM	Parts Per Million
PPV	Peak Particle Velocity
RCS	Rix's Creek South
RCN	Rixs Creek North
RCM	Rix's Creek Mine
ROM	Run-of-mine
RR	Resources Regulator
SEPP	State Environmental Planning Policy
SSD	State Significant Development
STP	Sewerage Treatment Plant
TBT	Toolbox Talk
TBG	The Bloomfield Group
TEOM	Tapered Element Oscillating Microbalance
TPH	Total Petroleum Hydrocarbons
TSP	Total Suspended Particulates
VWP	Vibrating Wire Piezometer
WMP	Water Management Plan
WSP	Water Sharing Plan
µS/cm	Micro Siemens per centimetre
µg/m ³	Micrograms per cubic metre

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SECTION 1 STATEMENT OF COMPLIANCE

Table 1 Summary Statement of Compliance for Major Approvals

Were all conditions of the relevant approval(s) complied with?	
SSD 6300 Mod 1	NO
DC # DA 49/94 Mod 10	NO
PA 08_0102 Mod 9	NO
EPL3391	NO
ML # 1432, CL352, ML1803	NO
ML # CL 357, ML 1630, ML 1648-1651, ML 1725	YES

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

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

Condition	Non-Compliance	Risk Level	Addressed in 2021 AR/ comments
Schedule 3, Condition 22	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 (d), M2.2 EPL3391	Dust Trak and TEOM downtime during reporting period.	Low	Section 6.4.3 Section 11.2

The non-compliances identified with SSD 6300 and associated mining leases are detailed in **Table 3** below.

Table 3 Summary of Non Compliances with Rix’s Creek South SSD6300 and DA49/94.

Condition	Non-Compliance	Risk Level	Addressed in 2021 AR/ comments
SSD-6300 Development consent, Part B, Condition B36	Seepage from Historic underground workings entered Rix’s Creek via Stonequarry gully.	Low	Section 11
SSD-6300 Development consent, Part B, Condition B36	Extraordinary weather event over three day period saw water exiting the historic workings via a shaft and flowing into Stonequarry gully. Seepage containment dam also overtopped during this rain event.	Low	Section 11

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SECTION 2 INTRODUCTION

This 2021 Annual Review is compiled pursuant to Part E, Condition 9 of SSD6300 and Schedule 5, Condition 10 of PA08_0102 and Schedule 5, Condition 10 of SSD 6300. Additionally, this Review satisfies the environmental reporting requirements of the Resources Regulator (RR), Mining, Exploration and Geoscience (MEG), The Environment Protection Agency (EPA) and the Natural Resources Access Regulator (NRAR). This reporting period extends from 1 January 2021 to 31 December 2021. This Annual Review has been prepared in accordance with the Post Approval Requirements for State Significant Developments – Annual Review Guideline (DPE 2015).

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

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

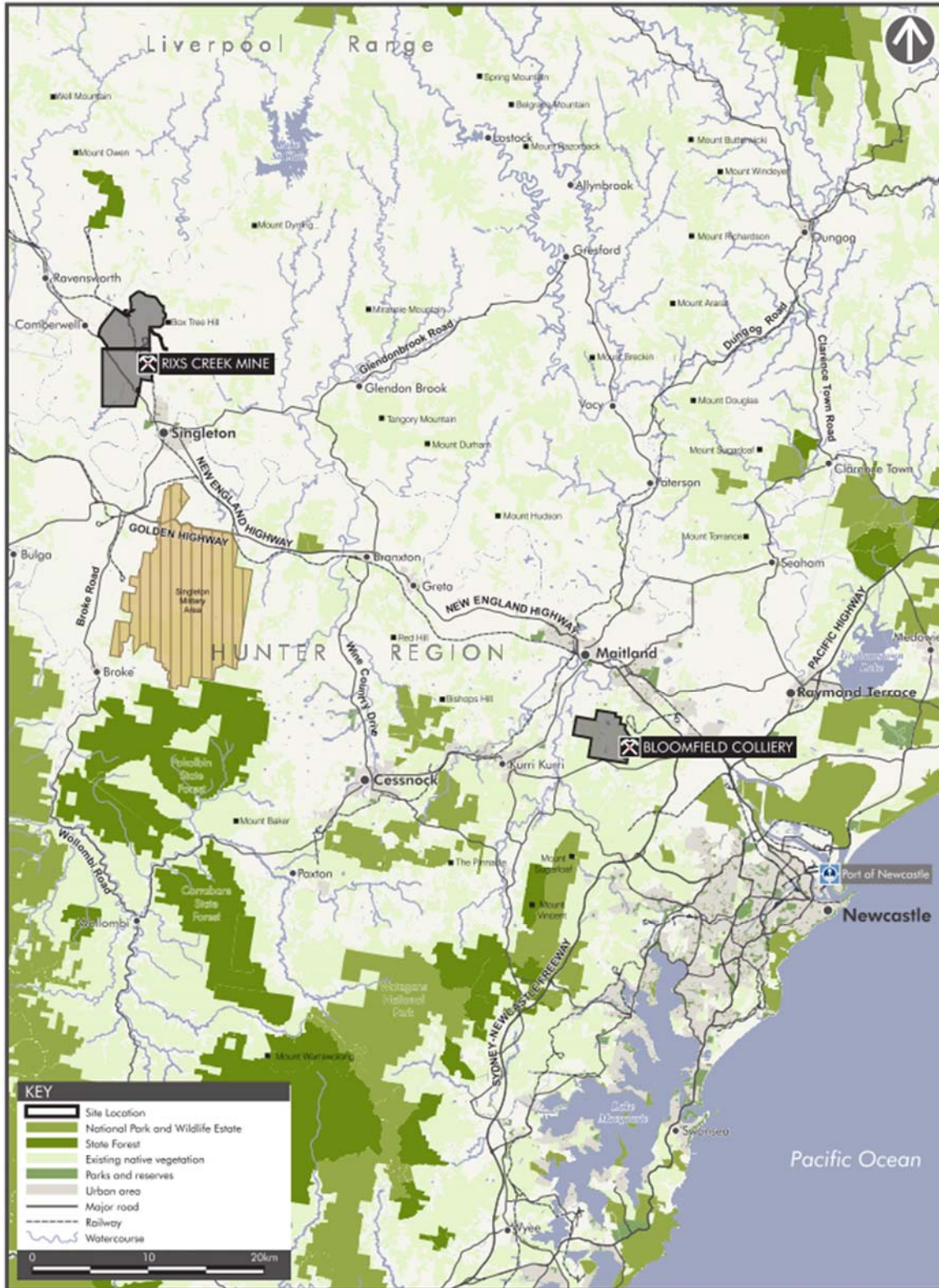
In 2015, BCL submitted a development application to extend Mining Operations within the area for a further 21 years. This project was named the Rix’s Creek (South) Continuation of Mining Project State Significant Development 6300 (SSD6300). BCL sought extension to the Project Approval (DA 49/94 MOD 10) duration for nine (9) months to allow continued coal extraction while the Continuation Project assessment was undergoing due process.

The Rix’s Creek South Continuation of Mining Project SSD 6300 was commenced on 24 February 2020.

In December 2015, HV Coking Coal Pty Limited (Glencore) completed the purchase of 100% of the Integra Mining Operations Complex. BCL subsequently purchased, from Glencore, the previous Integra Open Cut Operations, Coal Handling Preparation Plant, Train Loading Infrastructure and the Rail Loop. Under the “Operating, Infrastructure Access and Services Agreement”, entered into by Glencore and BCL, all current mining operations covered by the 2010 Integra Complex Consent, Project 08_0101 Integra Underground Project and Project 08_0102 Integra Open Cut Project, can continue. BCL operate the Open Cut Operations as Rix’s Creek North Mine (RCN). This governs open cut mining in the Camberwell Pit and Falbrook Pit areas. 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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BLOOMFIELD COLLIERIES -
CURRENT MINING OPERATIONS - LOCATION PLAN

Figure 1 Regional Context Plan

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Rixs Creek North & Rixs Creek South

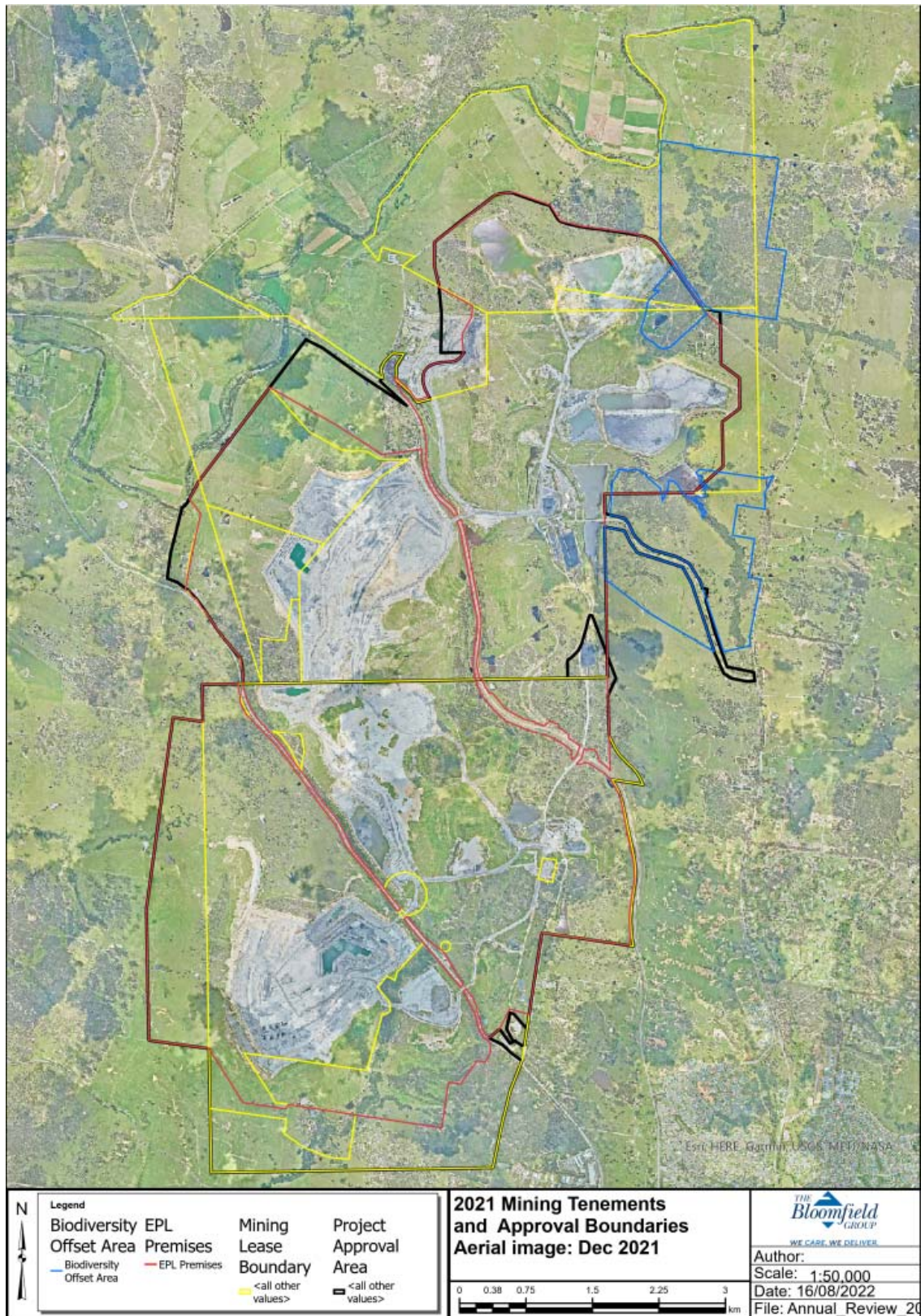


Figure 2 2021 Mining Tenements and Approval Boundaries

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Rixs Creek North & Rixs Creek South

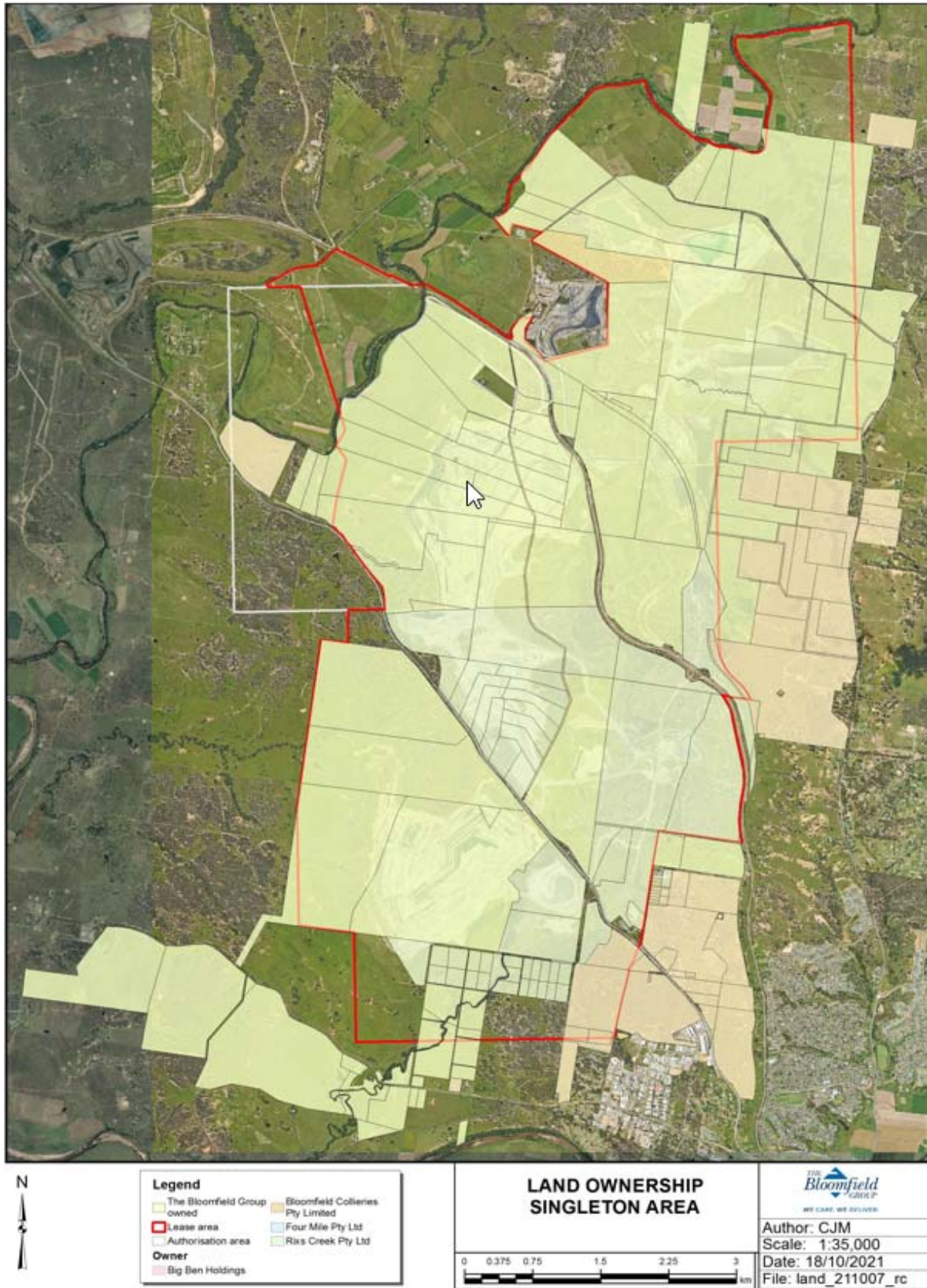


Figure 3 Land Ownership December 2021

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2.2 Mine Contacts

Rix’s Creek Pty Limited

Site:-	Rix’s Creek Lane Singleton NSW 2330	Postal Address:-	P O Box 4 EAST MAITLAND NSW 2323.
Telephone:-	02 65788800		
Fax:-	02 65711066		

Rix’s Creek Community & Blasting Hotline:-
02 49302665 (24hr)
info@bloomcoll.com.au

The Bloomfield Group Chief Operations Officer:- Luke Murray
Responsible for overseeing all Bloomfield Group operations.
E-mail:- lmurray@bloomcoll.com.au

Rix’s Creek Mine Operations Manager:- Brendon Clements
Responsible for overseeing all Rix’s Creek Mine operations.
E-mail:- bclements@bloomcoll.com.au

Rix’s Creek Technical Services Manager:- Tim Gentle
Responsible for survey and mine planning.
E-mail:- tgentle@bloomcoll.com.au

The Bloomfield Group Environment Manager :- Chris Knight
Responsible for consulting with regulatory authorities as required, provide measures for continual improvement to site procedures and ensuring all personnel are trained and competent in relation to environmental aspects of the mine site.
E-mail:- cknight@bloomcoll.com.au

Rix’s Creek Environment Superintendent :- Chris Quinn
Responsible for assisting monitoring and reporting on the environmental performance of the operation and co-ordinating the rehabilitation on the mine site.
E-mail:- cquinn@bloomcoll.com.au

Rix’s Creek Environment Officer:- David Holmes
Responsible for assisting monitoring and reporting on the environmental performance of the operation.
E-mail:- dholmes@bloomcoll.com.au

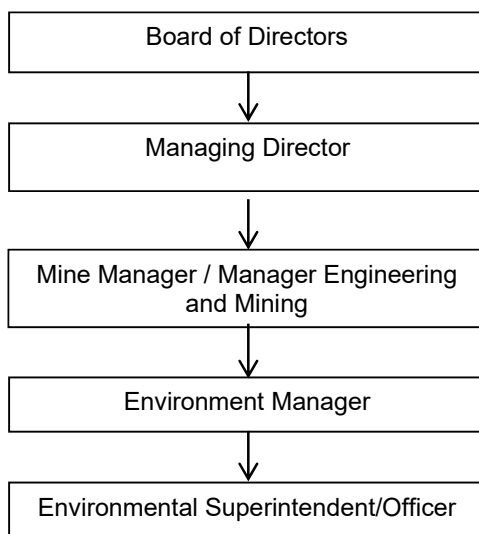
Bloomfield / Rix’s Creek Website:- www.bloomcoll.com.au

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2.3 Organisational Chart (Environment)

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



2.4 Employment Demography

Rix’s Creek currently has 294 employees comprising of staff and operators. This is a slight reduction from the 311 employees reported in the 2020 Annual Review. The areas which include the largest number of employees are Singleton Council (29%), Maitland City Council (26%) and Cessnock City Council (20%). Rix’s Creek mine endeavour to employ local personnel and local contractors are preferentially engaged as required.

Table 4 Demographic Breakdown at Rix’s 2021

Residential Council	TOTAL	%
Singleton Council	86	29.25%
Maitland City Council	76	25.85%
Cessnock City Council	59	20.07%
Lake Macquarie City Council	23	7.82%
Newcastle City Council	18	6.12%
Port Stephens Council	9	3.06%
Muswellbrook Shire Council	8	2.72%
Upper Hunter Shire Council	6	2.04%
Dungog Shire Council	5	1.70%
Central Coast Council	2	0.68%
Mid-Coast Council	1	0.34%
Wollongong City Council	1	0.34%
	294	100%

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SECTION 3 – APPROVALS

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

Table 5 RCM approvals, tenements and MOP

Approval Number	Description	Issue Date	Expiry Date
Approvals			
NSW Department of Planning, Industry and Environment			
PA No. 08_0102	Development Consent for the construction and operation of surface coal mine extensions.	26 November 2010	31 December 2035 – Mod 9)
Modification 1	Modification to acquisition and mitigation properties, increase Falbrook Pit dump height, North crib huts, Implementation date for OLC extension, BOA extension	18 March 2012	31 December 2035 – Mod 9).
Modification 3	Eliminate OLC, modify Falbrook Pit Operating hours (7a-10p x 7d), additional mitigation property, amend noise criteria at property 112, Further extension to BOA (2 years)	5 October 2012	31 December 2035 – Mod 9).
Modification 2	OLC extension (6months), BOA extension (6 months)	1 February 2013	31 December 2035 – Mod 9).
Modification 4	Application submitted April 2014 to revise BOA strategy	24 February 2016.	31 December 2035 – Mod 9).
Modification 5	Transport and Processing of ROM coal from either Open Cut at either CHPP.	26 February 2016	31 December 2035 – Mod 9).
Modification 6	Application submitted Feb 2016 to separate consolidated approval into individual Underground and Open Cut approvals- and extend timeframe for open cut mining operations till 2035.	23 August 2016.	31 December 2035
Modification 7	The exploration drilling activities as described in EA (Mod 7)	1 September 2017	31 December 2035

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Approval Number	Description	Issue Date	Expiry Date
Modification 8	Previous mined area outside approved open cut limit.	3 April 2019	31 December 2035
Modification 9	Increase in dump height, increase no of blasts per day and allow for exploration within the Approved Project Area	February 2021	31 December 2035
DA No. 49/94	Development Consent for the construction and operation of surface coal mine extensions.	19 October 1995	24 February 2022
DA No. 49/94 MOD 1	Consent modification to amend monitoring requirements	11 February 1999	24 February 2022
DA No. 49/94 MOD 2	Consent modification for Rix’s Creek Mine to receive ROM coal from Glennies Creek Underground Mine and to process the coal for transport by rail (2003)	30 June 2006	24 February 2022
DA No. 49/94 MOD 3	Consent modification for Rix’s Creek Mine to receive, process and transport bulk coal samples from the Bickham Exploration Project (2004);	15 June 2004	24 February 2022
DA No. 49/94 MOD 4	Consent modification for Rix’s Creek Mine. To allow a tunnel under the New England Highway (2009);	27 August 2009	24 February 2022
DA No. 49/94 MOD 5	Consent modification for Rix’s Creek Mine to enable the construction and operation of a rail loop, associated clean coal stockpile and rail loading facility (2013)	25 November 2013	24 February 2022
DA No. 49/94 MOD 6	Consent modification for Rix’s Creek Mine to increase the total volume of material that can be moved annually to 16.1 million bcm (2014);	2 December 2014	24 February 2022
DA No. 49/94 MOD 7	Consent modification for Rix’s Creek Mine for ROM coal from Rix’s Creek North (former Integra Mine site) to be processed at RCS Coal Handling and Preparation Plant (CHPP) (2016);	26 February 2016	24 February 2022
DA No. 49/94 MOD 8	Consent modification for Rix’s Creek Mine Satellite ROM Pads.	20 December 2016	24 February 2022

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Approval Number	Description	Issue Date	Expiry Date
DA No. 49/94 MOD 9.	Consent modification for Rix’s Creek Mine. (Dried tailings refuse to be emplaced in overburden dumps at Rix’s Creek North (up to 500,000 m3) and overburden from Rix’s Creek South to be placed at Rix’s Creek North (up to 5,000,000 m3).	01 September 2017	24 February 2022
DA No. 49/94	Consent Order- 2017/211784- NSW Land and Environment Court.	12 July 2017	24 February 2022
DA 49/94 MOD 10	Consent Modification for Rix’s Creek Mine Extension of approval for coal extraction until 24 March 2020.	12 June 2019	24 February 2022
SSD 6300	Rix’s Creek Continuation of Mining Project	12 October 2019	12 October 2040
SSD 6300 MOD 1	Administrative Changes, receipt of coalaceous material and allow exploration within the Approved Project Area		12 October 2040
Singleton Shire Council			
DC	Hydrocarbon Storage Shed	7 December 2005	-
DC	Control Room	12 September 2005	-
Approval to Demolish Existing Dwelling and Shed	Dwelling and shed located at Lot 93 DP 752442 Middle Falbrook Road	13 April 2005	-
DC 719/2003	For Glennies Creek to Ashton Water Pipeline	13 February 2004	-
DC 90/2001 (Mod)	Alteration / additions to transportable office building	13 June 2001	-
DC 90/2001	For new offices and bathhouse	5 April 2001	-
BA 2/99	Bathroom / office complex	26 March 1999	-
DA 51/90	Stockpile and Rail Loading Facility	18 October 1990	-

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Approval Number	Description	Issue Date	Expiry Date
7666/2019	Middle Falbrook Road Closure Permit	22 May 2019	-
18/00657	Consent for Permanent Road Closure- Disused Section of Middle Falbrook Road	18 September 2019	-
8167/2019	Stony Creek Road Use (Closure for Blasting).	30 May 2019	-
5586/2019	New England Highway Road Closure Permit	2 April 2019	-
Tenements			
CL352	Coal Lease	13 September 2011	Renewed until 20 October 2031
ML1432	Mining Lease	24 June 1998	Under renewal
CL357	Coal Lease	27 March 1990	27 March 2032
ML1630	Mining Lease	16 March 2009	16 March 2030
ML1648	Mining Lease	4 January 2011	4 January 2032
ML 1649	Mining Lease	4 January 2011	4 January 2032
ML1650	Mining Lease	4 January 2011	4 January 2032
ML1651	Mining Lease	4 January 2011	4 January 2032
ML 1725	Mining Lease	6 March 2018	11 November 2033
ML 1803	Mining Lease	5 May 2020	5 May 2041
Roads and Maritime			
New England Highway – Road Occupancy Licence.		Lic No 1185380	Renewed until 30 June 2022 (6-monthly renewal)
Mining Operations Plans (at end of period)			

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

Issued By	Number	Grant date	Expiry, renewal or anniversary date	Comment	
Environment Protection Licence					
NSW Environment Protection Authority.	EPL 3391	21 August 2000	03 April (Annually)	For coal mining and processing at the Rixs Creek North (Integra open cut) and Rix’s Creek, South on a scale of >5 million tonnes coal handled and >5 million tonnes of coal products loaded.	
Dangerous Goods Notification					
SafeWork NSW	NDG 028098 (RCN)	14/4/2019		Notification of Dangerous Goods on Premises (ammonium nitrate, emulsions and combustible liquids).	
SafeWork NSW	NDG 032405 (RCS)	14/4/2019		Notification of Dangerous Goods on Premises (ammonium nitrate, emulsions and combustible liquids).	
Water Licences					
Natural Resource Access Regulator	Number		Category	Volume	Purpose
	WAL41500		Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock

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Issued By	Number	Grant date	Expiry, renewal or anniversary date		Comment
	WAL 41555		Mining	100(ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	WAL 40777		Mining	305 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	20BL170864		Mining	100(ML/yr)	1 x Bore (dewatering groundwater)

Issued By	Number	Grant Date	Expiry, Renewal or Anniversary Date	Comment
NSW Environment Protection Authority. Radiation Management Licence No: 5079169	Radiation Regulated Material ID 8661	-	14 April 2022	Old No: RR10119
	Radiation Regulated Material ID 8663	-	14 April 2022	Old No: RR10120
	Radiation Regulated Material ID 8664	-	14 April 2022	Old No: RR10121
	Radiation Regulated Material ID 9121	-	14 April 2022	Old No: RR7561

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SECTION 4 – OPERATIONS SUMMARY

Rix’s Creek Mine has been operating with regular operations starting Sunday evening 10:30pm to Friday 10:30pm utilising a 3 shift roster of Day shift 6:30am – 2:30pm, Afternoon shift 2:30pm – 10:30pm and Night shift 10:30pm – 6:30am. Friday nights 10:30pm through to Sunday Afternoon 10:30pm reduced crews operate to allow mining to continue and product coal to be washed over the weekend. No mining was undertaken within the Falbrook Pit within the reporting period.

Table 6 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	5,032,788 BCM	4,171,424 BCM	7,592,836 BCM
ROM Coal / Ore	4.5 Million Tonne per annum (Western Mining area ONLY)	1,332,678t**	1,180,607t**	1,528,000t
Coarse reject / Fine reject (Tailings)	N/A	840,796t*	728,450t*	1,125,000t*

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

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

Table 7 Rix’s Creek South SSD6300 Production Summary

Material	Approved limit	Previous Reporting Period	This Reporting Period	Next Reporting Period
Waste Rock / Overburden	N/A	9,619,818 BCM	10,326,120 BCM	12,307,700 BCM
ROM Coal / Ore extracted	3.6 Million Tonnes per annum (RCS continued operations)	3,107,814t	2,955,708t	3,305,000t
Coarse reject / Fine reject (Tailings)	N/A	2,514,279t*	1,807,446t	2,521,000t
ROM Coal processed on site	4.5 Million Tonnes per annum	4,336,366t	3,936,297t	4,500,000t
Saleable product	N/A	1,822,344t	1,772,800t	1,979,112t

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

During 2021, the Rix’s Creek North CHPP washed Glencore’s Integra Underground ROM Coal, with fine tailings from the coal washing process being deposited in Rix’s Creek North prescribed emplacement facility Tailings Dam 2. Course reject from the processing of Integra UG’s coal was disposed within the Rix’s Creek North open cut area.

At Rix’s Creek North CHPP, fine tailings is pumped to a 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 so the water can be reused for coal washing and dust suppression at Rix’s Creek North.

Coal that was extracted from both the Rix’s Creek North and Rix’s Creek South open cut areas was processed at the Rix’s Creek South CHPP. Solid bowl centrifuges (SBCs) were primarily used to process tailings which was co-disposed in Rix’s Creek South open cut area. Tailings not treated via the SBC’s was stored in Rix’s Creek South’s Emplacement Area 4, which is referred to as MB19. Course reject was disposed within the Rix’s Creek South open cut area.

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The tailings at Rix’s Creek South 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 tailing’s to be transported by pipeline as the water removed during the tailing’s ‘drying’ process allows for co-disposal of the ‘dried’ tailing’s within the open cut emplacement area in a similar fashion to overburden. Early testing of dump areas has shown minimal surface slumping / cracking when this dried tailing’s material is capped with sufficient overburden material from the mining process.

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

Rix’s Creek South SSD6300 operated below the 3.6 Million ROM Tonne per annum limit. 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 8 Rix’s Creek North Production

YEAR	ROM COAL PRODUCTION (tonnes)	OVERBURDEN REMOVAL (bank cubic metres)	APPROVAL LIMIT ROM Coal (Tonnes) (Western Mining Area ONLY)
2016	915,011	4,825,050	4,500,000*
2017	1,804,652	11,564,760	4,500,000*
2018	2,979,572	10,402,073	4,500,000*
2019	1,213,920	7,352,886	4,500,000*
2020	1,332,678t	5,032,788	4,500,000*
2021	1,180,607t	4,171,424	4,500,000*

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

Table 9 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
1997	1,700,000	7,198,000	8,898,000	15,000,000 BCM
1998	1,800,000	7,052,000	8,852,000	15,000,000 BCM
1999	1,888,900	7,635,000	9,523,900	15,000,000 BCM
2000	2,288,900	7,635,000	9,923,900	15,000,000 BCM
2001	1,679,400	7,460,000	9,139,400	15,000,000 BCM
2002	1,754,001	7,787,685	9,541,686	15,000,000 BCM
2003	1,943,095	8,768,068	10,711,163	15,000,000 BCM
2004	1,931,383	8,511,771	10,443,154	15,000,000 BCM
2005	1,628,753	9,567,000	11,195,753	15,000,000 BCM
2006	2,015,042	11,547,989	13,563,031	15,000,000 BCM
2007	2,096,320	11,150,416	13,246,736	15,000,000 BCM
2008	2,096,697	11,020,152	13,116,849	15,000,000 BCM

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2009	2,338,424	10,698,123	13,036,547	15,000,000 BCM
2010	2,367,229	10,267,881	12,635,110	15,000,000 BCM
2011	2,212,703	10,589,386	12,802,089	15,000,000 BCM
2012	2,689,935	10,341,895	13,031,830	15,000,000 BCM
2013	2,747,880	11,502,321	14,250,201	15,000,000 BCM
2014	2,760,693	13,234,085	15,994,778	16,100,000 BCM*
2015	2,847,899	13,364,730	15,073,469	16,100,000 BCM
2016	2,662,223	13,534,982	15,132,316	16,100,000 BCM
2017	2,013,486	9,266,678	10,609,002	16,100,000 BCM
2018	1,694,275	8,343,078	10,037,353	16,100,000 BCM
2019	2,332,364t	7,621,847	9,954,211	16,100,000 BCM
2020	3,107,814**			3,600,000 ROM Tonnes extracted
2021	2,955,708t**			3,600,000 ROM Tonnes extracted

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

** SSD 6300 consent - Approval limit now ROM Coal Extracted from pit

Table 10 Rix’s Creek North Coal Transport PA 08_0102

YEAR	Product Coal railed from RCN Rail Loop (tonnes)	Coal Transport limit (Tonnes)
2021	2,228,498	7,300,000

Table 11 Rix’s Creek North Train Movements for 2021

RCN Train Movements		
Annual Average		PA_08_0102
Average trains/day over calendar year	1.76	3
Annual Maximum		
Maximum trains/day	5	7
Total days loading		
Days/year loading occurred	135	

4.1 Exploration

The current exploration programme at RCM started in mid-June 2021 (see attached table of completed holes). The programme completed to date comprises of nine (9) open holes and four (4) cored holes.

The work to date has involved installing five (5) vibrating wire piezometers and two (2) inclinometers. Sampling for geochemical analysis has occurred from 3 holes. Sampling for seam quality analysis has occurred from 2 holes. Sampling for permeability analysis has occurred from 3 holes. Packer tests have been conducted in 2 holes.

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Table 12 Rix’s Creek Mine Exploration drilling data

RCM Completed Exploration Drill Holes			
Area	Hole Name	Depth (m)	Hole Type
RCN CP West	RCMOH05	245	Open
	RCMOH06	269	Open
	RCMOH07	269	Open
	RCMOH08	221	Open
	RCMOH09	269	Open
	RCMOH10	275	Open
	RCMDDH01	255	Cored
	RCMDDH02	252	Cored
RCN CP SW	RCMOH11VWP05	236	Cored
	RCMOH11VWP05A	53	Open
	RCMOH13	173	Open
	RCMOH14	227	Open
	GCP28VWP04	276	Cored

4.2 Land Preparation

During 2021 disturbance of the arties pit rehabilitation area occurred to increase the dump height area of the Arties Pit in accordance with SSD 6300.

The Bloomfield Groups Permit to Disturb was utilised prior to clearing any land within the defined Arties Pit rehabilitation area. As per the permit to disturb process, a flora and fauna survey was conducted of the area prior to any clearing taking place.

4.3 Construction

No additional construction was completed in 2021.

4.4 Mining

Due to the Covid-19 pandemic, shift numbers were staggered to reduce large volumes of people from coming into contact at the same time. Covid-19 posed a lot of challenges during the 2021 period, with many forms of controls, such as hand sanitiser, personel in room restrictions and people working from home occurring in 2021.

The majority of RCM operations were conducted in Rix’s Creek South, where four excavators were working. The Liebherr R9800 (EX456), Hitachi 5500 (EX454) and two Hitachi 3600 excavators (EX450 & EX451) all conducted operations in the West Pit with most work completed to the southern and western side of the West Pit.

Operations also took place in Rix’s Creek North in the Camberwell Pit. The CAT 6060 (EX455) and another Hitachi 3600 (EX452) both had their operations spanning from the northern extents to the southern extents of the Camberwell Pit.

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

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, Cat 6060 (EX6060) Hitachi EX5500 excavator, Hitachi EX3600 excavators, and large front end loaders (Caterpillar 994 & 992). These machines load 220 tonne (Caterpillar 793) and 180 tonne (Caterpillar 789) 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.

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During 2021 the main operation areas includes mining of the Rix’s Creek North Camberwell Pit. Rix’s Creek West Pit will continue to progress in a north-west direction aligned with the current MOP in place (i.e. between the out of pit dump and the New England Highway).

Table 10 is a list and number of the major pieces of equipment utilised on site for the mining operation.

Table 13 Equipment List 2021

Equipment List 2020	
Caterpillar 789 Truck	26
Caterpillar 793 Truck	14
Caterpillar 994 Front-End Loader	3
Caterpillar 992 Front-End Loader	3
Caterpillar 950 Front-End Loader	1
Caterpillar 962H Front-End loader	1
Caterpillar IT12 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	5
Caterpillar Tiger 854 Bulldozer	1
Caterpillar 16M Grader	1
Caterpillar 16H Grader	1
Caterpillar 24H Grader	2
Caterpillar 24 Grader	1
Redrill SK75	1
Sandvik Drill D75K	1
Sandvik Drill D50-i	2
Volvo Stemming Truck	2
Volvo Lube Truck	2
Caterpillar 785 Water Cart (114,000 l)	3
Caterpillar 777 Water Cart (80,000 l)	3
ACCO Water Cart (10,000 l)	2

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4.5 Waste Management

The following waste streams were serviced during the reporting period:

Waste Water: Grey water generated on site consisting of domestic waste water from the bathhouse facility's, associated amenity areas and administration areas pass through septic systems approved by the local authorities. RCS: OSSM Approval No: 2820/2002 and 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. At the RCS Sewage Treatment Plant, an in-line chlorination dosing system was installed to significantly reduce faecal coliform within the effluent pond.

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 by the licenced waste oil contractor.

Waste Metal: Scrap metal is collected for recycling on a regular basis and as required. The metal recycler sorts into hard and soft metal for further economic benefit to the company. A tidy up initiative continued in 2021, which saw a large portion of disused scrap metal be recycled to improve the cleanliness of areas around RCM, which included the dismantling and scrapping of retired heavy equipment.

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

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

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

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

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

Oil Filter Bin: Used oil filters from heavy vehicles are placed in 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 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.

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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 2021.

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

Table 14 Waste Volumes 2021

Description	2020 Total	2021 Total
Liquid Waste (t)	60,500	17,500
Metal Recycling (t)	272	1,332
Batteries recycling (kg)	15,080	17,969
Copper (kg)	712	N/A
Oily Water (t)	27,000	20,446
Waste Oil (L)	388,600	228,500
Paper and Cardboard (kg)	12,592	12,060
Timber Recycling(kg)	29,300	20,400
General Waste (kg)	184,190	243,460
Oily Rags (kg)	6,500	6,800
Hydraulic hoses (kg) and Oil Filters	7,300	18,366
E-waste (kg)	0	0
Fluro recycling(kg)	0	0

A review of hydrocarbon management was undertaken at Rix’s Creek Mine following the Independent Environmental Audit where independent auditors identified opportunities for improvement in waste segregation, notably from workshop bins and Intermediate Bulk Container (IBC) storage. A tender for waste management has been completed and a new waste contractor has been chosen to oversee all of The Bloomfield Group sites to ensure a consistent process for waste management. Co-mingled recycling was introduced onto site by the new contract waste provider. This initiative will see further segregation and reduction of general waste quantities.

During 2021 there were improvements in hydrocarbon storage completed at the RCS Contractors pad. A new waste oil tank will also be commissioned to improve the process of licenced waste oil transfer offsite. Implementation of a colour coding bin system was rolled out to ensure that workers and contractors segregate waste effectively.

4.6 Product Stockpiles

Raw coal is transported from the active mining areas in 180 and 220 tonne rear dump trucks (Caterpillar 789 and 793) to the 30,000 tonne capacity run of mine (ROM) stockpile at the coal preparation plant or the two satellite ROM stockpiles prior to washing. Product coal (clean coal) is conveyed to a 1,000 tonne bin and then transported via internal roads using registered semi trailers to the rail loading facilities. Each 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.

4.7 Hazardous Material Management

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

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Depot 1	Above ground tank for Class C1, UN 00C1 Diesel.	220,000 litres
Depot 2	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 3	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 5	Above ground tank for Class C1, UN 00C1 Diesel.	90,000 litres
Depot 6	Above ground tank for Class 3, UN 1989 Aldehydes, N.O.S.	15,000 litres
Depot 8	Above ground tank for Class C1, UN 00C1 Combustible liquids	60,000 litres
GAS1	Cylinder store for Class 2.1, UN1001 Acetylene, dissolved	1,000 litres
GAS2	Cylinder store for Class 2.2, UN1072 Oxygen, compressed	1,000 litres
GAS2	Cylinder store for Class 2.2, UN1006 Argon, compressed	1,000 litres
RCN1	Above ground tank for Class 5.1, Ammonium Nitrate	50,000 kg
TKN1	Above ground tank for Class 5.1, Ammonium Nitrate Emulsion	60,000 kg
TKN2	Above ground tank for Class 5.1, Ammonium Nitrate Emulsion	30,000 kg

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

MAG1	Magazine Class 1.1B, UN 0360, Detonator Assemblies non-electric	10,000 units
MAG1	Magazine Class 1.4S, UN 0349, Articles, Explosives, N.O.S.	10,000 metres
MAG1	Magazine Class 1.4B, UN 0255, Detonators, Electric for blasting	10,000 units
MAG2	Magazine Class 1.1D, UN 0065, Cord, detonating, flexible	3,000 metres
MAG2	Magazine Class 1.1D, UN 0042, Boosters	3,000 kg
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.

4.8 Other Infrastructure Management

There has been an ongoing maintenance program on infrastructure associated with the Rix's Creek mining operation. This has included painting of assorted buildings and substations sheds across site. As part of this maintenance, regular brushcutting and weedspray have also been employed.

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

4.9 Bush Fire Management

An updated Bushfire Management Plan was submitted to the Rural Fire Services (RFS) for consultation in October 2019, and submitted to the local Darlington Fire Brigade in October 2020.

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

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

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

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SECTION 5 – ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEWS

5.1 Actions required from previous Annual Reviews

The Department of Planning Industry and Environment (DPIE) conducted offsite surveillance inspections focusing on dust management at Rix’s Creek Mine on Saturday 10th April and Wednesday 24th November 2021. DPIE observed no dust or other issues from these targeted inspections. .

On the 21st October 2021, the NSW EPA made a request RE: *Rix’s Creek Mine – EPL3391 - Remote Inspection Bunding of Chemicals and dangerous goods that relate to scheduled activity*. Rix’s Creek provided the request for information on the 26th October 2021.

On the 16th December 2021 the Resources Regulator conducted a rehabilitation inspection at Rix’s Creek Mine. Once formal correspondence is received from the inspection, actions will be addressed following the site inspection.

Additional Information Required from Annual Review 2020	Section Addressed in Annual Review 2021
1. Introduction a. Site layout and locality plan is to include: i. the project development boundary (as per Appendix 3 of MP08_0102 and Appendix 2 Figure 1 of SSD6300; ii.the location of the biodiversity offset areas.	Figure 2 updated to include, Mining Tenements, Project Approval Boundary and location of Biodiversity offsets
2. Environmental Performance a. Include a comparison of monitoring results for all aspects (noise, blasting, air quality, biodiversity, heritage, water management) against i. the monitoring results of previous years ii.relevant predictions in the environmental assessments b. Report on the effectiveness of the noise and air quality management systems	Noise section updated 6.2.2 Blasting section updated 6.3.2 Air quality section includes TSP and PM2.5 analysis 6.4.2 Water management section updated 7.0
3. Water management a. Include water taken in the previous water year as per Table 7 of the Department’s Annual Review Guideline (October 2015)	Water taken table included in Section 7.0.
4. Incidents and non-compliances a. Describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence b. Indicate if the non-compliances were reported to relevant agencies in accordance with approvals c. Summary of any warning letters, official cautions, penalty notices or prosecution proceedings by any regulatory agency	Refer to Section 11.

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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, blast vibration, blast over pressure and noise.

6.1 Meteorological

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

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

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

6.1.1 Rainfall

Total rainfall for the period was 1016.5 mm over 144 days, which was 376.0 mm above average for the year. The yearly average for Singleton is 640mm (BOM historical yearly average). The monthly rainfall data is provided in **Table 14** and **Figure 4** shows the results graphically. January, May and November were the only months to receive below average rainfall.

Table 15 Annual Rainfall

RIX’S CREEK ANNUAL RAINFALL 2021													
Month	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Total Rainfall	91.4	109	222.8	9.7	26.6	56.2	23	38.6	19.8	66.0	265	88.4	1,016.5
Average Rainfall	66	67	64.2	25.7	24.5	27	29	18.2	41	36.3	60.9	74	533.8
Wet days (>0.5 mm rainfall)	14	17	17	9	11	10	9	6	9	10	20	12	144

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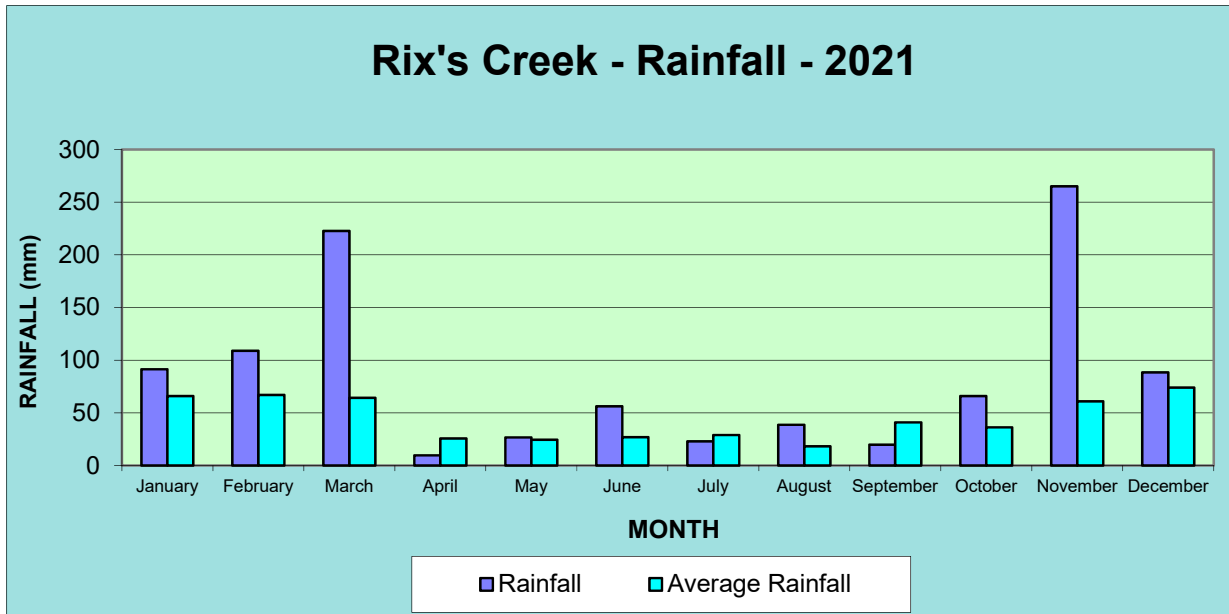


Figure 4 Annual Rainfall 2021

6.1.2 Temperature

The maximum temperature of 35.8°C occurred in December and the minimum temperature of 1.3°C was recorded in July. **Figure 5** shows the monthly average maximum and minimum temperatures for the site as well as the maximum and minimum recorded temperatures.

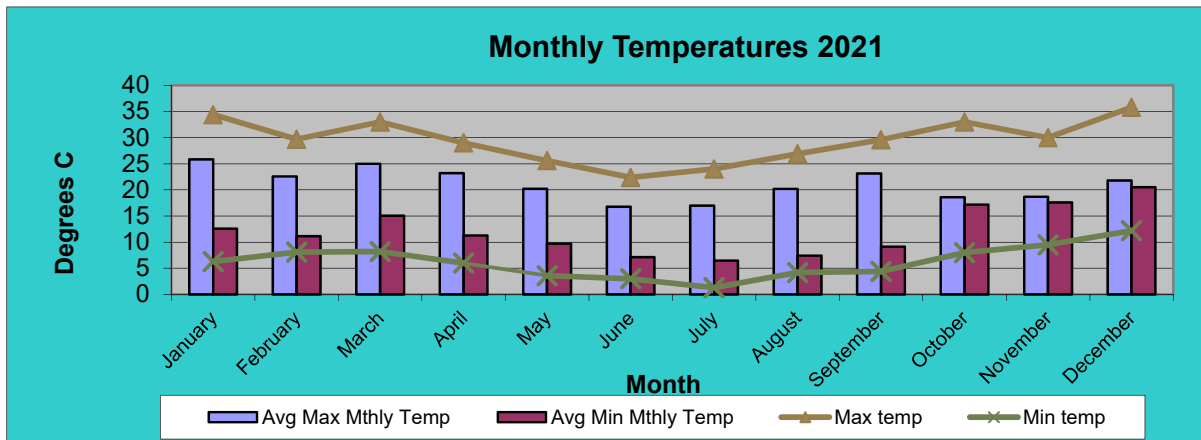


Figure 5 Average Monthly Maximum & Minimum Temperature 2021

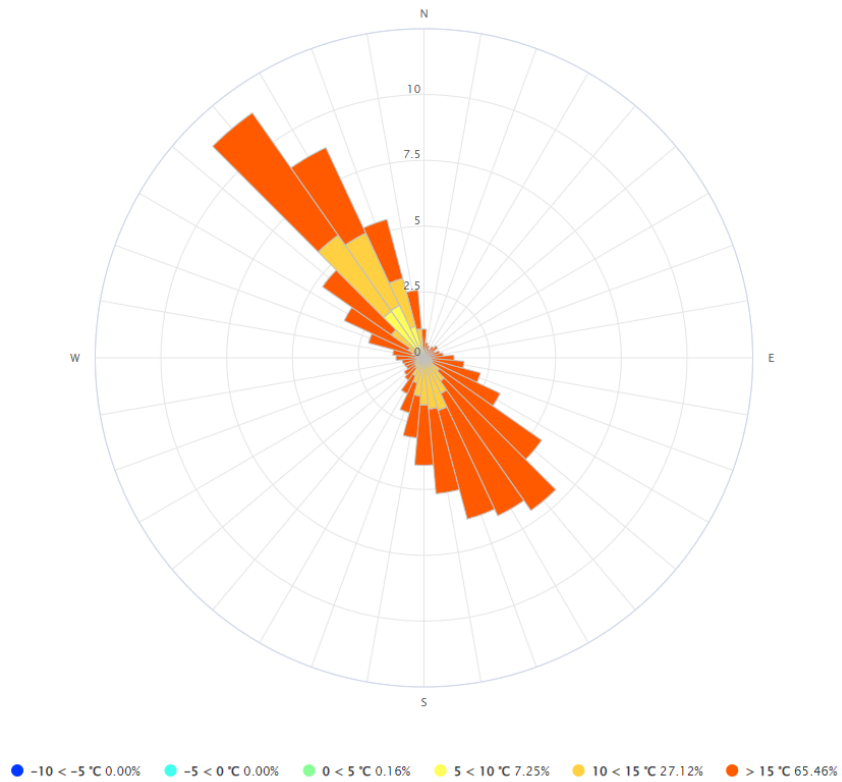
6.1.3 Wind Speed and Direction

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 wind roses it is evident the dominant wind direction for the 2021 calendar year was from the north-west.

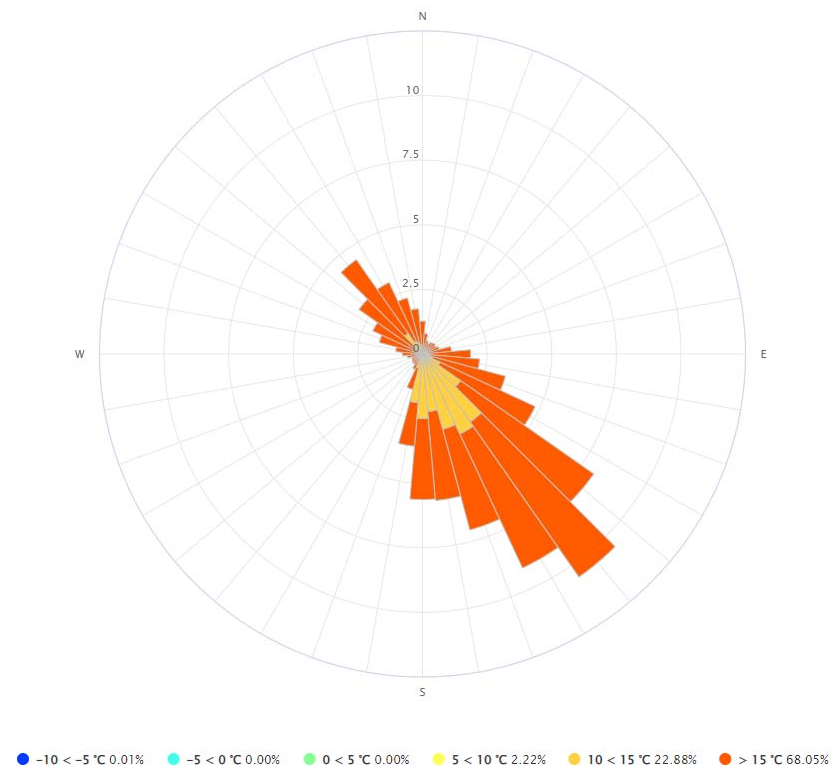
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Figure 6 shows the seasonal wind roses generated for the site on a seasonal basis.



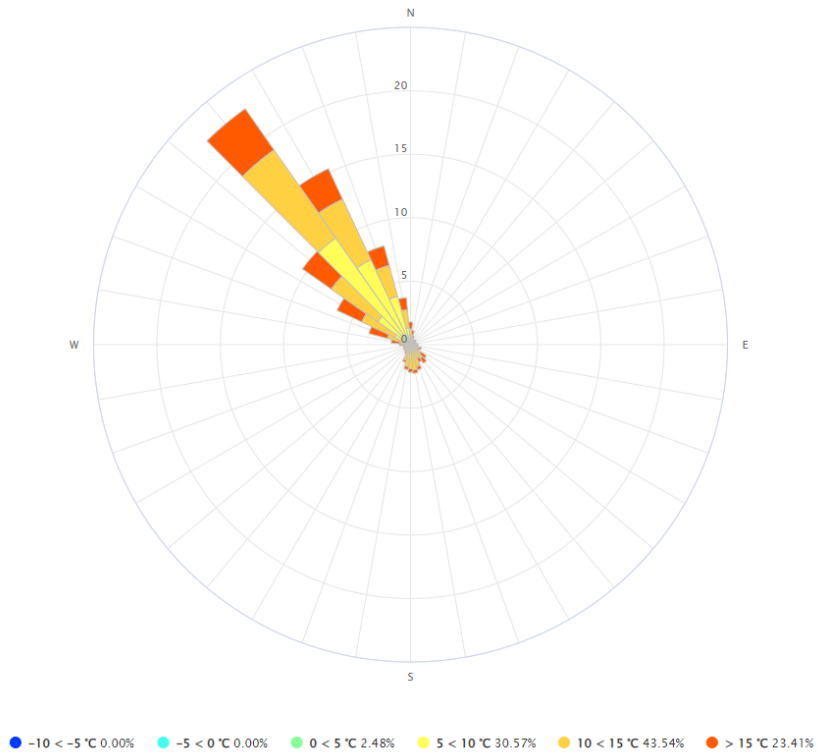
Summer 2021



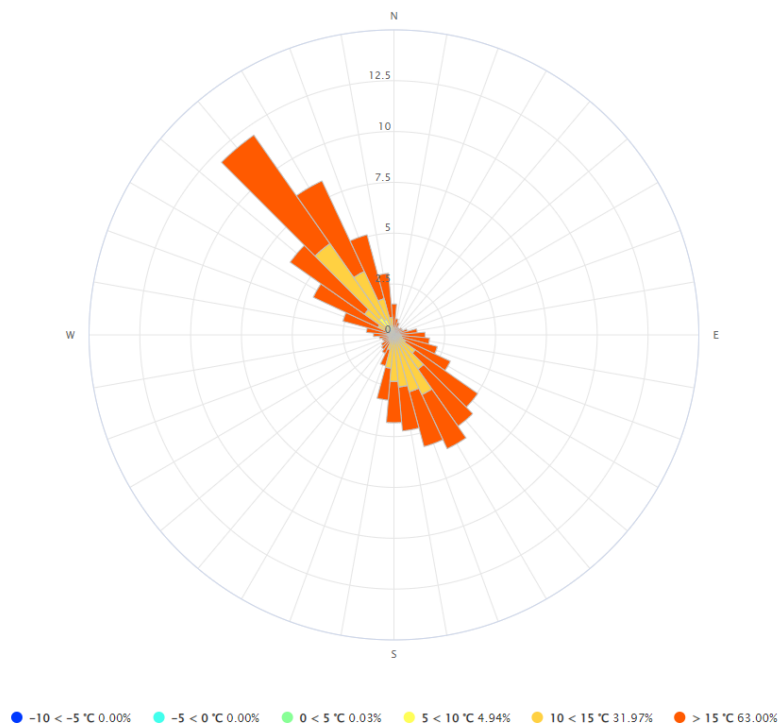
Autumn 2021

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Winter 2021



Spring 2021

Figure 6 Windrose for Rix's Creek 2021

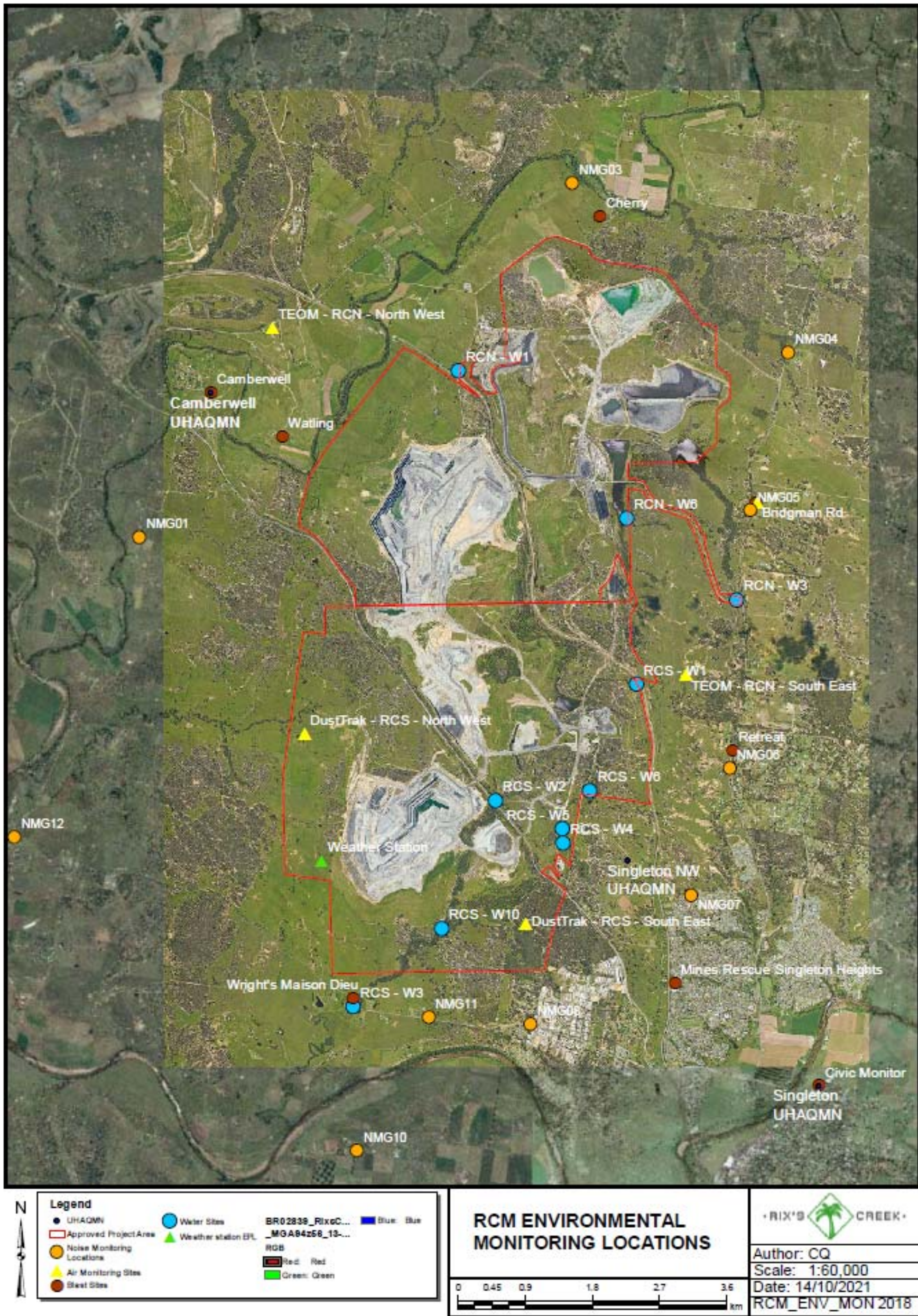


Figure 7 Rix’s Creek Mine Compliance Environmental Monitoring Locations

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6.2 Operational Noise

6.2.1 Environmental Management

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

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

The Noise Management Plan was updated on the 12/05/2021 following approval of Rix’s Creek North Modification 9.

Rix’s Creek EPL 3391 states that Rix’s Creek must seek to ensure that its rail spur is only accessed by locomotives approved to operate on the NSW rail network in accordance with noise limits L6.1 to L6.4 in RailCorp’s EPL (No. 12208) and ARTC’s EPL (No. 3142) or a Pollution Control Approval issued under the former Pollution Control Act 1970. Rix’s Creek Mine has received correspondence from ARTC and understands that each rail provider is required to meet their obligations under there respective EPL and that they must comply with conditions, which include use of approved locomotives from the EPA’s list.

6.2.2 Environmental Performance

There were no externally reportable incidents relating to noise during the 2021 reporting period.

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

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

In accordance with our Noise Management Plan, Monthly compliance attended noise monitoring is conducted at zones where meteorological enhancement is indicated by a predictive noise model. The Acoustic Consultant develops a monitoring plan based on this meteorological modelling. Table 15 and 16 show results from the Independent Monthly Compliance Attended Noise monitoring, as conducted by SLR Consulting Australia Pty Ltd.

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Table 16 Independent Monthly Compliance Attended Noise monitoring results (L_{Aeq}, 15 Minute dB)

RCM Laeq, 15 Minute dB															
Monitoring Location	Monitoring Period	RCN Criteria (L _{Aeq} , 15 minute dB)	RCS Criteria (L _{Aeq} , 15 minute dB)	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
NM01	Night	38	40	-	-	NM	IA	IA	IA	-	-	IA	IA	<30	-
NM03	Night	40	40	IA	32	-	IA	-	31	28	IA	33	-	27	31
NM04	Night	37	42	IA	28	-	-	-	31	<25	<25	28	-	30	<25
NM05	Night	41	42	IA	IA	-	-	-	40	<25	25	-	-	32	IA
NM06	Night	36	42	IA	IA	IA	-	37	-	IA	<25	-	IA	<30	IA
NM07	Night	35	40	IA	IA	IA	36	36	-	IA	IA	-	IA	IA	IA
NM08	Night	35	40	IA	IA	IA	32	29	-	IA	IA	30	IA	-	IA
NM10	Night	35	40	27	-	-	-	-	-	-	-	-	-	-	-
NM11	Night	35	40	-	IA	31	32	35	33	-	-	38*	IA	-	-
NM12	Night	35	40	31	IA	29	IA	IA	IA	-	-	IA	IA	-	-

IA = Inaudible; NM = Not Measurable, N/A Not Applicable

*RCS contribution for September 2021 NM11 monitoring result.

Table 17 Independent Monthly Compliance Attended Noise monitoring results (L_{A1}, 1 Minute dB)

RCM LA1, 1Minute dB															
Monitoring Location	Monitoring Period	RCN Criteria (LA1, 1 minute dB)	RCS Criteria (LA1, 1 minute dB)	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
NM01	Night	48	47	-	-	NM	IA	IA	IA	-	-	IA	IA	34	-
NM03	Night	45	45	IA	35	-	IA	-	34	32	IA	42	-	29	38
NM04	Night	49	47	IA	30	-	-	-	33	25	28	32	-	32	27
NM05	Night	47	47	IA	IA	-	-	-	46	26	33	-	-	34	IA
NM06	Night	48	47	IA	IA	IA	-	46	-	IA	<25	-	IA	<30	IA
NM07	Night	45	47	IA	IA	IA	44	42	-	IA	IA	-	IA	IA	IA
NM08	Night	45	47	IA	IA	IA	39	30	-	IA	IA	33	IA	-	IA
NM10	Night	45	47	28	-	-	-	-	-	-	-	-	-	-	-
NM11	Night	45	47	-	IA	36	38	N/A	38	-	-	41	IA	-	-
NM12	Night	45	47	38	IA	32	IA	IA	IA	-	-	IA	IA	-	-

IA = Inaudible; NM = Not Measurable, N/A Not Applicable

Based on the results shown in Tables 15 and 16 no non-compliances were identified in the reporting period. Elevated results were identified during cooler periods between April and August and this is consistent with previous years results.

The summary of model predictions for noise levels in the Environmental Assessment identified predictions for all the subsequent stages of NAG J (NM08) and NAG K (NM11) are less than L_{Aeq}(15 minute) 32 dB(A) under neutral atmospheric conditions. Noise modelling for all other NAG are less than or equal to L_{Aeq}(15 minute) 35 dB(A) under neutral atmospheric conditions. The results of noise modelling indicate that during neutral atmospheric conditions there would be minimal noise impacts and the operations of the Mine would

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be inaudible in many circumstances. This is consistent with the attended noise monitoring results for the 2021, with exception to NM11 in September 2021, which recorded an LAeq (15min) of 38dB. This is still within the compliance criteria of 40dB RCS criteria for NM11.

6.2.3 Incidents and Complaints

Seven (7) noise complaints were recorded during 2021, a decrease on the fifteen (15) complaints that were recorded during the 2020 period. Rix’s Creek Mine investigate all complaints. All complaints that RCM receive are investigated with actions taken if required.

6.2.4 Further Improvements.

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

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

All equipment is checked and maintained on a regular basis to ensure noise attenuation equipment such as silencers and mufflers are operational. Installation of sound suppression will continue to be installed on new pieces of earthmoving equipment as committed in the Project Approvals prior to commencing work/s on-site.

Ongoing operation of a real time noise management monitor located near the NM05 (Bridgman Road) receiver continued during 2021. The noise monitor can apply 1/3 octave low frequency and tonal noise penalties in real time in accordance with the Noise Policy for Industry Guidelines 2017 (NPMI). This system provides alarms when measured noise levels are within 2 dB of the noise criteria (Level 1 Alarm), above the noise criteria (Level 2 Alarm), or sustained over two 15 minute periods, (Level 3 Alarm). Each level of alarm requires action by either the noise technician or RCN washery operator.

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

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

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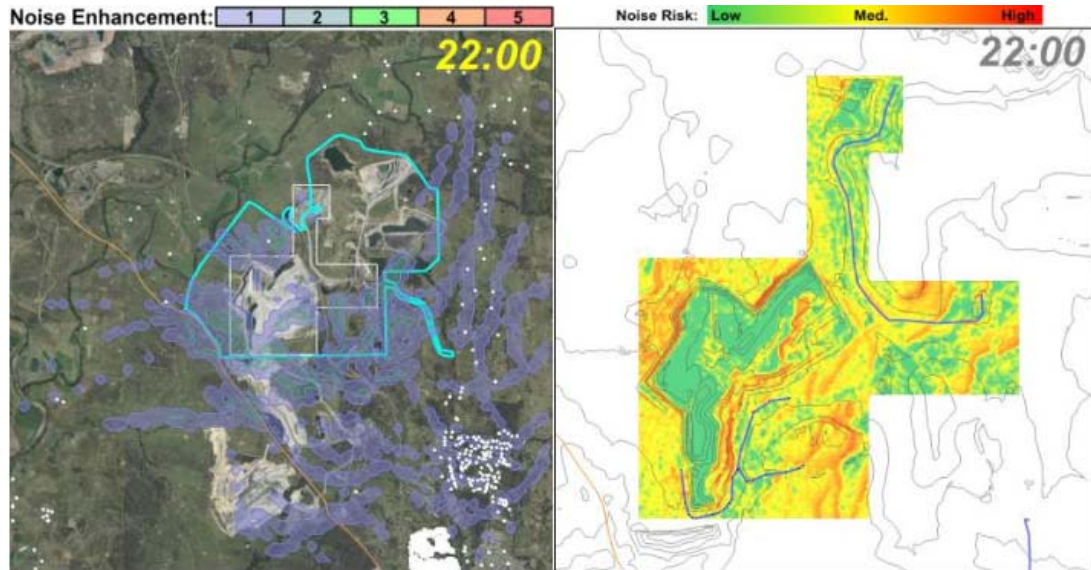


Figure 8 RCS and RCN predictive mine noise forecast models

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

The use of the 3-D noise model to predict areas of possible meteorological enhancement of Rix’s Creek open cut noise, to plan mine working locations, has been successful in controlling its noise impact to current Environment Protection License (EPL 3391). 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 within compliance limits.

6.3 Blasting

6.3.1 Environmental Management

The RCM Blast Management Plan combines Rix’s Creek Southern and Rix’s Creek Northern operations. On the 12/5/2021 the Blast Management Plan was updated following the RCN Modification 9 which allows RCN operations to carry out 3 blasts per day across the northern and western mining areas and a maximum of 10 blasts per week onsite, average over a 12 month period.

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).

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

During the year blasting in the West Pit was undertaken within the 500m exclusion zone as approved by NSW DPE under Sch2. Cond B18(b) of SSD 6300 dated 8/2/2020. RCM holds an approved procedure to close the Highway to traffic during blasting. The Company also has approval from the Roads and Maritime Services (RMS) to conduct closures of the Highway for blasting under a Road Occupancy License (currently ROL 1185380)– This approval is renewed annually.

Real-time wind speed and direction information is used in scheduling blasting operations to minimise offsite effects of air blast overpressure and dust. The Company is one of the joint venture partners in the Meteorological Sounding Group. This group has purchased equipment to measure wind speed,

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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.

During 2020 approval was sought from DPE to increase the ground vibration limit for the approved cut and cover tunnel (a subcomponent of “Other Public Infrastructure”) from 50mm/s to 100 mm/s, in accordance with Table 2 Condition B7 of Schedule 2 of SSD 6300. Approval to increase the limit was granted on 26/10/2020. During 2021 vibration monitoring of the cut and cover tunnel did not exceed the previous lower limit of 50 mm/sec, let alone 100 mm/sec. It is expected that as mining progresses towards the North at West Pit, that vibration levels will increase at the cut and cover tunnel, however stay well below the 100mm/ sec limit.

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 gas monitors as required. The monitoring was in conjunction with Rix’s Creek daily EnvMet and NOx emissions predictive modelling. The NOx modelling shows various predicted outcomes and has continued to provide an integral part of Rix’s Blast regime during 22020 and can be seen in Figure 9. The white dots on the model in Figure 8 are the closest residences/receptor’s that can potentially be impacted via blasting.

Rix’s Creek send out an email blast notification to nearby mines prior to all blasts that provides a figure of the location of the blast and the intended time of firing. Rix’s Creek Mine also receives blast notifications from nearby mines which identifies the intended time and position of the blast so that coordination of blasts times can occur between mine sites. A formalised communication protocol has been developed with quarterly meetings being conducted among neighbouring mine sites during the reporting period.

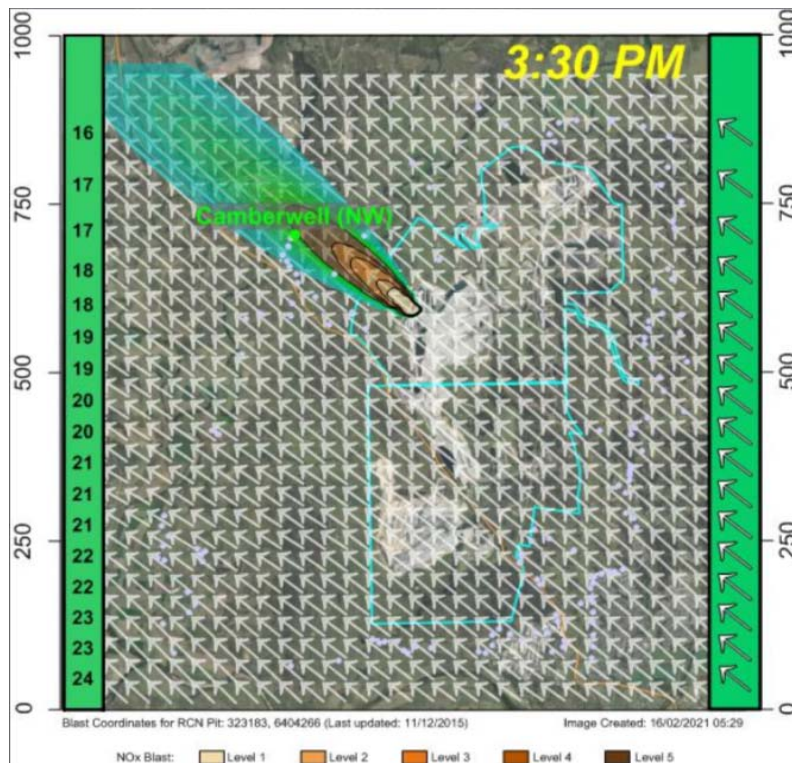


Figure 9 Blast Dust / Fume ‘Plume’ Model.

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6.3.2 Environmental Performance

During 2021 a total of 85 production blasts were initiated. 47 shots were fired in the Camberwell Pit at Rix’s Creek Northern operations and 38 shots were fired in the West Pit at Rix’s Creek Southern operations.

Rix’s Creek North PA 08_0102 allows three (3) blasts per day across the northern and western mining areas, unless an additional blast is required following a blast misfire. A maximum of ten (10) blasts per week onsite, average over a 12 month period is also approved, This was complied with during the 2021 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 SSD 6300 conditions.

Individual blast results for 2021 are shown on the Bloomfield website at:

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

Of the 85 blasts the fume ratings recorded were as follows:

Rating		A	B	C
0	52	-	-	-
1	-	26	2	-
2	-	1	2	1
3	-	-	1	-
4	-	-	-	-
5	-	-	-	-

Table 18 Blast monitoring criteria/compliance at individual monitoring sites for 2021

Location	Operation	Air blast overpressure	Ground Vibration	Allowable Exceedance	Environmental performance	Key trends	Proposed management actions
Watling	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Mines Rescue	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Retreat	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Wrights Residence	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil

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Camberwell	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Cherry Residence	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Bridgman Rd	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil
Civic	Rix’s Creek Mine	115	5	5% of the total number of blasts over a period of 12 months	Compliant	Nil	Nil
		120	10	0%	Compliant	Nil	Nil

The Rix’s Creek South Continuation of Mining project identifies majority of mining proposed in the Project would occur to the north-west of the existing operations in the West Pit. This would move the centre of blasting to the North / North West, moving away from the Wright, Dunns, and Mines Rescue Monitors to reduce ground vibration impacts.

Moving the blast centre in this direction, especially to the North West, would have the potential to cause increased ground vibration at the Retreat Monitor. However there is sufficient separation distance for ready compliance with regulatory limits. The Retreat monitor currently experiences a Peak Particle Velocity level of 0.15mm/s from worst case blasting, it has not been at risk of being exposed to ground vibration above 5mm/s.

The environmental assessment modelled the peak levels for Wrights blast monitor in West Pit operations is 105dB and a peak particle velocity level (PPV) of 3.4mm/s. This was not exceeded during the reporting period.

6.3.3 Incidents and Complaints

During the reporting period 85 blasts were initiated across Rix’s Creek Mine.

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

On the 17/11/2021 a shot was fired in the West Pit Operations that recorded a 3(b) fume rating. The shot was fired under very low risk weather conditions and the fume did not leave the site boundary. Of the 85 shots fired 52 did not have any visible fume.

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

During 2021, Five (5) complaints were received in relation to blasting at Rix’s Creek Mine. Four (4) complaints were received for blasting within the 2020 period.

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6.3.4 Further Improvements

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

Rix’s Creek have access to 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 2021 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. Rix’s Creek have the capability of setting up gas loggers downstream from blasts to monitor any potential gasses released from blasts on the site boundary.

The ACCO 10,000L water cart was used for crusting drill cuttings from the drill and blast process. The watering of drill cuttings occurs on the shot and is also prioritised when unfavourable wind conditions are predicted.

6.4 Air Quality

6.4.1 Environmental Management

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

On the 12/5/2021 the AQGGMP was updated following approval of RCN Modification 9.

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

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

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

- 2 dust deposition gauges (DDG28 and DDG32);
- 3 TEOM’s units to sample particulates less than 10 microns (PM10) in diameter via real-time / continuous monitoring (RCN North West, RCN South East and RCN North East);
- 2 DustTrak units which sample particulates less than 10 microns (PM10) in diameter via real-time continuous monitoring (RCS North West and RCS South East).

Table 19 Air Quality Assessment Criteria

POLLUTANT	STANDARD	PERIOD	AGENCY
TSP	90µg/m ³	Annual average	EPA/DPIE
PM2.5	8 µg/m ³	Annual Average	EPA/DPIE
	25 µg/m ³	24 hour maximum (contribution)	EPA/DPIE
PM10	50µg/m ³	24 hour maximum (contribution)	EPA/DPIE
	25µg/m ³	Annual average	EPA/DPIE
Depositional Dust	4g/m ² /month	Annual maximum total deposited dust level	EPA/DPIE
	2g/m ² /month	Annual maximum increase in deposited dust level	EPA/DPIE

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Dust Deposition Gauges

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

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

Tapered Element Oscillating Microbalance (TEOM)

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

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

DustTrak Monitors

Two DustTrakk units sample particulates less than 10 microns (PM10) in diameter via real-time continuous monitoring. DustTrak monitors are located at the Rix's Creek Southern operations and are located toward the North West of the mining operations in West Pit (DustTrakRCS North WestW) while the other DustTrak unit is located southeast of the West Pit rehabilitation (DustTrak RCS South East).

The location of the DustTrak 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.

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

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

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

During 2021 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-down equipment, activate water sprays on stockpiles, where required.

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29/12/2021																									
	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)	0.6	1.6	3.1	2.3	3.0	3.4	3.9	4.2	2.6	2.9	2.8	4.4	Wind Speed (m/s)	4.7	3.7	5.6	4.9	6.6	6.5	6.5	5.8	4.5	4.3	3.7	2.3
Wind Direction	SSW	S	S	S	S	S	S	S	S	ENE	E	ESE	Wind Direction	ESE	ESE	ESE	ESE	SE	SE	ESE	ESE	ESE	ESE	E	E
Max 1-hour average PM ₁₀ concentration (µg/m ³)																									
North-West	53	62	55	19	17	25	27	7	4	1	0	1	North-West	0	0	2	1	0	1	0	0	0	0	0	0

30/12/2021													31/12/2021											
	12am	2am	4am	6am	8am	10am	12pm	2pm	4pm	6pm	8pm	10pm		12am	2am	4am	6am	8am	10am	12pm	2pm	4pm	6pm	8pm
Wind Speed (m/s)	2.1	2.0	1.9	2.0	2.8	3.4	3.9	5.4	7.1	6.6	5.8	3.5	Wind Speed (m/s)	2.2	1.9	1.0	1.8	1.1	0.9	2.6	3.8	5.9	8.7	5.4
Wind Direction	S	SSE	SE	SSE	ESE	E	ESE	ESE	ESE	E	ESE	SE	Wind Direction	SSE	S	S	SSE	SE	ESE	SE	ESE	ESE	E	ESE
Max 2-hour average PM ₁₀ concentration (µg/m ³)																								
North-West	12	12	7	20	1	1	1	2	4	4	8	4	North-West	13	6	13	19	7	3	2	1	3	10	4

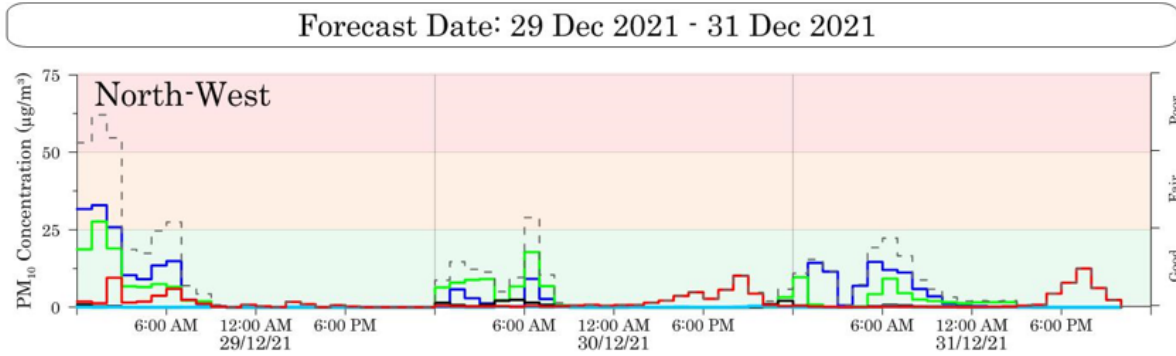


Figure 10 Example of dust forecasting tool to assist operations during 2021

Table 20 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 2021 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 gm²/m²/month. The 2021 average of DDG28 was 1.8 gm²/m²/month while 2021 average of DDG32 was 1.6 gm²/m²/month.

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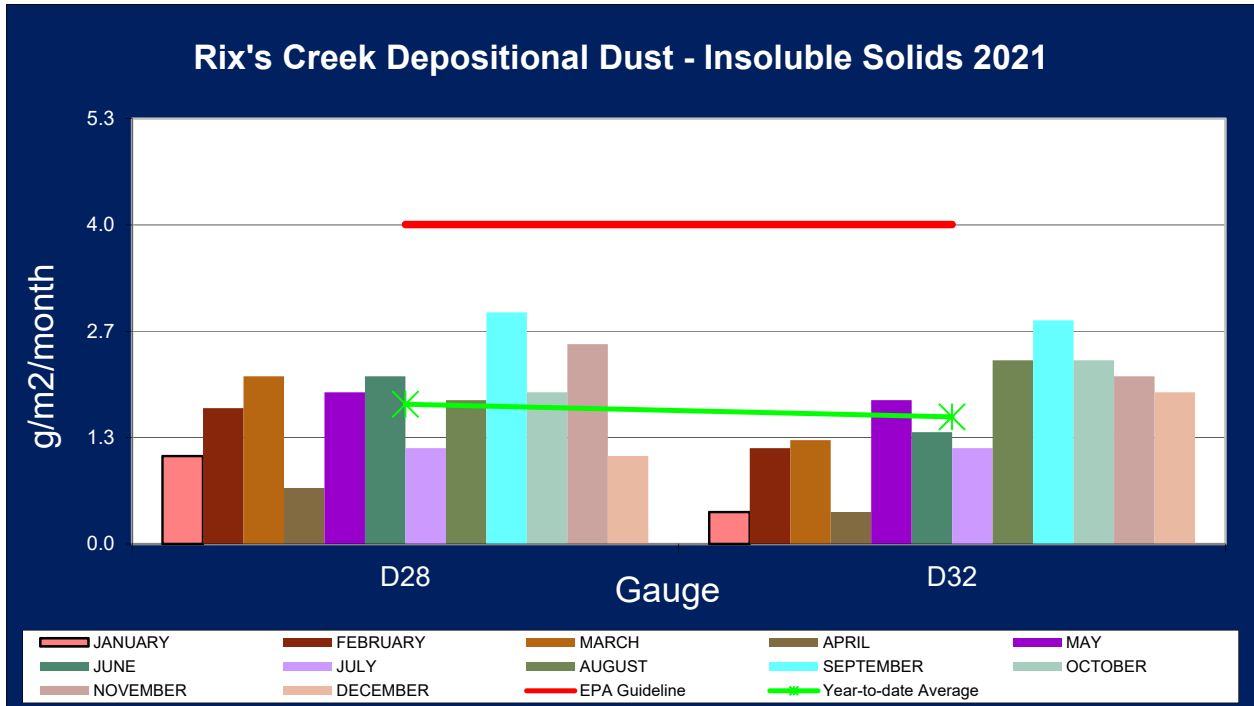


Figure 11 Rix's Creek Insoluble Solids Dust Deposition 2021

In 2021 there were no exceedance of the average result of 4 g/m²/month for either DDG28 and DDG32. 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 2021.

Particulates Less Than 10 Micron

During the 2021 reporting period, the North West RCN TEOM exceeded the 24hour PM10 contribution on 3 occasions, the South East and North East RCN TEOM did not exceeded the 24 hour PM10 contribution. 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 (Noth West RCN TEOM) has elevated readings when compared to the downstream (South East RCN TEOM) receptor. This trend indicates that the elevated air quality readings are generally coming from upstream sources in a North Westerly direction from Rix's Creek Mine.

The monthly averages and 12 month rolling averages are shown in **Figure 12**. The RCN North West TEOM recorded an annual average of 22.1ug/m³. The South East RCN TEOM recorded an annual average of 12.1ug/m³ while the RCN North East TEOM recorded a 12 month rolling average of 14.0ug/m³.

Due to 2021 above average rainfall all annual averages were well down on 2020's recorded averages (RCN North West 29.2ug/m³; RCN South East 19.8ug/m³ and RCN North East 20.4ug/m³). The RCN North West TEOM recorded moderate monthly averages for 2021. Of the 12 months of 2021, 9 of those months recorded above average rainfall.

When the Rix's Creek North air quality results for 2021 are compared to the 2009 Environmental

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Assessment modelled results for year 6 part pit extent of the operations, it was determined that the annual average at the RCN North West TEOM (22.1ug/m³) was slightly lower than the EA prediction at the mine owned residence ID 85 (27 ug/m³), which is where the location of the RCN North West TEOM is located. The RCN South East TEOM (12.4ug/m³) and RCN North East TEOM PM10 (14.0ug/m³) averages were slightly below the 2009 EA predictions for year 6 part pit extent operations.

During the 2021 reporting period the DustTrak units recorded averages above 30ug/m³ in February and March (North West DustTrak 30.7 & 35.4ug/m³ and South East DustTrak 33.1 & 36.8ug/m³), in April the South East DustTrak recorded 31.8ug/m³. These result coincided with a bellows effect of stronger SE to NW winds during the autumn period up and down the valley.

The annual average for RCS North West DustTrak in 2021 was 10.56ug/m³ and RCS South East DustTrak recorded an annual average result of 13.53ug/m³. When compared to the modelling predictions for the 2021 privately owned receptors from the 2014 Rix’s Creek Environmental Assessment (EA), ID 173 which is the closest privately owned receptor to the RCS North West DustTrak modelled 39ug/m³ for the 2020 period. ID 140, which is the closest private receptor to the RCS South East DustTrak unit modelled 21ug/m³. Both DustTrak units were below the 2021 predicted modelling results in the 2014 Rix’s Creek EA.

The Camberwell UHAQMN monitor recorded an annual average of 20.6ug/m³ for the 2021 reporting period, a decrease from 24.3 ug/m³ recorded for the 2020 reporting period. The Singleton North West UHAQMN monitor recorded an annual average of 18.8ug/m³ for the 2021 reporting period, a decrease from 22.2ug/m³ recorded for the 2020 reporting period.

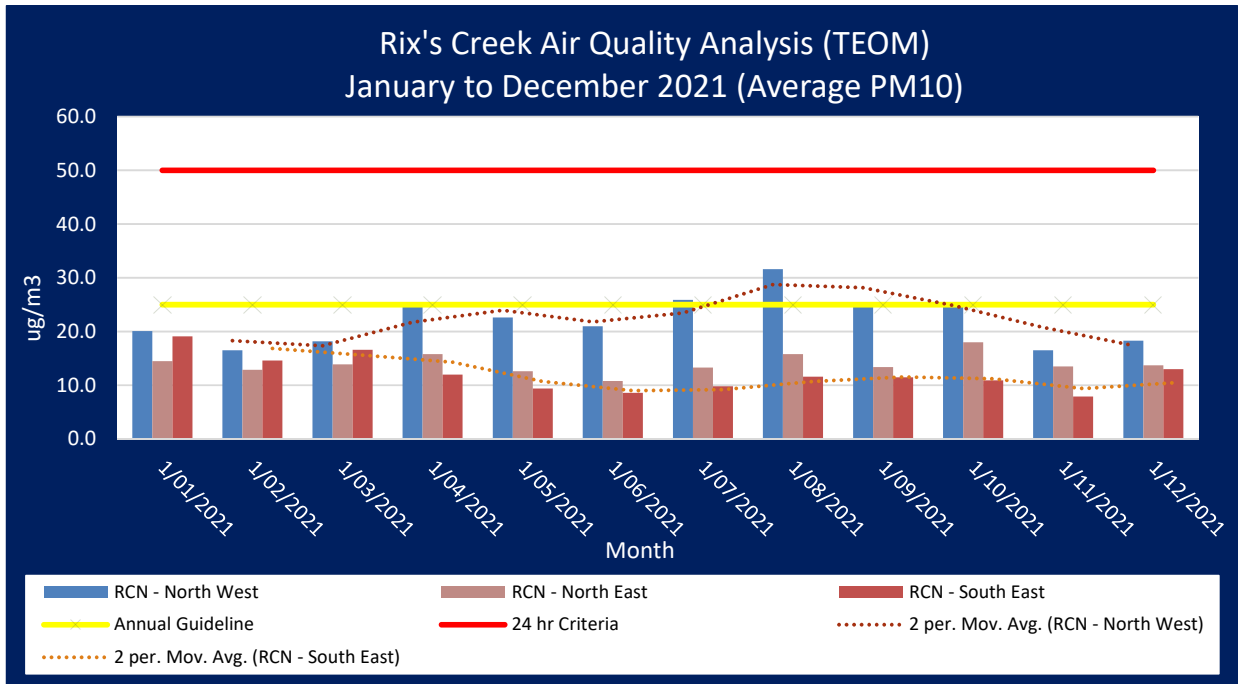


Figure 12 Particulate Matter <10 Micron Monthly and 12 Month Rolling Averages 2021 - TEOM

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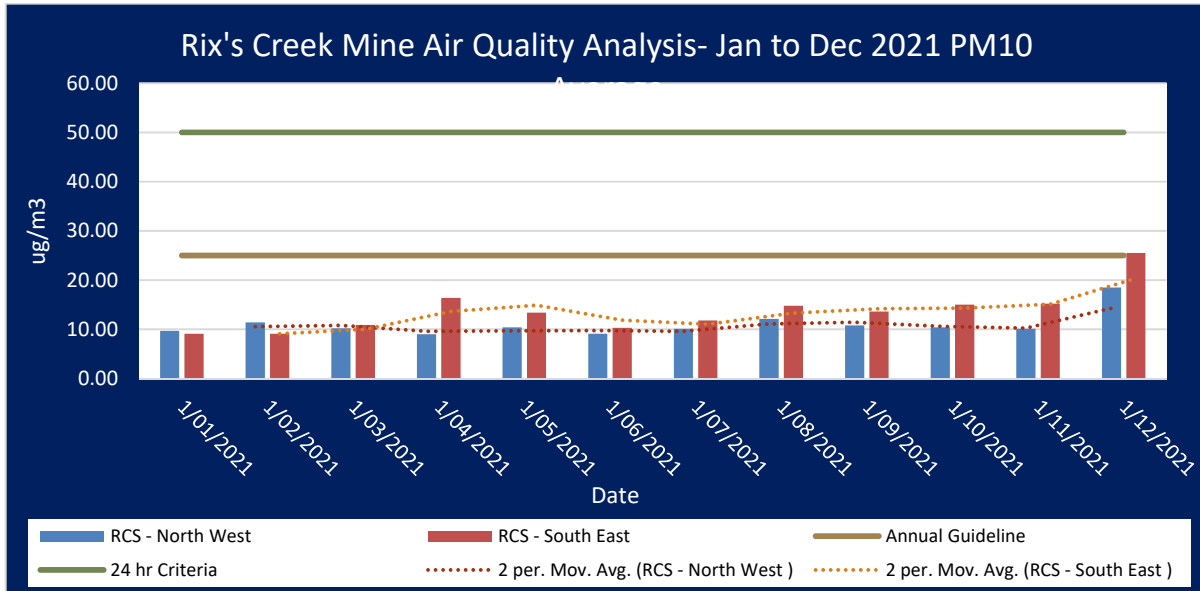


Figure 13 Particulate Matter <10 Micron Monthly and 12 Month Rolling Averages 2021 – DustTrak

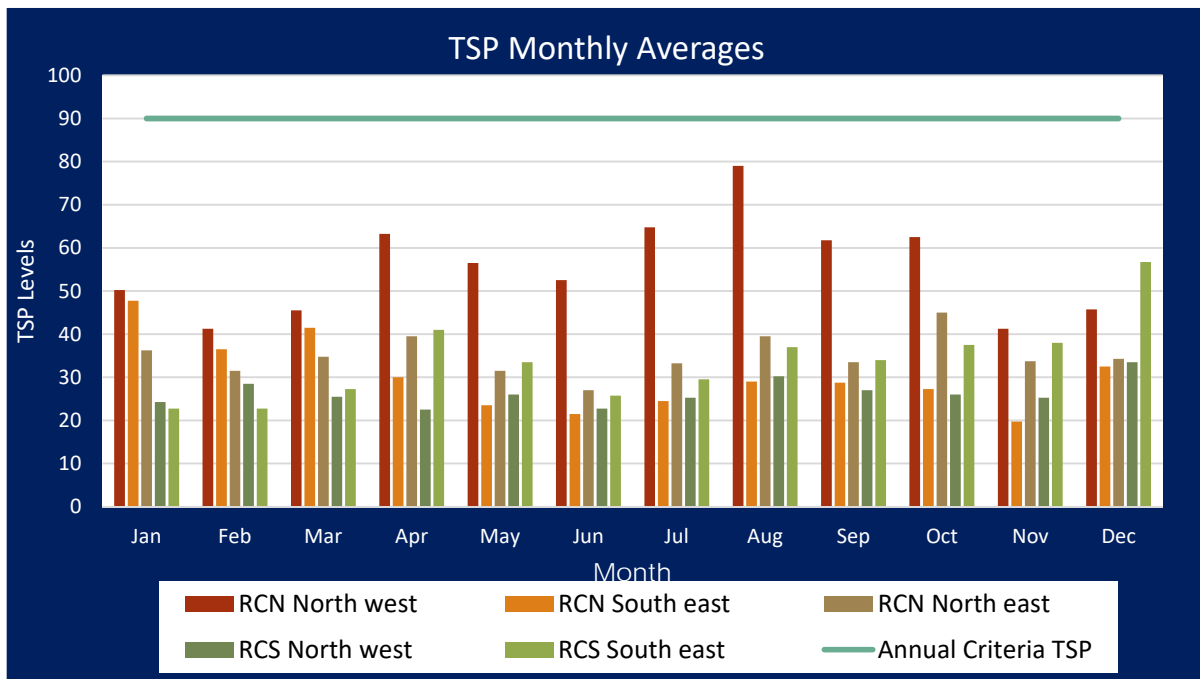


Figure 14 Total Suspended Particulate Monthly Averages for 2021

Total Suspended Particulate matter refers to the total dust particles that are suspended in the air and nominally defined with an upper size range of 30 micrometres (μm). TSP levels are inferred from the measured PM_{10} data by calculating that the TSP level is 2.5 times the measured PM_{10} level. This inference is derived from measurements in the report 'Particle size distributions in dust from open cut mines in the Hunter Valley' (SPCC, 1986). The results for 2021 have remained below the Annual Criteria of $90\mu\text{g}/\text{m}^3$ at all five monitoring points.

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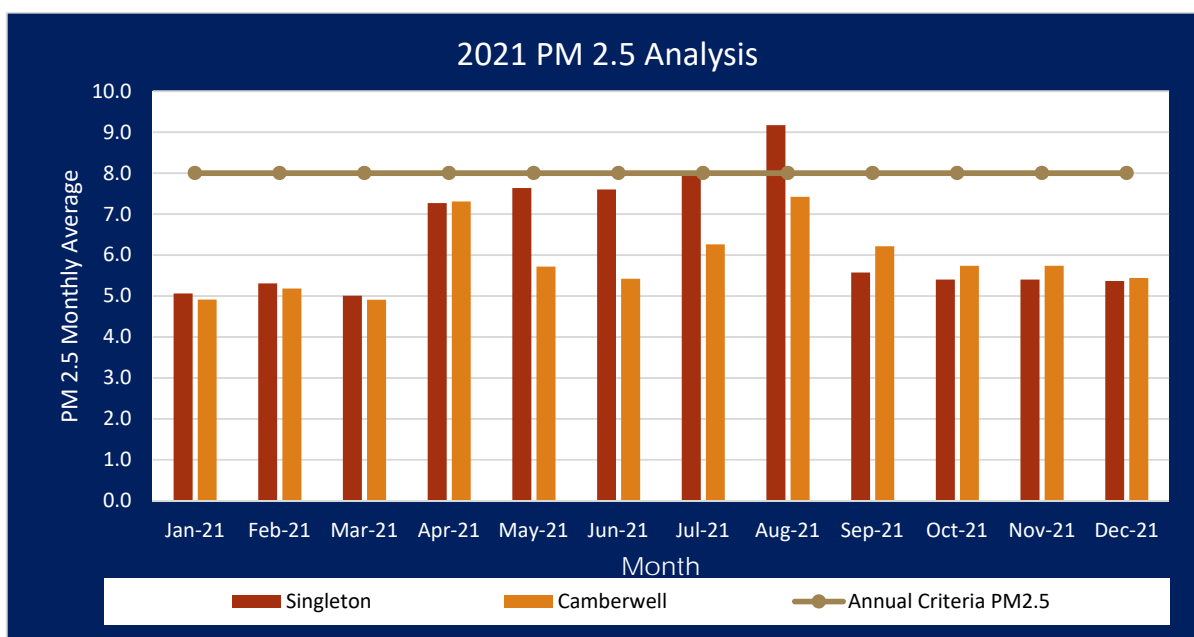


Figure 15 Monthly Particulate Matter 2.5 Analysis for 2021

Particulate Matter 2.5 refers to particulate matter with an aerodynamic diameter less than 2.5µm. PM_{2.5} is a measurement of regional airshed and is reflective of air quality over a larger area than direct source emissions as specific upstream and downstream mine site contributions such as PM₁₀. In accordance with Schedule 3 Condition 27 (d) of the RCN Project Approval data has been sourced from the Upper Hunter Air Quality Monitoring Network (UHAQMN) that was used in Figure 15. August 2021 results were above the annual PM_{2.5} criteria of 8ug/m³. All other months were below the annual criteria level for PM_{2.5}.

Table 21. Calculation of Incremental Impact of PM₁₀ 24 Hour Emissions on Air Quality by Rix’s Creek Mine. (Schedule 3 Condition 22. Table 10 (b)).

Date	RCN NW TEOM 24 Av(ug/m ³)	RCN NE TEOM 24 Av(ug/m ³)	RCN SE TEOM 24 Av(ug/m ³)	Upstream downstream Differential (RCM Contribution)	Predominant Wind Direction	Max Wind Speed (m/s)
28/07/2021	54.3	26.6	15.6	-38.7	NW	16.8
16/08/2021	59.1	28.9	17.4	-41.7	NW	13.4
29/10/2021	58.1	42.7	20.1	-38	NW	17.7

During the 2021 period three (3) exceedances of the 24 hour PM₁₀ criteria for the RCN North West TEOM were recorded. An assessment was undertaken to determine the incremental impact from Rix’s Creek Mine which showed that the exceedances were during a northwesterly wind where RCN provided zero contribution and was a net sink for particulate emissions.

6.4.3 Incidents

From the 15th April to the 17th of May 2021 the RCS North West DustTrak recorded low results and intermittent failures due to faulty dust trak units.

The RCS North West DustTrak unit was observed to be reading low values from the 15th April 2021. A spare unit was installed and it returned high readings due to a fault with that unit. An additional

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backup DustTrak unit was installed and serviced by external contractor. When serviced, the zero calibration of the unit failed, and the contractor removed the unit and was sent for maintenance and re-calibration. An additional DustTrak monitor was sourced and installed as an interim while the DustTrak units were sent for calibration. The DustTrak unit was re-installed on its return from manufacturer on the 17 May 2021. Due to Covid, shipping of unit was delayed due to interstate restrictions and not received back till 17 May 2021. The spare units were sent to manufacturer for periodical calibration after original unit was returned.

On Sunday 12th September 2021, the North East TEOM went offline. On Monday 13th September contractor attended site and found the unit had stopped operating. The contractor rebooted the unit and it came back online. On the 18th September the North East TEOM went off line and contracting company was notified. Contractor rebooted and the TEOM returned to normal operations.

Both the RCS North West and RCS South East DustTrak were affected by storm activity on the 3rd – 4th December, with the RCS North West DustTrak requiring a new USB>RS232 converter.

The RCN South East TEOM required a new data card when the data card froze during 10th - 16th December. Efforts were made to retrieve the data from the frozen data card, however a software update was required to repair the RCN South East TEOM.

The RCS South East DustTrak unit required replacement on the 21st/22nd December as the unit was due for calibration.

6.4.4 Further Improvements

The Rix’s Creek Mine real time air quality monitoring network has been upgraded and integrated with the sites Environmental Monitoring and Management Teledata system. This allows both the environmental team and contracted environmental consultants to identify when a machine is malfunctioning, with the aim to reduce downtime of air quality units at Rix’s Creek.

6.5 Biodiversity

6.5.1 Environmental Management

Rix’s Creek North

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

Efforts continue with the NSW Biodiversity Conservation Division (BCD) to finalise the Conservation Agreements for the Rix’s Creek North Martins Creek, Bridgman, Southern and Northern Biodiversity Offset Areas. During October 2020 the offset areas were inspected by BCD and further progress has been made with the agreements. The draft agreements are currently with BCD to be finalised. RCM continues to work toward finalisation of the agreements by May 2022.

During 2020, an independent audit as required under Sch. 3 Cond.41 of PA 08_0102 was undertaken of the BOA’s This audit report was provided to DPE on the 25 August 2021.

Rix’s Creek South

In accordance with Schedule 2, Condition B43 of SSD 6300, Bloomfield Collieries are required to retire credits to fulfil the requirements of the condition.

Due to delays with the finalisation of the Stewardship agreement with BCD Rix’s Creek Mine sought extension to the timeframe for retirement of the Stage 1 credits. An extension was approved to retire the Stage 1 credits by 22 September 2022.

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During November 2021, a request was made to DPE for a change in the staging of credits, noting that the revisions to the staged areas remain within the same project footprint and the total credits remain unchanged. The revision to the staged credits was approved 2 December 2021.

In order to meet some of the offset requirements of SSD 6300, Bloomfield Collieries has entered into a Biodiversity Stewardship Agreement ID number BS0028. This agreement has been finalised in February 2022 including the full payment of the Total Fund Deposit paid on 23 February 2022.

During March 2022 Bloomfield Collieries have retired all credits to meet Zone 7 credit requirements under SSD 6300. (Sch. 2 Cond B43 - Table 5).

The remaining credits required to be retired under SSD 6300 will be undertaken by a combination of purchase via the market, payment into the BCT and establishment of another BSA currently being prepared.

Rix’s Creek Mine continues to manage the Berewin Property in accordance with Biodiversity Stewardship Agreement BS0028 to enhance biodiversity outcomes.

The Rix’s Creek South Biodiversity Management Plan was submitted on the 17/8/2020 and was subsequently reviewed and approved by DPIE on the 23/12/2020.

6.5.2 Environmental Performance

The ecological monitoring of Rix’s Creek North biodiversity offset areas is prescribed in Section 2.7 – Flora and Fauna Monitoring of the RCN Biodiversity Management Plan (BMP) 2018 – 2020 (AECOM, 2017). Components relevant to annual monitoring at Rix’s Creek North include:

- inspection of 76 installed nest and roost boxes for a variety of tree hollow dependent fauna, including the threatened Brush-tailed Phascogale, Squirrel Glider and honeybees;
- diurnal and nocturnal surveys along 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 3 years.

Nest box usage between 2015 - 2020 was comparable for glider and possum style boxes, with no usage of the microbat boxes. In 2020, only 1 individual of the Brush-tailed Phascogale was recorded compared to the 2017 and 2018 monitoring period. No Squirrel Gliders were detected in nest boxes in 2020, despite many of the boxes exhibiting evidence of use due to presence of leaf nests characteristic of the species.

Bird census counts conducted at each of the 6 monitoring sites in 2020 recorded species diversity of 68 native and 2 introduced species. Several of the offsets recorded significantly increased bird species diversity scores in 2020 compared to previous monitoring periods. One offset, Martins Creek Offset, recorded a very significant increase, which is likely attributed to the improved habitat quality since the previous survey in 2018. The cessation of the drought, and improvement to floristic structure, would contribute to improvement of bird species diversity and abundance.

The trapping surveys resulted in the captures of 2 native and one introduced small mammal species, the Yellow-footed Antechinus, Brush-tailed Phascogale and introduced House Mouse. Trapping for microbats recorded only 1 individual, 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 no evidence of Fox or wild dogs. However, one of the cameras only partly operated, failing to take nocturnal images due to a faulty flash. Despite this, no species were detected by diurnal monitoring, suggesting low abundance.

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A total of 9 threatened species (3 bird species and 6 mammals) were recorded during surveys in the Rix’s Creek Biodiversity Offset areas in 2020. All 9 threatened species have previously been recorded in the offsets.

The next flora and fauna biodiversity monitoring programme is scheduled to commence in October 2022.

The Department of Planning, Industry and Environment (DPIE) approved members of the OzArk Ecology team to conduct a Biodiversity Offset Audit required by Schedule 3, Condition 41 of project approval MP 08_0102 for the Rix’s Creek North Mine. The audit completed a review of the biodiversity offset implementation.

The following table identifies non compliances and recommendations for implementation to comply with the RCN Biodiversity Management Plan.

Table 22. RCN Biodiversity Management areas for improvement.

Management Strategy	Comments and recommendations for improvement
Flora monitoring includes assessment of plant decline that may be an indicator of disease	It is recommended that plant health is monitored to capture the potential presence of emerging pathogens. This measure should be implemented at the time of the next flora-monitoring event (31/12/2022).
Fauna monitoring includes review of disease that may pose a threat to the biosecurity of the BOA	Future fauna monitoring should include a review of diseases that may pose a threat to the biosecurity of the BOA. It is recommended that this measure be implemented at the time of the next fauna-monitoring event (31/12/2022).
Redundant fences removed	Redundant fences with barb wire topping evident at a number of locations. Update: Identified redundant fences have been removed by 31/12/2021.
Annual fence inspections and any breaches rectified within 4 weeks	Fencing inspected by HLM and issues with maintenance raised. Future damaged fences should be repaired within 4 weeks of discovering them damaged.
Site inspection undertaken after any localised flooding or significant storm event to assess for the presence of erosion or storm damage and any maintenance issues rectified within 4 weeks.	After the next flooding or significant storm event the site should be inspected and the inspection should be documented.
Nest box maintenance	All damaged or absent nest boxes should be repaired/replaced during the next fauna monitoring event (31/12/2022).
Control of Casuarina glauca and Allocasuarina leuhmannii	A controlled burn has not been carried out due to the belief that clearing of these species would be in violation of their protection status as a component of a threatened ecological community. Rix’s Creek Mine to seek clarification on implementation of a controlled burn by 31/12/2022.

6.5.3 Reportable Incidents

No external reportable incidents relating to flora and fauna management occurred during the 2021 reporting period.

6.5.4 Further Improvements

In accordance with Schedule 2 Condition 39, suitable arrangements in the form of Conservation Agreements (CA) to provide long term security for the offsets at Rix’s Creek North. Two CA’s have been drafted and are currently under review by the Biodiversity Conservation Division (BCD).

6.6 Aboriginal Heritage

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6.6.1 Environmental Management

In accordance with SSD 6300 the Rix’s Creek South Aboriginal Cultural Heritage Management Plan (ACHMP) was submitted on the 25/5/2020 to the Biodiversity Conservation Division (BCD) and DPIE for approval. On the 2/9/2020 the ACHMP was approved by BCD and DPIE.

In accordance with the Rix’s Creek North Project Approval (08_0102) and Rix’s Creek South Project Approval (SSD 6300) an Aboriginal Cultural 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 respective EA’s.

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

6.6.2 Environmental Performance

During 2021 no Archaeological excavation and salvage were undertaken, in accordance with the Aboriginal Cultural Heritage Management Plan (ACHMP) and Salvage Management Plan requirements for SSD 6300 Rix’s Creek South Continuation of Mining Project.

6.6.3 Reportable Incidents

There were no reportable incidents during the 2021 period.

6.7 Non-Aboriginal Heritage

6.7.1 Environmental Management

The Historic Heritage Management Plan (HHMP) forms part of a series of Environmental Management Plans for RCM. This HHMP is applicable to RCS only and is the primary tool that will be utilised to manage items of historical significance predicted to be impacted by the development of RCS in accordance with SSD 6300. The HHMP was submitted for consultation and review on the 21/08/2020. After two additional amendments the HHMP was approved by DPIE on the 23/12/2020.

The management of Historical Heritage at RCN is managed under a separate Heritage Management Plan Rix’s Creek North (Bloomfield, 2016).

6.7.2 Environmental Performance

A specialised consultant was engaged to develop a Coke Oven management measures plan. The plan will be used by the RCM Environment Department to manage the coke ovens to ensure that the cultural heritage values of the location are maintained. The Plan will also provide appropriate management in relation to the auxiliary features. Procedures within this Plan will be used by contractors engaged by RCM to carry out works within the buffer area of the coke ovens.

6.7.3 Reportable Incidents

There were no reportable incidents in relation to natural heritage during the 2021 reporting period.

6.7.4 Further Improvements.

The program of protection of the Coke oven area and other known natural heritage sites will continue. Annual inspections are undertaken of the areas with known heritage. Any weeds identified will be sprayed. Vegetation maintenance may be required as necessary and fencing and signage are checked for adequacy. Implementation of the Management Measures, Rix’s Creek Coke Ovens and Associated Works will be undertaken in accordance with timelines identified in the approved RCS Historic Heritage Management Plan.

SECTION 7 WATER MANAGEMENT

7.1 Rix’s Creek Setting and Context

7.1.1 Geology

Local Geology

The Project is confined within a basin-like north–south trending syncline that hosts the Permian coal seams of the Foybrook Formation 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 resources. 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 17 and 18 (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.

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

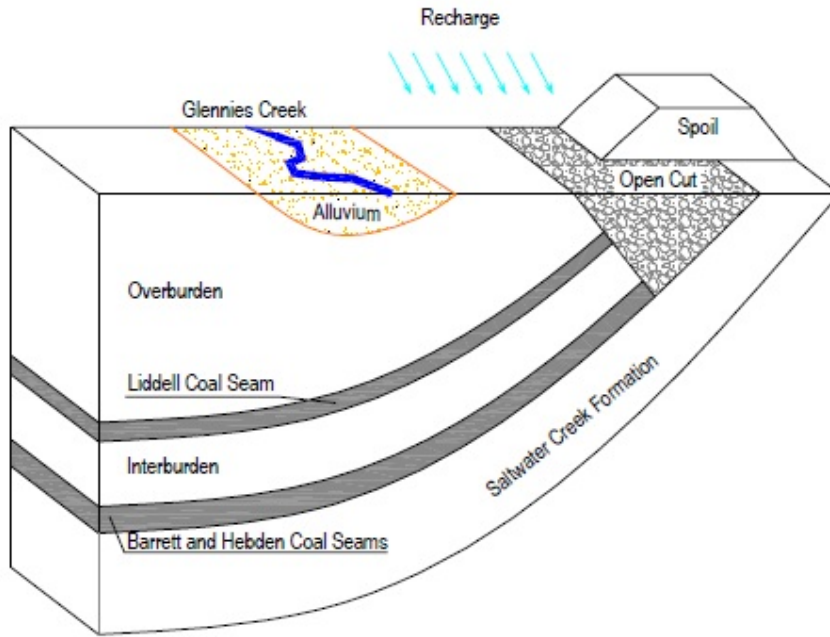


Figure 16 Conceptual Hydrogeological Model of the Rix's Creek Syncline area

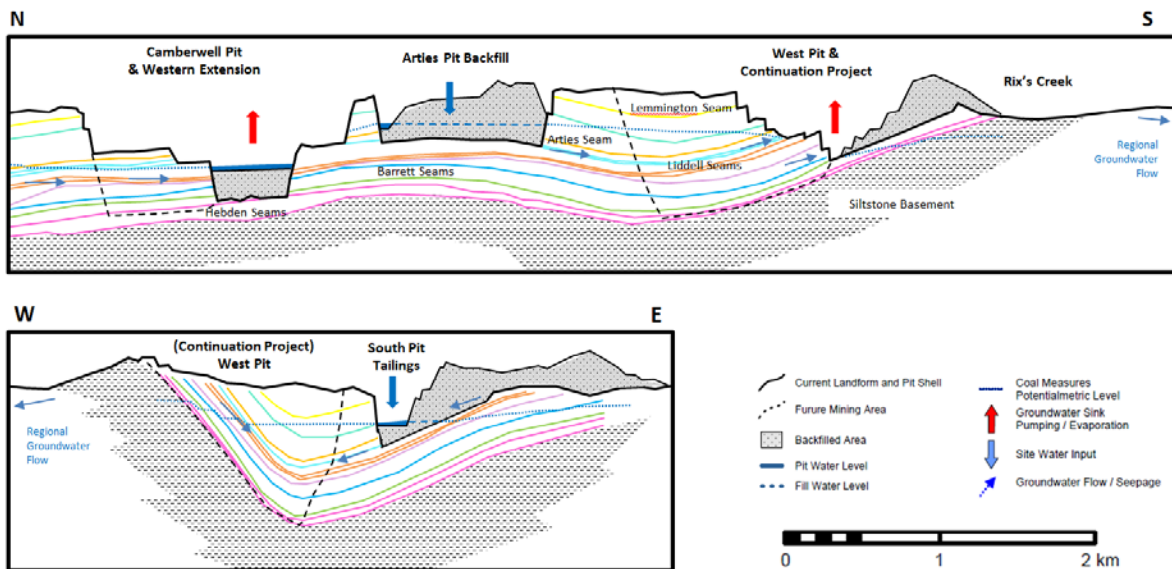


Figure 17 Conceptual Hydrogeological Cross Section

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Aquifer Recharge

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

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

Hydrological Setting

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

In the RCS area, the 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 Glennie’s Creek or Rix’s Creek and ultimately into the Hunter River.

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

Groundwater Dependent Ecosystems (GDE’s)

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

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

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

7.2 Water Licences

Rix’s Creek has the following active groundwater licences:

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Table 23 Rix’s Creek Water Licences

Water Licences					
	Number		Category	Volume	Purpose
Natural Resource Access Regulator	WAL41500		Mining	100 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	WAL 41555		Mining	100(ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	WAL 40777		Mining	305 (ML/yr)	Open Cut (dewatering groundwater) Hard Rock
	20BL170864		Mining	100(ML/yr)	1 x Bore (dewatering groundwater)

7.21 Water Management

In January 2019 the RCM Water Management Plan was approved combining both RCN and RCS to rationalise and combine the monitoring programme. This 2021 water review uses the monitoring programme outlined in RCM combined Water Management Plan. The RCM combined WMP with inclusion of the SSD6300 conditions was approved 16/3/2021.

A static water balance was calculated for 2021 providing information on inputs and outputs for RCM operations and the results are shown in **Table 19**.

Rix’s Creek Mine Results

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

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

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

In 2021, 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 and for increased use water water carts for dust suppression of roads and dig faces.. 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.

Potable Water Use

22.2 megalitres (ML) of potable water was sourced from the Singleton town water supply in 2021 for potable supply and bathhouse facilities.

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Rixs Creek North & Rixs Creek South

Hunter River Salinity Trading Scheme

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

Groundwater

There was an estimated 85 ML of groundwater inflow into the Rix’s Creek South open cut voids during the reporting period.

There was an estimated 120 ML of groundwater inflow into the Rix’s Creek North open cut voids during the reporting period.

The groundwater inflow and seepage from rehabilitated emplacements and spoil dumps into the Underground Portal Storage was estimated at 1149 ML.

Site Inventory

Site inventory increased at RCM from 9950 ML to 11690 ML during 2021. This was from increased rainfall into dirty water catchments during the 2021 period. Integra Mine returned seepage water back to Rix’s Creek Mine during the reporting period.

Surface Water Dams

Water inventories in site process water dams increased over the year due to above average rainfall:

The Falbrook Pit is used as a storage for excess mine water and the inventory increased from 2370 ML to 2870ML over the year as water was pumped from Integra UG to Falbrook Pit and excess water from D1 was transferred to Falbrook Pit.

Possum Skin Dam inventory ranged from 240 ML in January, closing the year at an estimated 890 ML.

DWD 1 was mostly around 400 ML over the year.

Free water in the tailings dams was estimated at 215ML during the reporting period.

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Rixs Creek North & Rixs Creek South

Table 24 Estimated Sample Static Water Balance Rix’s Creek Mine 2021

Water Stream	2021 (ML)	Estimation technique
Inputs		
Imported Fresh Water	0	High (metered)
Imported Potable	22.2	High (metered)
Groundwater Seepage To Open Cuts	205	Low
Seepage Transfer from Integra UG to RCN	1149	Low (modelled)
Underground Dewatering	226	low
Rainfall Runoff – Into Dirty Water System	1915	Moderate (catchment)
Recycled to CHPP from Tails & Storage (not included in total below)	1,710	Low
Water from ROM Coal	730	Low
Total Inputs	4247.2	
Outputs		
Groundwater Seepage Out (Down dip losses and high wall evaporation)	530	Low
Dust Suppression – Water Carts	456	high (metered)
Exported to Other Mines – through GRAWTS	0.39	high (metered)
Evaporation - Mine Water & Tailings Dams	360	low
Entrained in Process Waste	871	low
Water in Product Coal	268	low
Potable Usage	22.2	High (metered)
Total Outputs	2507.59	
Estimated Change in Pit Storage (increase)	1739.6	

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Rixs Creek North & Rixs Creek South

7.2.1 Climate/Rainfall

Specific rainfall during 2021 is as follows:

- Over the review period, the only months to that didn’t exceed the monthly average rainfall were April (9.7mm), July (23mm) and September (19.8mm).
- 2021 annual rainfall at Rix’s Creek was 1,016.5mm, which is significantly higher than the long-term average of 640.5mm. March (222.8mm) and November (265mm) were more than 3 times the monthly average.

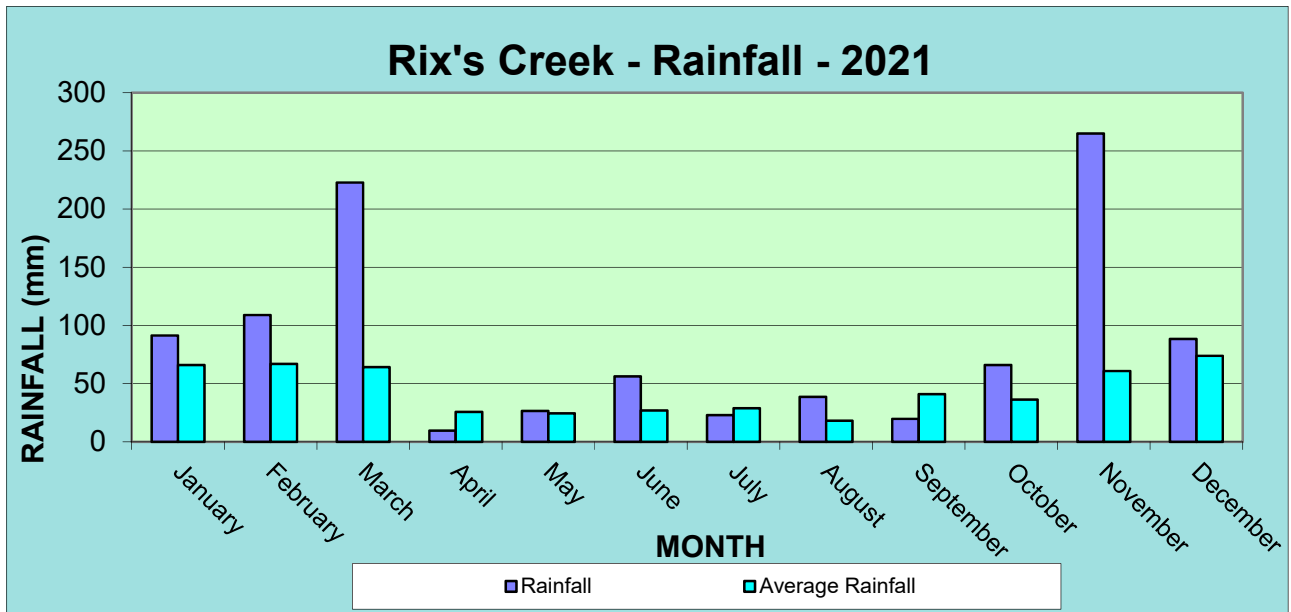


Figure 18 Annual Rainfall at Rix’s Creek 2021

Annual rainfall results are plotted for the last 23 year historic rainfall average and are presented in Figure 19.

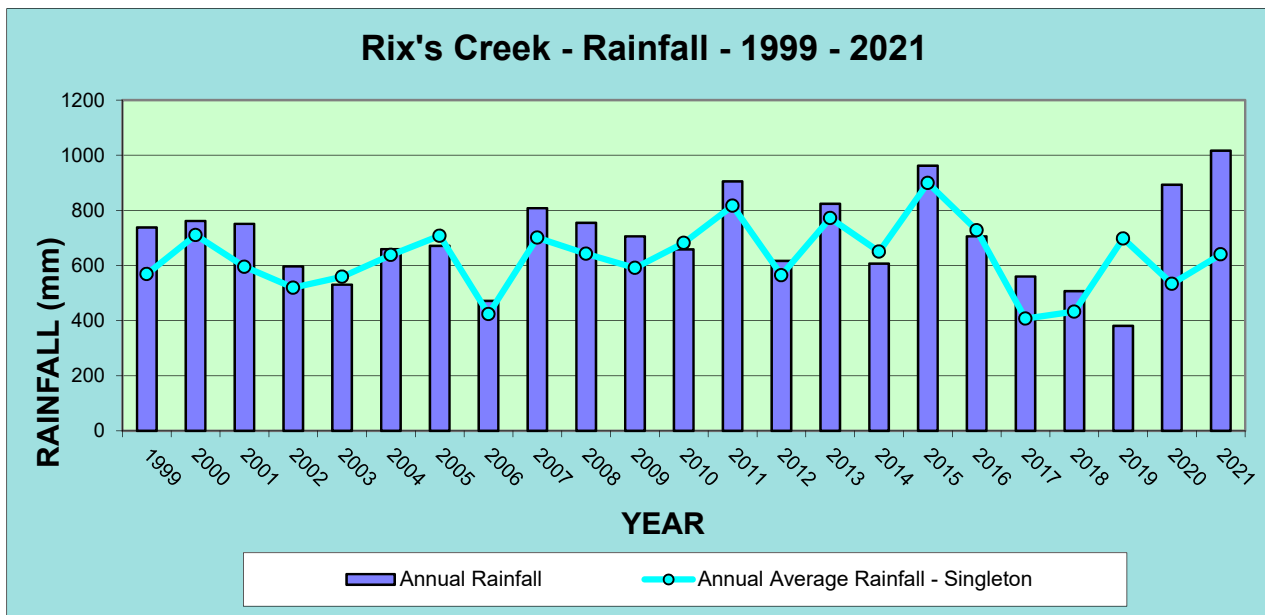


Figure 19 Annual rainfall at Rix’s Creek 1999-2021

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

7.3 Surface Water

7.3.1 Environmental Management

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

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

Clean Water

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

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

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

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

Mine Water

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

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

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

Hunter River Salinity Trading Scheme

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

Sampling Locations

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

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Rixs Creek North & Rixs Creek South

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

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

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

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

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

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

EPL Samples are taken on a monthly basis. Sampling site locations are indicated on Figure 18.

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

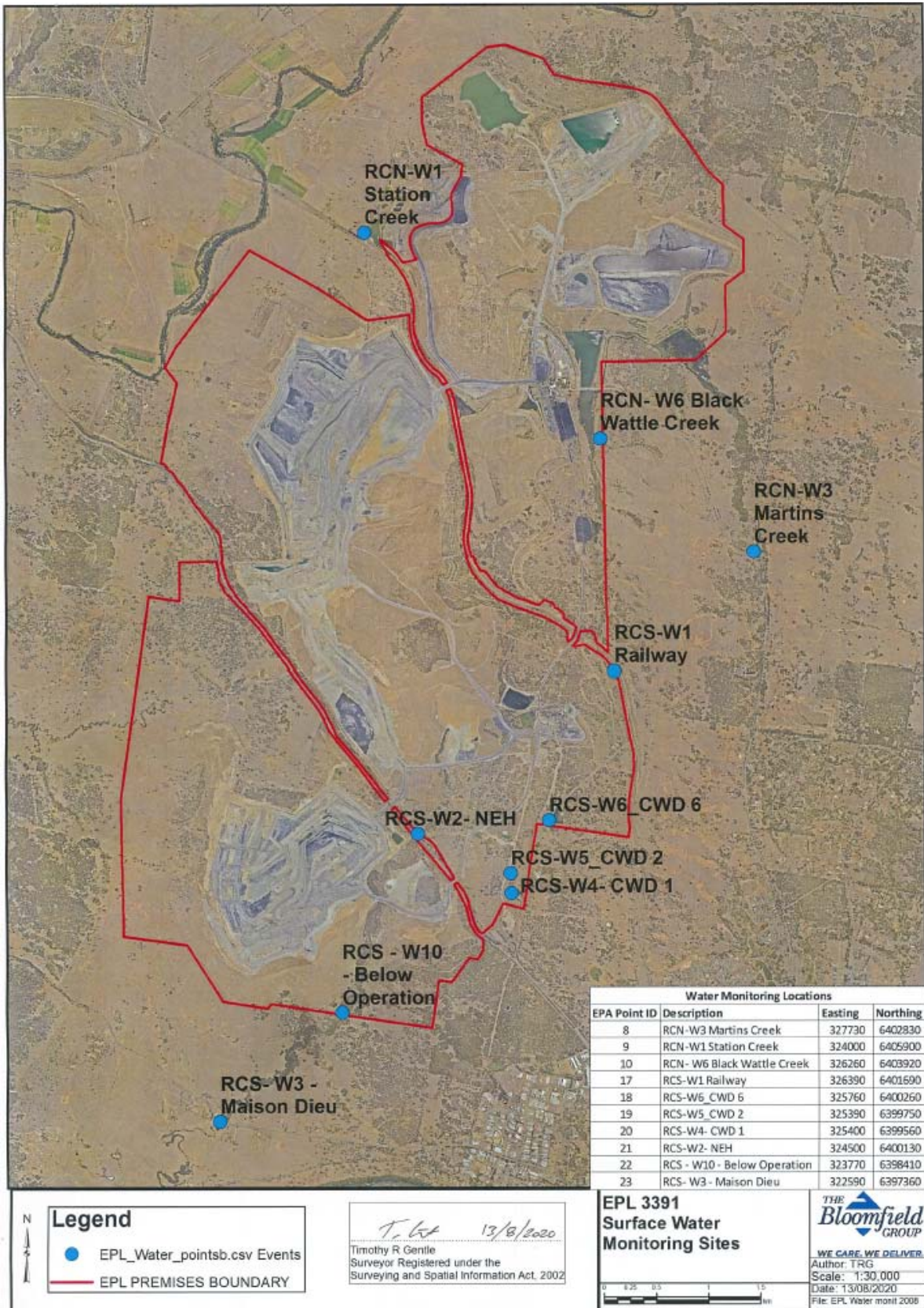


Figure 20 EPL 3391 water monitoring sites

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

Table 25 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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Rixs Creek North & Rixs Creek South



Figure 21. Rix's Creek North Ground and Surface Water Monitoring sites

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Rixs Creek North & Rixs Creek South

7.3.2 Environmental Performance

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

Rix’s Creek Mine surface water results

During the 2021 surface water assessment, with exemption from April, July and September the monthly rainfall average was exceeded. The general trend with pH is that it increases under low flow or periods of low rainfall and conversely, there’s a general reduction in pH under periods of above average rainfall is experienced. This trend was demonstrated during the 2021 period.

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 7.0 to 9.2 throughout 2021. Due to the irregularity in rainfall experienced the past 2 years there was a general stability in pH when compared to 2020.

The surface water assessment of the pH of upstream ephemerals W6 (Black Wattle Creek) ranged between 7.2 and 8.2 and W3 (Martins Creek) ranging between 6.5 and 6.9. The Upstream Railway underpass recorded pH between 7.2 and 9.2. W1 (Station Creek) downstream ephemeral monitoring site is located downstream of mining operations and recorded a neutral to slightly elevated pH during the reporting period ranging between 7.3 and 7.8.

Electrical Conductivity (Salinity)

The Electrical Conductivity results are presented in **Appendix 1**. Salinity levels at RCM generally fluctuated in correlation with variations in rainfall and flowing vs non-flowing conditions, ranging from 75µS/cm to 11,600µS/cm during the 2021 reporting period.

Results ranged from 75µS/cm at the Clean water dam No.1 to 11,600µS/cm at the Dead Man’s Gully Creek.

The EC of upstream ephemeral W3 (Martins Creek) ranged between 86µS/cm (November) and 250µS/cm (September), with W3 able to be sampled every month, as compared to past years. W1 (Station Creek) monitoring site is located downstream of mining operations ranging between 491 and 1692 µS/cm. W1 was also able to be sampled every month. Black Wattle Creek, which is ephemeral recorded 263 µS/cm to 11,000 µS/cm (June). Black Wattle Creek was too low to sample on four (4) occasions during the reporting period as compared to eight (8) the previous reporting period.

Total Dissolved Solids

The Total Dissolved Solids (TDS) results for Rix’s Creek Mine are presented in **Appendix 1**. TDS ranged from 77 mg/l – Sediment Dam 20 to 7,080 mg/L – Black Wattle Creek W6. Throughout the reporting period there was above average rainfall resulting in a general reduction of TDS which was a continuation on from 2020 recorded TDS results.

TDS ranged from 118 mg/l (March) – W7 Stoney Creek to 7080mg/l (June) – W6 Dam. The higher results during June coincided with reduced rainfall in April and May after very high rainfall recorded in March 2021. The general trend saw TDS reduce when above average rainfall was experienced.

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Rixs Creek North & Rixs Creek South

Total dissolved solids at monitoring site W1 (Station Creek) ranged between 319mg/l in December and 1070mg/l in January. Due to the ephemeral nature of Black Wattle Creek, on three (3) occasions Black Wattle Creek was too low to sample during 2021. At W3 Martins Creek the TDS ranged between 152mg/l (March) and 1080 mg/l (May).

Total Suspended Solids

Total Suspended Solids (TSS) results are presented in **Appendix 1**. TSS ranged from 12 mg/l at the Clean Water Dam 2 in March to 26 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 2021 period and is consistent with previous reporting periods.

Rix’s Creek North Results

Total Suspended Solids

TSS results are presented in **Appendix 1**. TSS results ranged from 2 mg/l (January) at the W12 Dam C1 site under no flow conditions to 48 mg/l (October) at the downstream location of W1 Station Creek. The Ephemeral Black Wattle Creek ranged from <5 mg/l to 46 mg/l 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.

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Rixs Creek North & Rixs Creek South

Table 26. 2021 Rix’s Creek South Surface Waters pH and EC results.

2021 Rix's Creek South Surface Waters										
Monitoring Location	pH Results					EC Results (µS/cm)				
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Criteria	Comments
Railway Underpass	7.2	8.0	9.2	6.5	8	262	549	753	125 - 2500	
New England Highway	7.3	7.5	7.9	6.5	8	378	2008	6260	125 - 2500	
Maison Dieu Bridge	7.1	7.3	7.6	6.5	8	240	1486	5985	125 - 2500	
Clean Water Dam No. 1	6.4	7.7	9.1	6.5	8	75	186	257	125 - 2500	
Clean Water Dam No. 2	6.6	7.0	7.3	6.5	8	90	159	202	125 - 2500	
Clean Water Dam No. 6	7.1	7.9	9.1	6.5	8	216	262	339	125 - 2500	
Dirty Water Dam No. 1	8	8.7	8.9	-	-	2930	5709	7970	-	
Dirty Water Dam No. 2	8.1	8.5	9	-	-	2720	5746	8170	-	
Dirty Water Dam No. 4	8.1	8.6	9	-	-	2650	5798	7960	-	
Below Operations	7.5	7.8	8.1	6.5	8	344	1008	1920	125 - 2500	
Industrial Estate Catchment	7.5	8.2	9	6.5	8	353	879	1770	125 - 2500	
Above Industrial Catchment	7.1	7.5	7.9	6.5	8	347	1656	3390	125 - 2500	
Turkey's Nest Dam	7.6	8.3	8.8	-	-	1500	4841	7020	-	
Dead Man's Gully Dam	6.6	7.3	7.7	-	-	115	166	205	-	
Dead Man's Gully Creek	6.8	7.3	7.8	-	-	141	5917	11600	-	
Sediment Dam 16	6.9	7.4	7.8	6.5	8	103	158	194	125 - 2500	
Sediment Dam 17	6.8	7.3	7.8	6.5	8	106	162	240	125 - 2500	
Sediment Dam 20	6.6	7.1	7.6	6.5	8	68	87	110	125 - 2500	

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Rixs Creek North & Rixs Creek South

Table 27. 2021 Rix’s Creek North Surface Waters pH and EC results.

2021 Rix's Creek North Surface Waters										
Monitoring Location	pH Results					EC Results (µS/cm)				Comments
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Criteria	
North Sediment Dam	6.7	7.8	8.5	6.5	8	260	1944	4460	125 - 2500	
Centre Sediment Dam	7.3	8.0	9.0	6.5	8	407	749	1550	125 - 2500	
South Sediment Dam	7.3	7.7	8.0	6.5	8	204	339	606	125 - 2500	
W 14	7.2	8.5	9.7	6.5	8	405	1615	2320	125 - 2500	
W 16	7.4	8.4	8.9	6.5	8	381	1538	2470	125 - 2500	
W 20	8.0	8.4	9.1	-	-	4620	7570	9460	-	
W 21	7.5	8.6	9.3	-	-	270	2159	3530	-	
B 2	7.1	7.7	8.3	6.5	8	141	215	376	125 - 2500	
B 6	6.9	8.2	8.8	6.5	8	142	292	465	125 - 2500	
W 19 Dam D1	7.8	8.8	9.1	-	-	3220	5869	7120	-	
W 20 North Dam 1	8.0	8.4	9.1	6.5	8	960	6862	9380	125 - 2500	
W 21 North Dam 2	7.5	8.6	9.3	6.5	8	276	2362	3530	125 - 2500	
Falbrook Pit	8.8	8.9	9.0	-	-	5660	6673	7390	-	
W 1 Station Creek	7.3	7.5	7.8	6.5	8	491	1098	1692	125 -	
W 3 Martins Creek	6.5	6.7	6.9	6.5	8	84	167	250	125 - 2500	
W 4 Glennies Creek Up	7.4	7.8	8.0	6.5	8	275	626	838	125 - 2500	
W 5 Glennies Creek Down	7.6	7.8	8.1	6.5	8	431	654	881	125 - 2500	
W 6 Blackwattle Creek	7.2	7.7	8.2	6.5	8	263	3160	11100	125 - 2500	collected under no-flow conditions, ephemeral creek.
W 7 Stony Creek	6.4	6.7	7.2	6.5	8	92	301	1914	125 - 2500	
W 10 Dam C4	6.7	7.8	8.6	6.5	8	499	1154	1674	125 - 2500	
W 11 Glennies Creek NEH	7.4	7.9	8.5	6.5	8	307	623	840	125 - 2500	
W 12 C1 Dam	7.2	7.8	8.5	6.5	8	400	1378	2510	125 - 2500	
W 13 C6 Dam	6.9	7.4	9.1	6.5	8	148	203	280	125 - 2500	
W 14 Dam C3	7.2	8.5	9.7	6.5	8	405	1615	2320	125 - 2500	
W 15 Dam C6A	7.0	7.3	7.8	6.5	8	154	184	207	125 - 2500	
W 16 South Pit	7.4	8.4	8.9	6.5	8	381	1540	2470	125 - 2500	
W 17 Dam C2	7.2	7.7	8.4	6.5	8	408	1175	2010	125 - 2500	
W 18 Dam C5	7.0	7.5	8.8	6.5	8	149	244	310	125 - 2500	

7.3.3 Reportable Incidents

There were two (2) reportable incidents. Refer to Section 11.2 for details.

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

7.4 Groundwater

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

Table 28 Rix’s Creek Ground Water Monitoring Sites

Bore ID	License	Easting	Northing	Screened Interval (mgl)	Stick Up (m)	Surface Elevation (mAHD)	Total Depth (mbgl)
Rix’s Creek North							
Open Cut Piezometers and Wells							
Glennies Creek Alluvium							
GCP9	(20BL171708)	323259	6407315	Unknown	1.5	69.885	9
GCP10	(20BL171708)	324414	6408030	Unknown	0.7	74.891	11.5
GCP19	(20BL171708)	325086	6408333	8.5 - 12	0.63	77.5	12
GCP20	(20BL171708)	325201	6408179	5.2 - 8.2	0.67	82	8.2
GCP21	(20BL171721)	324466	6407916	6 to 11	0.82	76	11
GCP22	(20BL171721)	324558	6407814	8.5 - 12	0.7	75	12
GCP23	(20BL171721)	324535	6407659	4.6 - 8	1.01	75	8
Coal Measure							
GCP1	(20BL169631)	325124	6406664	Unknown	0.34	96.013	108
GCP2	(20BL169631)	325160	6406490	Unknown	0.61	105.495	105
GCP5	(20BL169631)	324337	6406203	Unknown	0.54	80.334	108
GCP6	(20BL169631)	324941	6406784	Unknown	0.38	102.931	126
GCP7	(20BL169628)	325864	6407071	60 - 72 and 96 - 102	0.1	93.034	120
GCP8	(20BL169630)	326332	6407214	Unknown	0.44	105.095	120
GCP13	(20BL169628)	326169	6406745	Unknown	0.15	105.356	66
GCP14	(20BL169628)	325774	6407042	Unknown	0.66	90.99	123
GCP15	(20BL169628)	325912	6406961	Unknown	0.42	95.035	114
GCP16	(20BL169628)	326029	6407077	Unknown	0.7	98.853	120
GCTB	(20BL169631)	325149	6406572	Unknown	0.2	102.564	90
Extended Southern Pit							
Glennies Creek Alluvium							
GCP28	(20BL171722)	322651	6405459	6.7 -12.0	0.8	69.5	12
GCP29	(20BL171722)	323191	6405356	4.5 - 10.0	0.9	71	10
GCP30	(20BL171720)	322438	6404649	5.5 -12.0	0.94	67.5	12
Coal Measure							
GCP27	(20BL171881)	323197	6406037	36.5-37.5	1.11	70	27.5
GCP32	(20BL171880)	322491	6404250	49.0-55.0	0.66	70.5	55.55
GCP34	(20BL171879)	322800	6403235	47.0-56.25	0.61	101	56.25
GCP36	(20BL171722)	322915	6405320	14.5-16.0	0.85	70.5	16
GCP38	(20BL171878)	323468	6405626	17.0-24.3	0.98	71	24.3
GCP24	(20BL171722)	323241.8	6407107	46-48	0.6	71.25	48
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

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Rixs Creek North & Rixs Creek South

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 Mine and the Rix’s Creek North Mine.

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 2021 Groundwater Monitoring Performance

Rix’s Creek South Groundwater Levels

For Rix’s Creek South operations, three piezometers are installed into the Permian coal measures and three into overlying regolith zone. Bore details are summarised in Appendix 2.

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

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

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

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

BH3 has shown a slight decline in water levels, 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 level ranged from 5.17 – 6.23mbgl.

During 2021 BH4 ranged from 3.964 – 2.27mbgl and BH8 ranged between 3.53 – 2.92mbgl.

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

Groundwater levels are presented in **Appendix 2**.

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7.4.3 Water Take

Table 29 presents the relevant water sources, units licensed by Rix’s Creek Mine and predicted take for the 2021 reporting period. No water was imported from Hunter Regulated - River Alluvial – Glennies Creek Management Zone 3a for operational use during the reporting period.

Table 29 Mine inflows 2021

Number	Category	Total units	Purpose	Predicted Take
WAL41500	Mining	100	Open Cut (dewatering groundwater) Hard Rock	44
WAL 41555	Mining	100	Open Cut (dewatering groundwater) Hard Rock	73
WAL 40777	Mining	305	Open Cut (dewatering groundwater) Hard Rock	235
20BL170864	Mining	100	1 x Bore (dewatering groundwater)	-

Table 30 Rix’s Creek South 2021 Groundwater Monitoring Network

Bore ID	Type	Depth (mbgl)	Location	Change in Water Levels during 2021 (m)
BH1	Standpipe Piezometer	130	Middle of basin - Upper / Lower Artesians	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	-1.06
BH4	Standpipe Piezometer	10	Rix’s Creek south of Pit 3- Regolith	+0.17
BH5	Standpipe Piezometer	66.5	East of Rix’s Creek / tailings emplacement area- Lower Barrett	+5.40
BH7	Standpipe Piezometer	200.5	Bottom of basin- Hebden	-4.91
BH8	Standpipe Piezometer	20	Dead Man’s Creek wet of coal outcrop – regolith	-0.08
20BL170864	Production bore	~70	East of New England Highway North of Rix’s Creek. Bore intersects previous Hebden workings of New Park Colliery.	+8.34

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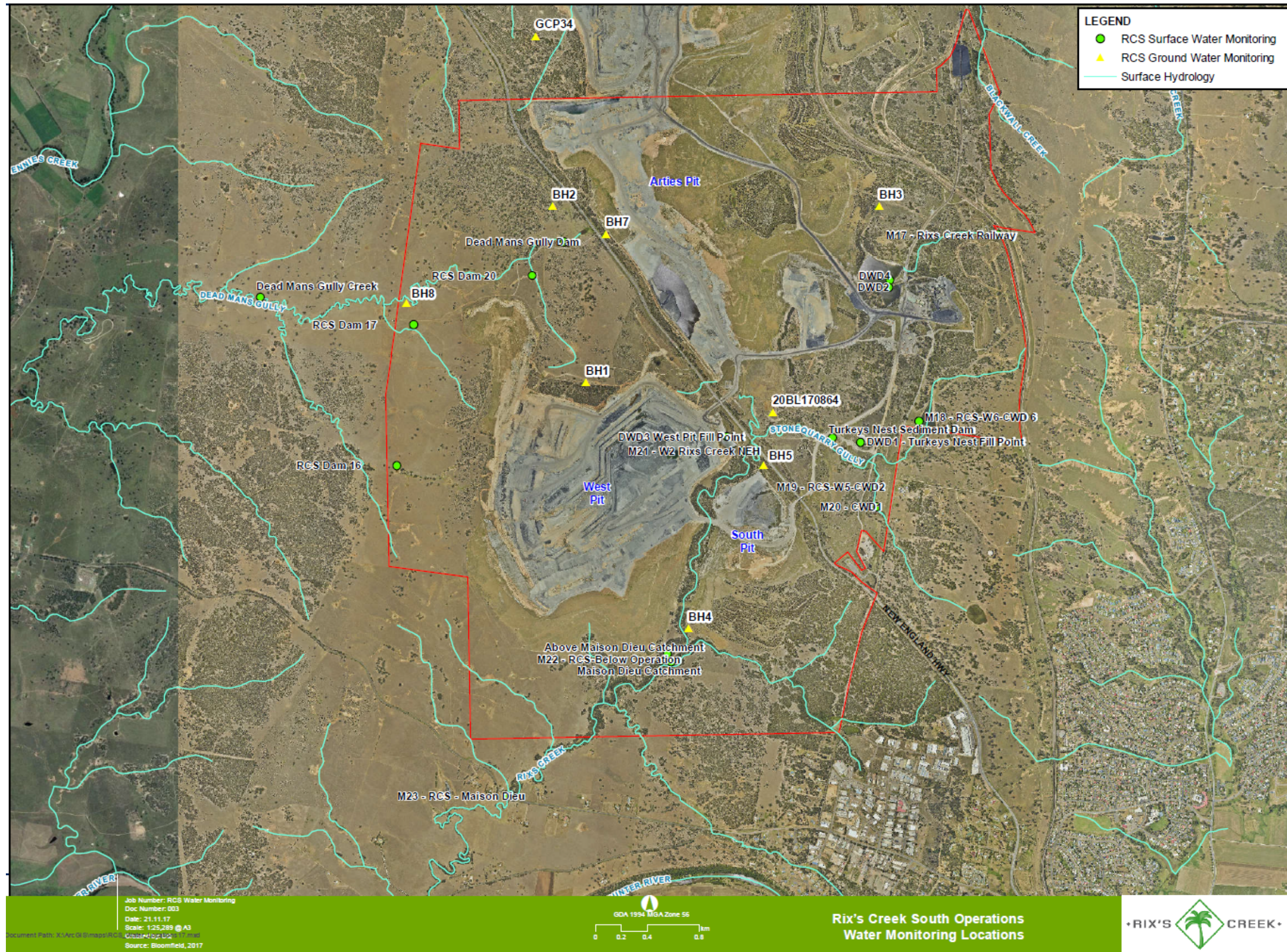


Figure 22. Rix's Creek South Groundwater and Surface Water Monitoring sites

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Rix’s Creek South Groundwater Quality

During 2021, salinity in the coal seam (BH5) ranged between 4,100 – 5,410 uS/cm.

Salinity within BH3 had only one reading in 2021 (5,700 uS/cm) whilst BH4 ranged from 4,990 – 18,600 uS/cm which is consistent with the parameters outlined in the Rix’s Creek South Water Management Plan.

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

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

Alluvium - RCN

From the 2009 Environmental Assessment, the model indicated that groundwater within alluvial aquifers associated with Glennie’s Creek and Station Creek had the potential to be marginally to negligibly affected by the proposed pit during its active mining phase, with drawdowns ranging up to 1.2m near the Mine Area until the pit excavation was completed.

Results up to the end of 2021 show the alluvium water levels have been relatively consistent with some variation induced by rainfall, evaporation and natural creek flow process.

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

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

Table 31 Rix’s Creek North Ground Water Monitoring Network

Bore ID	Type	Total Depth (mbgl)	Formation	Change in Water Levels during 2021 (m)
GCP09	OSP	9	Glennie’s Creek Alluvium	0.03
GCP10	OSP	11.5	Glennie’s Creek Alluvium	0.04
GCP19	OSP	12	Glennie’s Creek Alluvium	0.03
GCP20	OSP	8.2	Glennie’s Creek Alluvium	n/a
GCP21	OSP	8.2	Glennie’s Creek Alluvium	0.06
GCP22	OSP	12	Glennie’s Creek Alluvium	0.05
GCP23	OSP	8	Glennie’s Creek Alluvium	0.02
GCP28	OSP	12	Glennie’s Creek Alluvium	-0.04
GCP29	OSP	10	Glennie’s Creek Alluvium	n/a
GCP30	OSP	12	Glennie’s Creek Alluvium	-0.09
GCP32	OSP	55.56	Camberwell Pit Basement	-0.22
GCP34	OSP	56.26	Camberwell Pit Basement	n/a
GCP36	OSP	15.98	Camberwell Pit Basement	-0.10
GCP38	OSP	24.31	Camberwell Pit Basement	-0.23
GCP02	OSP	105	Falbrook pit Basement	0.26
GCP05	OSP	108	Falbrook pit Basement	0.30
GCP06	OSP	126	Falbrook pit Basement	-1.26
GCP07	OSP	120	Falbrook pit Basement	-1.93
GCP08	OSP	120	Falbrook pit Basement	2.14
GCP13	OSP	66	Falbrook pit Basement	-1.25
GCP14	OSP	123	Falbrook pit Basement	-1.56
GCTB	OSP	90	Falbrook pit Basement	-0.43

Note: OSP = open standpipe piezometer

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

Basement

As shown in **Appendix 2** the basement monitoring data to the end of the 2020 reporting period indicated;

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

Pit Inflows - RCN

Groundwater inflow for the Rixs Creek North (RCN) Mine is licenced for 200ML/year.

The potential proposed RCN pit groundwater inflows from the 2009 ground water environmental assessment predicted that full pit ground water inflows of 73 ML/year in 2014 and 117ML/year from 2019 from West Pit Operations. At the North Pit Operations, Pit inflows for year 6 operations were estimated at 16.1ML. The 2021 annual groundwater inflow is estimated at 120 ML at Rix’s Creek North operations.

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 2021 (and previous) reporting periods.

Bores1, 4, 5 and 6 were dry during the 2021 reporting period.

Rix’s Creek North Groundwater Levels

Piezometers, bores and private wells included in the 2021 Rix’s Creek Mine Groundwater Monitoring Plan include the Foybrook Formation basement coal measures as well as the Glennie’s Creek and Station Creek alluvium groups.

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

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

Piezometers GCP32 – GCP37 recorded partial data. Richards Bore was not monitored during 2021 as its monitoring shifted to the underground operations and GCP20 was dry throughout 2021.

Rix’s Creek North Groundwater Quality

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

The pH and salinity in the Camberwell basement open standpipe piezometers have not shown any significant

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trends since they were installed after mid 2007.

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

GCP7 and GCP8 salinity rose after late July then fell and rose again in 2021.

The 2021 monitored electrical conductivity and pH have not varied above the 2017 WMP trigger levels of >15% variation from the average 2003 – 2016 salinity baseline data, or >0.5 pH, except for GCP27, where the acidity increased and salinity freshened by more than 15% variation.

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

Table 32. 2021 Rix’s Creek South Ground Waters pH and EC results.

2021 Rix's Creek South Ground Waters							
pH Results				EC Results (µS/cm)			Comments
Monitoring Location	Min	Ave	Max	Min	Ave	Max	
BH3	N/A	N/A	N/A	N/A	N/A	N/A	Level to low to sample, dry.
BH4	7.0	7.2	7.6	5510	11408	17800	Within historical range
BH5	6.7	6.9	7.6	4100	4942	5410	Within historical range
20BL170864	6.9	7.2	7.5	494	694	792	Within historical range
BH8	6.8	7.1	7.5	19900	20620	21800	Within historical averages

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Table 33. Rix’s Creek North Ground Waters pH and EC results.

2021 Rix's Creek North Ground Waters							
Monitoring Location	pH Results			EC Results (µS/cm)			Comments
	Min	Ave	Max	Min	Ave	Max	
GCP01	7.7	8.2	8.5	11550	12278	12620	Within historical range
GCP02	8.0	8.1	8.2	11580	12147	12500	Within historical range
GCTB	7.5	8.0	8.1	13180	14047	14400	Within historical range
GCP05	7.2	7.4	7.5	11950	12245	12620	Within historical range
GCP06	6.6	6.8	6.9	11070	12295	12700	Within historical range
GCP07	7.5	7.9	8.1	9670	10978	11700	Within historical range
GCP08	7.0	7.4	7.5	8440	9535	10100	Within historical range
GCP09	6.7	7.0	7.2	362	421	446	Within historical range
GCP10	6.9	7.1	7.2	537	632	690	Within historical range
GCP13	6.7	6.9	7.0	10940	12210	12620	Within historical range
GCP14	4.4	5.0	5.4	3700	11635	13900	Within historical range
GCP19	6.8	7.1	7.2	2380	2580	2680	EC slightly below historic average elevated rainfall.
GCP21	6.9	7.1	7.2	1200	1280	1340	Within historical range
GCP22	6.7	7.0	7.1	10462	11927	12700	Within historical range
GCP23	7.1	7.3	7.5	13550	15592	16300	Within historical range
GCP24	7.4	7.6	7.8	2962	3037	3100	Within historical range
GW67291	6.7	6.8	6.9	704	1123	1520	Within historical range
GCP27	10.0	10.8	12.2	3290	4698	7450	EC slightly below historic average elevated rainfall.
GCP28	6.7	6.9	7.0	462	507	526	Within historical range
GCP29	N/A	N/A	N/A	N/A	N/A	N/A	Too Low to sample, dry.
GCP30	6.9	7.1	7.3	4670	4980	5350	Within historical range
GCP32	6.8	7.0	7.1	11700	13970	14700	Within historical range
GCP36	7.2	7.6	7.8	1042	1122	1190	Within historical range
GCP38	6.9	7.1	7.5	9140	10673	11200	Within historical range

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 2021 sediment dams across site were de-silted whilst climatic conditions were dry allowing adequate access and works to take place. This required the use of a 20 tonne excavator

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accompanied by a 12 tonne tipper truck. An additional longreach excavator was also utilised to desilt dams that couldn’t be reached with a 20 T excavator. 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.

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

7.5.2 Environmental Performance

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

7.5.3 Reportable Incidents

No reportable incidents relating to erosion and sediment occurred during the 2021 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 in accordance with the Bioremediation Procedure.

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SECTION 8 REHABILITATION

8.1 Buildings

Maintenance of structures is undertaken on as needs basis throughout the year. Throughout 2021 infrastructure sheds and structures were painted as necessary. The preferred colour scheme is light green (known as rivergum green) with this same colour utilised on the colorbond fencing installed adjacent to the bridge of the cut and cover tunnel as well as major infrastructure across the site. Rix’s Creek North infrastructure will remain the non-intrusive beige colour.

8.2 Post Landform Land Use

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

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

The progressive rehabilitation when compared to the respective Mining Operations Plans is referred in Table 28.

8.3 Resources Regulator Signoff on Rehabilitation

In 2021 no areas of rehabilitation received formal sign-off from Resources Regulator that the land use objectives and completion criteria have been met.

8.4 Rehabilitation Performance during the Reporting Period

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

As defined in the Rix’s Creek South Rehabilitation Strategy 2020, the rehabilitation objectives for final landform and landscape for the site are:

General

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

Landform

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

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

Growing media

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

Vegetation

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

Infrastructure which has no use post mining

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

During the reporting period a total of 7.1 ha was rehabilitated across Rix’s Creek Mine. A further breakdown of this can be seen in Table 27.

Table 34 Rehabilitation Summary RCM 2021

Locator	Site Name	Type	Date Sown	Species mix	Area (ha)
Camberwell Pit	Rail Corridor Rehabilitation	Pasture	October	Pasture #1	7.1
TOTAL 2021 @ RCM					
CUMULATIVE TOTAL INCLUDING 2021 @ RCM					7.1

Camberwell Pit Rail Corridor Rehabilitation

The Camberwell Pit Rail Corridor site was rehabilitated in October 2021 totalling 7.1 ha. This area was direct seeded via a tractor using pasture species (Pasture mix #1).

The area was created using overburden from the Arties Pit operation then clay and subsoil (300-500 mm thick) from the Arties Pit pre-strip (“Re-Strip” see below comments) was shaped onto a 6-8 degree slope. This slope was overlaid with approximately 100 mm of topsoil from the Arties Pit topsoil re-strip. A D6 Dozer constructed 1% contours from the spoil material and covered the contours with topsoil material. Prior to seeding, the area was spread with 10t/ha of gypsum and biosolids at a rate of 100 tonnes / hectare and disced into the soil with a tractor. The rip lines were created 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. Since the post mining land use for this rehabilitation will be grazing, greater emphasis has been placed on the removal of small to moderate rocks. The contours that were created have been formed so that four wheel drives can drive over the contours.

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During the 2021 period, in accordance with the SSD 6300 staged plans and MOP, the Arties Pit area was continued to be de-habilitated and additional dumping of overburden material was undertaken. 17.1ha of the Arties Pit area was de-habilitated during 2021. The Arties Pit area was re-striped, with the topsoil and subsoil material being stockpiled for future rehabilitation of the area. The MOP has factored the de-habitation into the proposed rehabilitation schedule for the period.

As shown in Table 28, 7.1 ha was rehabilitated in 2021 at RCM. In 2021 Rix’s Creek Mine operations focused on completing the rehabilitation of the Camberwell Pit Rail Corridor Area and Arties Pit area. A total of 7.1ha of rehabilitation was completed compared to the 28.8ha of rehabilitation required in 2021 MOP. Some of the areas planned for rehabilitation within the in the Arties Pit during 2021 are still yet to be disturbed. Due to operations being 2.9 million BCM behind overburden target for the year ending 2021, dumping has not progressed in the Arties Pit area. Therefore areas within the Arties Pit are still being used as overburden dumps and havent reached final landform and haven’t been shaped.

Arties Pit south and Old North pit void rehabilitation was shaped during October 2021. Due to rain delays in November and December 2021, rehabilitation wasn’t completed by the end of 2021. These area have been prioritised to be completed in 2022.

During 2021 the Western out of pit area in Rix’s Creek South was planned to be disturbed. Due to operations being behind overburden targets the West out of pit area was not disturbed during the reporting period. Planned disturbance is 50.8ha.

Covid-19 caused significant disruption to business operations during 2021. Gypsum deliveries and bio-solid deliveries were put on hold due to people residing in hot zones. Covid 19 disruptions to operations is also likely to have caused set backs in overburden movement during the 2021 period.

During the 2021 period an infrastructure area was placed over topsoil and subsoil stockpiles at the Dulwich block in Camberwell Pit. Due to the topsoil and subsoil stockpile increase there was an increase to the infrastructure area of 8.3 ha compared to the 2021 RCM MOP. Topsoil and subsoil stockpiles have been prioritised during the 2021 period. The long-term stockpiles were shaped via a dozer to a nominal three metre height and seeded with a cover crop to stabilise the topsoil stockpiles long-term.

There are two Tailings Emplacement Areas at Rix’s Creek Mine that are currently being capped with overburden material. Due to the slow nature of the capping process, this has taken longer than anticipated, therefore 86ha remains as tailing emplacement area compared to the 2021 MOP Emplacement Area 80.3ha.

Rehabilitation will be focused on the Arties Pit for the 2022. Bulk shaping of these areas was completed in late 2021 and rehabilitation commenced at the Artiers pit in November 2021. Due to heavy rainfall the areas planned to be completed in the 2021 year

The proposed 2021 MOP had additional rehabilitation to be completed in the Camberwell Pit RL 150. In February 2021 a modification was approved by DPIE that enables additional dump room and micro relief on the Camberwell Pit RL150 area. While preparing the rehabilitation reforms documentation in 2022, submission of shapefiles reflecting the Modification 9 inclusion will remove the proposed Camberwell Pit RL150 rehabilitation requirement.

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Table 35 RCM Rehabilitation and Disturbance Areas (ha) compared to MOP

Domain / Phase	2021 RCM MOP	2021 RCM Actual	2022 RCM MOP
Infrastructure Area	206.5	224.9	252.8
Tailing's Emplacement Area –RCM	80.3	86.0	78.2
Active Mining Area RCM	173.5	190.5	179.2
Overburden Emplacement Area -RCM	731.9	772.3	823.6
Rehabilitated Lands – Pasture phase – Ecosystem and land use establishment	35.9	7.1	42.9
Rehabilitated Lands – Pasture; Ecosystem and Land use Sustainability	165	62.8	122.1
Total Rehabilitation – Ecosystem and Land use Sustainability (incl. pre MOP rehabilitation)	701	745.9	718.8

Figure 21 outlines the progression of rehabilitation during the 2021 reporting period. All areas rehabilitated during 2021 across Rix's Creek Mine were treated with biosolids and gypsum. The application of biosolids greatly enhances revegetation onsite given the poor quality of available topsoil. Biosolids organic properties also aid in water infiltration which leads to an improvement in soil composition and long-term vegetative growth. Figure 21 also shows the areas that were shaped to final landform but were not ameliorated and seeded during the reporting period due to availability issues with covid 19 and rain delays during elevated rainfall in November and December.

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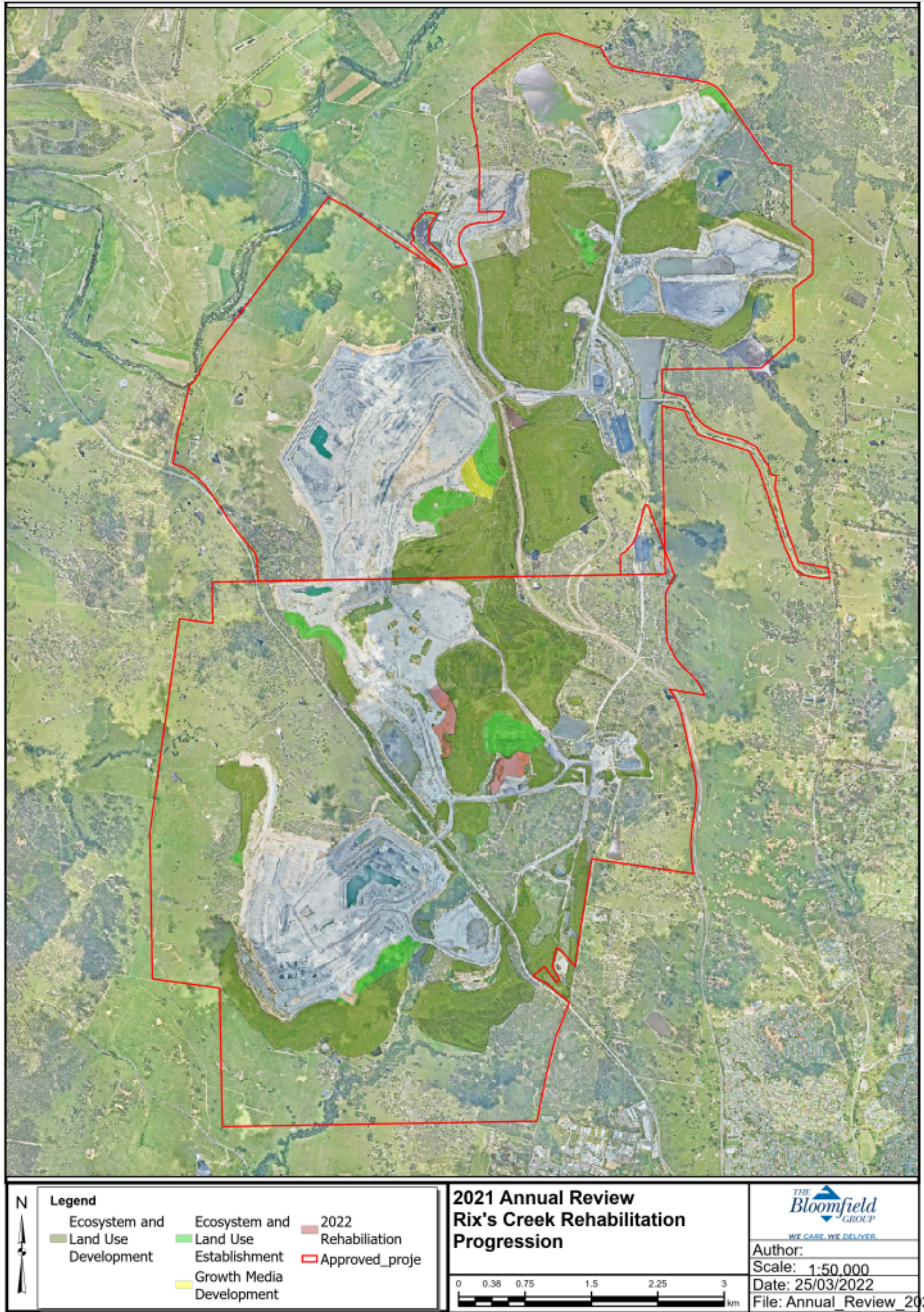


Figure 23 2021 Rix's Creek Mine Rehabilitation - Aerial image Dec 2021

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8.4 Other Infrastructure

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

8.5 Glennies and Station Creek Riparian Management

In accordance with the Rix’s Creek North consent conditions a Glennies and Station Creek Riparian Monitoring and Management Program was developed on the 14/7/2020.

An annual weed survey and targeted weed management was completed along Glennies Creek Management Zones in July 2021.

Along Glennies Creek, the riparian area has been fenced to exclude cattle. No crash grazing occurred along the Glennies Creek Riparian area during the reporting period.

Slashing in between the tubestock lines was completed on two occasions during the reporting period. No additional supplementary planting of tube stock was completed along the Riparian Area Management zones during 2021. Due to the above average rainfall good uptake of tubestock that were planted in previous years of Riparian Management was observed.

8.6 Weed and Pest Management

Ongoing weed control management programs are undertaken onsite each year. During 2021 many widespread areas were targeted to control Galenia, African Boxthorn, Mother of Millions, Prickly/Creeping/Tiger Pear, Blue Heliotrope, St. John’s wart, Scotch/Saffron thistle, Coolatai grass, Cotton bush, Lantana, Castor Oil, Green Cestrum, Bitou bush, Pampas grass, African Olive and Western Australian Wattle (*Acacia Saligna*).

Coolatai Grass across the Rix’s Creek Northern and Southern operations was the focus during July and September 2021. Targeted areas including the RCN rail infrastructure area, Martin’s Creek Biodiversity area, Rix’s Creek South rehabilitation. Assorted weeds and grasses surrounding site infrastructure and topsoil stockpiles were also controlled as required.

Acacia Saligna was targeted again between May and July 2021. A dedicated *Acacia Saligna* Control Management Plan has been developed with the intention to eradicate the population of *Acacia Saligna* at Rix’s Creek Mine. The most efficient way to control *Acacia Saligna* is to begin working in the areas of best quality vegetation with the least weeds. This ensures that the best bush areas or rehabilitated areas are conserved and that new weed infestations do not establish whilst working in already degraded areas.

African Boxthorn, African Olive, Mother of Millions, Blue Heliotrope, St. John’s wart, Lantana, Castor Oil, Bitou bush, Pampas grass, African Olive often occur in isolated outbreaks. During 2021 any identified occurrences of these species were identified, reported and managed as necessary. The Environmental component of the Bloomfield Group generic induction process explains to all new personal their responsibility to remain vigilant in identifying potential weed outbreaks and reporting any sightings to supervisors and/or a member of the Environment department.

During the 2021 reporting period a qualified pest control contractor sprayed amenities and infrastructure across site with odourless chemical to control insects.

The following weed species have been identified and treated on-site during 2021:-

- 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);

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- Lantana, *Lantana* spp. (class 4);
- Noogoora burr, *Xanthium occidentale* (class 4); and
- African Olive, *Olea europaea subspecies Africana* (class 4).
- 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 plantaginuem* (class 4);
- Coolatai Grass, *Hyparrhenia hirta*, (class 4);
- Castor Oil, *Ricinus communis* (non noxious – class 4 Sydney area);

Weed management at RCM in 2021 is shown in Figure 24.

From the 27 May to 24 June 2021, 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.

- A total of 172 baits were presented at 43 stations with 29 takes being from Foxes and 16 takes from Wild Dogs based on animal sign left on mound and surrounding area.
- The uptake rate throughout this Autumn 2021 control program produced a percentage of 26.2%. This is a low uptake rate as compared to 2018 Program which had 66.4% and can be used as a baseline for future control programs.
- All of the poisonous baits were consumed by foxes or wild dogs with no takes by any other species. No non-target species such as Goannas or Eagles were recorded as taking baits.

From August to September 2021, qualified open range shooters conducted a Kangaroo culling program across site. The shooting was undertaken during night time targeting Eastern Grey Kangaroo’s (*Macropus giganteus*). Kangaroos were culled and tagged with tags supplied by National Parks and Wildlife Service (NPWS) in accordance with commercial harvesting requirements.



Figure 24. Weed Management Plan

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8.6 Rehabilitation Trials and Research

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

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

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

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

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

Monitoring of the sites has included:

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

The rehabilitated pastures are dominated by sown tropical grass species. These are providing a stable pasture cover and have recovered well after the recent major drought. Ground cover levels have been maintained above the recognised standards required to minimise erosion hazards.

Overall, the rehabilitated pasture is a well balance, stable pasture that is producing high quality forage for cattle production.

Cattle grazing at the site have been putting on weight and providing a viable return. The pasture growth has exceeded the demands of the cattle resulting in a large bulk of feed that will be available into the coming winter months.

Cattle have been grazing on the rehabilitated pastures at Rix Creek, with monitoring conducted via weight gain data. Pasture growth has been strong responding to the high rainfall received through the year which has maintained good cattle growth rates.

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Cattle have sustained good growth rates on the rehabilitated pastures.

Cattle grazing on the rehabilitated pasture between July 2019 and August 2020 had an average weight gain of 207 kilograms per head. This is an average daily gain of 0.43 kilograms per head per day. Those cattle were replaced with weaner steers with an average weight of 224 kg/head. These steers averaged 455 kg/head when sold from the site. This is a weight gain of 231 kg/head, nearly doubling their weight in 13 months. This is a weight gain of 0.58 kg/head/day. These steers were sold into the cattle market at Hunter Livestock Exchange and met good demand from market.



Cattle were sold from the site weighing on average 455 kg/head.

When they were sold (January 2021) additional cattle replaced them at the site. In January 2021, 22 steers and heifers weighing on average 320 kg were introduced to the rehabilitated pasture. These cattle have grazed on the rehabilitated pasture continuously since then. The cattle are to be weighed and sold within a couple of months.

While the pasture quality varies throughout the year and seasonally, the quality and quantity of pasture has been able to sustain good growth rates and have fattened cattle.

The quality of the pasture has been conducive to good cattle performance, particularly where some clovers and vetch have formed part of the pasture composition. The legume species provide additional quality to the pasture on offer to the livestock.

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The high growth rates of the tropical pasture species sown on the rehabilitated land has resulted in high ground cover levels, productive cattle feed and a stable pasture base.

Good ground cover levels have been maintained in the rehabilitated pastures, remaining above 80% on average over all recordings. This has reduced the erosion risk considerably despite the heavy rainfall events experienced.

Tropical grass recovery after the serious drought years has been exceptional with strong growth and production from Green Panic, Setaria, Kikuyu and Rhodes Grass. These are palatable grasses which have maintained higher feed quality for longer periods than native pasture grasses.

Seed set and spread of the sown tropical grasses is evident after the good summer rainfall which has improved ground coverage and density of the pastures.



Setaria is a component of the rehabilitation pasture mix that has grown well and produced large volumes of feed.

Weed type and density has been monitored. Strong annual weed establishment occurred after the drought. Taking advantage of the good summer rainfall events, during 2019 weeds such as Sticky Beak (*Bidens pilosa*), Stinking Roger (*Tagetes minuta*) and Purple Top (*Verbena bonariensis*) infested areas of the rehabilitated pastures. Grazing and strong pasture growth has reduced the density of these weeds significantly, showing the resilience of the strong pasture base that has been established.

These weeds are unlikely to form a problem in a grazing system such as this where there is plenty of competitive pasture growth and good ground cover.

In addition to the cattle grazing trial, Rix’s Creek Mine is an industry monitor on ACARP Project C34025 that’s

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investigating a new landscape evolution model for assessing rehabilitation designs. The model development is the refinement of the State-Space Soil Production and Assessment Model (SSSPAM) and looks at optimising the existing model. Rix’s Creek is participating in this trial which is being managed by Greg Hancock from the University of Newcastle.

8.7 Rehabilitation Monitoring

Rehabilitation monitoring was conducted by an independent Consultant during November 2021. Key findings of the 2021 rehabilitation monitoring program include the following:

- Landscape function yielded excellent results in terms of stability, and moderately good results for nutrient cycling indices, however infiltration results remain low. Analogue sites experienced a trajectory similar to the rehabilitated sites, which indicates a trend towards slow landscape scale recovery after the prolonged period of drought.
- Land and soil capability were generally quite good across all rehabilitated areas. Rehabilitated sites performed similar to, or better than Analogue Sites and generally within acceptable completion criteria.
- Stability remains high and erosion issues remain minor.
- Ground cover percentage has increased overall dramatically since 2019, and indicates a trend towards recovery. Recolonisation is slower at Tree Sites than Pasture Sites. • Species diversity has increased greatly since the 2019 monitoring event, and now remains on an upward trajectory. However, it is likely that the bulk of this diversity is made up of annual weeds.
- Pasture performance was improved in 2021, however pasture could benefit from slashing excess material to improve yield quality.
- The majority of sites with mid and upper storeys appeared to be in good health and condition however did not exhibit obvious signs of natural regeneration.
- Weed cover scores increased overall this year. Particular areas of infestation warranting management.
- Topsoil cover was limited at some older rehabilitated sites; however, their vegetative performance did not appear to be adversely affected, and topsoil re-spreading is not recommended at any of the rehabilitated sites.
- All sites displayed excellent soil characteristics in terms of soil acidity, salinity and sodicity. Soil dispersion benchmarks were not achieved at all sites however this does not appear to have had an impact on vegetative performance.

8.8 Key Issues that may Affect Rehabilitation

Due to the increased rainfall during 2021, weed infestation remains the major challenge that has the potential to affect rehabilitation performance across the site, particularly with widespread occurrence and local infestations of Galenia (*Galenia pubescens*), and more localised incursions of Prickly Pear (*Opuntia spp.*), Coolatai grass (*Hyperheria hirta*) and Western Australian Wattle (*Acacia Saligna*). Efforts have been increased to remove *Acacia Saligna* from previously rehabilitated areas, 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 2022 to ensure that we reduce the amount of invasive species that have the ability to affect rehabilitation at Rix’s Creek Mine.

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8.9 Rehabilitation Status

RCM as follows:

Table 36. Rehabilitation Status 2021

Mine Area Type	Previous Reporting Period (Actual)	RCM Reporting Period	MOP Reporting Period	Reporting Period (Actual)	Next Reporting Period (Forecast) combined RCM MOP
	Year 2020	Year 2021		Year 2021	Year 2022 (ha)
Mining Lease	5303.6**	5303.6		5303.6	5303.6
Total active disturbance	1235.8	1350.6		1263.5	1282.1
Land being prepared for rehabilitation	11.4	-10.1*		28.8	7.4
Land under active rehabilitation	8.9	8.1		7.1	36.2
Completed rehabilitation	837.1	820.7		819.2	862.8

*Arties Pit disturbance exceeded land being prepared for rehabilitation

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SECTION 9 COMMUNITY

9.1 Community Engagement.

Rix’s Creek is required under the development consent to participate and co-operate with a Community Consultative Committee (CCC). The committee consists of community representatives and is chaired by Council and other Government representatives are invited to participate on the committee. Rix’s Creek was the first mine in the Hunter Valley to have a CCC which has operated for 30 years.

The Committee representatives are:-

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

Company representatives:-

Chief Development Officer - Geoff Moore
Operations Manager - Brendon Clements
Environment Manager – Chris Knight
Environmental Superintendent – Chris Quinn

The Committee met two times during the year.

On the 26th May 2021, the CCC meeting was held to provide an update on the Western continuation area. Company representatives outlined the start of works with pre-clearing commencing and a fence line demarcating the boundary of disturbance allowed.

The meeting also discussed extensive general business such as the significantly above average rainfall for the previous year and a general overview of Environmental works and results from 2020. An update on RCN Modification 9 was also delivered

On the 20th October 2021 a Zoom meeting was held due to Covid 19 restrictions. An overview of the Environmental Performance was provided for Rix’s Creek. At this meeting, Community Complaints and Responses were outlined and discussed by the Environmental Manager and Advisor, both replying to any questions raised.

The October meeting also highlights some of the Covid related initiatives that RCM had introduced including the ‘Spend Local Vaccination’ initiative which encouraged employees to become vaccinated and receive a voucher that can be used in the local Singleton area, supporting the local businesses. An update of the SSD6300 modification 1 of was provided to the meeting as well.

A copy of the Rix’s Creek Mine Community Consultative Committee meeting minutes can be found at <https://www.bloomcoll.com.au/sustainability/environmental-management/rixs-creek-assessments/ccc-minutes>

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

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- Quaterly Employee Community newsletters
- A number of advertisements in local newspapers such as the Singleton Argus and Coalface.

Notifications on kangaroo culling and 1080 wild dog and fox baiting were also distributed to near neighbours during the reporting period.

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

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

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

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

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

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

The Bloomfield Group UHMD representatives are:-

Steering Committee:-	Chief Development Officer – Geoff Moore
UHMD Industry Working Group	Environment Manager – Chris Knight
	Environmental Superintendent – Chris Quinn

9.2 Community Contributions.

In 2021, the Company provided support to 15 charitable groups and to 11 local community groups.

In particular, in the Singleton community over the last 12 months, the company has contributed to:

- Salvation Army – Red Shield Appeal (Singleton and Newcastle)
- Singleton Business Chamber – Business Excellence Awards 2021
- Singleton Fire Brigade Social Club – Christmas
- Singleton Hospital – refurbishment Palliative Care rooms
- Singleton Legacy – Christmas
- Singleton Neighbourhood Centre – wages for Open Door Project Officer
- Singleton Neighbourhood Centre – funds for Christmas hampers
- Singleton Netball Association – junior coach development program
- Singleton Police Citizens Youth Club – DRIVE program
- Singleton Show - sponsorship
- The Samaritans – Singleton Christmas Lunch
- Youth Off The Streets – Hunter Valley Engagement and Support Team

In response to COVID-19, the Company also donated supplies of Rapid Antigen Tests to a number of charities operating in the Hunter including Lifeline, Youth off the Streets, Singleton Neighbourhood Centre, Singleton Salvation Army, and Singleton Men’s Shed.

In February 2021, a fund to benefit the social and economic future of Singleton was formalised with the signing of the Community Economic Development Fund (CEDF) Deed. Signatories to the deed,

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Singleton Council, Glencore and The Bloomfield Group oversee the use of the proceeds from the Community Economic Development Fund, which was developed last year with a portion of the proceeds from Voluntary Planning Agreements (VPAs). Applications for the first round of the Community and Economic Development Fund opened in September 2021 ahead of the planned awarding of the funds in early 2022.

9.3 Community Complaints.

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

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

During 2021 there were eighteen (18) complaints received. This is a slight decrease from 2020, when twenty four (24) complaints were recorded. No complaints were received in the months March or October.

Of the eighteen (18) complaints received in 2021, seven (7) related to noise, one (1) related to dust, five (5) related to blasting, three (3) related to a lighting, and 2 other (external vehicle movements) complaints. Of the seven (7) noise complaints, four (4) were from one complainant. Of the five (5) blast complaints, four (4) were made by the one complainant.

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

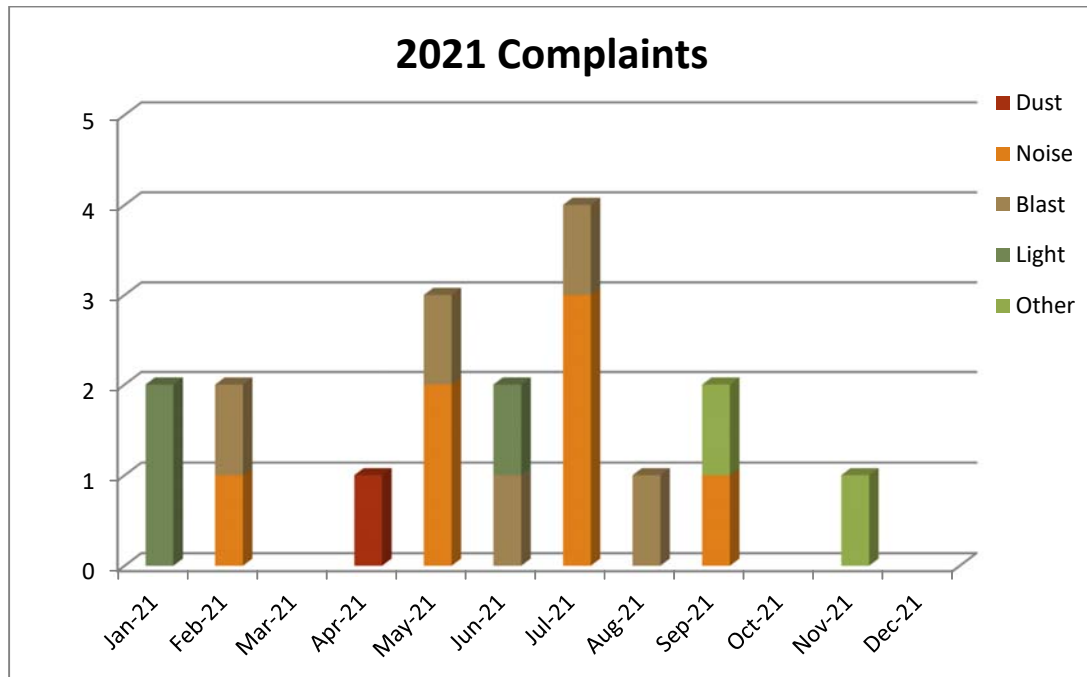


Figure 25. RCM Complaints Summary 2021

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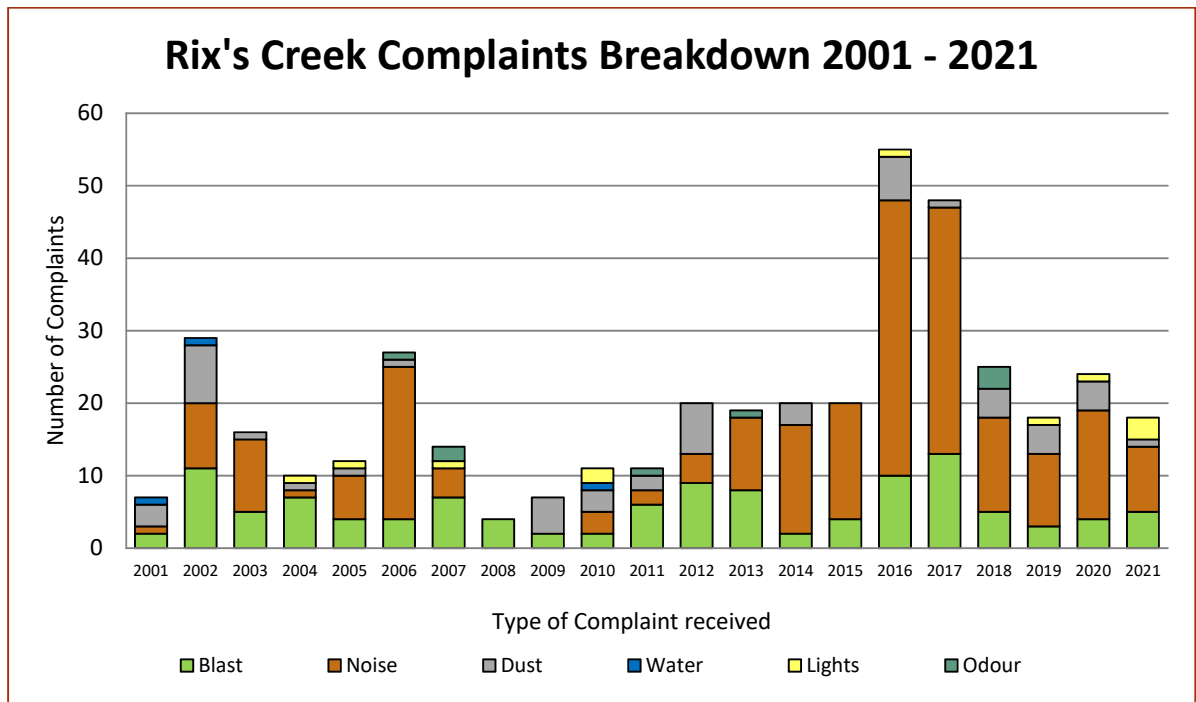


Figure 26. Summary of Rix's Creek Complaints 2001-2021

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SECTION 10 – INDEPENDENT AUDIT

During 2020 an independent audit covering Rix’s Creek North Project Approval (08_0102), Rix’s Creek South SSD 6300, EPL 3391 and associated mining leases were independently audited by DPIE approved consultants GHD.

10.1 Development Consent

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

The actions for the RCN and RCS Independent Audits have been closed out.

The Independent Audit Reports can also be viewed on the website

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

Refer below to progress made in implementing actions from the 2020 Independent Environmental Audit.

2020 Rix's Creek North Mine Independent Environmental Audit Response to Auditors Corrective Actions



WE CARE. WE DELIVER.

Number	Condition	Auditors Recommendation	Bloomfield's Response
1	Environmental Performance	Store chemicals and fuels in accordance with the WHS Regulations.	The Rix's Creek North Independent Environmental Audit was undertaken to facilitate the requirements of the Environmental Planning and Assessment Act 1997. While chemicals and fuels are stored generally in accordance with the required Australian Standards the audit was not a WHS audit under the Coal Mine Health and Safety Act. A review of all chemical and fuel storage areas will be undertaken with the results reported in the next Annual Review to be submitted prior to 31/3/2021.
2	Schedule 3, Condition 36	Update RCM Water Management Plan to address all requirements of Schedule 3, Condition 36.	Update Water Management Plan in accordance with Schedule 5 Condition 5 of PA 08_0102. Water Management Plan updated.
3	Schedule 5, Condition 2	Update Biodiversity Management Plan to include reference to the procedures for management of incidents, complaints, exceedances and non-compliances in the Environmental Management Strategy.	Update Water Management Plan in accordance with Schedule 5 Condition 5 of PA 08_0102. Water Management Plan updated.
4	EPL Condition M9.1	Update the Noise Management Plan nighttime monitoring period to comply with Condition L3.3 and M9.1.	Update Noise Management Plan in accordance with Schedule 5 Condition 5 of PA 08_0102. Noise Management Plan updated
5	EPL Condition R5.8	Ensure the 2020/21 Annual Water Quality Monitoring Report includes graphical presentation of results, rainfall data and a plan of the monitoring locations.	Include recommended information in the 2020 Annual Return (EPL) to be submitted by 2 June 2021. Completed EPL Annual Returns submitted with annual water quality results and graphs.

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2020 Rix's Creek North Mine Independent Environmental Audit Response to Auditors Recommendations



WE CARE. WE DELIVER.

Number	Condition	Auditors Recommendation	Bloomfield's Response
1	Environmental Performance	Decommission the mobile service trailer.	Bloomfield will decommission the mobile service trailer by 31/3/2021. Mobile Service trailer decommissioned by 31/3/2021.
2	2017 audit findings SoC Conditions B2, B4 and B11	Update Land Disturbance Management Procedure to include protocols for topsoil stripping.	Update Land Disturbance Management Procedure (Internal) to include protocols for topsoil stripping by 31/3/2021. Update: Land Disturbance Procedure updated to include topsoil and susboil stripping.
3	Schedule 3, Condition 9	Acoustic consultant to recommend mitigation measures for equipment exceeding sound power limits.	Where attenuated equipment are identified to be greater than 3 dB over limit and no reason can be found (ie attenuation damaged) an acoustic consultant will be engaged to provide further information within 3 months of the receipt of the Annual Sound Power Testing if required.
4	Schedule 3, Condition 25	Provide a better website address in future letters to tenants to assist with locating the particulate matter monitoring data.	Direct link to information will be provided in all future letters. It is noted that this information is openly available on the Bloomfield website and NSW EPA Upper Hunter Air Quality Monitoring Network. Updated on Bloomcoll website under Environmental Management Link.
5	Schedule 3, Condition 48	Reinforce importance of waste segregation with operational personnel in workshop and stores.	Refresher waste training to be delivered across Rix's Creek Mine on waste management via toolbox talk to employees by 31/3/2021. Waste Training Completed.
6	EPL Condition R5.8	Acoustic consultant to update monthly reports to reflect updated condition L3.7 referencing the Noise Policy for Industry (2017) in lieu of the Industrial Noise Policy.	Acoustic Consultant to reference NPfi 2017 going forward.

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

Incidents that occurred during 2021 are detailed in this section. Non-compliances were reported to relevant agencies during the reporting period.

11.1 Air Quality Monitoring exceedances in 2021

Air quality monitoring exceedances occurred during 2021, where the 24 Hour criteria of 50ug/m³ was exceeded at TEOMs during the reporting period on 3 occasions. When the upstream monitors were compared to the downstream monitor results, there was an indication that air quality was coming from upstream sources generally in a NW direction from the mine. Therefore, Rix’s Creek Mine was not a major contributor of the air quality monitor exceedances and acted as a net dust sink. Refer to Section 6.4 Air Quality for a breakdown of exceedances during the reporting period.

11.2 DustTrak and TEOM minor down time in 2021.

From the 15th April to the 17th of May 2021 the Bowmans DustTrak recorded low results and intermittent failures due to faulty DustTrak units.

RCS NW DustTrak unit was observed to be reading low values from the 15th April 2021. A spare unit was installed and it returned high readings due to a fault with that unit. An additional backup DustTrak unit was installed and serviced by external contractor. When serviced, the zero calibration of the unit failed, and the contractor removed the unit and was sent for maintenance and re-calibration. An additional DustTrak monitor was sourced and installed as an interim while the DustTrak units were sent for calibration. The DustTrak unit was re-installed on its return from manufacturer on the 17 May 2021. Due to Covid, shipping of unit was delayed due to interstate restrictions and not received back till 17 May 2021. The spare units were sent to manufacturer for periodical calibration after original unit was returned.

On Sunday 12th September 2021, the RCN North East TEOM went offline. On Monday 13th September contractor attended site and found the unit had stopped operating. The contractor rebooted the unit and it came back online. On the 18th September the North East TEOM went off line and contracting company was notified. Contractor rebooted and the TEOM returned to normal operations.

Both the RCS North West and RCS South East DustTraks were affected by storm activity on the 3rd – 4th December, with the RCS North West DustTrak requiring a new USB>RS232 converter.

The RCN South East TEOM required a new data card when the data card froze during 10th - 16th December. Efforts were made to retrieve the data from the frozen data card, however a software update was required to repair the RCN South East TEOM.

The RCS South East DustTrak unit required replacement on the 21st/22nd December as the unit was due for calibration.

An environmental consultant currently completes monthly servicing and maintenance on the DustTrak and TEOM units. The Environmental Consultants receive an alarm where any anomalies to the system are identified. This ensures that a faster response in repairing or servicing air quality units is undertaken.

11.3 Water Seepage event Rix’s Creek South Mine – SSD 6300 (Major Projects Portal Issue PA-36).

On the 13th July 2021 water was observed seeping out of the ground from historic underground workings, and passively flowing into Stonequarry Gully, a tributary of Rix’s Creek. Water sampling was conducted above, at the site of the seepage, and downstream of the seepage point. These samples were sent for analysis at a NATA accredited lab. Inspections, monitoring and sampling has been ongoing since the initial event.

The Rix’s Creek Mine Pollution Incident Response Management Plan (PIRMP) was activated for the event. A report was provided to the EPA, DPIE, RR and Singleton Council on the 20 July 2021.

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On the 8 September 2021 the EPA requested additional information in relation to the event. On the 30 September Rix’s Creek Mine provided a stream health assessment as well as further details relating to water quality results post event.

Rix’s Creek Mine continues to collect all seepage water from the historical underground workings. The collected water is pumped into the Mine Water system where it is re-used for dust suppression.

An electric pump and diesel generator is installed at the site which includes level sensors for auto running.

The site and pump continue to be checked daily.

Sampling of pH, electrical conductivity and total suspended solids continues on a weekly basis at the site and at the downstream sampling locations.

11.4 Water Event Rix’s Creek South Mine – SSD 6300 (Major Project Portal Issue PA-43).

On the 12th November, Rix’s Creek Mine received significant rainfall over a short period with 46.2mm of rain falling in approximately 7 hours. The previous 48 hours had seen 82.6mm rainfall saturating the ground.

Water was observed exiting a historic underground workings shaft and flowing into Stonequarry Gully which also had localised flooding. Storm water entered a seepage containment dam resulting in heavily diluted seepage water overflowing into Stonequarry Gully. Water sampling above, at and below the source was conducted following the event with the samples sent to a NATA accredited lab.

The Rix’s Creek Mine Pollution Incident Response Management Plan (PIRMP) was activated for the event. A report was provided to the EPA, DPIE, RR and Singleton Council on the 19 November 2021.

Where water was identified flowing into the historical underground system, temporary structures were established to divert water away from these visible entry points.

The pump located at licenced bore 20BL170864 was operational to reduce water from historic underground workings. The submersible pump located at the seepage containment dam reduced water levels post event.

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

Mining will be focussed in the West Pit (Pit 3) at Rix’s Creek South and Camberwell Pit operations at Rix’s Creek North. Due to coal advances in the West Pit a majority of overburden from the West Pit will be placed in the Arties Pit until coal mining reserves move in a northward fashion. Camberwell Pit mining will progress in a southerly manner with pre stripping to the south west of Camberwell Pit to be completed. The Dulwich block strip 2 located to the North West of the Camberwell Pit will be mined. The overburden placement will be dumped from the eastern section of Camberwell pit and transition to the west in 2022 as per the Mining Operation Plan.

Further improvements to the Rix’s Creek environmental systems include the implementation of the INX software package to track environmental compliance requirements.

Environmental management is an ongoing process at Rix’s Creek Mine with continual improvement being made to the existing systems already in place.

Table 37 Environmental Performance Improvement Activities

Environmental Performance Improvement Activities	Target Date
Rix’s Creek Mine Rehabilitation Progression	Q1-Q4 2022
Flowmeter upgrades around Rix’s Creek Mine. Flowmeter data to be integrated into Power BI system	Q4 2022
Review of site procedures relating to permit to modify	Q2 2022
Teledata Sytem Environmental Updates	Q4 2022

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SECTION 13 MANAGEMENT PLAN REVIEW

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

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

The management plans for both RCN and RCS as required under their relevant approvals are listed in **Table 27** along with their relevant status. Management Plans were updated to include SSD 6300 conditions during the 2021 period. Management Plans were updated during 2021 in accordance with the Annual Review and to include amendments for inclusion of RCN Modification 9.

Table 38 Environmental Management Plans

Approval Authority	Approval Date	Review Update	Title
Rixs Creek North			
DPE	21/12/2017		Biodiversity Management Plan
DPE	19/2/2016	-	Heritage Management Plan
DPIE	16/10/2020	-	Rix’s Creek North Glennies Creek and Station Creek Riparian Management Programme
DA49/94 Rix’s Creek South			
DPE	22/1/2014	-	Rix’s Creek South Final Void Management Plan
DPIE	22/1/2014	-	Rix’s Creek South Mine Closure Plan
DPE	22/1/2014	-	Rix’s Creek Mine Erosion and Sediment Control Plan
DPE	22/1/2014	-	Rix’s Creek Mine Traffic Management Plan
DPE	22/1/2014	-	Rix’s Creek South Landscape Management Plan
SSD 6300 Rixs Creek South			
DPE	29/01/2021		Rix’s Creek South Rehabilitation Strategy
DPE	18/12/2020	-	Rix’s Creek South Historic Heritage Management Plan
DPE	23/12/2020	-	Rix’s Creek South Biodiversity Management Plan
DPE	02/09/2020	-	Rix’s Creek South Aboriginal Cultural Heritage Management Plan
DPE	17/01/2022		Rix’s Creek South Coalaceous Material Haulage Management Plan
RCM Integrated Management Plan to cover Rixs Creek North & Rixs Creek South Operation			
DPE	11/03/2021	-	Environmental Management Strategy
DPE	23/12/2020	12/5/2021	Noise Management Plan
DPE	23/12/2020	12/5/2021	Blast Management Plan
DPE	23/12/2020	12/5/2021	Air Quality & Greenhouse Gas Management Plan
DPE	15/03/2021	17/5/2021	Water Management Plan
DPE	30/10/2019	14/9/2021	Bushfire Management Plan
RR	1/12/2019	30/11/2022	RCM MOP

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: Glennies Ck Up (nobles Xing)			
		pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l
20/01/2021	Jan-21	7.3	1692	5	1070	6.9	166	86	538	7.8	630	12	361
19/02/2021	Feb-21	7.47	1500	<5	846	6.76	110	43	322	7.74	473	<5	285
22/03/2021	Mar-21	7.77	970	28	519	6.59	84	29	152	7.4	275	17	204
26/04/2021	Apr-21	7.43	1160	11	663	6.69	170	27	1070	7.76	757	5	433
21/05/2021	May-21	7.47	1140	12	606	6.63	186	26	1080	7.84	726	<5	401
30/06/2021	Jun-21	7.51	986	12	552	6.6	177	32	721	7.98	778	<5	408
27/07/2021	Jul-21	7.73	995	17	593	6.64	208	24	735	7.94	758	<5	395
25/08/2021	Aug-21	7.52	1050	34	586	6.58	188	34	258	8.03	744	10	348
28/09/2021	Sep-21	7.64	1360	30	755	6.6	250	91	1040	7.85	838	<5	436
27/10/2021	Oct-21	7.66	1290	48	917	6.75	209	66	1020	7.56	484	18	302
8/12/2021	Nov-21	7.45	491	14	333	6.74	86	36	186	7.61	427	<5	256
31/12/2021	Dec-21	7.34	521	13	319	6.53	168	48	798	7.66	618	14	323
HISTORICAL AVERAGE		7.7	2860	35	1862	6.7	276	98	632	7.7	406	10	247
MIN		3.4	179.0	3.0	238.0	5.9	73.0	1.0	152.0	6.7	199.0	2.0	117.0
MAX		9.3	10090.0	252.0	6850.0	7.3	1473.0	631.0	1270.0	8.1	838.0	61.0	447.0
SD		0.9	2754.5	39.5	1734.9	0.3	198.3	110.2	284.0	0.2	163.2	8.4	84.8
		Dry = No sample, site was dry NS = not sampled											

Date Sampled	Month Sampled	W5: Glennies Ck Down (Oxfords)				W6: Blackwattle Ck				W7: Stony Ck				W8: Tisdells Ck			
		pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l
20/01/2021	Jan-21	7.8	591	14	341	7.9	1740	38	1030	6.6	161	32	223	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19/02/2021	Feb-21	7.8	526	<5	300	7.59	1260	45	823	6.48	109	33	199	0.0	0.0	0.0	0.0
22/03/2021	Mar-21	7.71	537	11	322	7.17	263	46	236	6.89	92	14	118	0.0	0.0	0.0	0.0
26/04/2021	Apr-21	7.84	753	7	432	7.65	1370	9	763	6.79	164	15	180	0.0	0.0	0.0	0.0
21/05/2021	May-21	7.99	733	<5	400	7.64	2130	18	1160	6.81	168	15	132	0.0	0.0	0.0	0.0
30/06/2021	Jun-21	8.08	776	<5	400	7.84	11100	13	7080	6.68	191	7	191	0.0	0.0	0.0	0.0
27/07/2021	Jul-21	8.08	766	<5	396					6.74	168	<5	168	0.0	0.0	0.0	0.0
25/08/2021	Aug-21	7.93	764	<5	362	8.22	8330	5	4760	6.78	170	38	195	0.0	0.0	0.0	0.0
28/09/2021	Sep-21	7.81	881	<5	482					6.71	196	10	174	0.0	0.0	0.0	0.0
27/10/2021	Oct-21	7.59	481	20	300					6.44	138	15	158	0.0	0.0	0.0	0.0
8/12/2021	Nov-21	7.69	431	36	252	7.42	426	35	310	7.16	148	17	177	0.0	0.0	0.0	0.0
31/12/2021	Dec-21	7.74	607	13	319	7.9	1820	<5	1050	6.53	184	42	168	0.0	0.0	0.0	0.0
HISTORICAL AVERAGE		7.8	423	12	257	7.7	5740	62	3773	6.7	353	29	275	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
MIN		7.2	201.0	2.0	119.0	7.0	263.0	1.0	236.0	5.6	84.0	2.0	96.0	0.0	0.0	0.0	0.0
MAX		8.2	881.0	69.0	484.0	8.4	13130.0	1660.0	9200.0	7.9	6170.0	249.0	3460.0	0.0	0.0	0.0	0.0
SD		0.2	176.5	10.4	92.0	0.3	3935.4	215.4	2667.2	0.3	711.4	36.6	387.2	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

Date Sampled	Month Sampled	W9: Tisdell Dam				W10: Dam C4 (EPA Site)				W11: Glennies Ck NEH				W12: Dam C1				
		pH	EC uS/cm	TSS mg/l	TDS mg/l	Disch. Flow	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l
20/01/2021	Jan-21						8.1	1674	8	986	7.6	608	7	386	8.2	2460	2	1370
19/02/2021	Feb-21						8	1660	8	959	7.76	475	17	287	8.04	2510	6	1360
22/03/2021	Mar-21					Steady	8.23	898	25	530	7.41	307	20	219	7.44	790	18	524
26/04/2021	Apr-21						7.56	1140	9	661	7.93	724	7	431	7.88	1020	5	578
21/05/2021	May-21						7.7	1140	6	638	8	723	<5	383	7.56	1120	<5	613
30/06/2021	Jun-21						8.02	1180	14	670	7.98	775	<5	409	7.84	1280	<5	692
27/07/2021	Jul-21						7.89	1190	6	670	8.11	768	7	401	8	1400	<5	745
25/08/2021	Aug-21						8.07	1260	11	670	7.99	767	<5	360	7.9	1490	<5	760
28/09/2021	Sep-21						8.6	1330	<5	692	7.86	840	17	428	8.52	1690	<5	870
27/10/2021	Oct-21						6.67	1350	11	877	8.52	486	18	324	7.6	1790	<5	1050
8/12/2021	Nov-21						7.55	499	11	308	7.75	435	17	274	7.21	400	11	265
31/12/2021	Dec-21						7.69	522	6	284	7.74	562	13	318	7.26	580	10	312
HISTORICAL AVERAGE		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	8.8	3699	14	2282	7.9	507	10	301	8.4	2184	30	1281
MIN		0.0	0.0	0.0	0.0	0.0	6.7	499.0	1.0	284.0	7.3	210.0	2.0	128.0	6.7	265.0	1.0	202.0
MAX		0.0	0.0	0.0	0.0	0.0	9.8	8480.0	156.0	5570.0	8.7	2640.0	48.0	1480.0	9.8	5020.0	1780.0	3000.0
SD		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.6	2014.1	17.2	1287.6	0.2	378.8	7.6	214.7	0.7	1085.4	180.5	636.7

Date Sampled	Month Sampled	W13: Dam C6				W14: Dam C3				W15: Dam C6A				W16: Dam C8 (South Pit)			
		pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l	pH	EC uS/cm	TSS mg/l	TDS mg/l
20/01/2021	Jan-21	7.2	280	4	159	7.2	405	49	668	7.2	154	11	165	8.9	1162	39	689
19/02/2021	Feb-21	7.24	262	10	179	8.72	1460	9	779	7.09	160	7	143	8.63	472	33	381
22/03/2021	Mar-21	7.15	148	26	139	7.97	1060	24	612	6.98	174	29	170	7.38	381	308	367
26/04/2021	Apr-21	7.26	178	<5	172	7.97	1620	22	880	7.52	193	12	132	8.43	624	23	398
21/05/2021	May-21	7.14	186	<5	146	8.12	1840	19	1000	7.35	204	7	138	8.39	1420	9	804
30/06/2021	Jun-21	7.12	184	29	156	8.23	1900	10	1110	7.23	193	<5	146	8.33	1850	7	1160
27/07/2021	Jul-21	7.34	204	13	123	8.22	1890	16	1110	7.36	185	5	130	8.02	1980	7	1250
25/08/2021	Aug-21	7.28	186	25	147	8.87	2030	68	1190	7.26	185	15	136	8.3	2240	10	1410
28/09/2021	Sep-21	7.63	220	18	152	9.13	2110	9	1200	7.3	207	13	144	8.45	2320	<5	1480
27/10/2021	Oct-21	9.11	210	7	166	9.7	2320	13	1240	7.84	192	11	157	8.49	2470	6	1480
8/12/2021	Nov-21	7.09	176	11	154	9.57	2280	34	1500	7.03	159	22	158	8.54	2420	6	1730
31/12/2021	Dec-21	6.88	200	10	128	7.79	469	28	297	7.02	198	7	139	8.62	1120	15	684
						Sampled by RCN								Sampled by RCN			
HISTORICAL AVERAGE		7.6	270	31	206	8.9	3861	15	2443	7.5	395	24	283	8.6	4375	82	3141
MIN		4.0	116.0	3.0	87.0	7.2	405.0	1.0	297.0	5.7	100.0	2.0	96.0	7.4	281.0	2.0	367.0
MAX		9.8	1026.0	206.0	642.0	10.5	9740.0	85.0	6200.0	9.4	1666.0	252.0	969.0	9.8	9430.0	2030.0	6810.0
SD		0.9	160.8	38.2	101.1	0.6	2358.0	13.5	1528.2	0.6	246.6	33.2	136.8	0.5	2355.0	251.0	1633.7

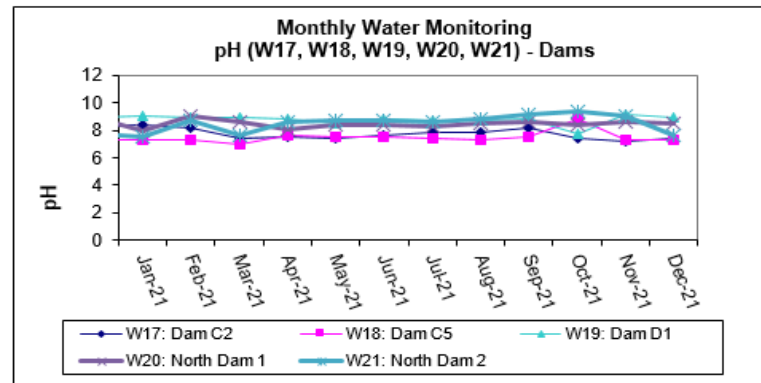
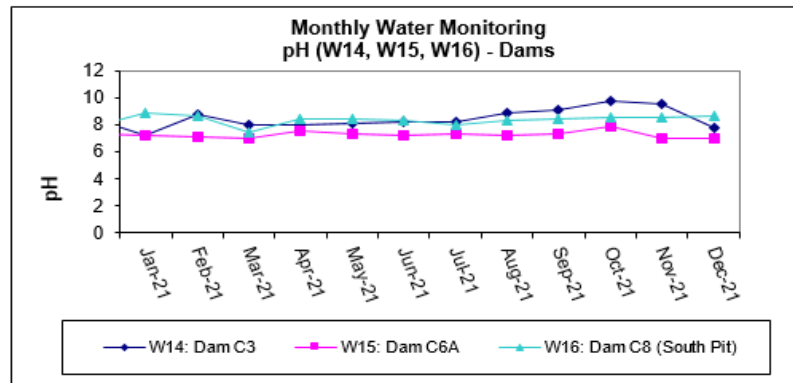
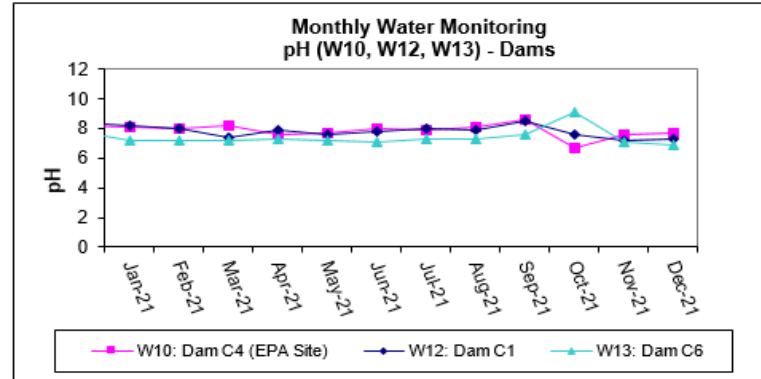
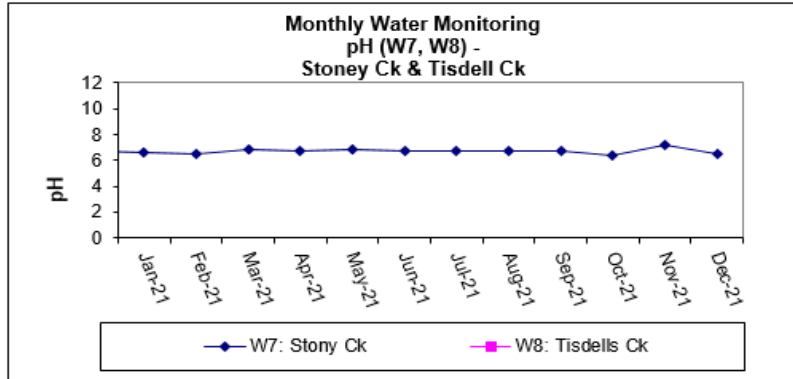
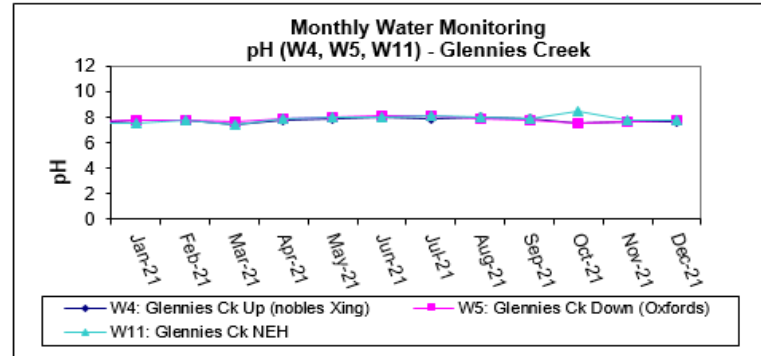
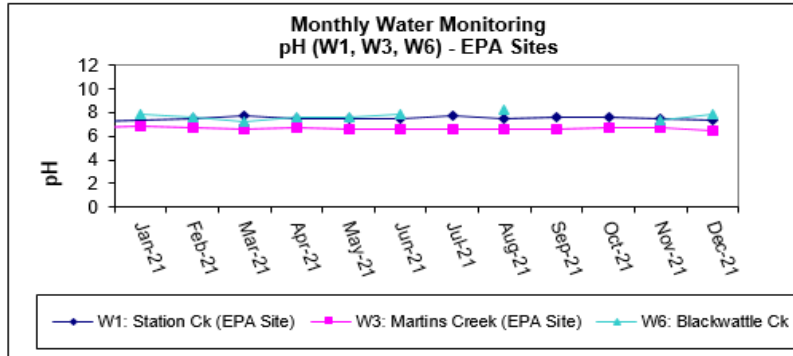
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Rixs Creek North & Rixs Creek South

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
20/01/2021	Jan-21	8.4	1920	5	1100	7.3	259	6	182	9.1	6890	7	4310	8	6720	30	4920	7.5	815	33	665
19/02/2021	Feb-21	8.15	2010	<5	1090	7.34	264	11	189	8.93	6850	15	4130	9.06	8180	10	4800	8.77	2240	15	1270
22/03/2021	Mar-21	7.4	746	36	428	7.04	149	19	108	8.94	5440	32	2970	8.58	4620	17	2840	7.64	790	244	520
26/04/2021	Apr-21	7.54	971	18	534	7.59	222	12	192	8.84	5980	9	3610	8.13	4840	9	1470	8.61	2700	15	1660
21/05/2021	May-21	7.44	1050	<5	551	7.54	237	<5	159	8.55	6640	17	4270	8.35	8700	5	5890	8.78	3530	11	2330
30/06/2021	Jun-21	7.66	1160	<5	610	7.5	255	<5	162	8.81	4790	17	2830	8.35	9380	20	6300	8.72	3120	7	1890
27/07/2021	Jul-21	7.81	1220	5	644	7.38	255	16	152	8.74	6860	18	3970	8.3	9460	18	6130	8.63	2890	5	1850
25/08/2021	Aug-21	7.82	1270	14	635	7.28	266	12	182	8.78	5620	7	3340	8.49	9150	27	5760	8.84	3400	10	2080
28/09/2021	Sep-21	8.23	1370	12	715	7.53	295	9	182	8.88	6470	8	3800	8.62	7950	<5	5000	9.21	3000	9	1810
27/10/2021	Oct-21	7.43	1400	7	835	8.79	310	6	223	7.79	7120	17	4590	8.4	8240	40	4920	9.33	2680	29	1490
8/12/2021	Nov-21	7.23	408	14	245	7.32	190	21	164	9.12	4550	15	2620	8.57	7660	<5	5740	9.07	2900	58	1940
31/12/2021	Dec-21	7.38	552	<5	308	7.32	231	<5	153	8.93	3220	9	1950	8.49	5940	6	3490	7.67	276	112	497
														Sampled by RCN				Sampled by RCN			
HISTORICAL AVERAGE		8.3	1353	9	793	7.5	316	18	225	8.7	7960	12	5313	8.8	8652	21	5841	8.6	2730	56	1755
MIN		6.9	292.0	1.0	231.0	6.8	105.0	2.0	104.0	7.8	3020.0	1.0	1940.0	7.7	1575.0	1.0	966.0	6.8	140.0	3.0	242.0
MAX		10.0	2520.0	49.0	1420.0	9.0	1178.0	98.0	783.0	9.2	11400.0	51.0	7210.0	9.7	12460.0	180.0	8850.0	10.5	9800.0	478.0	6670.0
SD		0.8	557.8	8.9	313.2	0.4	176.4	18.2	103.4	0.3	1511.8	8.8	1174.7	0.4	1871.0	26.5	1424.5	0.7	2314.3	84.1	1475.6

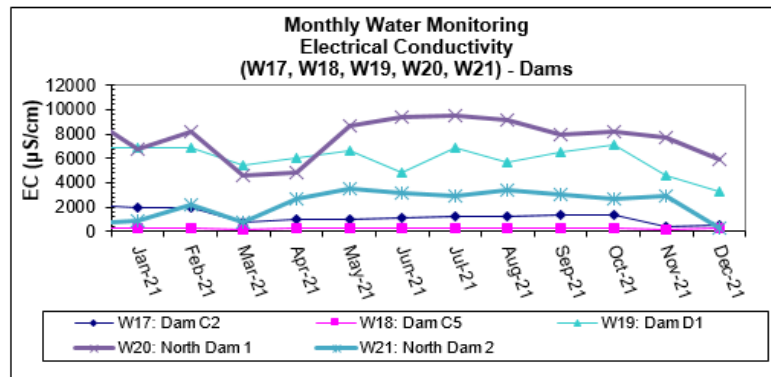
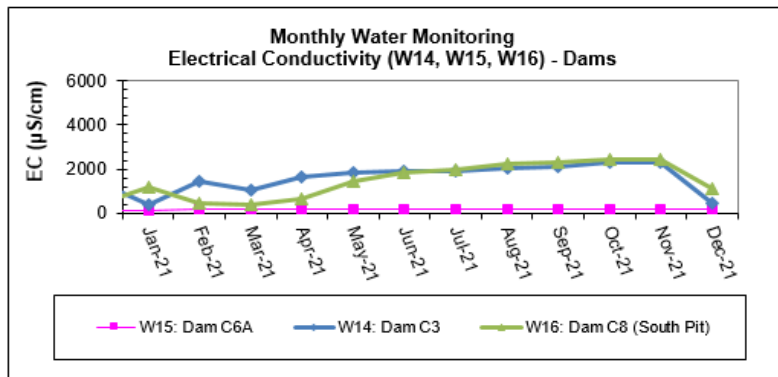
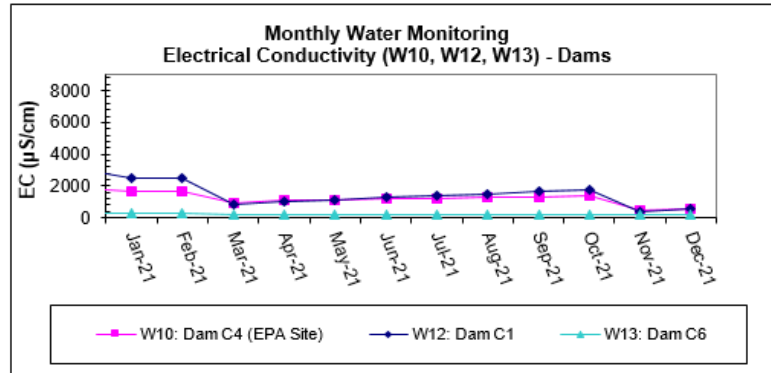
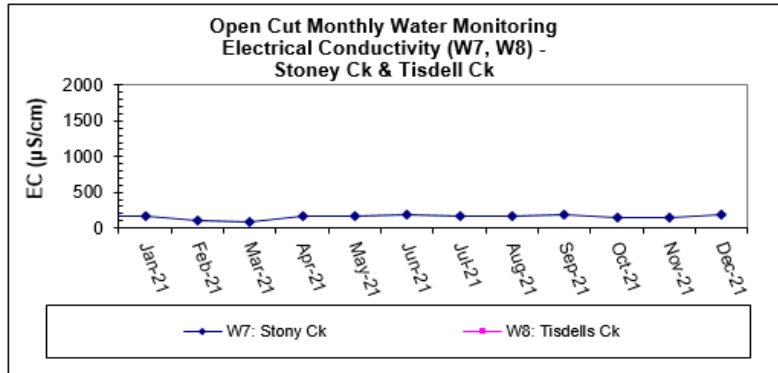
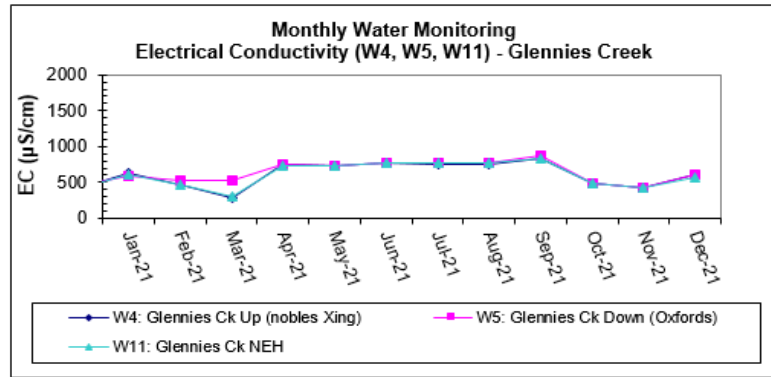
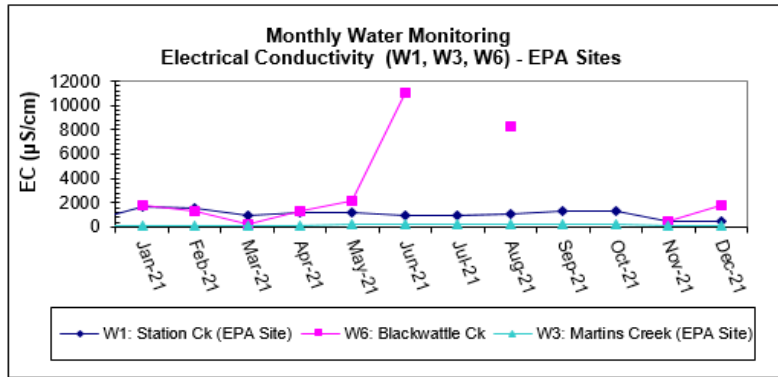
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



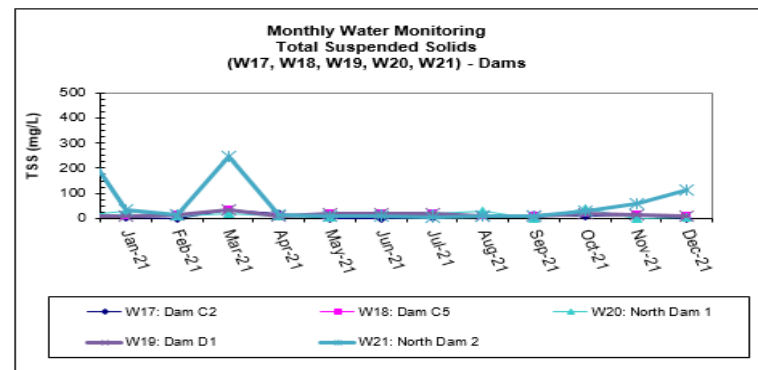
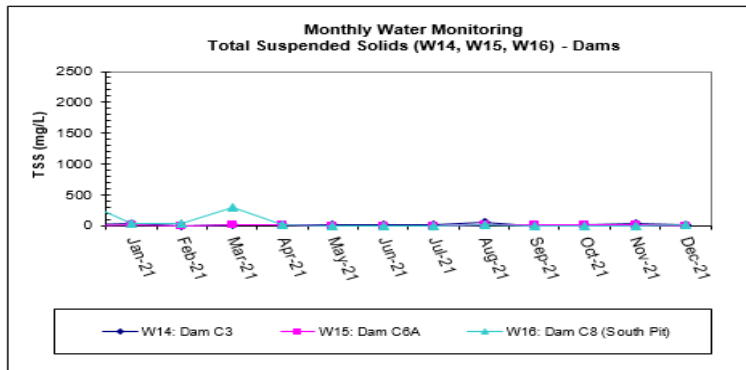
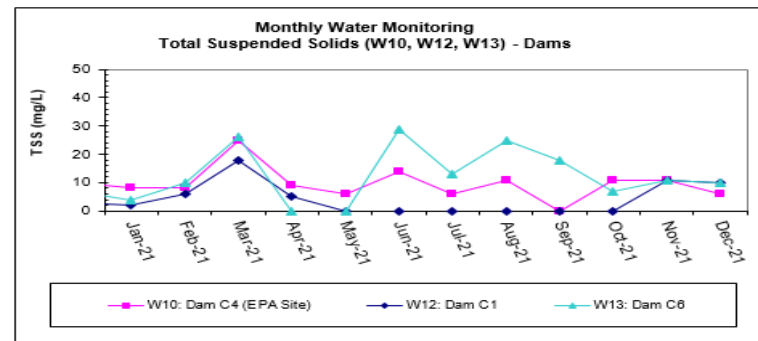
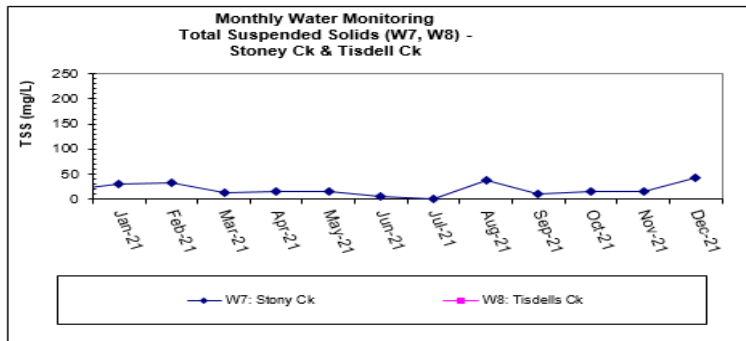
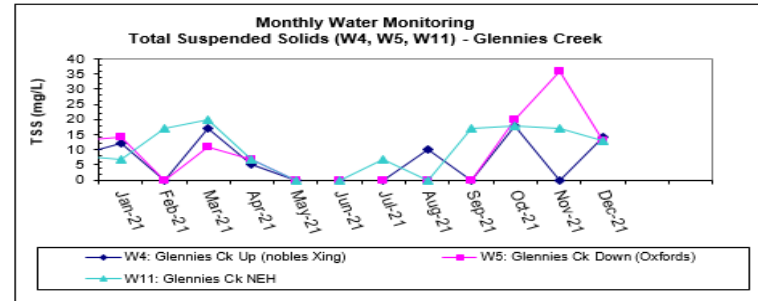
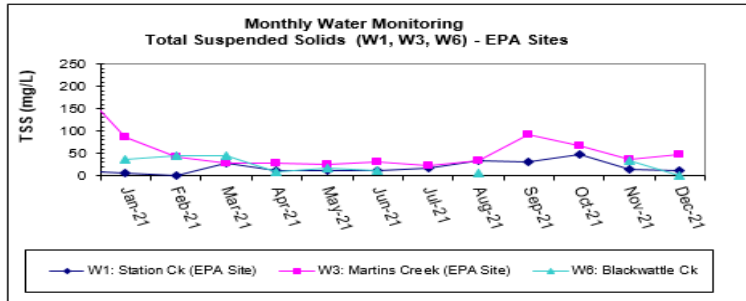
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



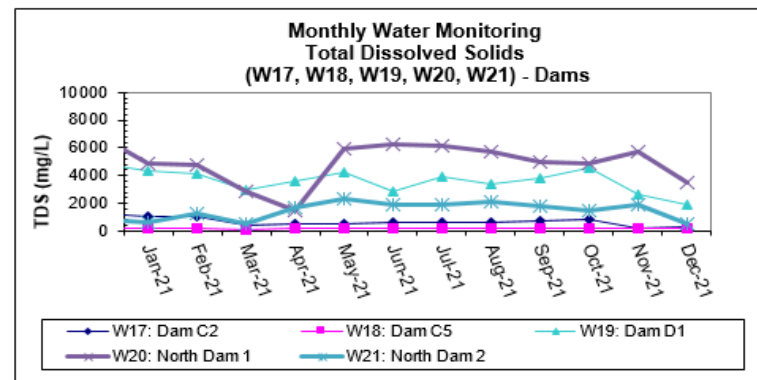
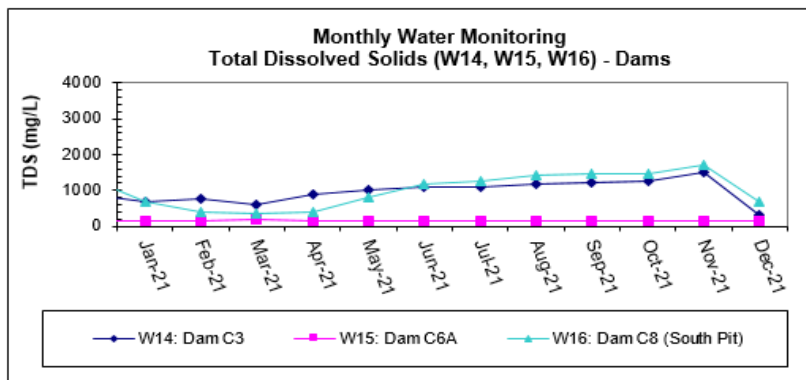
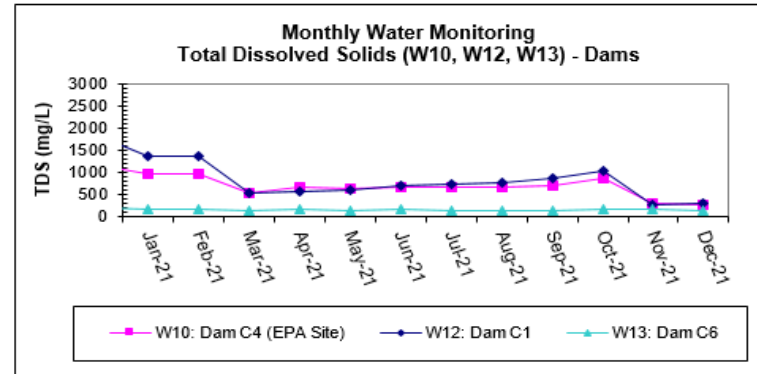
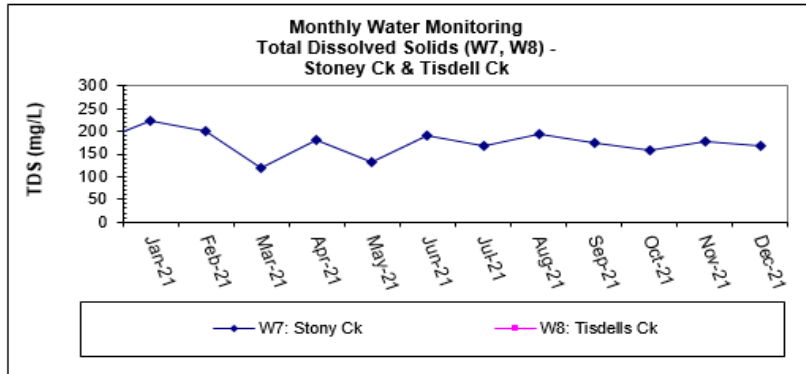
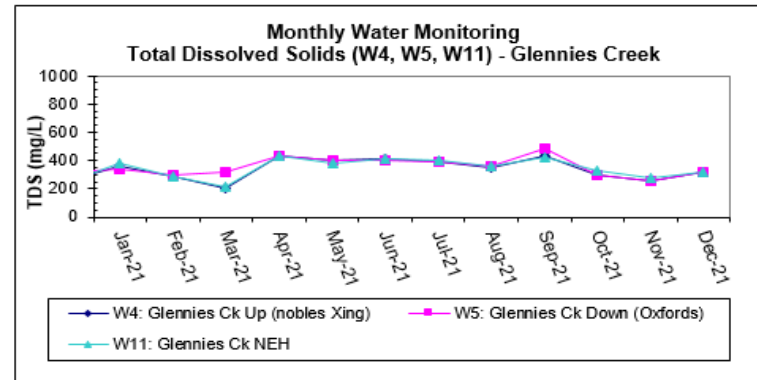
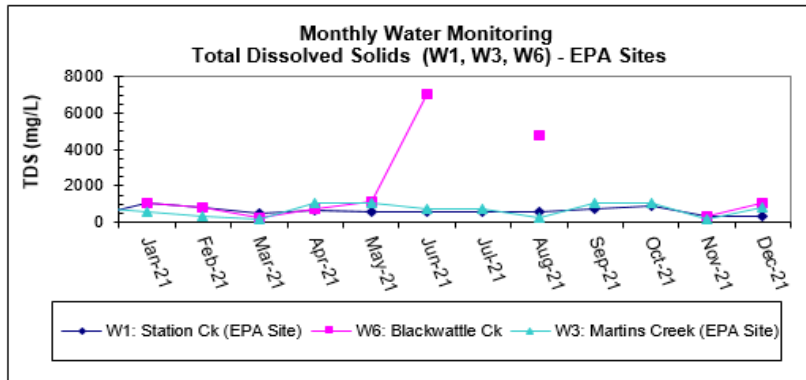
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



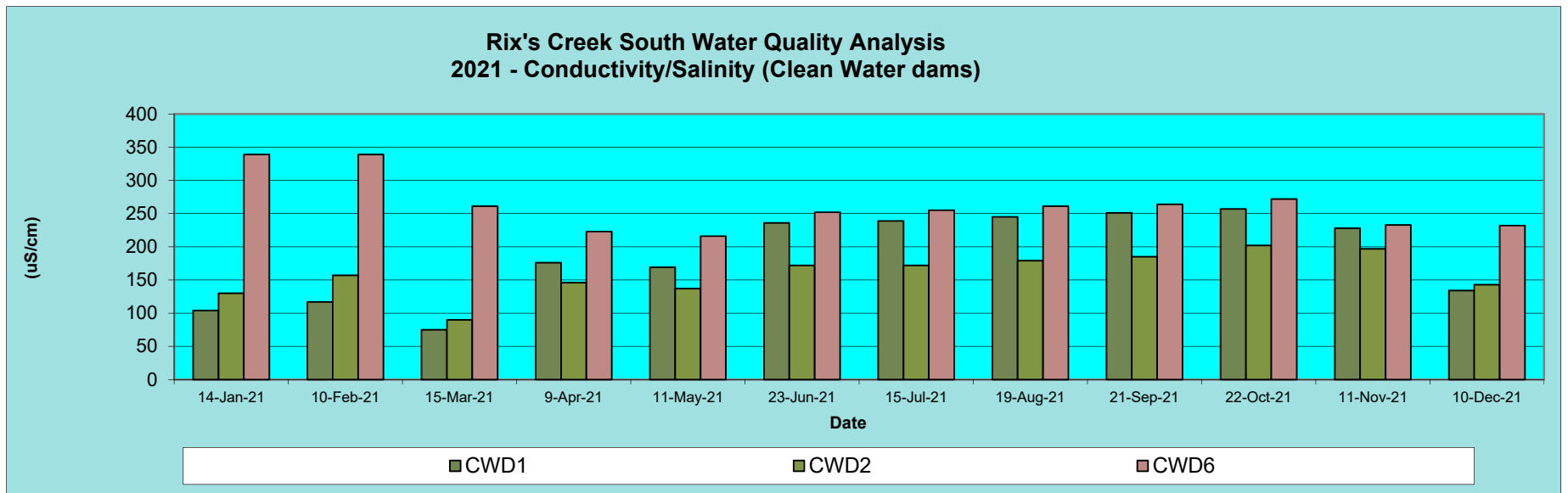
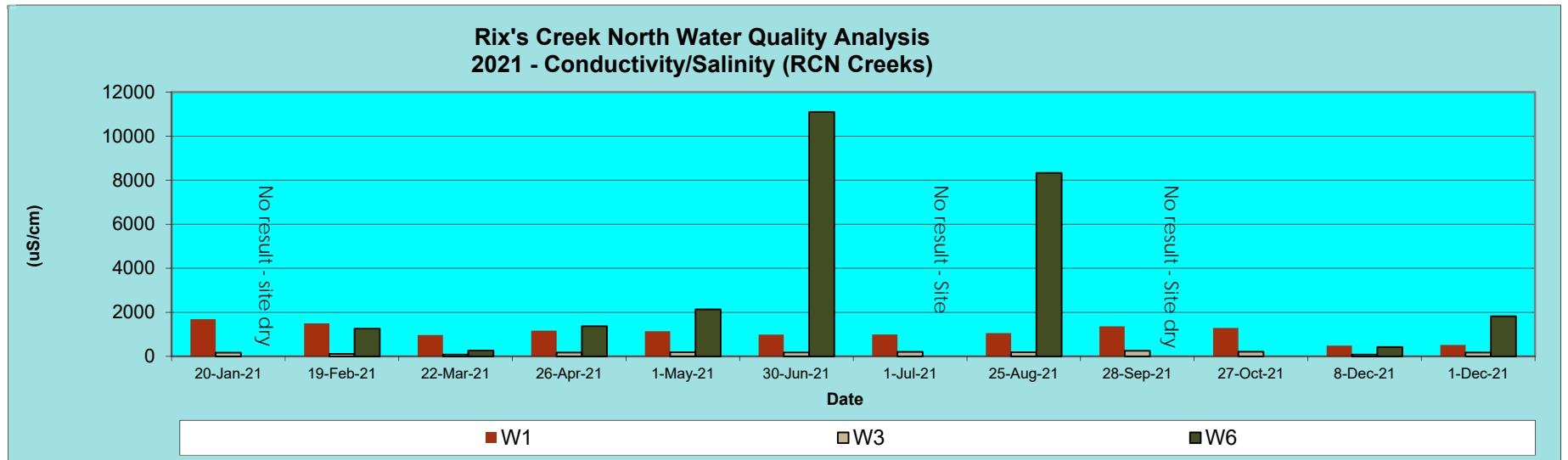
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



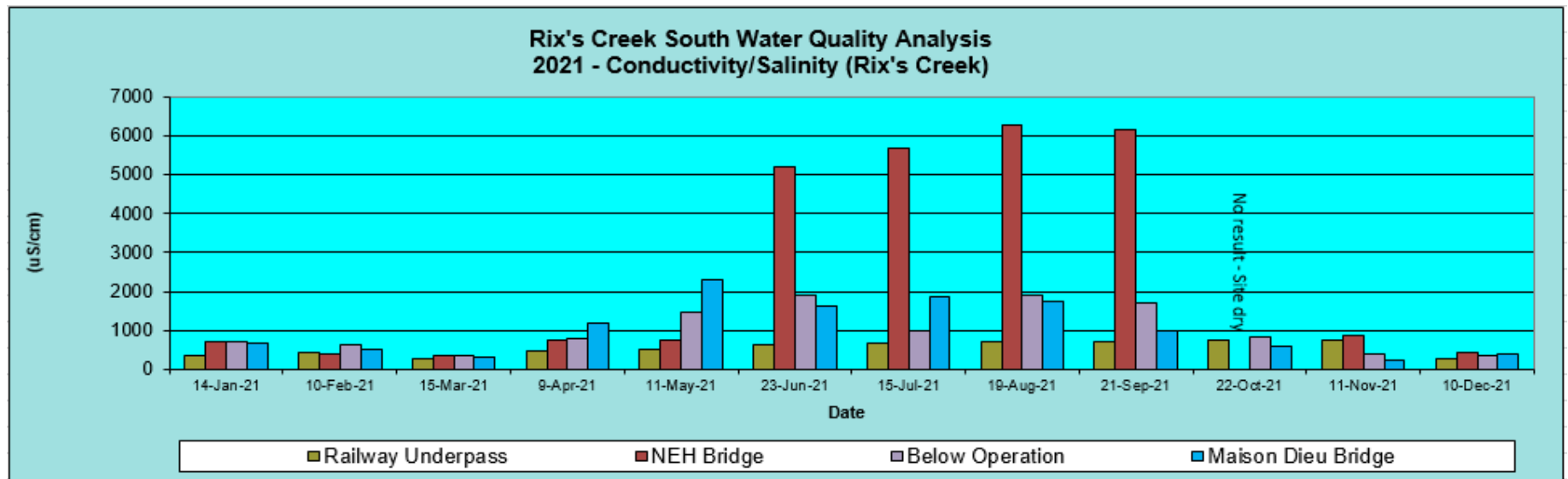
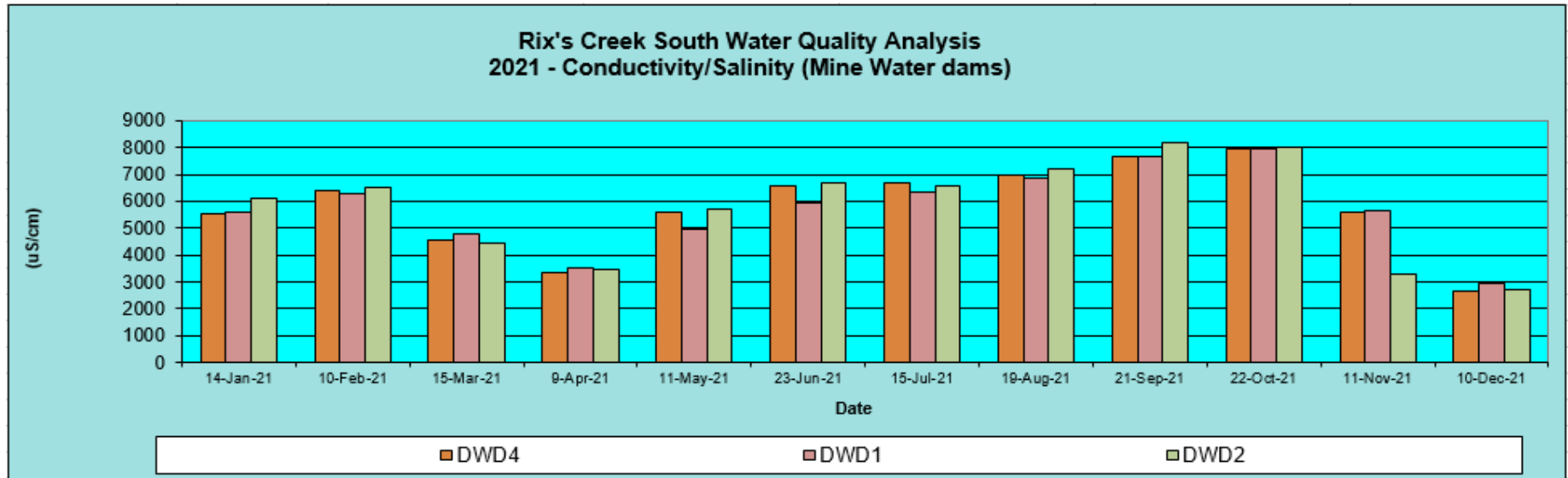
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



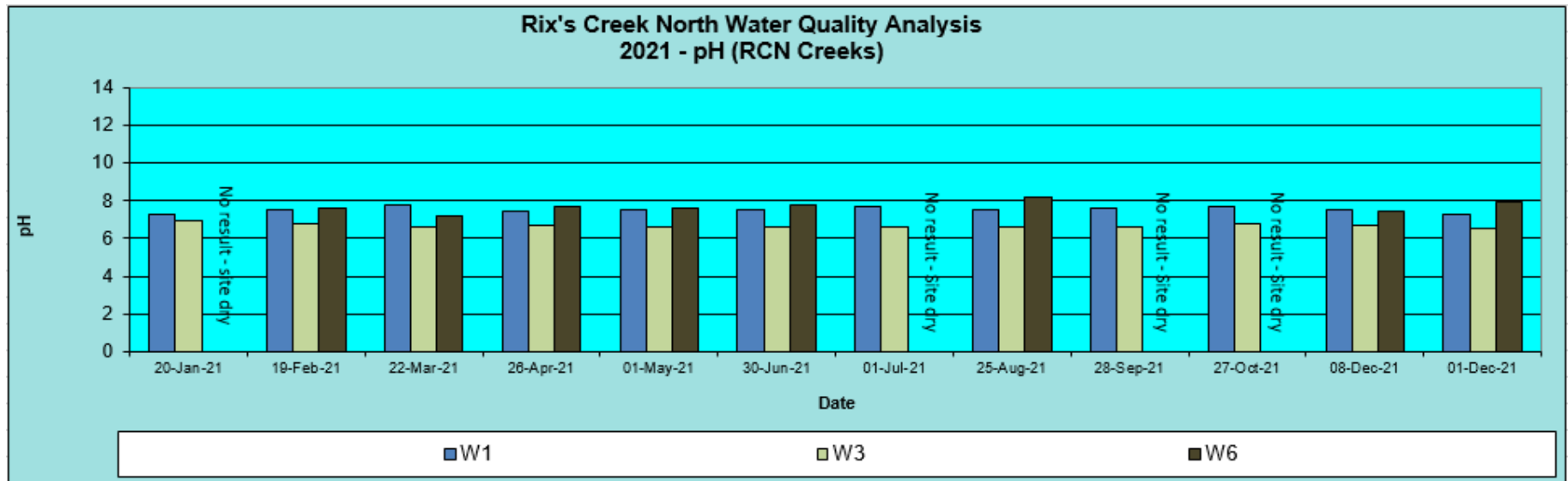
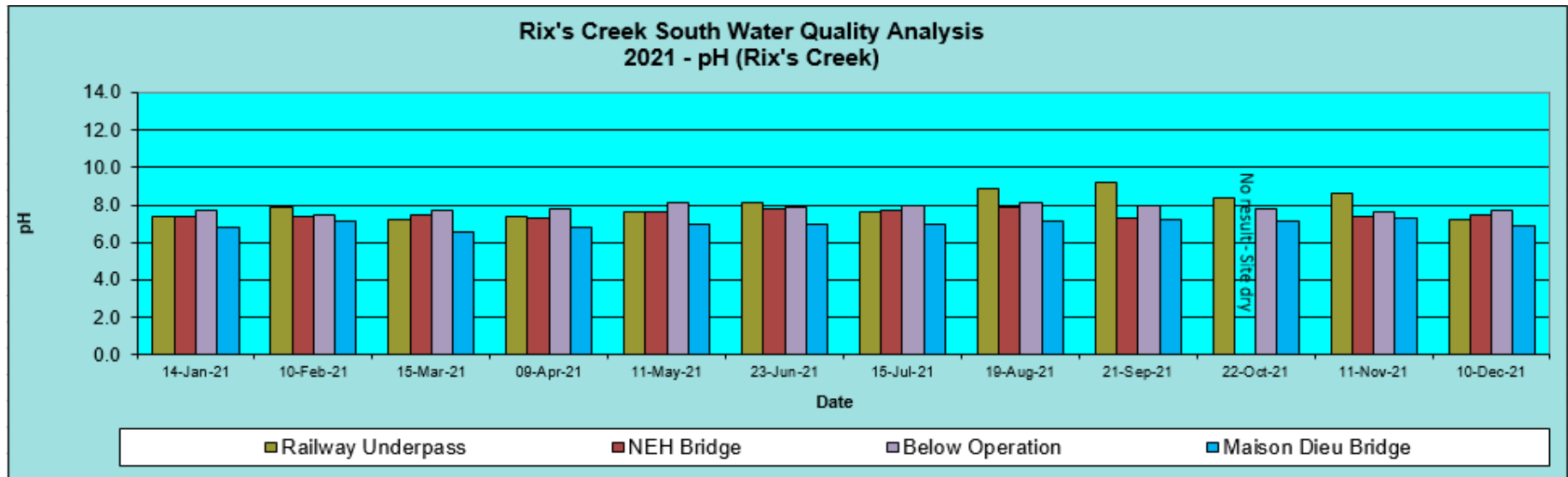
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



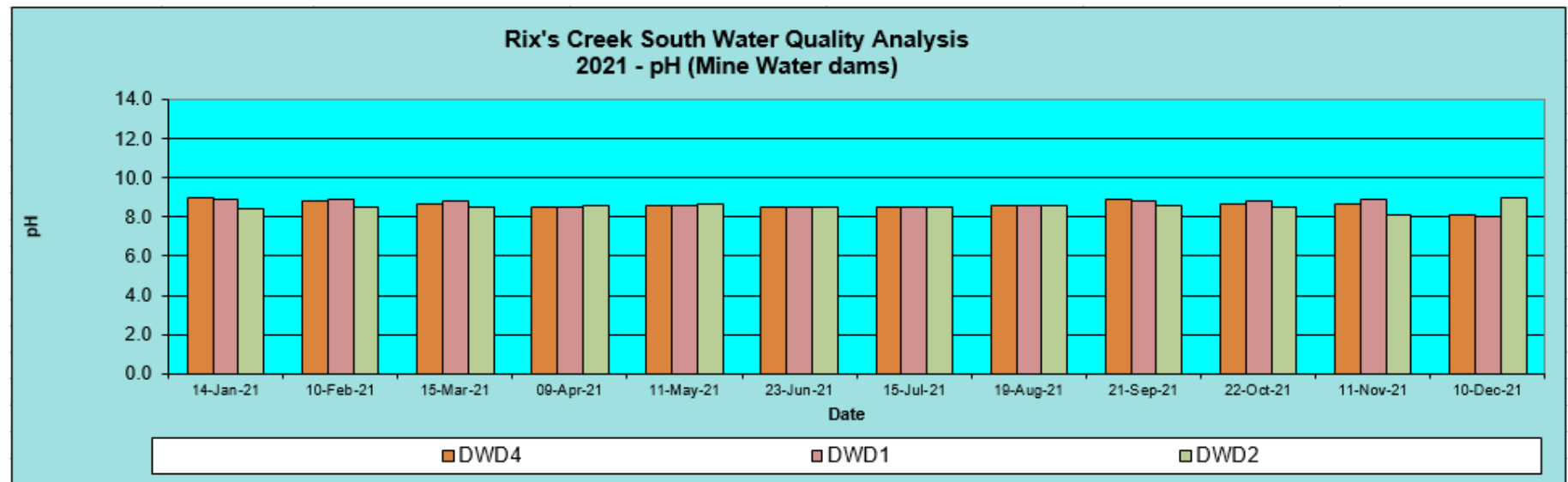
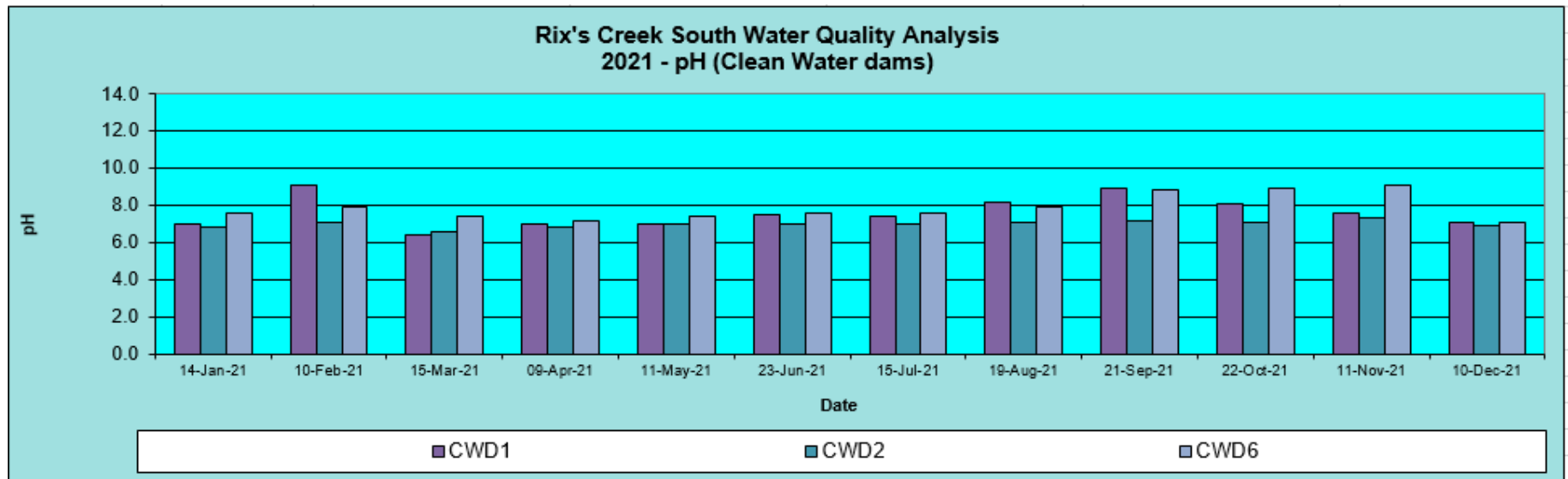
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



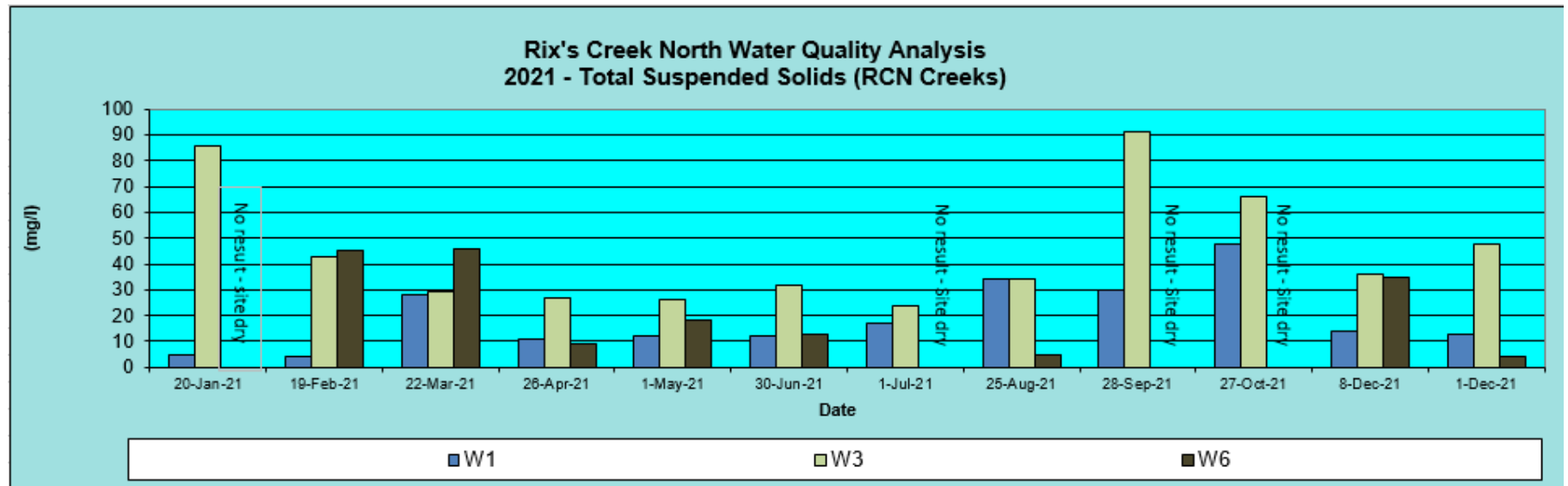
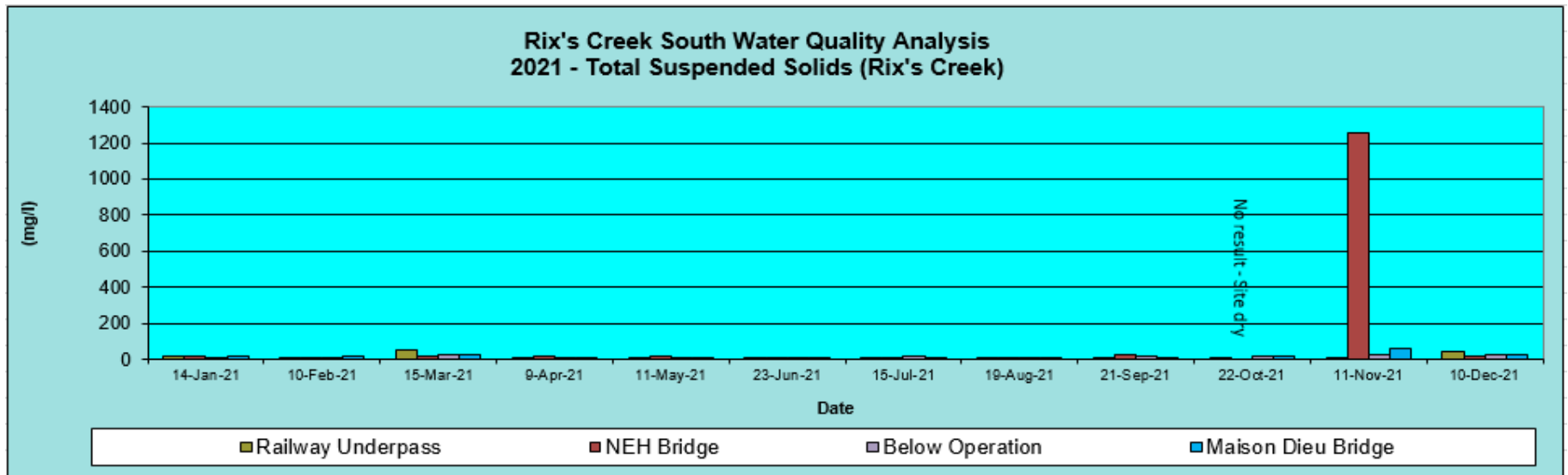
ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



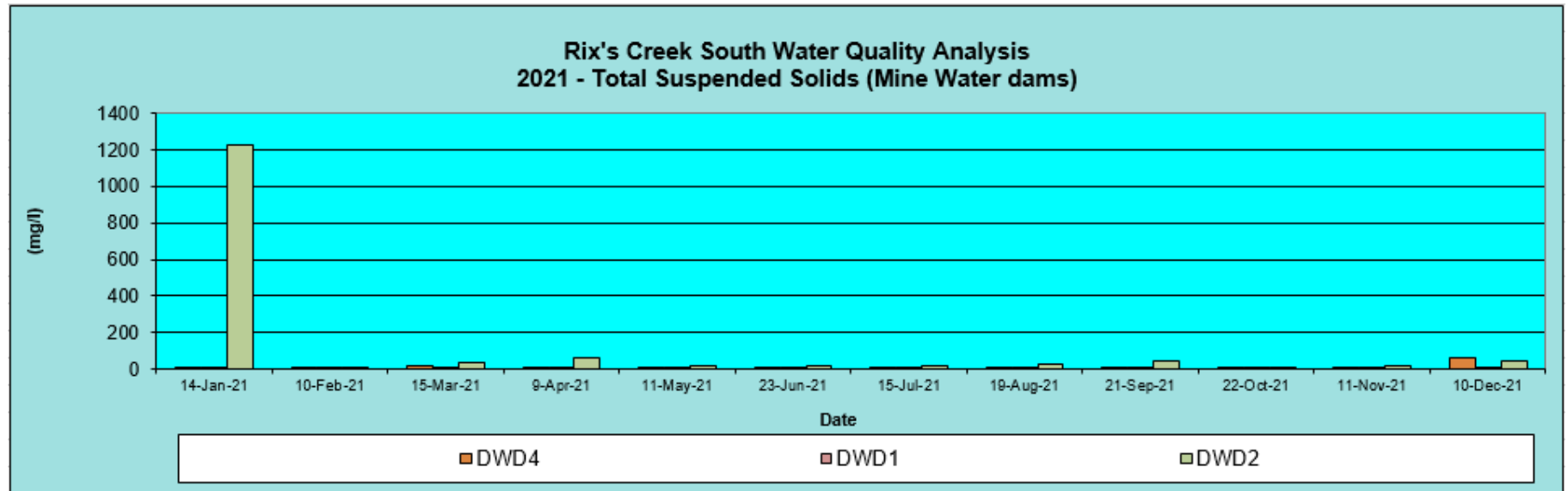
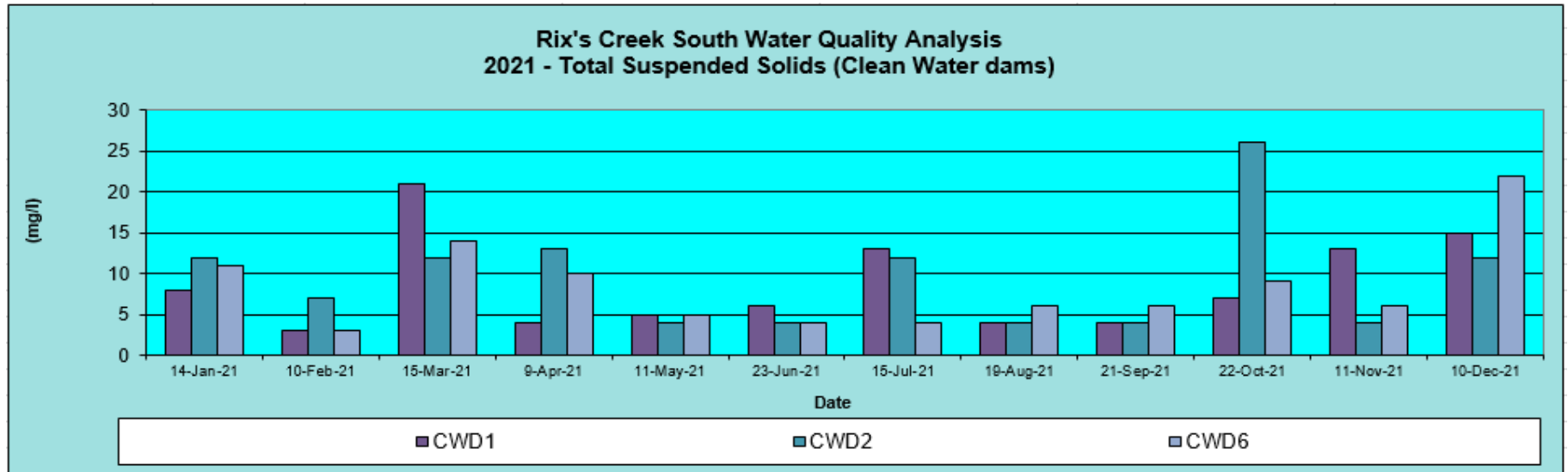
ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



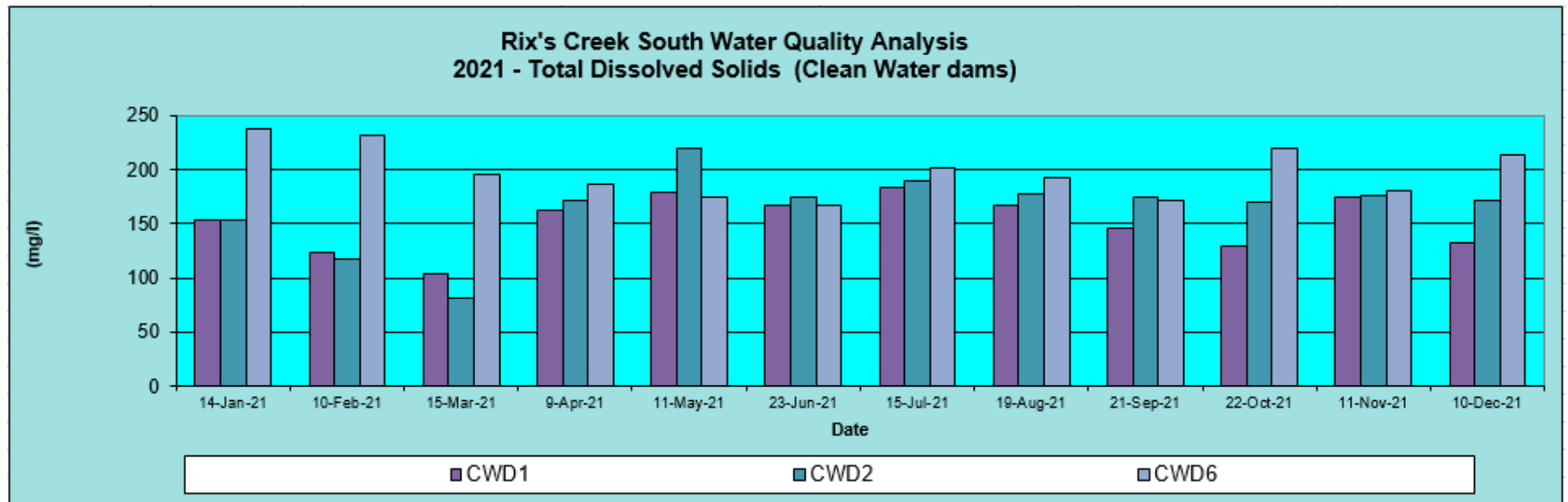
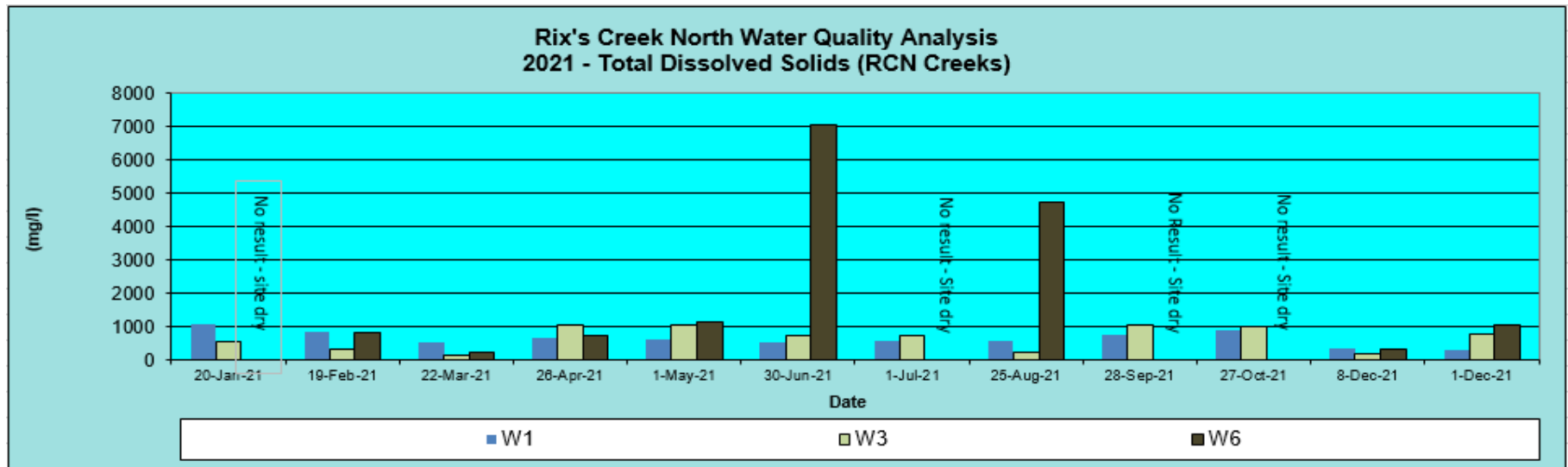
ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



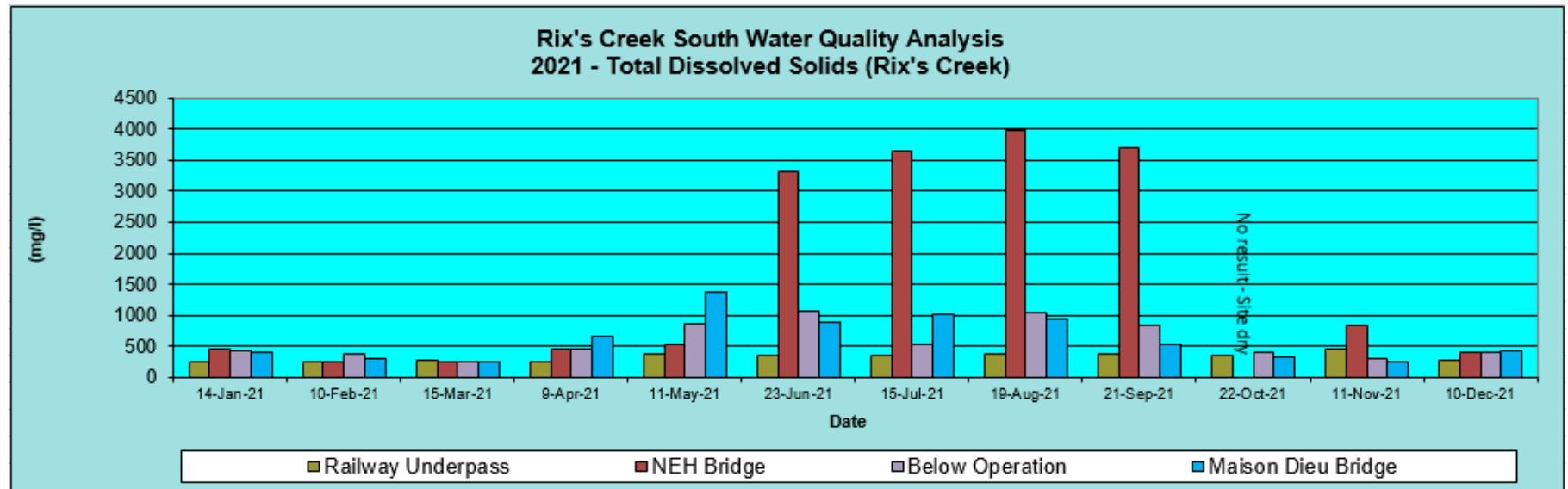
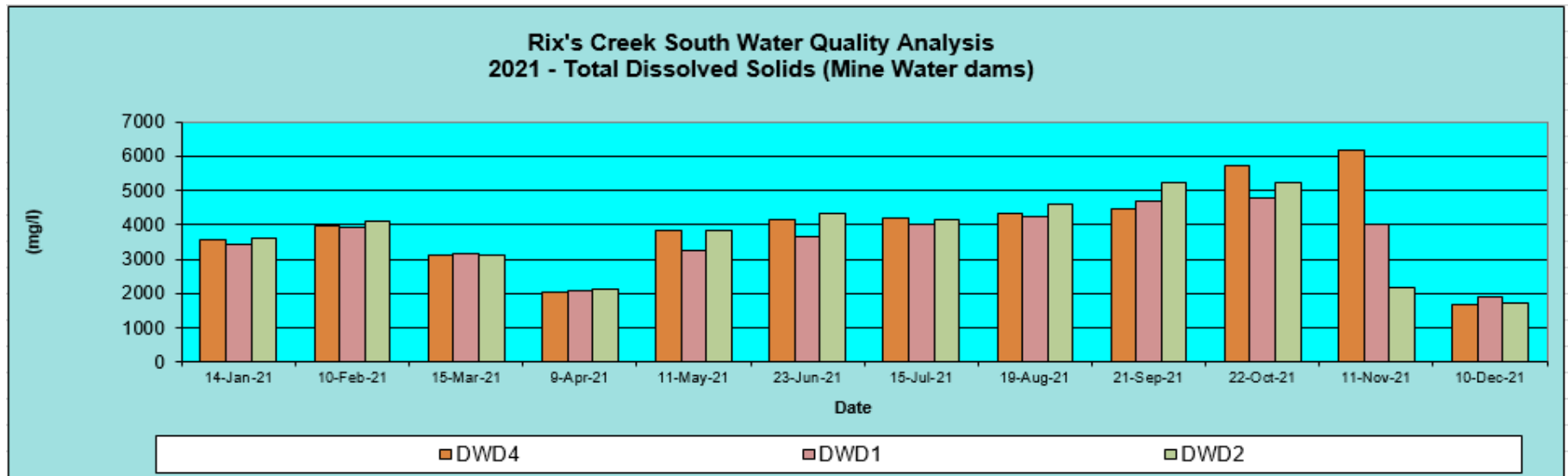
ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

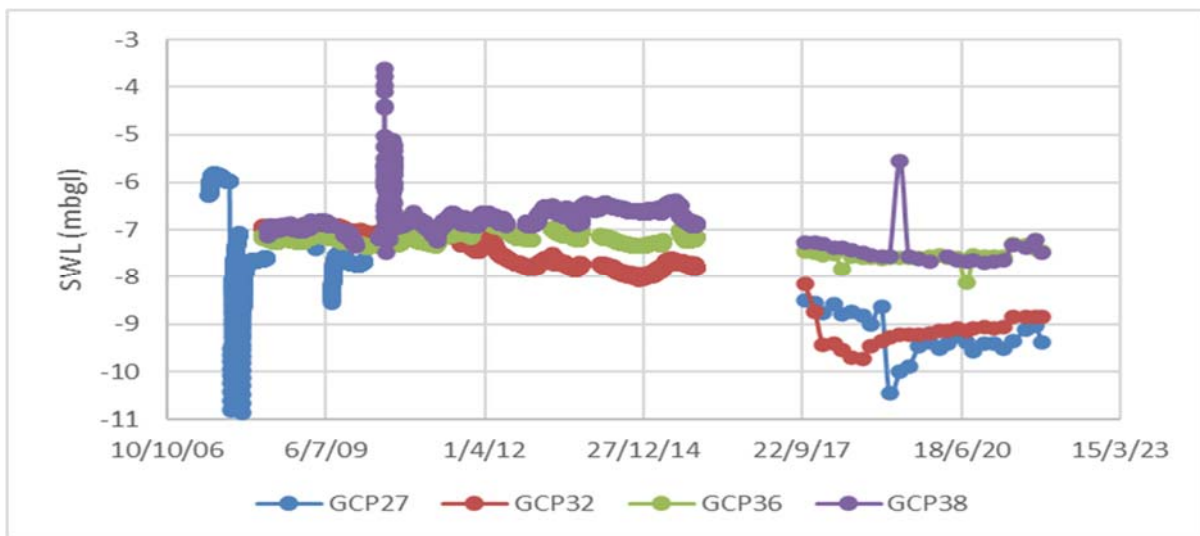
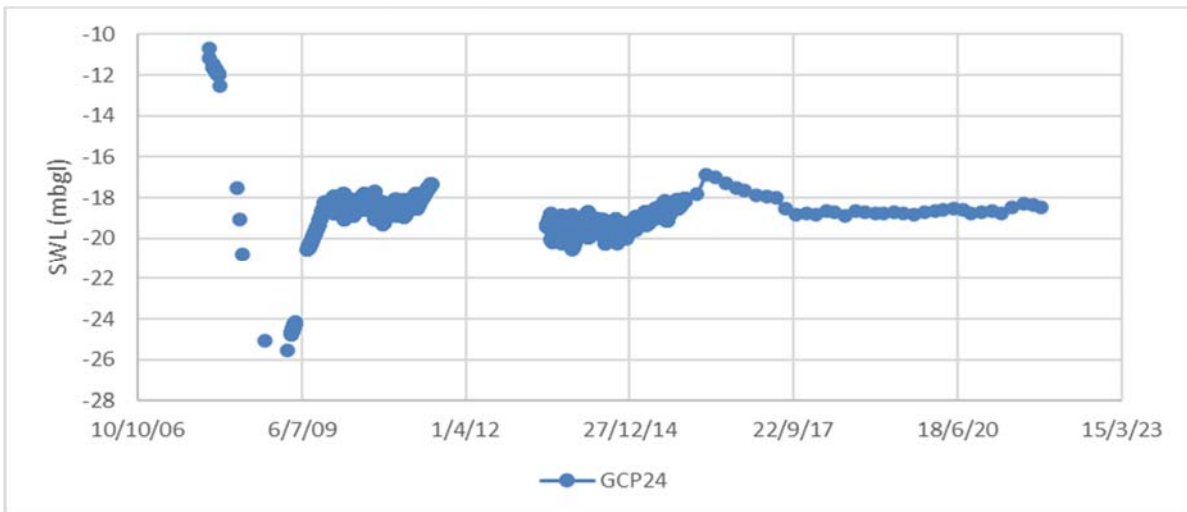
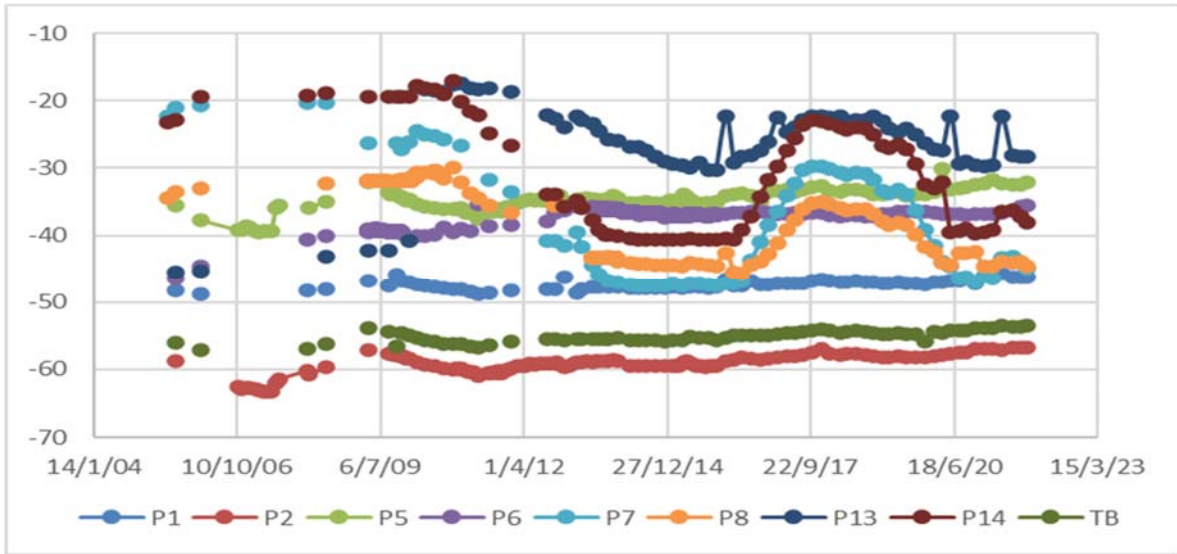


Appendix 2 Rix's Creek Mine Ground Water Sampling Results

ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

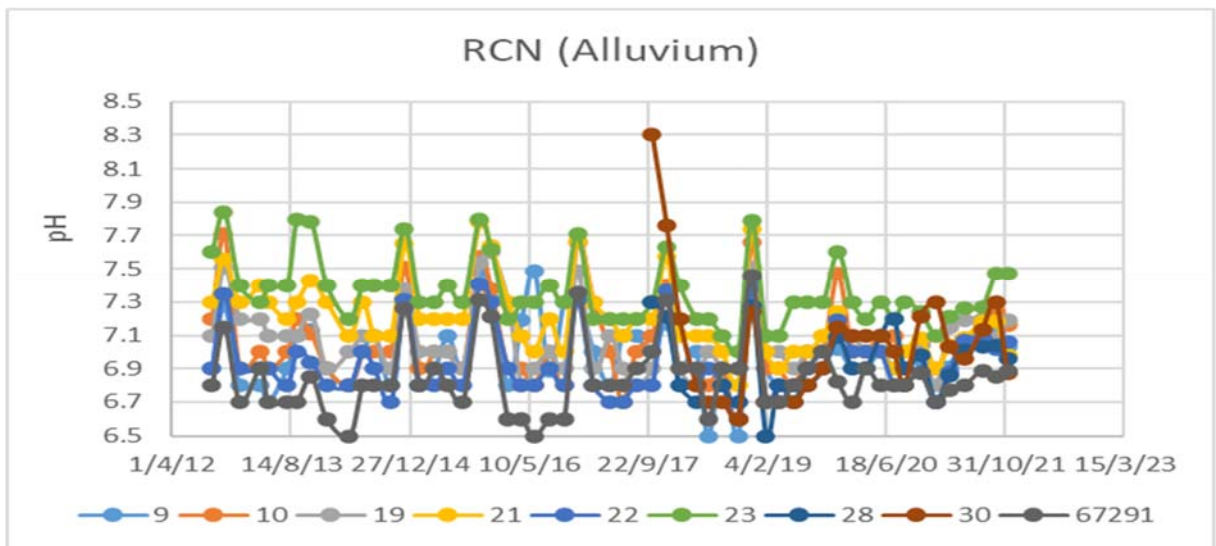
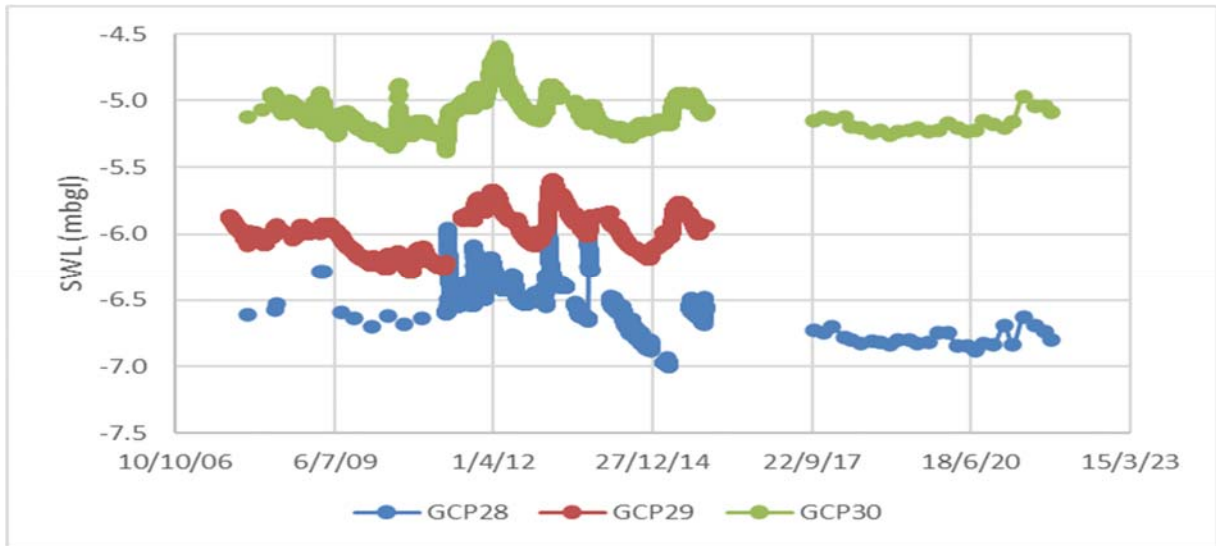
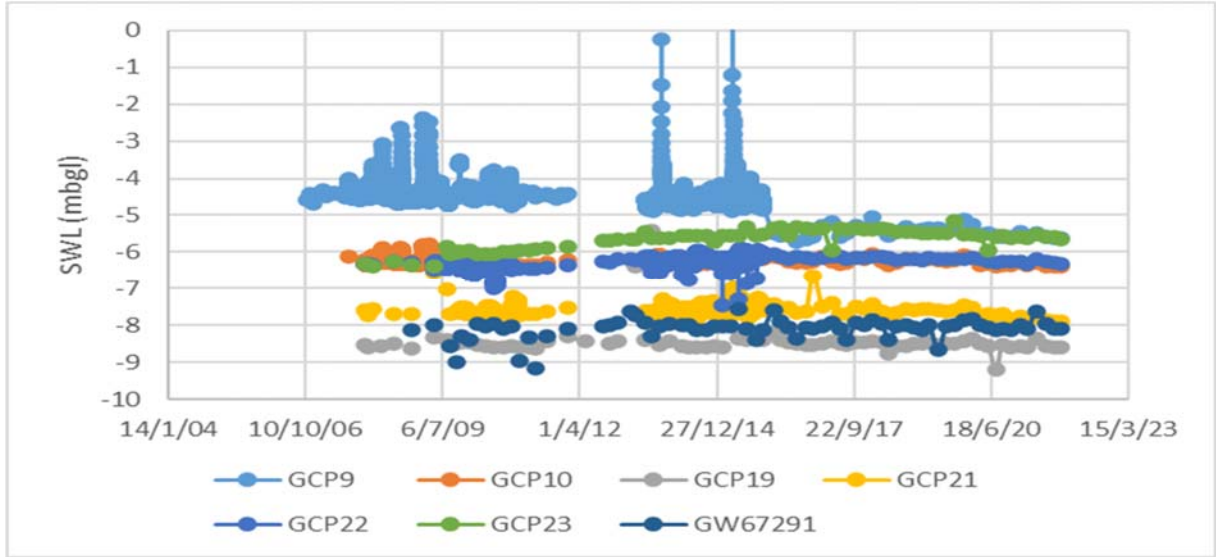
RCN Basement Ground Waters



ANNUAL REVIEW 2021 – RIX’S CREEK MINE

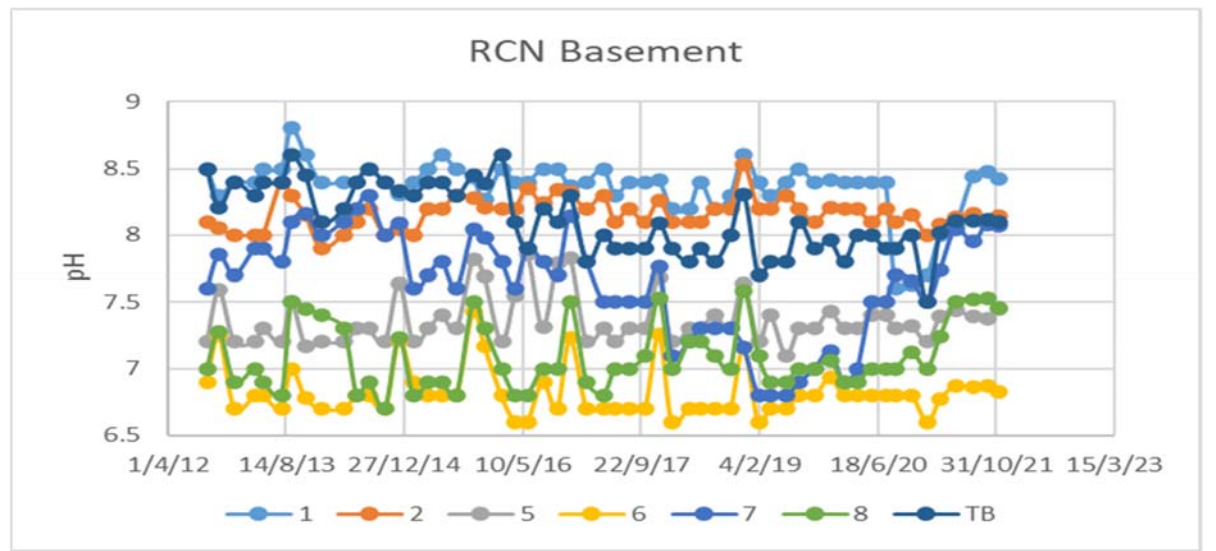
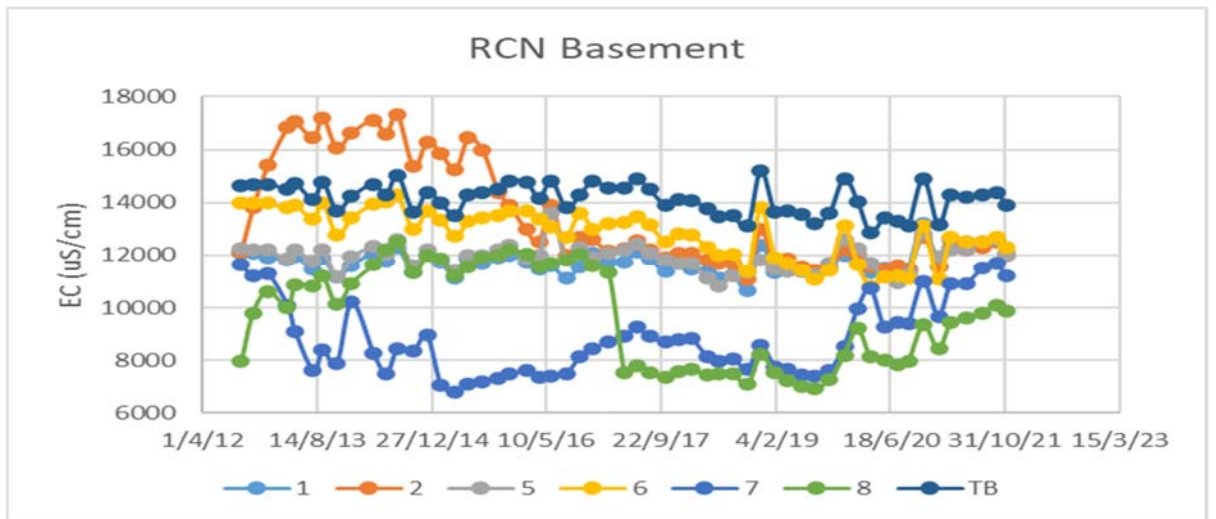
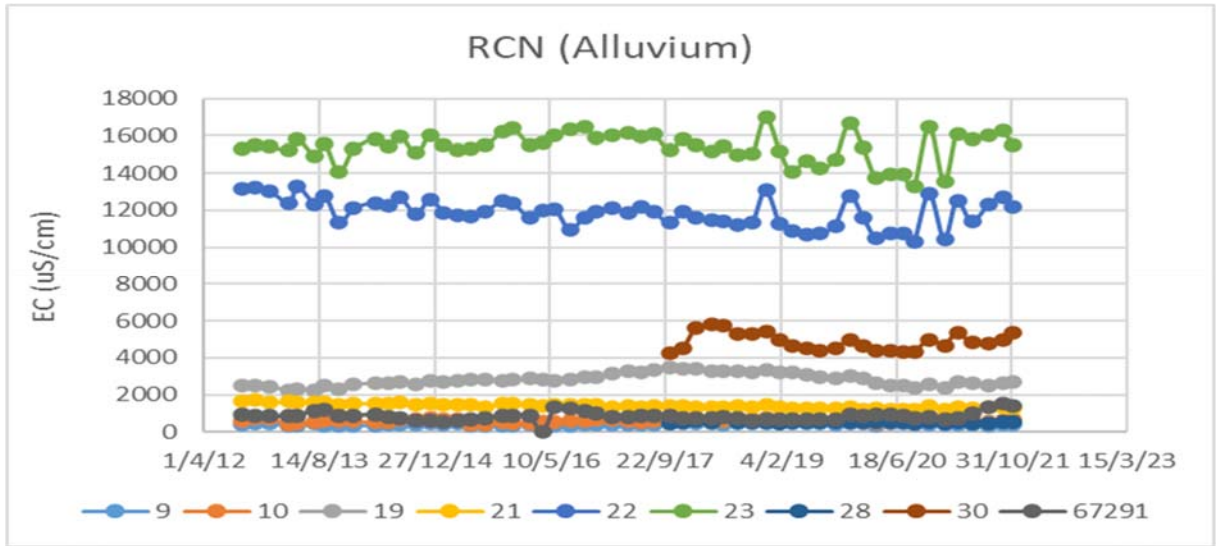
Rixs Creek North & Rixs Creek South

RCN Ground Water Alluvium



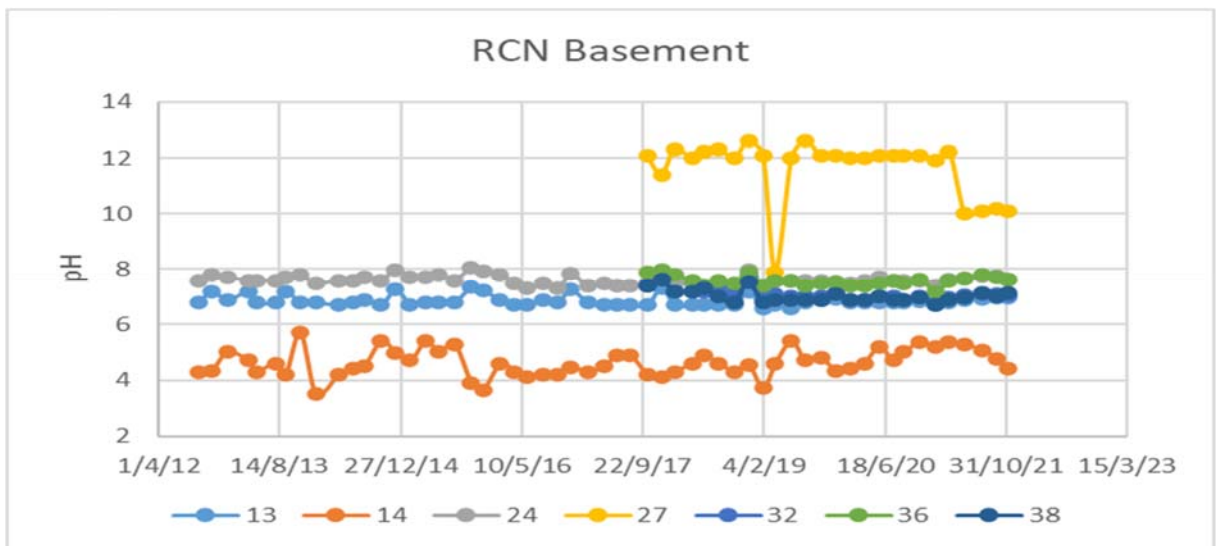
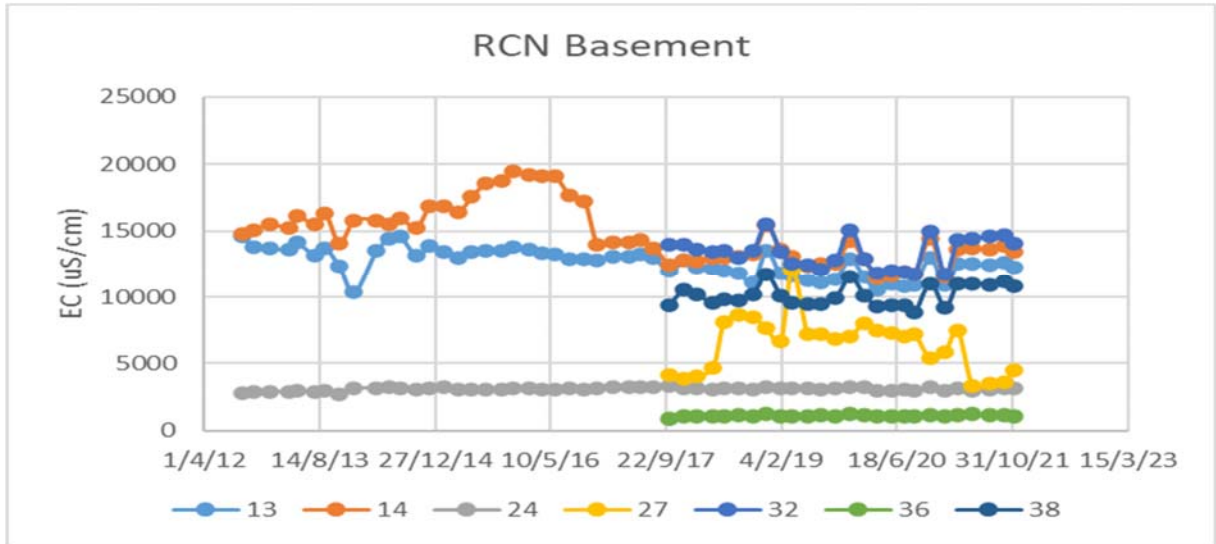
ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2021 – RIX'S CREEK MINE

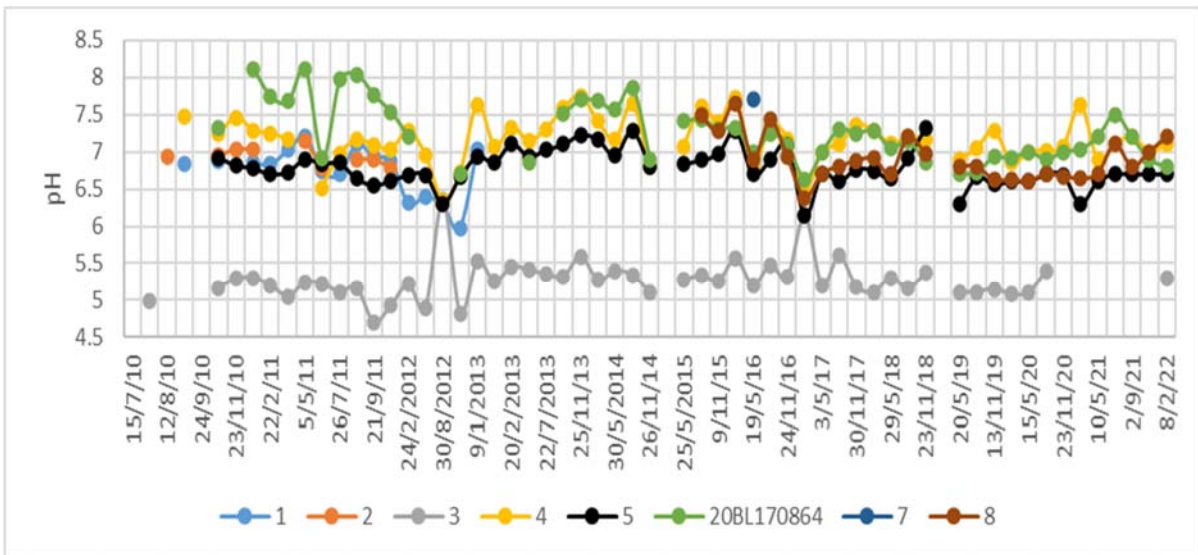
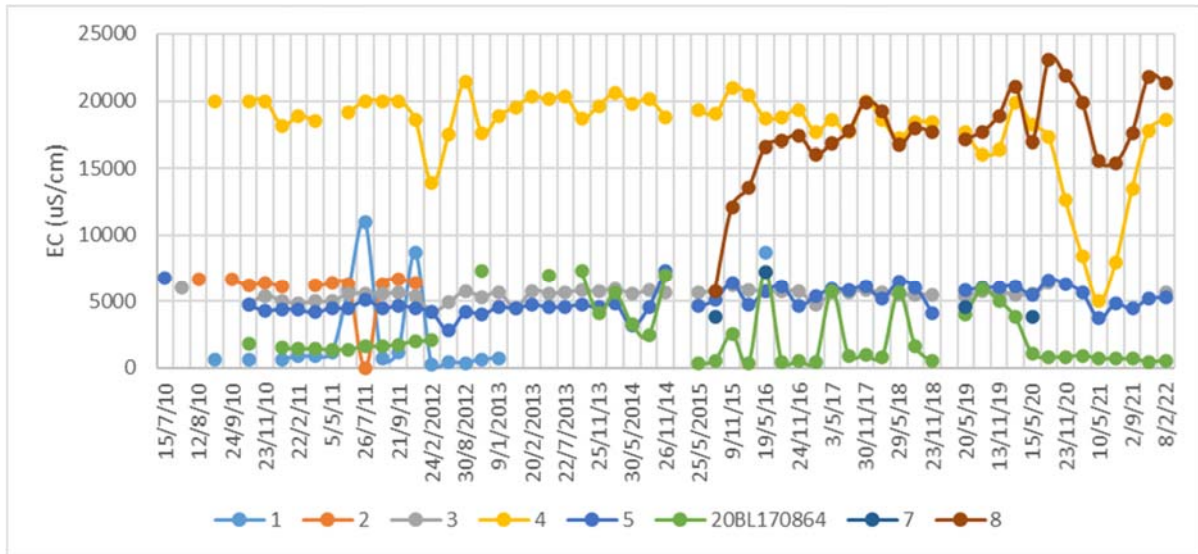
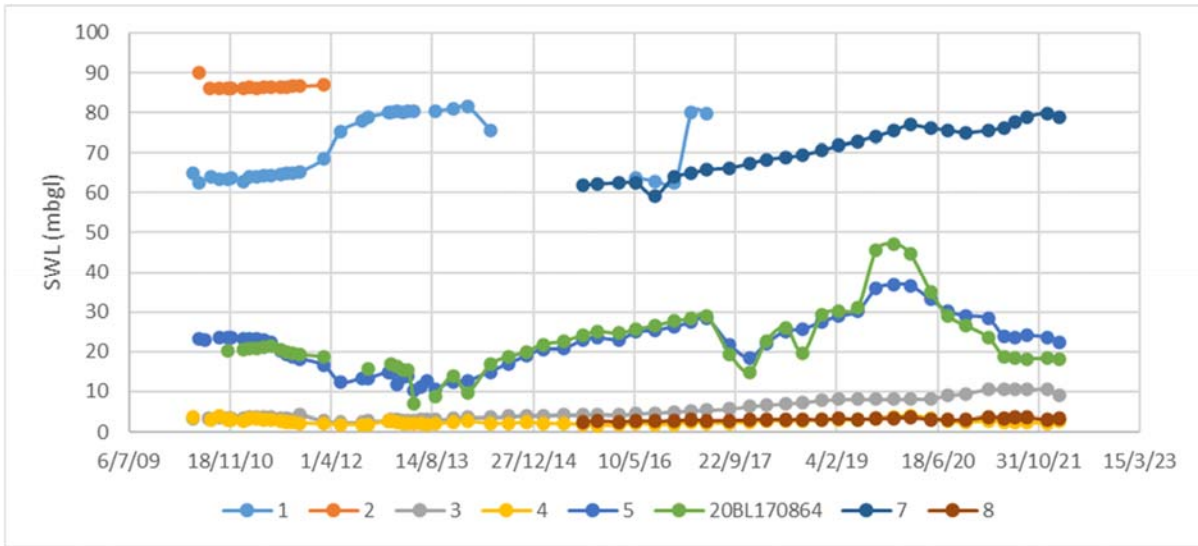
Rixs Creek North & Rixs Creek South



ANNUAL REVIEW 2021 – RIX'S CREEK MINE

Rixs Creek North & Rixs Creek South

RCS Ground Water Results



Appendix 3 Rix's Creek Mine Community Complaints 2021

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South



WE CARE. WE DELIVER.

**Rix’s Creek Mine
Complaints Register
2021**

Number	Date Received	Site	Nature of Complaint	Location	How received	Action taken and findings
JANUARY 2021						
1	19/01/2021	Rix’s Creek	Lighting	Bridgman Road	Phone	<p>Action: RCN OCE phoned Environment Compliance Technician (ECT) and ask them to attend the residence. While with the complainant, ECT guided RCN OCE in redirecting the lights to non-obtrusive direction.</p> <p>Findings: Lights were redirect to a non-obtrusive direction. No further action required.</p>
2	22/01/2021	Rix’s Creek	Lighting	Bridgman Road	Phone	<p>Action: RCN OCE redirected the lights to non-obtrusive direction.</p> <p>Findings: Lights were redirect to a non-obtrusive direction. No further action required.</p>

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

FEBRUARY 2021						
3	06/02/2021	Rix’s Creek	Noise	Gowrie	Phone	<p>Action: Environment Manager (EM) contacted OCE for machinery in use and reviewed weather conditions. EM asked OCE to change work priorities from West Pit to North Pit.</p> <p>Findings: EM returned Complainants phone call. Complainant was supplied Complaints Hotline/OCE’s phone number for future complaints. No further action required.</p>
4	12/02/2021	Rix’s Creek	Blast	Camberwell/ New England Highway.	Text Msg	<p>Action: Environment Manager (EM) obtained information of the shot and shared this with the Complainant. EM and Environment Supervisor (ES) met with Complainant to discuss their issues, outline different shot types and explain the information.</p> <p>Findings: Shot was within compliance limits. Invitation extended to Complainant to visit site and view blasting procedure and processes. No further action required.</p>
MARCH 2021						
APRIL 2021						
5	14/04/2021	Rix’s Creek	Dust	Bridgman Road	Phone	<p>Action: Environmental Advisor (EA) contacted RCN CHPP Maintenance Supervisor to get spigot lines open over dry areas of Tailings dam (TD). Fluren crew working at TD had already requested a water cart and were reducing their activities.</p> <p>Findings: EA rang Complainant back and explained the measures that were being put in place. Also explained that trialling of a polymer on the TD had been held up due to the frequent rain events of the past few months and this trial requires rescheduling. Complainant noted our response. No further action required.</p>

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

MAY 2021						
6	06/05/2021	Rix’s Creek	Blast	Camberwell / New England Highway	Email	<p>Action: Environment Manager (EM) supplied the blast results to the Complainant.</p> <p>Findings: EM supplied his details if the Complainant wished to discuss the matter further and/or EM could visit Complainant. No further action required.</p>
7	19/05/2021	Rix’s Creek	Noise	Maison Dieu	Text	<p>Action: Environment Officer (EO) was monitoring in the Maison Dieu area at the time of complaint. EO was in contact with RCM OCE, who then shut down machinery as per RCM Trigger Action Response Plan.</p> <p>Findings: EO continued to monitor in the Maison Dieu area throughout the night while remaining in contact with the RCM OCE’s. The following readings were within compliance limits. No further action required.</p>
8	25/05/2021	Rix’s Creek	Noise	Maison Dieu	Text/Phone call	<p>Action: The Bloomfield Group Rix’s Creek Community & Blasting Hotline received the complaint. The Environment Manager (EM) received the message, then contacted the OCE to discuss complaint. EM rang our Environment Officer (EO) asking them to attend the area. Monitoring was conducted at 21:34 and 21:49. Both results were within compliance levels. EM then phoned Complainant and discussed what could be heard.</p> <p>Findings: EO continued to monitor in the Maison Dieu area throughout the night while remaining in contact with RCM OCE’s. The following day EM followed up with Complainant via email outlining the actions that were taken. EM also offered a direct phone number to our OCE’s and thanked Complainant for phoning the Community and Blasting Hotline and offered further opportunity to discuss the issues. No further action required.</p>

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ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

JUNE 2021						
9	15/06/2021	Rix's Creek	Blast	Camberwell / New England Highway	Email	<p>Actions: Environmental Manager (EM) supplied the blast results to the Complainant. EM noted that the results show that the blast did not exceed compliance levels.</p> <p>Findings: EM supplied his details if Complainant wished to discuss the matter further. No further action required.</p>
10	22/06/2021	Rix's Creek	Lighting	Camberwell / New England Highway	Phone	<p>Actions: Environment Officer (EO) contacted OCE who turned the lighting plant off and folded it down.</p> <p>Findings: Complainant's use of the Rix's Creek Community & Blasting Hotline Telephone number was able to alert the mine to the issue quickly and have the issue rectified. No further action required.</p>
JULY 2021						
11	02/07/2021	Rix's Creek	Blast	Camberwell / New England Highway	Email	<p>Actions: Environment Advisor (EA) supplied the blast results to the Complainant. EA noted that the results show that the blast did not exceed compliance levels.</p> <p>Findings: EA supplied his details if Complainant wished to discuss the matter further. No further action required.</p>

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

12	14/07/2021	Rix’s Creek	Noise	Singleton Heights	Phone	<p>Actions: Environment Manager (EM) received call and informed complainant that Rix’s Creek Mine would send out a representative to monitor the noise.</p> <p>Findings: Environmental Superintendent (ES) attended the location and monitored the noise. ES noted mine noise was not audible at time of assessment with predominant noise being Northern train line, birds and noise contribution from elevated winds. No further action required</p>
13	22/07/2021	Rix’s Creek	Noise	Maison Dieu	Text	<p>Actions: Environment Officer (EO) was actively monitoring in the area at the time. TARP was activated and changes made to operational equipment prior to and during complaint.</p> <p>Findings: Environment Manager (EM) emailed Complainant to outline operational changes that were being made during and after the Complainants call. No further action required.</p>
14	28/07/2021	Rix’s Creek	Noise	Maison Dieu	Phone	<p>Actions: Environment Officer (EO) was actively monitoring in the area at the time. TARP was activated and changes made to operational equipment prior to, during and after complaint was received.</p> <p>Findings: Environment Manager (EM) emailed Complainant to outline operational changes that were being made before, during and after the Complainants call. No further action required.</p>
AUGUST 2021						
15	16/08/2021	Rix’s Creek	Blast	Camberwell / New England Highway	Email	<p>Actions: Environment Manager (EM) supplied the blast results to the Complainant. EM noted that the results show that the blast did not exceed compliance levels.</p> <p>Findings: EM supplied his details if Complainant wished to discuss the matter further. No further action required.</p>

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

SEPTEMBER 2021						
16	23/09/2021	Rix’s Creek	Noise	Rix’s Creek Lane	Phone	<p>Actions: Environment Manager (EM) noted the use of attenuated trucks on site.</p> <p>Findings: Environment Manager (EM) asked that complainant let us know when noise was high and we would have our Environment Officer (EO) monitor Rix’s Creek Lane way area. No further action required.</p>
17	24/09/2021	Rix’s Creek	Truck speeds	Rix’s Creek Lane	Phone	<p>Actions: Environment Superintendent spoke to Rix’s Creek personnel with the Company and truck being identified.</p> <p>Findings: The Company and truck driver were informed of the complaint, reminded of the speed limits in Rix’s Lane and that we have a number of neighbours that reside on the Lane. All RCM stakeholders asked to remind delivery companies of speed limits when arriving and departing RCM. No further action required.</p>
OCTOBER 2021						
NOVEMBER 2021						
18	28/11/2021	Rix’s Creek	Truck speeds	Rix’s Creek Lane	Phone	<p>Actions: Environment Superintendent raised issue with Procurement Dept (PD). PD to speak directly with truck company reminding them of speed limits of Rix’s Creek Lane and our local communities expectations for safe driving habits from employees, contractors and delivery drivers.</p> <p>Findings: The Company and truck driver were informed of the complaint, reminded of the speed limits in Rix’s Lane and that we have a number of neighbours that reside on the Lane. No further action required.</p>
DECEMBER 2021						

ANNUAL REVIEW 2021 – RIX’S CREEK MINE

Rixs Creek North & Rixs Creek South

2021 Complaints Summary

	<i>Blast</i>	<i>Noise</i>	<i>Dust</i>	<i>Water</i>	<i>Lights</i>	<i>Odour</i>	<i>Other</i>
Summary	5	7	1	0	3	0	2
2021 Total Complaints	18						

Data updated: 04/01/2022

