RUSSELL VALE COLLIERY
FY 2022 ANNUAL REVIEW

Table 1: Annual Review Title Block

Name of Operation	Russell Vale Colliery
Name of Operator	Wollongong Resources Pty. Ltd.
Development Consent number	Russell Vale Revised Preferred Underground Expansion Project (MP 09_0013)
Name of holder of Project Approval	Wollongong Resources Pty. Ltd.
Mining lease number(s)	CCL 745, MPL 271, and ML 1575
Name of holder of mining lease(s)	Wollongong Resources Pty. Ltd.
Water Licence number(s)	WAL 36488 and WAL 43561
Name of holder of water licence(s)	Wongawilli Resources Pty. Ltd.
MOP Start date	1 September 2020
MOP End date	1 September 2022
Annual Review start date	1 July 2021
Annual Review end date	30 June 2022

I, Bill Vatovec, certify that this audit report is a true and accurate record of the compliance status of Russell Vale Colliery for the period [1 July 2021 to 30 June 2022 and that I am authorised to make this statement on behalf of Wongawilli Resources Pty Ltd.

Note;

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of Authorised Reporting Officer	Bill Vatovec
Title of Authorised Reporting Officer	General Manager, Russell Vale Colliery, Wollongong resources Pty Ltd
Signature of Authorised Reporting Officer	
Date	29 September 2022

Table 1: Annual Review Title Block

CONTENTS

TABLES

FIGURES

Table 2: Abbreviations

AR	Annual Review
AWS	Automatic Weather Station
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CO_2-e	carbon dioxide equivalent
DDG	Depositional Dust Gauge
DPE	Department of Planning and Environment
EPA	Environment Protection Agency
EPL	Environment Protection Licence
EPBC	Environmental Protection and Biodiversity Conservation
GNSS	Global Navigation Satellite System
Ha	Hectares
IEA	Independent Environmental Audit
kL	kilolitre
kL/day	kilolitres per day
LiDAR	Light detection and ranging
mg/L	milligram per litre
ML	Megalitre
MOP	Mine Operations Plan
NGER	National Greenhouse and Energy Reporting
NSW	New South Wales
$PM_{2.5}$	particulate matter less than 2.5 microns in size
PM_{10}	particulate matter less than 10 microns in size
PKCT	Port Kembla Coal Terminal
REF	Review of Environmental Factors
ROM	Run-of-Mine
RVC	Russell Vale Colliery
SMP	Subsidence Monitoring Plan
TARP	Trigger Action Response Plan
WRPL	Wollongong Resources Proprietary Limited

Table 3: Definitions

Adit	A horizontal entrance to an underground mine, typically driven into the side of a hill or mountain.
Conveyor	Fixed mechanical apparatus consisting of a continuous moving belt used to transport coal from one place to another.
Development Consent	A legal document that allows you to undertake a development.
First Workings	Involves the development headings or roadways which will provide access to the coal resource. They are developed using continuous miners with integrated roof and rib bolting rigs. First workings leave the coal pillars intact and the overlying strata fully supported
Greenhouse gases	Gases with potential to cause climate change (e.g., methane, carbon dioxide and non-methane volatile organic compounds). Usually expressed in terms of carbon dioxide equivalent.
Groundwater	All waters occurring below the land surface; the upper surface of the soils saturated by groundwater in any particular area is called the water table.
Infrastructure	The supporting installations and services that supply the needs of the Project.
Potable water	Water of quality suitable for human consumption.
Rehabilitation	The restoration of a landscape and especially the vegetation following its disturbance.
Run-of-mine (ROM)	Raw coal that is stockpiled and/or prior to being processed through a coal preparation plant.
Metropolitan Special Area	Refers to the WaterNSW Metropolitan Special Area (See map, **Figure 3**).

1 STATEMENT OF COMPLIANCE

This Annual Review (AR) has been prepared to provide a summary of the environmental performance of the Russell Vale Colliery (RVC) from 1 July 2021 to 30 June 2022 (the reporting period).

The compliance status of RVC with its relevant approval conditions at the end of the reporting period is summarised in **Table 4**.

Table 4: Statement of Compliance

Were all the conditions of the relevant approvals complied with?	Yes/No
Development Consent 09_0013	No
Environment Protection Licence 12040	No
Consolidated Coal Lease 745	No
Mining Lease 271	No
Mining Lease 1575	Yes
Mining Operations Plan	Yes
Water Access Licence 36488	Yes
Water Access Licence 43561	Yes

Any non-compliances during the reporting period are summarised in **Table 6** and elaborated on in **Table 31.**

Table 5: Compliance Status Key for Table 6

Risk Level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 6: Incidents, notifications, and non-compliances for FY2021-2022 reporting period.

Date	Relevant Approval	Type and Classification (if required)	Location of event
10 December 2021	MP09_0013	Water Management - TARP Level 3	Pit top Licenced Discharge Point LDP11
17 December 2021	MP09_0013	Noise Monitoring	Pit top South monitor (NM2)
March 2022	EPL 12040 Condition M2.1	Technical non-compliance	Pit top RVC Dust Monitoring
May 2022	MP09_0013	Technical non-compliance	RVC – Previous consent surrender
May 2022	MP09_0013 EPL 12040 Conditions M4.1 and M8.1	Meteorological Monitoring	Pit top Weather Station
May 2022	MP09_0013 Consolidated Coal Lease 745 Mining Lease 271	Technical non-compliance. Water Management	Pit top Licenced Discharge Point LDP11
May 2022	MP09_0013	Technical non-compliance - Management Plan	Technical non-compliance
May 2022	MP09_0013	Technical non-compliance Management Plan	Technical non-compliance
13 May 2022	EPBC 2020/8072 Condition 8a	Water Management	Pit-top water

2 INTRODUCTION

This Annual Review has been prepared in accordance with the NSW Department of Planning and Environment's (DPE) *Post-approval requirements for State significant mining developments – Annual Review Guideline, October 2015.*

This document satisfies the requirements of Schedule 2, Condition F11 of the RVC Development Consent (MP 09_0013) and the requirement to submit an Annual Environmental Management Report (AEMR), as per condition 3 of Consolidated Coal Lease (CCL) 745.

This document satisfies the requirements of the EPBC 2020/8072 approval Annexure B, Condition 25.

2.1 Project Background

RVC is a well-established underground coal mine located approximately 8 kilometres north of Wollongong within the Wollongong and Wollondilly local government areas (LGA). The total lease area covered by RVC is 6,973 hectares. The mine is owned and operated by Wollongong Resources Pty. Ltd. (WRPL), which is majority owned by Jindal Steel and Power Limited.

RVC currently operates under Development Consent MP 09_0013, which was granted on 8 December 2020 by the Independent Planning Commission, allowing for the recommencement of mining operations for five years to 8 December 2025.

Mining is to occur in the Wongawilli coal seam using bord and pillar methodology, and with an approved limit of up to 1.2 million tonnes of run-of-mine (ROM) coal to be extracted each calendar year over the five-year period.

In addition, WRPL was granted approval under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act) on 31 August 2021 (EPBC 2020/8072).

Prior to the approval of MP 09_0013, RVC ceased the production of coal on 1 September 2015 and was placed into Care and Maintenance for a period of six years.

On 7 July 2022, Wollongong Coal Limited changed its name to Wollongong Resources Pty. Ltd.

2.2 Mine Contacts

Key contacts for RVC are outlined in **Table 7.**

Table 7: Mine Contacts at RVC

Position	Name	Contact Details
Chief Executive Officer	Greg Pawley	(02) 4223 6832
Mine Manager	Bill Vatovec	(02) 4223 6825
Environmental Superintendent (Acting)	Jackson Allenby	(02) 4223 6800

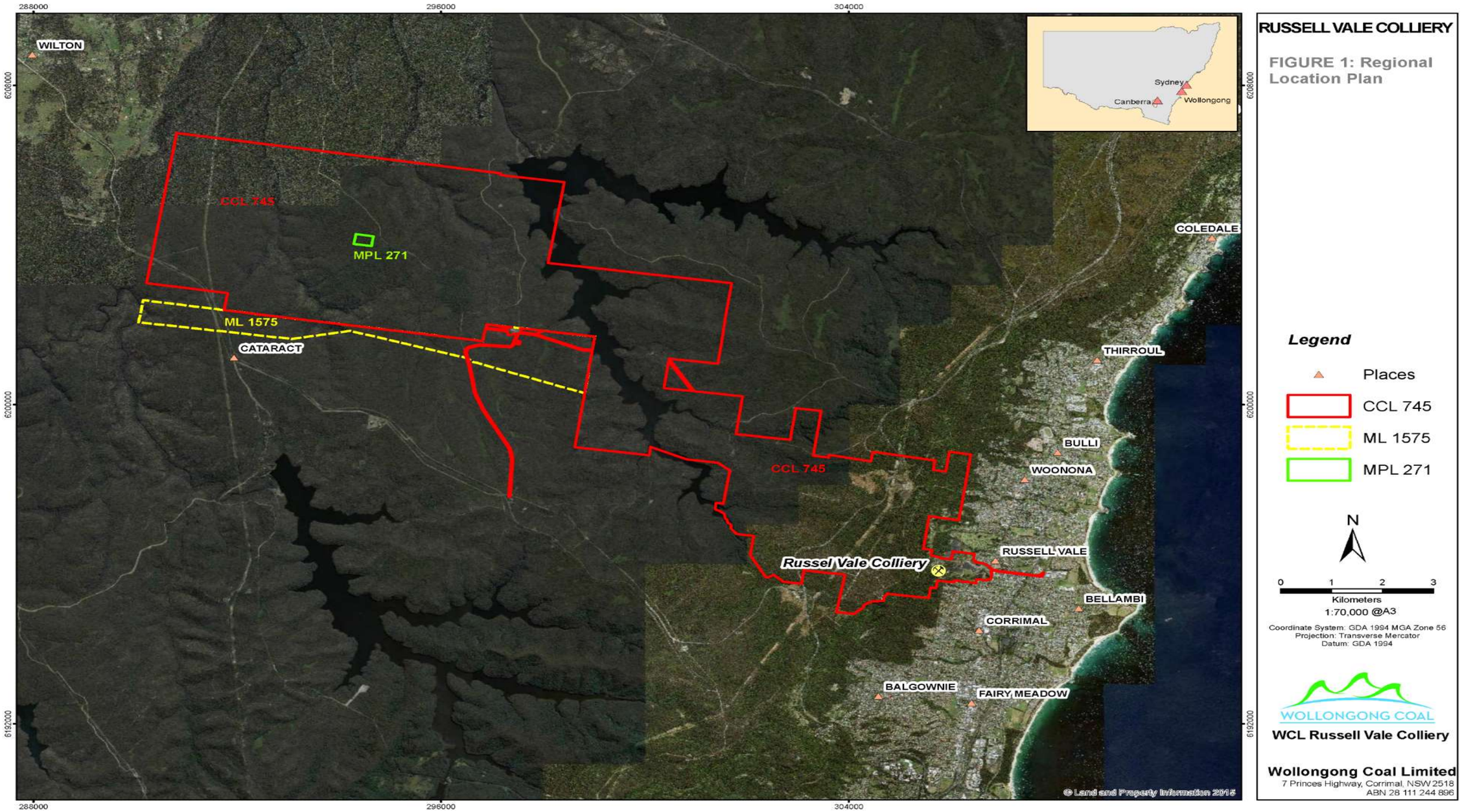

Figure 1: Regional Setting of RVC

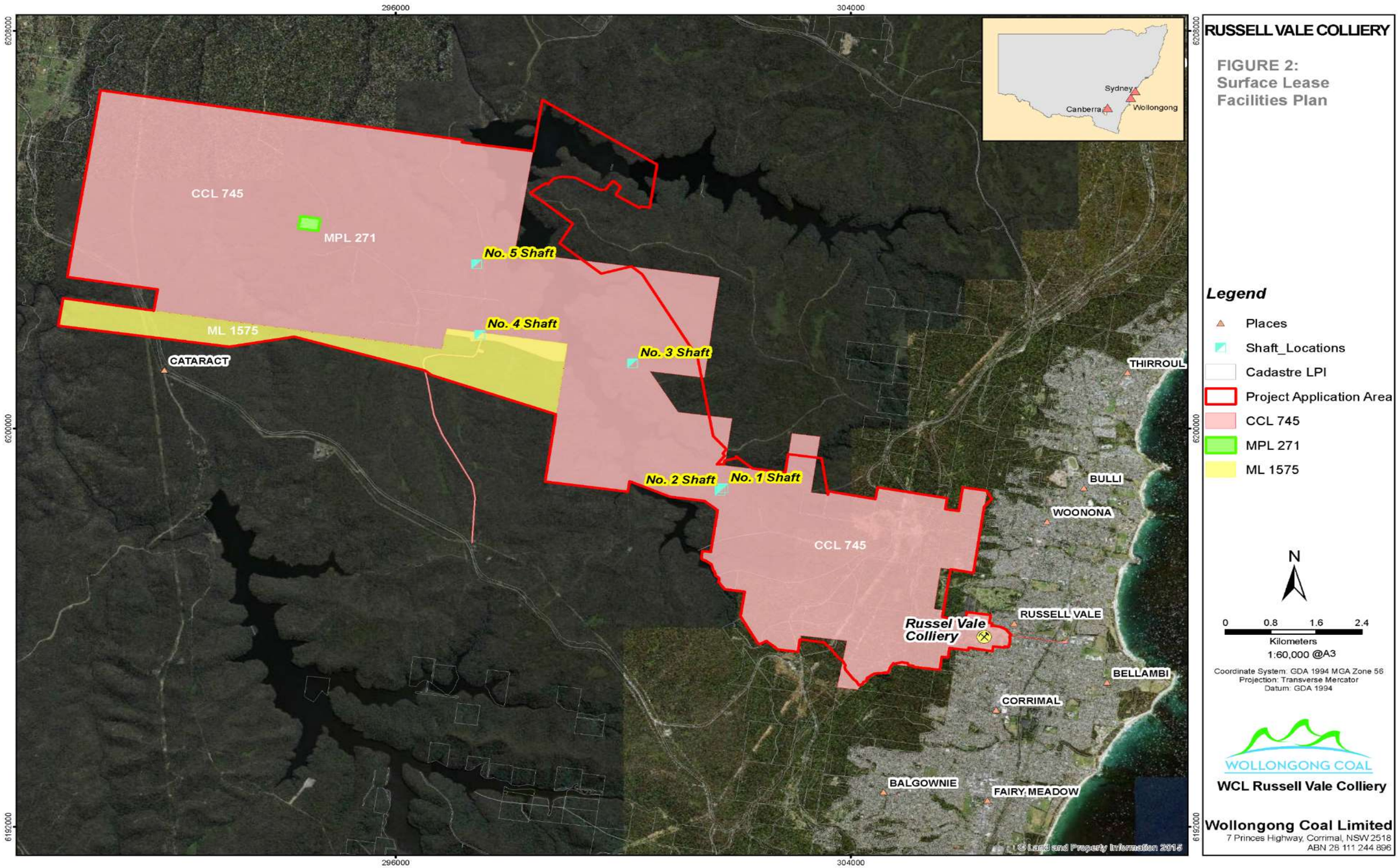

Figure 2: Surface Lease Facility Plan

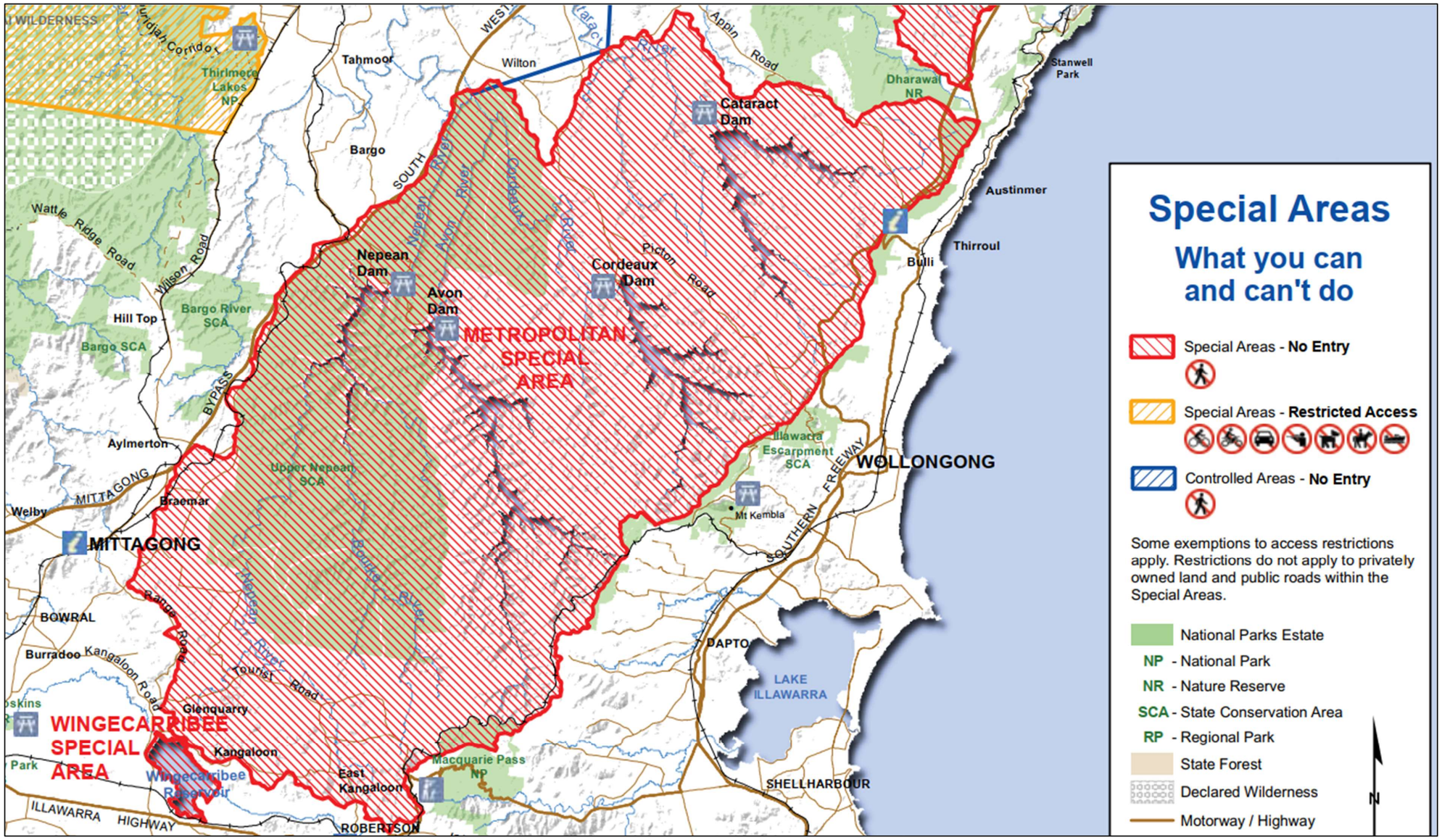

Figure 3 WaterNSW Metropolitan Special Area relevant to RVC

FIGURE 13:
Loccation of Monitoring/ Discharge Points

Environment Protection Licence
Licence No.: 12040

Legend
- Water Monitoring Location
- Dust Monitoring Point
- Meteorological Monitoring Station
- Fire Trails
- Road & Tracks
- RVC Lease Boundary

N

0 0.1 0.2
Kilometers

1:4,000 @A3

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

WOLLONGONG COAL

WCL Russell Vale Colliery

Wollongong Coal Limited
7 Princes Highway, Corrimal, NSW 2518
ABN 28 111 244 896

Figure 4: Russell Vale Colliery Pit Top

Figure 5: RVC No. 4 Shaft Pit Top

Figure 6: RVC Pit-top Water Management System

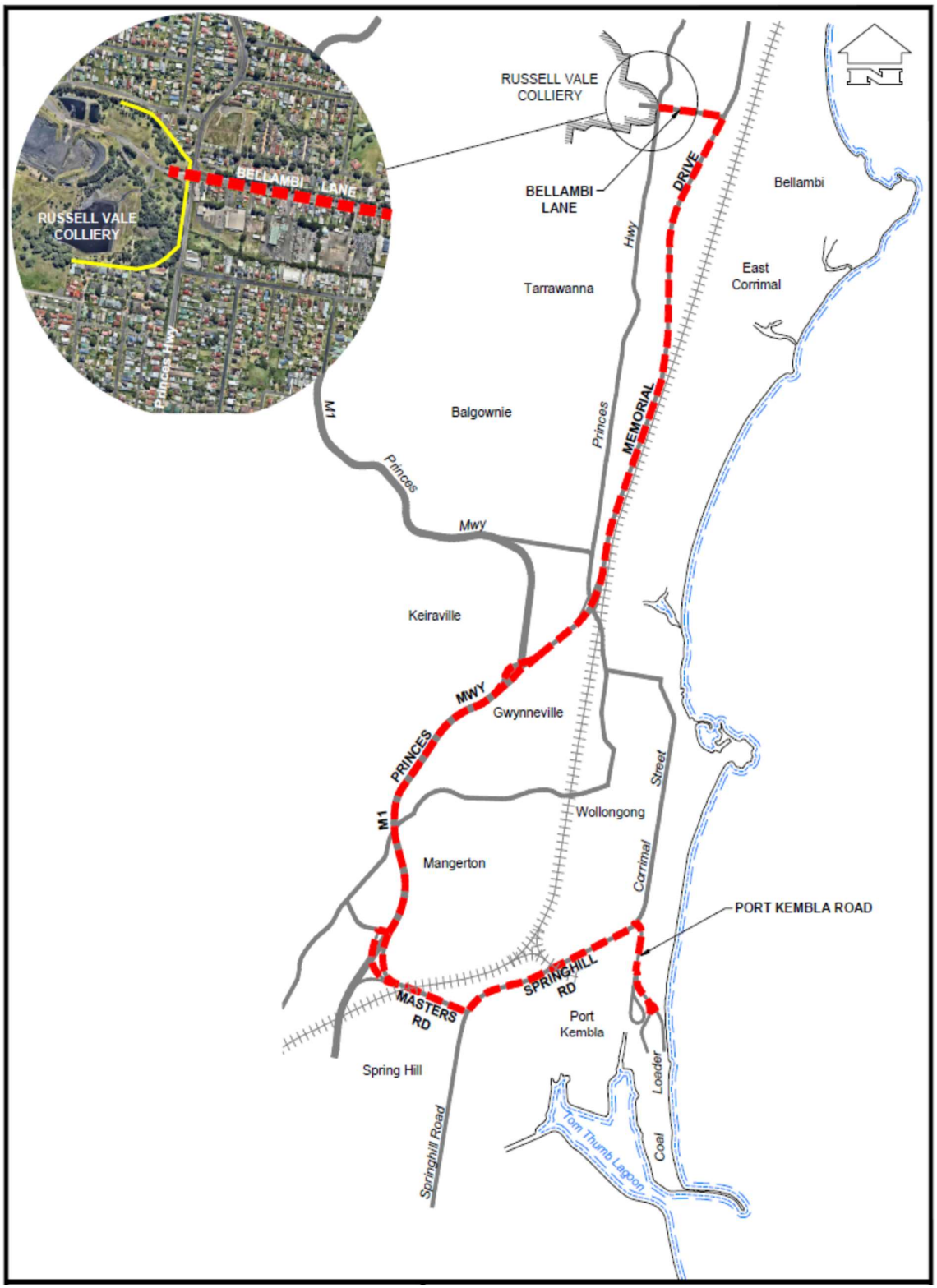

Figure 7: Coal Haulage Route from Russell Vale Colliery to PKCT

3 APPROVALS

Table 8 provides a summary of the key licences, leases and approvals that were relevant to the operation of RVC during the reporting period.

Table 8: Approvals

Approval	Reference	Issue Date	Expiry Date
Consolidated Coal Lease	CCL 745	27/12/1990	30/12/2023
Mining Purpose Lease	MPL 271	09/05/1991	09/05/2033
Mining Lease	ML 1575	22/03/2012	22/03/2029
Russell Vale Revised Preferred Underground Expansion Project	MP09_0013	08/12/2020	01/09/2026
EPBC Approval (RVC Revised UEP)	2020/8072	31/08/2021	31/12/2067
Environmental Protection License	12040	Current	-
SPCC (now EPA) Approval for Storm Water Control Dam	90/6041 (280.021C/21)	10/08/1992	-
Dangerous Goods Licence	NDG021269	08/09/2015	-
Licence to Store Explosives	XSTR200014	-	3/10/2022
DC for Demolition of Washery	D2004/32	14/12/2004	-
Water Access Licence	WAL 36488	29/01/2013	28/01/2028
Water Access Licence	WAL 43561	15/12/2020	-
Approval for Hydrology Monitoring Equipment Installation (WaterNSW, under part 5)	F2020/3092	04/03/2021	3/3/2026
Radiation Licence (NSW EPA)	5063081	22/10/2021	22/10/2022

4 OPERATIONS SUMMARY

4.1 Operating Hours

RVC underground operations are approved to run 24 hours per day, seven days per week.

Operation of Surface facilities at the site can only occur between the hours of:

- 7 am to 6 pm Monday to Friday
- 8 am to 6 pm Saturday, and
- no time on Sundays and public holidays.

Trucking from RVC to the Port Kembla Coal Terminal (PKCT) can only occur between the hours of:

- 7 am to 6 pm Monday to Friday
- 8 am to 6 pm Saturday, and
- no time on Sundays and public holidays.

4.2 Mining Operations

Mining operations were conducted throughout the reporting period in accordance with MP 09_0013. **Table 9** provides a production summary for the previous, current, and next reporting periods. Waste rock was oversized material that was re-used on site for road repairs and maintenance.

Table 9: RVC Production Summary

Material	Approved limit (t) (MP 09_0013)	Previous reporting period (t) (actual)	This reporting period (t) (actual)	Next reporting period (t) (forecast)
ROM Coal / Ore	1,200,000	0	348,957	1,200,000
Oversized material [#1]	-	0	13,758	120,000
Fine reject (Tailings)	-	0	0	0
Saleable product [#2]	1,000,000	0	246,185 [#3]	1,080,000

[#1] Oversized material = oversized material is used on site for maintenance of roads etc.
[#2] Saleable product = Run-of-mine (ROM) coal as no processing occurs on site.
[#3] Closing stock of ROM was stockpiled at RVC (14,341 t) and at PKCT for July shipment

4.3 Mineral Processing

No mineral processing activities were undertaken at RVC during the reporting period.

4.4 Coal Stockpiling

At the end of the reporting period, 14,341 tonnes of ROM coal was stockpiled at RVC awaiting transport to the PKCT.

4.5 Construction

Ongoing construction of the Bellambi Gully Diversion occurred throughout the reporting period.

4.6 Exploration

No exploration program for RVC was conducted during the reporting period.

4.7 Explosives

No explosives are stored at RVC, and the former explosive's magazine has been sealed and no longer used. Blasting activities at RVC are now conducted by a licenced contractor.

During the reporting period, a total of 400.2 kg of explosives were used for underground mining activities.

4.8 Spontaneous Combustion

No instances of spontaneous combustion during the reporting period.

4.9 Other Infrastructure Management

4.9.1 Shaft sites No. 1

No.1 shaft, shown in **Figure 2**, is not currently in use and no hazardous materials are stored in the vicinity. Routine vegetation maintenance and security inspections of the infrastructure were conducted throughout the reporting period to maintain the area to a working standard.

4.9.2 Shaft site No. 2

No.1 shaft, shown in **Figure 2**, is not currently in use and no hazardous materials are stored in the vicinity. Routine vegetation maintenance and security inspections of the infrastructure were conducted throughout the reporting period to maintain the area to a working standard.

4.9.3 Shaft site No. 3

No. 3 shaft, shown in **Figure 2**, is not currently in use and no hazardous materials are stored in the vicinity. The shaft has been temporarily capped and the transmission lines to the site are de-energised. Routine vegetation maintenance and security inspections of the infrastructure were conducted throughout the reporting period to maintain the area to a working standard.

4.9.4 Shaft site No. 4

No. 4 shaft, shown in **Figure 5,** is not currently in use and no hazardous materials are stored in the vicinity. The site consists of the shaft, administration facilities, bathhouse, workshop, electrical substation, car parking, water management and treatment facilities, and an explosives compound.

The site was de-energised and mothballed during the 2019-20 reporting period as a result of the cessation of Bulli seam workings. A solar power and battery system has been installed to facilitate gas monitoring, communications, security, and alarm systems at the site for the foreseeable future.

Routine vegetation maintenance and security inspections of the infrastructure were conducted throughout the reporting period to maintain the area to a working standard in anticipation of future mining approval applications in the vicinity.

4.9.5 Shaft site No. 5

No. 5 shaft, shown in **Figure 2,** was de-energised and mothballed during the 2019-20 reporting period as a result of the cessation of Bulli seam workings. Routine vegetation maintenance and security inspections of the infrastructure were conducted throughout the reporting period to maintain the area to a working standard in anticipation of future mining approval applications in the vicinity.

4.9.6 Bulk Raw Water Supply Compound

In accordance with directions from the NSW Resource Regulator in 2019, the infrastructure used to transfer raw water from the Cataract reservoir to No. 4 shaft was removed to eliminate the risk to the catchment. If mining recommences in the vicinity, pending future applications to mine, the pumping station will be reassessed and may be reinstated to provide bulk raw water to the underground operations. Until such time, any fresh water required at the No. 4 shaft is to be delivered by truck.

5 ACTIONS FROM PREVIOUS ANNUAL REVIEW

No actions were identified by regulatory agencies relating to the previous AR.

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

6.1.1 Environmental Management

Russell Vale Site

Meteorological monitoring is conducted on site by an Automatic Weather Station (AWS) that complies with the *Approved Methods for Sampling and Analysis of Air Pollutants in NSW,* as per Schedule 2 Condition B11 of MP 09_0013.

Metropolitan Special Area

RVC has no commitments in place for meteorological monitoring in the Water NSW Metropolitan Special Area.

6.1.2 Environmental Performance

Russell Vale Site

During the reporting period the AWS presented technical issues relating to power supply. Issues were brought on by adverse weather effects and exacerbated by COVID-19 related impacts, causing delayed response times to malfunction and overall maintenance needs.

Table 10 compares the monthly and yearly data availability for the previous two reporting periods. Data was available for 88% of the reporting period, which is an increase of 95.6% from the 45% recorded during the previous reporting period.

Table 10: AWS Data Availability

Month	Data Availability (%)	
	Previous Reporting Period	Reporting Period
July	90.0	95.0
August	100.0	100.0
September	100.0	100.0
October	100.0	83.0
November	100.0	77.0
December	100.0	97.0
January	100.0	99.0
February	27.0	96.0
March	0.0	64.0
April	0.0	73.0
May	5.0	77.0
June	56.0	97.0
Reporting Period Availability	**45.0**	**88.0**

Metropolitan Special Area

No meteorological monitoring was conducted during the reporting period.

6.2 Air Quality

6.2.1 Environmental Management

Russell Vale Site

Air quality is managed in accordance with the relevant EPL 12040 conditions and the approved Air Quality and Greenhouse Gas Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B9 of MP 09_0013.

RVC implements a range of controls to manage dust, including but not limited to:

- stockpile and conveyor water sprayer system
- Utilisation of a water cart
- Truck and wheel washing facilities
- All trucks are fitted with tarps to cover outgoing material. Tarps are sprayed with water prior to leaving site
- regular visual dust assessments
- modification of work practices as required
- temporary cessation of operational equipment as required
- predictive controls and an air quality Trigger Action Response Plan (TARP)
- continuous sampling of $PM_{2.5}$, PM_{10}, and Total Suspended Particulate (TSP) concentration using two Tapered Oscillating Microbalances (TEOMs)
- enforced site speed limits for site vehicles
- operation of an AWS, and
- monthly sampling of deposited dust via a Dust Deposition Gauge (DDG) network, see **Figure 4.**
    - sampling period for DDGs is 30 ± 2 days and analysis of DDGs is conducted by a NATA certified laboratory.
    - In accordance with Schedule 2, Condition B7 of MP 09_0013, deposited dust is assessed as insoluble solids.

Metropolitan Special Area

RVC has no commitments in place for air quality monitoring in the Special Area.

WRPL obey the WaterNSW enforced speed limits for catchment fire trails, to minimise excessive dust kick-up, protect the integrity of the roads, and guarantee the safety of personnel.

6.2.2 Environmental Performance

Russell Vale - TEOM

RVC monitors the concentration of Particulate Matter < 2.5 ($PM_{2.5}$) and < 10 µm (PM_{10}) at its licenced TEOMs to ensure that compliance with the criteria in Schedule 2, Condition B7 of MP 09_0013 is maintained.

Table 11: $PM_{2.5}$ and PM_{10} Monitoring Results

Month	TEOM 1		TEOM 2		DPE Wollongong	
	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
	Monthly Average (µg/m³)					
July	2.9	6.1	5.7	8.1	4.8	9.7
August	3.3	7.7	6.4	9.6	5.2	10.6
September	6.8	12.2	4.0	9.3	5.1	13.8
October	6.0	14.6	4.7	12.6	5.3	16.4
November	5.1	11.8	4.2	12.4	5.3	15.9
December	7.3	11.2	5.1	12.8	5.8	16.2
January	5.2	16.9	4.8	16.4	5.8	20.8
February	4.9	15.8	4.9	16.7	6.0	18.4
March	4.0	10.9	3.4	9.5	4.8	15.2
April	3.6	9.8	3.2	8.3	4.5	13.5
May	3.2	8.3	2.0	5.8	4.5	11.7
June	3.0	6.6	2.5	5.1	4.3	8.6
Annual Average	4.6	11.0	4.2	10.6	5.1	14.2

*The data recovery rate (24-hour average) was 83% to 87% for TEOM 1 and 58% to 74% for TEOM 2. No exceedances of the 24-hour PM_{10} criterion of 50 µg/m³ or $PM_{2.5}$ criterion of 25 µg/m³ were recorded at either RVC monitoring location.

** The data recovery rate (24-hour average) was 86% to 92% for TEOM 1 and 100% for TEOM 2. No exceedances of the 24-hour PM_{10} criterion of 50 µg/m³ or $PM_{2.5}$ criterion of 25 µg/m³ were recorded at either RVC monitoring location.

*** The data recovery rate (24-hour average) was 83% to 92% for TEOM 1 and 100% for TEOM 2. No exceedances of the 24-hour PM_{10} criterion of 50 µg/m³ or $PM_{2.5}$ criterion of 25 µg/m³ were recorded at either RVC monitoring location.

***** The data recovery rate (24-hour average) was 100% in April and June but dropped to 77% in May for TEOM 1. TEOM 2 capture rate was > 97% between April and June. No exceedances of the 24-hour PM_{10} criterion of 50 µg/m³ or $PM_{2.5}$ criterion of 25 µg/m³ were recorded at either RVC monitoring location.

The time series of 24-hour PM_{10} concentrations recorded at RVC and Wollongong via TEOM. The profiles were generally similar across the three sites, although the peak concentrations at DPE Wollongong were higher than at the RVC sites.

Average monthly PM_{1s0} and $PM_{2.5}$ concentration profiles for the three sites are shown in **Table 11** and **Figure 8**. There is a markedly higher concentration at DPE Wollongong compared with the RVC sites. Generally, DDG results show similar results to the last reporting period whilst representing a significant decrease from the 2019-2020 reporting period.

Figure 8: Particulate Matter PM_{10} TEOM Monitoring results for July 2021-June 2022

Russell Vale – Dust Deposition Gauge (DDG)

Sample collection and analysis was conducted by consultants.

Table 12 summarises the results from the DDG network for the reporting period and shows that results remained compliant with the EPA's annual averaging criteria of 4 g/m^2/month.

Figure 9 compares the DDG results from the reporting period to the previous four reporting periods. The concentration of deposited dust has increased at every site since the previous reporting period, due to the recommencement of mining operations, but are significantly lower when compared to previous years where RVC has been in operation.

Metropolitan Special Area

No air quality monitoring was conducted during the reporting period.

Table 12: Dust Depositional Monitoring Results

EPL Monitoring Point	Analyte	Min	Average	Max	Annualised yearly average (EPA Guideline)	Comments
		(g/m^2/month)			(g/m^2/month)	
4	Ash	0.10	0.43	1.90	4	
	Combustible Matter	0.10	0.61	1.90		
	Insoluble Solids	0.10	1.04	3.80		
5	Ash	0.20	0.44	0.80	4	DDG was found broken in March 2022.
	Combustible Matter	0.10	0.49	0.90		
	Insoluble Solids	0.40	0.93	1.30		
6	Ash	0.10	0.25	0.60	4	
	Combustible Matter	0.10	0.28	0.70		
	Insoluble Solids	0.20	0.53	1.30		
7	Ash	0.10	0.35	0.70	4	
	Combustible Matter	0.20	0.38	0.70		
	Insoluble Solids	0.40	0.73	1.40		
8	Ash	0.10	0.20	0.40	4	
	Combustible Matter	0.10	0.28	0.60		
	Insoluble Solids	0.20	0.47	1.00		

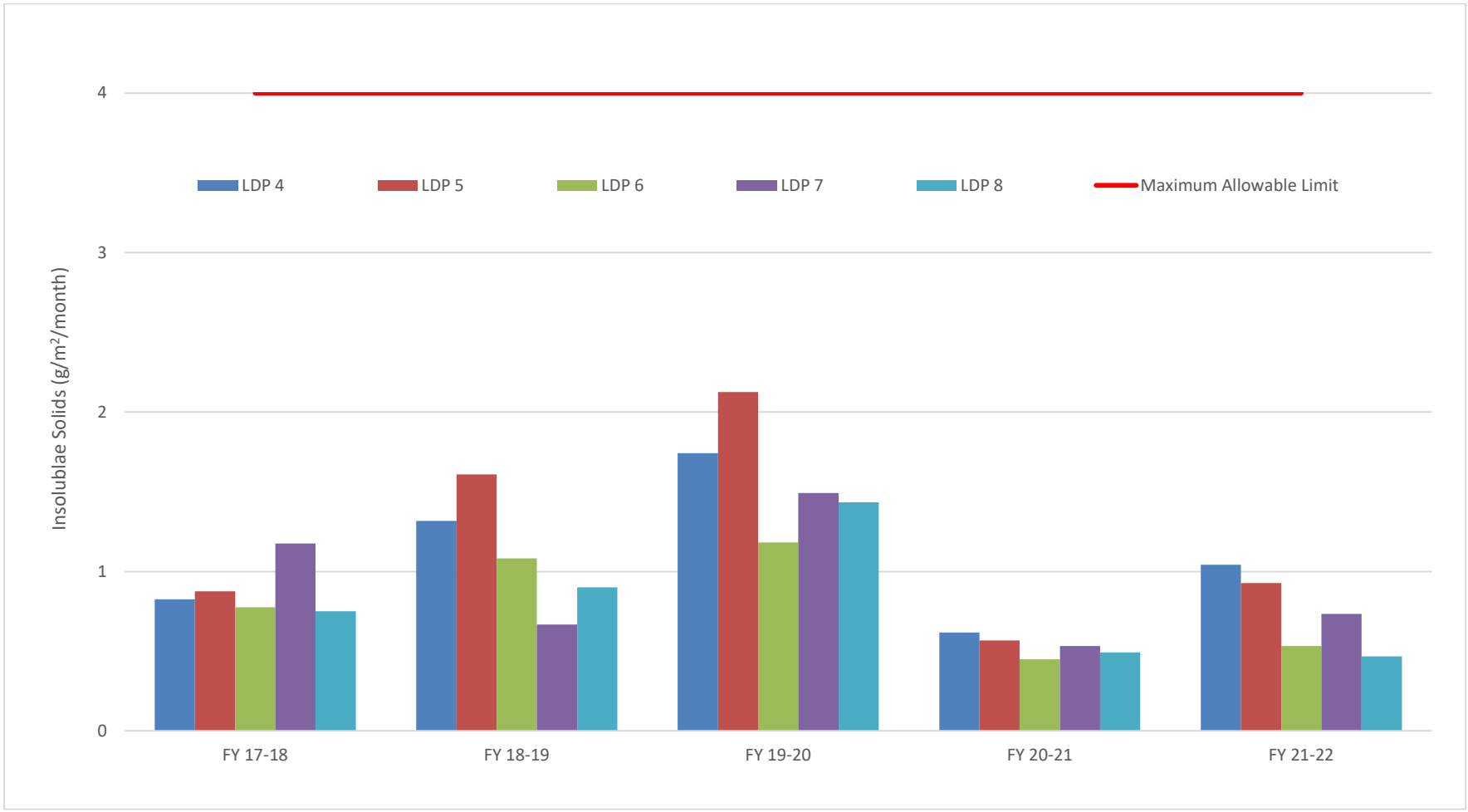

Figure 9: Depositional Dust Gauge results across all sites

6.3 Waste Management

6.3.1 Environmental Management

Waste is managed in accordance with the Waste Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B37 MP 09_0013.

All waste materials generated from RVC operations are categorised into unique streams and disposed of in clearly identifiable skip bins. Bins are collected by licensed waste contactors and delivered to appropriate disposal facilities.

Liquid waste

Water produced at the workshop and fuel bay containing hydrocarbons and suspended solids is diverted towards and captured by a series of IBCs that are routinely disposed of and replaced by a licensed contractor.

6.3.2 Environmental Performance

Table 13 and

Figure 10 summarise the relevant waste streams collected at RVC, compares the volumes of waste produced during the previous two reporting periods and identifies the contractors employed for collection.

Due to RVC transitioning from Care and Maintenance during the last reporting period, several waste streams, such as cardboard/paper and general waste have all accumulated in increasing volumes reflecting an increased workforce and productivity.

Table 13: Waste Streams

Waste Stream	Volume/Weight		Contactor
	Previous Reporting Period	Reporting Period	
General Waste	58.20 (Tonnes)	207.1 (Tonnes)	REMONDIS Australia Pty Ltd
Cardboard / Paper	0.57 (Tonnes)	3.625 (Tonnes)	REMONDIS Australia Pty Ltd
Comingle Recycling	0.639 (Tonnes)	0.698 (Tonnes)	REMONDIS Australia Pty Ltd
Metal	250.61 (Tonnes)	40.1 (Tonnes)	East West Metal Trading Pty Ltd
Green waste	13.30 (Tonnes)	11.60 (Tonnes)	REMONDIS Australia Pty Ltd
Oil	6.20 (kL)	9.20 (kL)	Cleanaway Industrial Solutions Pty Ltd
Timber	0.00 (Tonnes)	0.00 (Tonnes)	REMONDIS Australia Pty Ltd

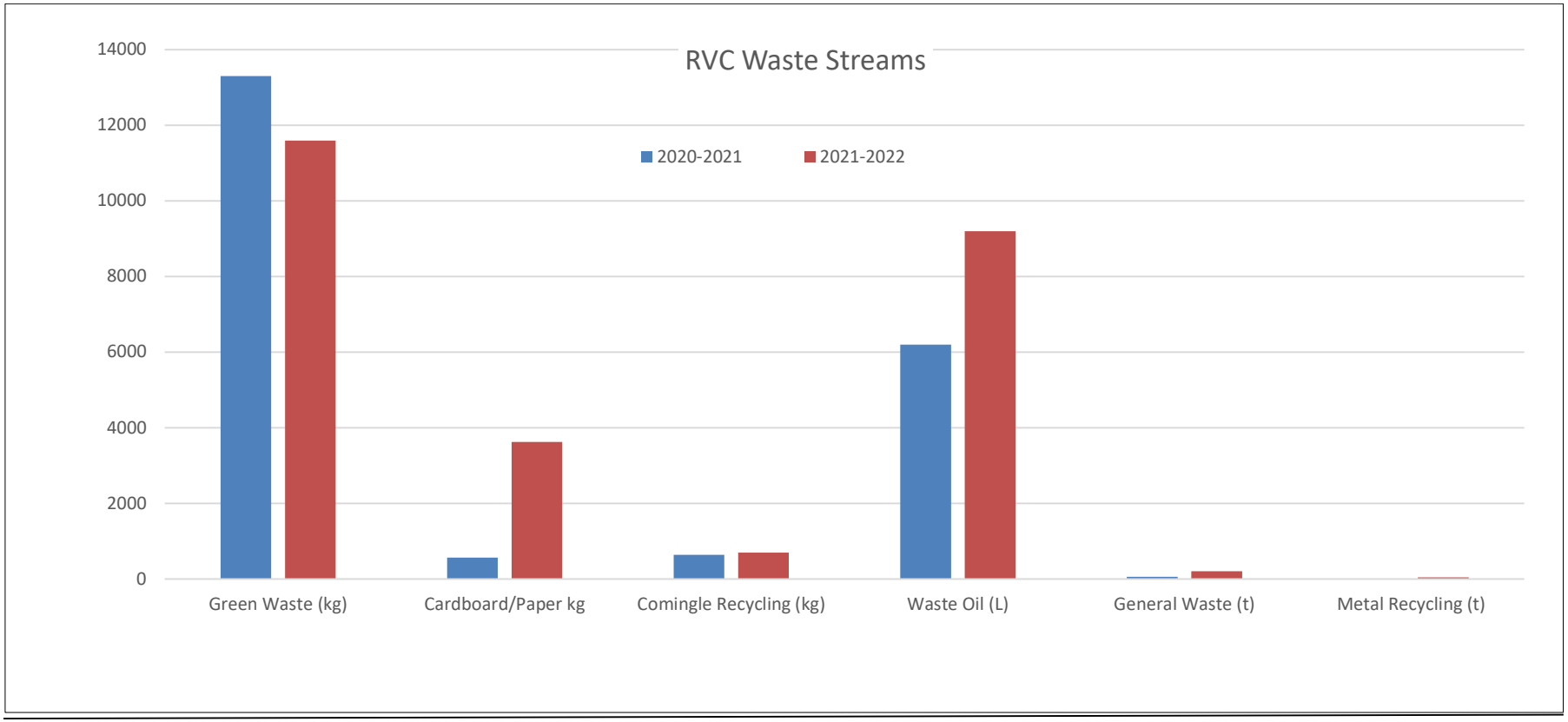

Figure 10: Waste Deposal Comparison

6.4 Hazardous Material Management

6.4.1 Diesel

RVC uses low emission fuels, containing a sulphur content of less than 0.02%. Diesel fuel is brought to site by fuel tankers and is stored in a 16,000-litre tank at the workshop fuel-bay. The tank is independently bunded and contained within a spill apron to collect any spills which may occur during filling. Firefighting and spill-containment facilities are located nearby. Diesel is pumped from the main storage tank into vehicles and smaller transportable containment vessels for use underground.

Table 14 provides the total volume of diesel used at RVC during the reporting period.

Table 14: Hazardous Materials

Hazardous Material	Volume (kL)	
	Previous Reporting Period	Reporting Period
Diesel	50.85	266.54

6.4.2 Petrol

Petrol is used to fuel the handheld power tools required to maintain the grass and other vegetation regrowth around the site. Petrol is purchased at off-site vendors and stored in a 20-litre jerry can, which is kept in a designated fuel storage bay.

RVC used a total of 0.988 KL of petrol during the reporting period.

6.4.3 Oil

Oil is used on site for vehicle and other mechanical infrastructure maintenance. Oil containers are stored in bunded areas or on spill pallets where necessary.

RVC used a total of 157.375 KL of petrol during the reporting period.

6.4.4 Compressed Gas

The use of compressed gas is required for various activities in the workshop. Gas cylinders are stored in accordance with the relevant Australian Standards.

RVC used a total of 26.1 m^3 of acetylene and 7.905 tonnes of LPG during the reporting period.

6.4.5 Chemicals

A variety of chemicals are utilised to facilitate operations on site. RVC maintains a register of Safety Data Sheets for all chemicals used on site. The register is maintained in the Control Room.

6.5 Erosion and Sediment

6.5.1 Environmental Management

Russell Vale Site

Erosion and sediment are managed in accordance with the approved Surface Water Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B17 of MP 09_0013.

Several permanent erosion and sediment controls are in place at RVC, including drainage lines, dams, and sumps. These structures are inspected and sampled after specific wet weather events and undergo maintenance when required.

Metropolitan Special Area

Erosion and sediment are managed in accordance with the approved Subsidence Monitoring Plan (SMP). The SMP outlined the approved monitoring requirements to be carried out in the vicinity of the underground extraction area throughout the pre, during, and post mining phases of the project.

6.5.2 Environmental Performance

Russell Vale Site

Minor repairs and maintenance were carried out on drainage lines, sumps, and earthen dams during the reporting period. Sediment controls were also inspected as part of the routine environmental inspections and maintained and repaired as needed.

Erosion and sediment controls, such as sediment fences, coir logs and hay bales were implemented during construction works in accordance with the Erosion and Sediment Control Plan. Controls are maintained during construction works and remain in place until the disturbed areas are revegetated.

Metropolitan Special Area

No major erosion or sediment management activities were conducted during the reporting period.

6.6 Contaminated Land

6.6.1 Environmental Management

Russell Vale Site

All materials with the potential to contaminate the surrounding natural environment are stored in dedicated bunded areas or contained by temporary bunding, if required in an area where a permanent setup in not feasible.

The following general management controls are applied during daily operations:

- provision of spill kits
- vehicle inspections
- site inductions, and
- environmental inductions.

Spills and environmental incidents involving the contamination of land are recorded in the incident reporting system, and major incidents are managed in accordance with the Pollution Incident Response Management Plan.

Metropolitan Special Area

Substances with the potential to contaminate are only brought into the Special Area during construction works, such as drilling activities. The following controls are applied at each site:

- drill pads are cleared and as flat as possible
- Sediment fencing is installed to prevent materials from exiting the pad

- diversion bunds and catchment drains are constructed to divert clean water run-off from the surrounding area away from the pad
- dirty water is captured from the drilling process and stored in tanks for removal,
- upon completion of the work, sites are rehabilitated in accordance with WaterNSW requirements.

6.6.2 Environmental Performance

Russell Vale Site

No instances threatening contamination occurred during the reporting period.

Metropolitan Special Area

No instances threatening contamination occurred during the reporting period.

6.7 Threatened Flora

6.7.1 Environmental Management

Russell Vale Site

Threatened flora is managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013.

Metropolitan Special Area

In the Metropolitan Special Area, threatened flora is managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013. Terrestrial ecological monitoring has been undertaken within the RVE area since 2012, several swamps within the RMZ of the past mining operations have a much longer monitoring history than those only effected by the new UEP.

6.7.2 Environmental Performance

Russell Vale Site

No impacts to threatened flora occurred during the reporting period.

Metropolitan Special Area

Since autumn 2021, bi-annual upland swamp vegetation surveys have been undertaken in autumn and spring at sixteen impact monitoring sites and eight control monitoring sites within the Metropolitan Special Areas. When accounting for Total Species Richness (TSR) within each swamp for control and impact swamps, respectively, variability within and between swamps was large, regardless of year effects and mining status.

During the period of this annual report CCUS10 (occurring within the 350 meters RMZ of current workings within PC21) is the only swamp that has been subjected to impacts. Variability in (TSR) at CCUS10 was relatively large, and higher than last year, an indication that TSR falls within the normal range for this swamp. As such, there is no indication that TSR declined within the impacted site since second working commenced.

Vegetation dieback has previously been observed at impact swamp CCUS4 and control swamps BCUS12 and BCUS13 in 2020. The main flora species impacted within the dieback areas were Pouched Coral Fern *Gleichenia dicarpa* / microphylla species complex, and Heath-leaved Banksia. Vegetation dieback was observed at S15A(1) during the 2021 monitoring period. This is a continuation of processes following an extended period of drought first identified in 2019. No additional areas of dieback at impact swamps were observed during the 2021 monitoring period. In the impacted swamp CCUS4, both areas of dieback were re-visited in the 2021/2022 monitoring period and it was noted that a number of rhizome bearing species had begun recolonising these areas of dieback, with species such as Razor Sedge *Lepidosperma limicola*, Pouched Coral Fern and Spreading rope-rush *Empodisma minus* recorded in these areas.

The **Total Species Richness** data at each control and impact swamp are provided in **Error! Reference source not found.** No impacts were identified in the post mining regions, with data in the control and pre-mining sites remaining relatively consistent over time.

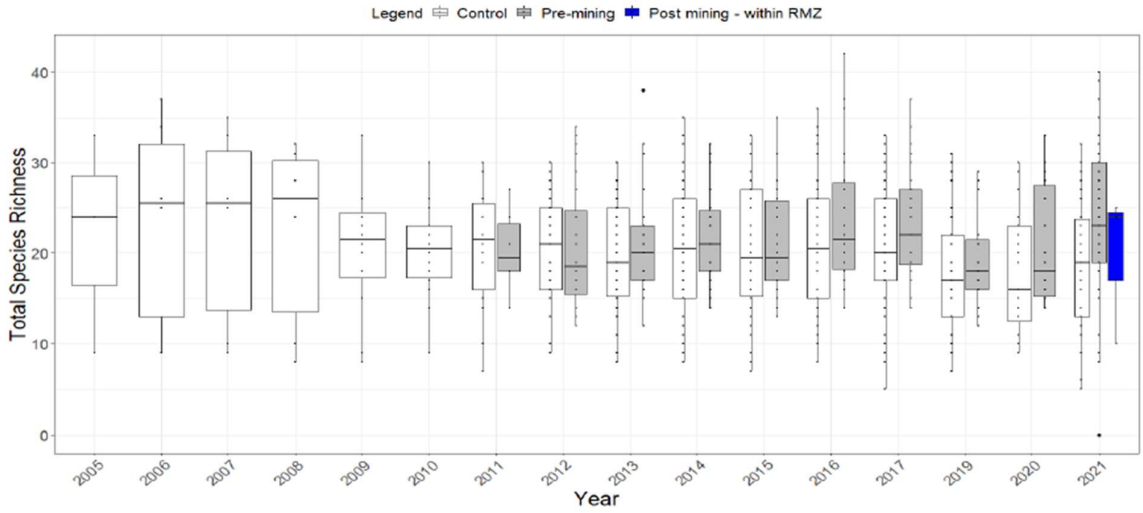

Figure 11: Total Species Richness (TSR) from 2005-2021. The median is a solid line within the boxes (i.e. the 50th percentile), the interquartile range (IQR) as the margins of the box (i.e. the 25th and 75th percentile), and the whiskers of the boxplot cover range in the data.

6.8 Threatened Fauna

6.8.1 Environmental Management

Russell Vale Site

Threatened fauna is managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013. For activities with the potential to impact the habitat of native fauna in undisturbed areas, WRPL conducts a REF to establish that no endangered species or communities are present before commencing operations.

Metropolitan Special Area

In the Metropolitan Special area, threatened fauna is managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013. For activities with the potential to impact the habitat of native fauna in undisturbed areas, WRPL conducts a REF to establish that no endangered species or communities are present before commencing operations.

6.8.2 Environmental Performance

Russell Vale Site

No impacts to threatened fauna occurred during the reporting period.

Metropolitan Special Area

No impacts to threatened fauna occurred during the reporting period.

For activities with the potential to impact the habitat of native fauna in undisturbed areas, WRPL conducts a REF to establish that no endangered species or communities are present before commencing operations.

Terrestrial ecological monitoring has been undertaken in the area since 2012 due to the extended history of mining in the area and the assessment process for the UEP. This provides a long period of baseline data for the identification of potential impacts from mining in RVE. Longwall mining in the RVE area concluded in 2015, with two years of post-mining terrestrial ecological monitoring undertaken in 2016 and autumn 2017. Ecological monitoring programs in 2019 targeted pre-UEP mining 'baseline' data at the existing impact and control monitoring sites.

Monitoring data was collected in areas within the 350 metre Risk Management Zone (RMZ) of mining activities in PC21. While some of this monitoring has been undertaken in relation to the monitoring of impacts from previous longwall mining, there have been no significant impacts identified to aquatic biodiversity, rocky habitats or other threatened species from this mining that precludes the use of this data as being suitable for setting a baseline for monitoring of impacts associated with the mining covered by the UEP.

As many of the terrestrial ecological (flora and fauna) values present within the study area are unlikely to be impacted because of mining, the program focuses on those values considered at greatest risk of impact from subsidence effects. Ecological values which were monitored in the 2021 include upland swamp vegetation (Total Species Richness [TSR] and composition – section 6.7), Giant Burrowing Frog (tadpole detection) and Giant Dragonfly (exuviae detection).

The **Giant Burrowing Frog** tadpoles recorded in the 2021 (**Figure 12**) survey broadly align with results of previous surveys which show greatest detection during winter and lowest during summer and demonstrate the ongoing presence of this species in this waterway. These results indicate continued breeding activity within the known extent of habitat.

The **Giant Dragonfly** transect exuviae surveys completed in summer 2021/2022 found 11 specimens (**Figure 13**). Three adults were recorded at impact site swamp (CCUS4) and eight exuviae were recorded at Control swamps (BCUS12, BCUS13 and WACUS). There was a decline in the number of exuviae observed at the impact sites when compared to control sites. No exuviae were found at any of the impact sites, only adult specimens. Given the heavy rain experienced in the RVE catchment area in the summer of 2021/2022 it is likely that exuviae were disintegrating quickly due to the heavy rainfall and damp conditions. This may have hindered the search effort as identification of specimens would have needed to occur shortly after emergence. While no exuviae were observed at the impact sites several adult specimens were identified, indicating There was a slight drop in specimen numbers at impact monitoring sites in comparison to the previous year's monitoring program, however the results of the survey were consistent with past results for the area. When interpreted with historic data variability, it was determined that the 2021/2022 results are unlikely to be reflective of mining impacts, but rather standard variability is data associated with monitoring a cryptic and mobile species in poor weather conditions.

When considering the number adult specimens observed within impact swamps, this is considered to be consistent with previous years of monitoring.

The Giant Dragonfly survey reported a decline in the number of exuviae observed at the impact sites when compared to control sites. No exuviae were found at any of the impact sites, only adult specimens, which is a drop from previous years. The results of the 2021/2022 survey indicate that the results are constant with **TARP trigger Level 2 results**. The Level 2 action has been triggered: to continue monitoring, and to review frequency and location of monitoring to determine if additional monitoring is required.

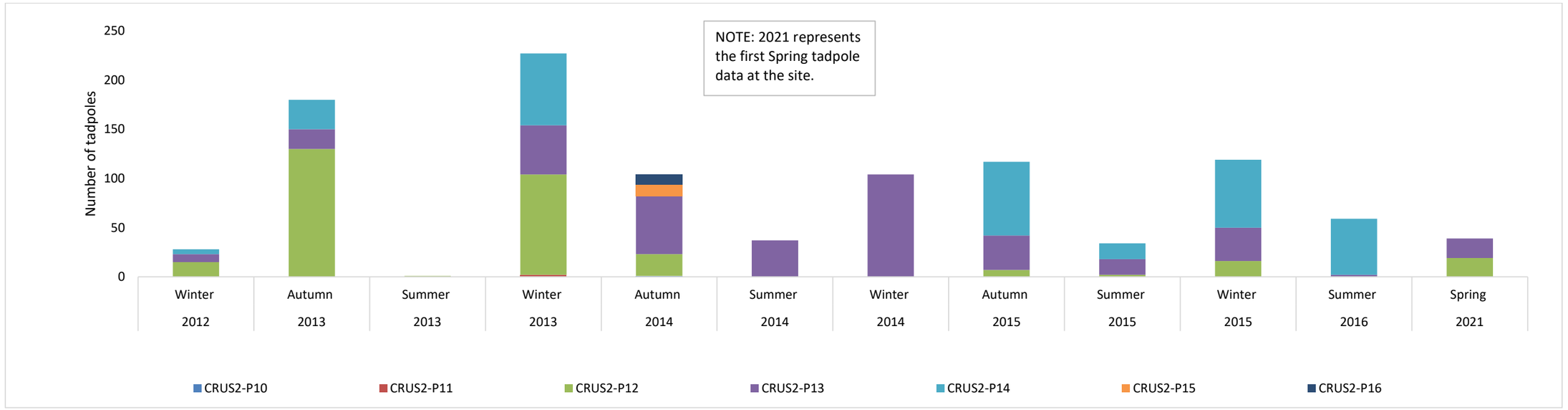

Figure 12: Giant Burrowing Frog tadpole detection in identified pools along the Swamp CRUS2 transect

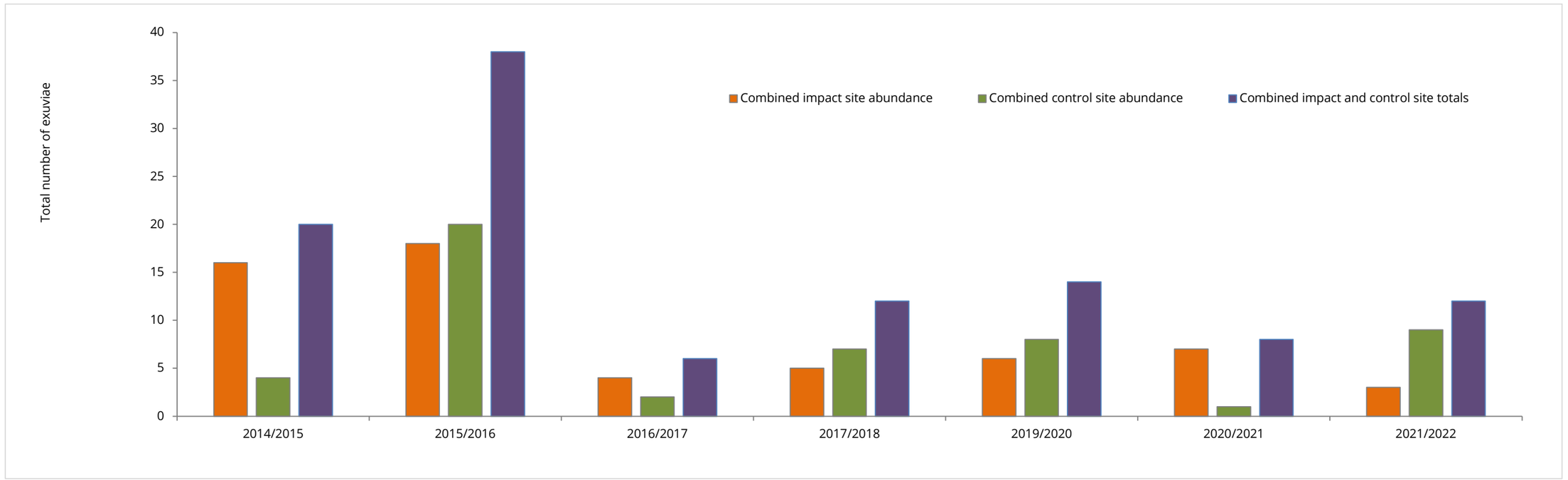

Figure 13: Giant Dragonfly exuviae detected during the summer monitoring periods

6.9 Introduced Species

6.9.1 Environmental Management

Russell Vale Site

Introduced species are managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013.

Metropolitan Special Area

RVC has no commitments for introduced animal management in the Metropolitan Special Area.

6.9.2 Environmental Performance

Russell Vale Site

No programs for managing introduced species were conducted during the reporting period.

Metropolitan Special Area

No programs for managing introduced species were conducted during the reporting period.

6.10 Weed Management

6.10.1 Environmental Management

Russell Vale Site

Weeds are managed in accordance with the approved Biodiversity Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B21 of MP 09_0013.

Weed management activities, in the form of manual clearing and chemical spraying are approved to be used on the RVC lease.

Metropolitan Special Area

Weed management activities, in the form of manual clearing and chemical spraying are approved within the compounds surrounding the No. 1 – No. 5 shafts.

6.10.2 Environmental Performance

Russell Vale Site

RVC employed licenced contractors to remove approximately 1.2 Ha of priority weeds along its access roads. In addition to these major works, WRPL staff routinely slashed and removed vegetation, including priority weeds, from around key electrical infrastructure to maintain Asset Protection Zones.

Metropolitan Special Area

During the reporting period the No. 1 – No. 5 shafts were inspected for weed species and treated via physical removal and chemical treatment when weeds were observed.

6.11 Noise

6.11.1 Environmental Management

Russell Vale Site

Noise is managed in accordance with the approved Noise Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B4 of MP 09_0013.

RVC implements a range of controls to manage noise levels, including but not limited to:

- a continuous unattended real time noise monitor with audio capture and real time alerts
- quarterly attended noise monitoring program at surrounding sensitive receivers
- concrete noise barriers adjacent to haulage roads and stockpile areas;
- earth bunds positioned around site;
- Operation of surface facilities are restricted to:
  - 7 am to 6 pm Monday to Friday;
  - 8 am to 6 pm Saturday, and
  - no time on Sundays or Public Holidays.
- Trucking schedule restricted to:
  - 7 am to 6 pm Monday to Friday
  - 8 am to 6 pm Saturday, and
  - no time on Sundays or Public Holidays.
- site vehicles and automated equipment meet manufacturer specifications and are routinely serviced, and
- reduced speed limits are enforced around site.

Metropolitan Special Area

RVC has no commitments for noise monitoring in the Special Area.

6.11.2 Environmental Performance

Russell Vale Site

Unattended monitoring

Unattended real time noise monitoring is a management tool used to alert staff at RVC of rising noise levels. Utilising this data allows staff to make pre-emptive adjustments to operations before an exceedance of the criteria in MP 09_0013 occurs.

Attended monitoring

In accordance with Schedule 2, Condition B2 (f) of MP 09_0013, WRPL employed qualified external consultants to conduct attended noise monitoring during the reporting period. Testing was performed quarterly with the objective of confirming compliance with the criteria set out in Schedule 2, Condition B1 of MP 09_0013.

Monitoring is conducted in four phases (Early Morning Shoulder, Day, Evening, Night). Each phase is classified as follows:

- Early Morning Shoulder = 5:00 am to 7:00 pm Monday to Saturday; and 8:00 am to 6:00 pm Sundays and Public Holidays.
- Day = 7:00 am to 6:00 pm Monday to Saturday; and 5:00 am to 8:00 pm Sundays and Public Holidays.

- Evening = 6:00 pm to 10 pm.
- Night = 10:00 pm to 5:00 am Monday to Saturday; and 10:00 pm to 8:00 am Sundays and Public Holidays.

Results from the annual monitoring program are summarised in **Table 15** and show that RVC operated under its approved noise limits throughout the reporting period.

Metropolitan Special Area

No noise monitoring activities were not conducted during the reporting period.

Table 15: Attended Noise Measurements

Reporting Quarter	R2 - 30 West Street		R6 - 659 Princes Hwy		R9 - 109 Midgley Street	
	Noise Measurement	Noise Criteria	Noise Measurement	Noise Criteria	Noise Measurement	Noise Criteria
Daytime dB(A)						
	$L_{Aeq\ (15\ min)}$		$L_{Aeq\ (15\ min)}$		$L_{Aeq\ (15\ min)}$	
Q1 (Jul-Sep 21)	44	44	48	48	44	44
Q2 (Oct-Dec 21)	44	44	48	48	44	44
Q3 (Jan-Mar 22)	44	44	48	48	44	44
Q4 (Apr-Jun 22)	44	44	48	48	44	44
Early Morning Shoulder dB(A)						
	$L_{Aeq\ (15\ min)}$ - LAF_{max}	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}	$L_{Aeq\ (15\ min)}$	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}	$L_{Aeq\ (15\ min)}$	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}
Q1 (Jul-Sep 21)	44	54	44-54	44	54	44-54	41	52	41-52
Q2 (Oct-Dec 21)	44	54	44-54	44	54	44-54	41	52	41-52
Q3 (Jan-Mar 22)	44	54	44-54	44	54	44-54	41	52	41-52
Q4 (Apr-Jun 22)	44	54	44-54	44	54	44-54	41	52	41-52
Evening dB(A)						
	$L_{Aeq\ (15\ min)}$		$L_{Aeq\ (15\ min)}$		$L_{Aeq\ (15\ min)}$	
Q1 (Jul-Sep 21)	43	43	45	45	43	43
Q2 (Oct-Dec 21)	43	43	45	45	43	43
Q3 (Jan-Mar 22)	43	43	45	45	43	43
Q4 (Apr-Jun 22)	43	43	45	45	43	43
Night dB(A)						
	$L_{Aeq\ (15\ min)}$ - LAF_{max}	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}	$L_{Aeq\ (15\ min)}$	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}	$L_{Aeq\ (15\ min)}$	LAF_{max}	$L_{Aeq\ (15\ min)}$ - LAF_{max}
Q1 (Jul-Sep 21)	43	52	43-52	42	52	43-52	41	52	43-52
Q2 (Oct-Dec 21)	43	52	43-52	42	52	43-52	41	52	43-52
Q3 (Jan-Mar 22)	43	52	43-52	42	52	43-52	41	52	43-52
Q4 (Apr-Jun 22)	43	52	43-52	42	52	43-52	41	52	43-52

6.12 Visual Impacts

6.12.1 Environmental Management

Russell Vale Site

Visual impacts are managed in accordance with the approved Visual Impact Management Plan, prepared to satisfy the requirements of Schedule 2, Conditions B33 of MP 09_0013.

RVC had a reduced need for lighting throughout the reporting period, as surface operations were restricted to daylight hours (7 am – 6 pm). Limited lighting was utilised however during night hours for the purpose of security and safe vehicle access.

Metropolitan Special Area

No. 1 – No. 5 shafts no longer have a power supply and therefore do not impact their surroundings.

6.12.2 Environmental Performance

Russell Vale Site

Lights used on site are routinely observed to ensure that they remain compliant with the *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting.*

No formal light audits were conducted during the reporting period, as no concerns were raised by the community.

Metropolitan Special Area

No formal light audits were conducted during the reporting period, as there are no sensitive receivers that can be impacted.

6.13 Aboriginal Cultural Heritage

6.13.1 Environmental Management

Russell Vale Site

Aboriginal Cultural Heritage is managed in accordance with the approved Aboriginal Cultural Heritage Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B24 of MP 09_0013.

Metropolitan Special Area

RVC has used consultants to undertake Aboriginal Cultural Heritage Management Plan and associated monitoring within the Russell Vale East (RVE) Domain, to satisfy the Development Consent MP 09_0013, Schedule 2, Conditions B23 and B24.

6.13.2 Environmental Performance

Russell Vale Site

No activities causing disturbance were conducted during the reporting period and thus there has been no potential impacts to Aboriginal cultural heritage.

Metropolitan Special Area

A baseline recording was undertaken of all Aboriginal Heritage Information Management System (AHIMS) sites within the Underground Expansion Program in 2021. As per the Heritage Management Plan, a post-mining inspection is to be undertaken and the condition of the site reinspected and compared to the original baseline recording. The includes:

- Reinspection of the same points and features photographed and recorded in such a way that they can be directly compared to the baseline documented results.

- Observations of the rock surfaces are recorded, to assess if/whether there is any new cracking, and/or widening of existing cracks.

No instances of activities causing disturbance were recorded during the reporting period to Aboriginal cultural heritage, as highlighted by **Table 16**.

Table 16: Aboriginal Cultural Heritage Monitoring Results.

Site Name	AHIMS No	Site type	Baseline Recording	Monitoring Completed	Monitoring Results
Bulli Mine Shaft 20	52-3-0311	Shelter with deposit	Yes	Yes	No impacts Observed
Bulli Mine Shaft 26	52-3-0323	Shelter with deposit artefacts	Yes	Yes	No impacts Observed
Bulli Mine Shaft 27	52-3-0323	Shelter with deposit artefacts	Yes	Yes	No impacts Observed
Wonga East 4	52-2-4170	Shelter with deposit artefacts	Yes	Yes	No impacts Observed
Wonga East 5	52-2-4171	Shelter with stone arrangement	Yes	Yes	No impacts Observed

6.14 Bushfire

6.14.1 Environmental Management

Russell Vale Site

Bushfires are managed in accordance with the approved Bushfire Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B40 of MP 09_0013.

Vegetation management is routinely conducted to maintain appropriate Asset Protection Zones (APZ) around site infrastructure. Vegetation adjacent to access roads is periodically slashed back as far as practicable to ensure that the road remains unimpeded should an emergency evacuation be required.

A dedicated firefighting dam is maintained on site to provide the means to manually fight fires that may threaten the site.

WRPL has a designated fire officer on staff who liaises closely with the local Rural Fire Brigade and conducts staff training in the use of fire extinguishers and other firefighting practices around site.

Metropolitan Special Area

Clearing and maintenance of undergrowth and weeds around the No 1 – No. 5 shafts is conducted to maintain adequate firebreaks around the infrastructure.

6.14.2 Environmental Performance

Russell Vale Site

Energy and telecommunication providers accessed RVC on several occasions throughout the reporting period to remove the vegetation encroaching on the overhead power lines running adjacent to the main access road.

In addition to the major works conducted by Endeavour Energy, selective slashing was performed around key electrical infrastructure to maintain Asset Protection Zones.

Metropolitan Special Area

Clearing and maintenance of undergrowth was not required around the No.1 – No. 5 shafts during the reporting period, however the site was regularly inspected and maintained throughout the reporting period.

6.15 Mine Subsidence

6.15.1 Environmental Management

Russell Vale Site

There are no requirements to monitor subsidence at the Russell Vale Pit-top site.

Metropolitan Special Area

Subsidence is managed in accordance with the approved SMP, prepared to satisfy the requirements of Schedule 2, Condition C10 of MP 09_0013.

WRPL is evaluating survey methods to measure low-level subsidence movements from the approved bord and pillar mining at the coastal upland swamps in the steep terrain and undeveloped bushland environment above the Russell Vale East section of RVC. Schedule 2, Condition C7 of MP 09_0013 includes a subsidence performance measure of less than *300 mm* of vertical subsidence be achieved across all areas affected by the RVC development. In addition to the conditions in MP 09_1113, EPBC 2020/8702 provides a vertical subsidence limit of *100 mm* at coastal upland swamps, within 350 m of the bord and pillar panels, and a requirement to measure subsidence at these swamps on a weekly basis.

Surface subsidence monitoring is conducted using both Global Navigation Satellite Systems (GNSS) and light detection and ranging (LiDAR).

6.15.2 Environmental Performance

Russell Vale Site

There are no requirements to monitor subsidence at the Russell Vale Pit-top site.

Metropolitan Special Area

Global Navigation Satellite Systems (GNSS)

Surface subsidence monitoring conducted using GNSS unit records movement in the Northing, Easting and Elevation (Reduced Level) planes. This data is reported in real time to a server. Analysis of this data illustrates surface movement in areas overlying seams. Current mining is occurring at RVC in PC21 above GNSS units #9, #11 and #30 (PC21 East, PC21 West, PC21 9ct). No significant movements were recorded.

The RVC vertical subsidence performance measures in all areas of the site affected by the development had a vertical subsidence limit of not more than 300 mm and 100 mm above swamps. A maximum observed movement across all GNSS monitors in the Russell Vale East lease area (**Figure 15 and 16**) was ± 0.02 m, with movement between March and June 2022 coinciding with significant rain events in the catchment. The surface movement above the PC21 panel (**Figure 14**) reached a maximum height movement of 0.014 m during the reporting period.

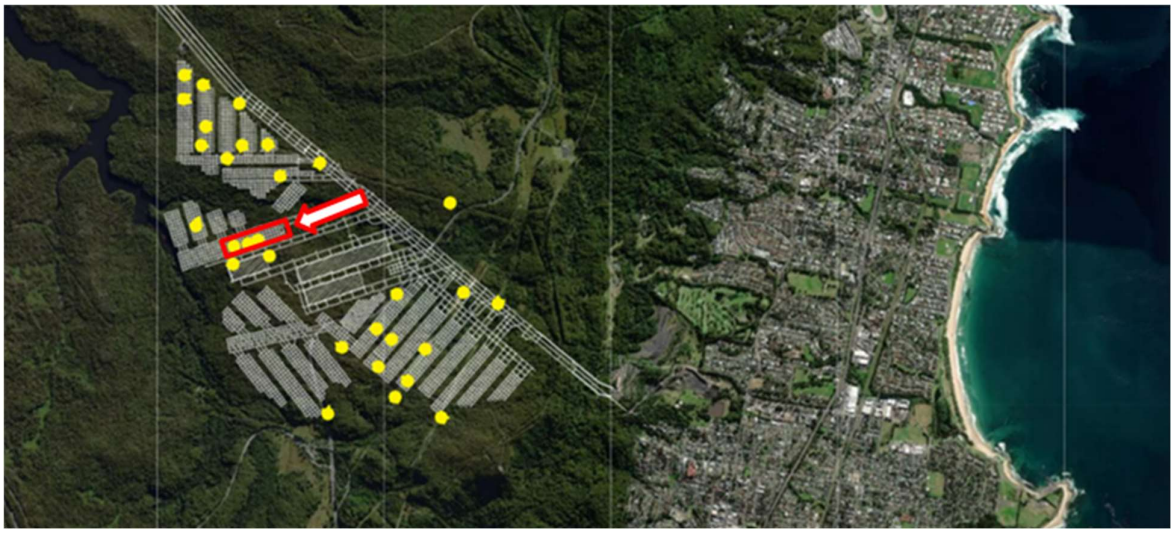

Figure 14: Map of RVC area depicting locations of installed GNSS units as of September 2022. Current mining panel PC21 shown by arrow and red box

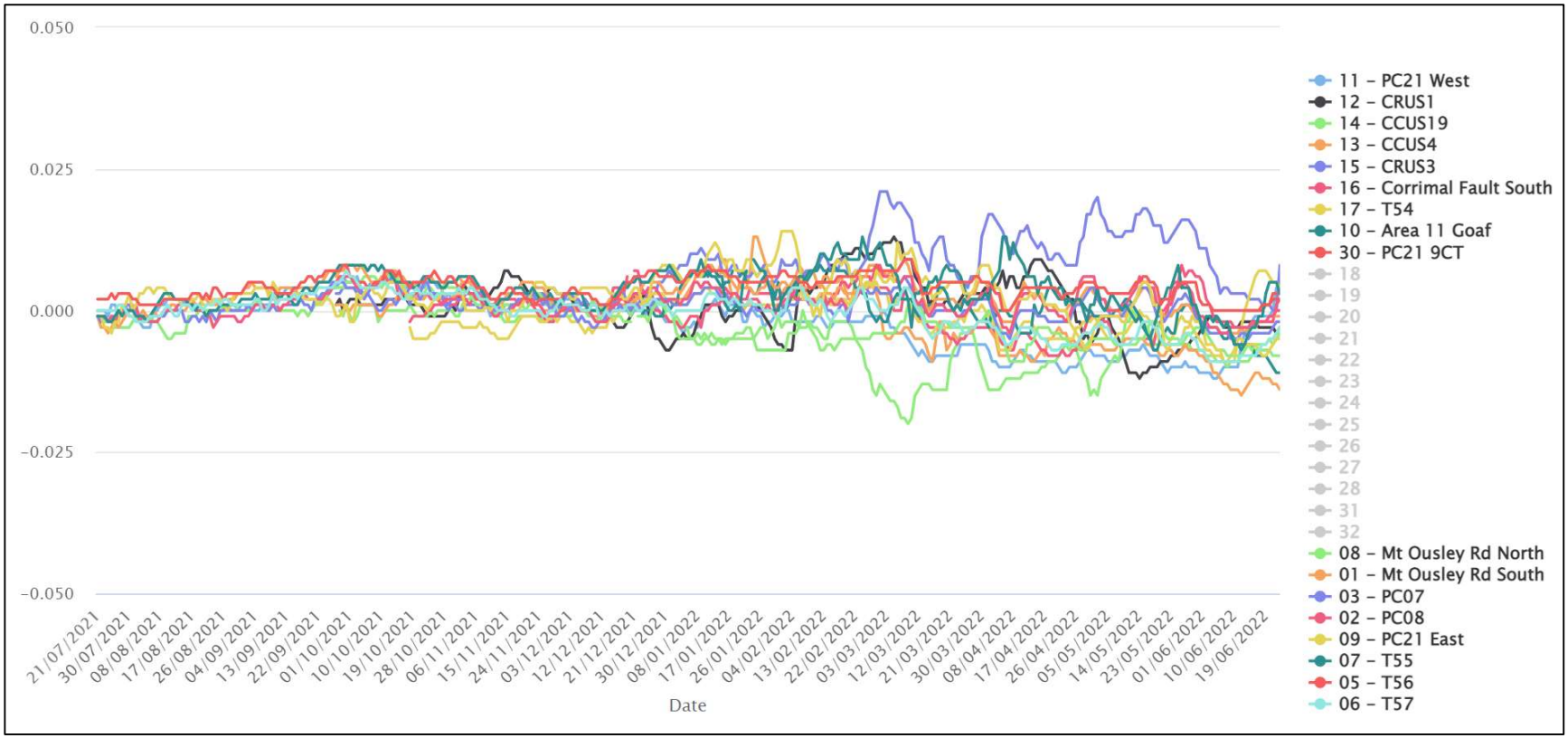

Figure 15: Total movement height (meters) recorded at all active GNSS units during the reporting period FY2021-2022. A maximum height movement of 0.02 m was recorded across the area. RVC has a vertical subsidence limit of not more than 0.3 m (MP09_0013).

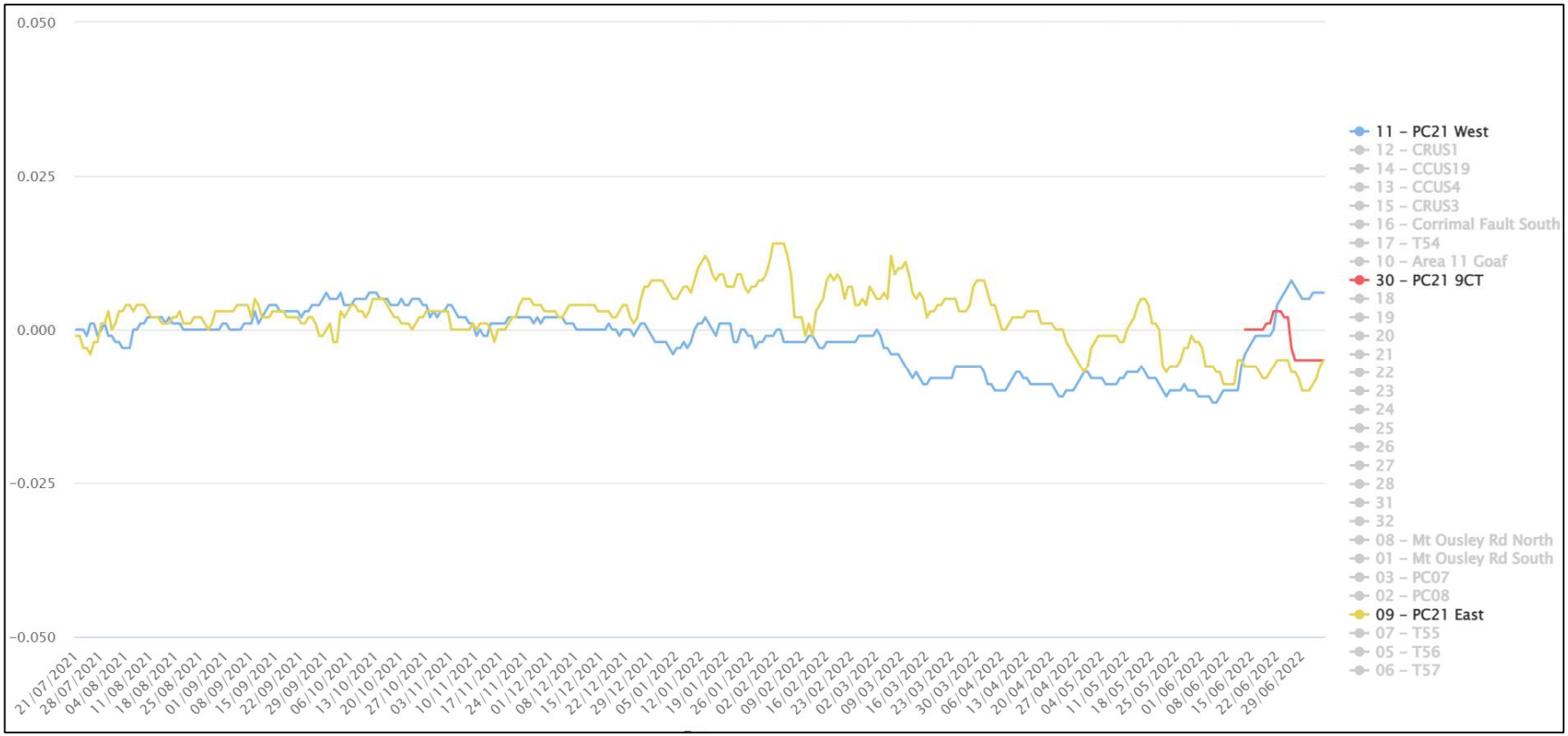

Figure 16: Total movement height (meters) recorded at GNSS units located above the current mining panel, PC21, during the reporting period FY2021-2022. A maximum height movement of 0.014 m was recorded at the sites.

Light Detection and Ranging (LiDAR)

LiDAR surveys are conducted on a two-monthly basis and provide the changes in surface elevations (subsidence) and vectorized swamp/water bodies against the baseline LiDAR survey from 31 August 2021. The accuracy of changes in elevation between LiDAR surveys for hard surfaces has been reported to be typically within ±100 mm and up to approximately ±300 mm at some locations. The LiDAR surveys (report dated 24 June 2022) have shown LiDAR to be unsuitable to detect subsidence of less than the 100 mm limit at swamps due to the nature of the steep terrain and influence of surface features such as vegetation, watercourses, and sandstone outcrop formations.

These survey standards combined with control provided by the GNSS units are expected to be able to detect vertical subsidence of greater than 500 mm if it were to occur in isolated areas above Bulli Seam goaf, areas that are not yet confirmed as collapsed and subsided.

The survey report of vertical subsidence variations has estimated vertical movement that was inconsistent with the GNSS control units, and the expert consultant reported that this is possibly due to the classification process of the raw LiDAR data. The LiDAR variations were deemed as not credible from a subsidence engineering perspective. As such, the GNSS data is deemed more accurate at this stage.

6.16 Greenhouse Gases

WRPL uses a carbon intensity measure to report its Net Carbon Footprint. Operational direct (Scope 1) and indirect (Scope 2) emissions and energy consumption data are reported to the Federal Clean Energy Regulator on an annual basis in line with the Australian National Greenhouse and Energy Regulator (NGER) Reporting Act 2007. WRPL has established systems and processes for the collection, calculation and reporting of Scope 1 and Scope 2 data which are described in our NGER Basis of Preparation documents, and these processes have been audited by the Australian Federal Clean Energy Regulator.

Scope 1 (measured in tCO_2-e) includes emissions from combustion generators, operating equipment, vehicles, and coal seam fugitive emissions (direct emissions). The majority our Scope 1 emissions relate to fugitive emissions associated with our underground mining operations, decommissioned mines, and combustion of fuels. There is no gas drainage at the site.

Scope 2 emissions (measured in tCO_2-e) applies the grid emission factors to all our purchased electricity, regardless of specific renewable electricity contracts (indirect emissions). These emissions occur at the point of electricity generation and accounted for at the location where it is consumed.

For the 2020-21 year, WRPL reported a total of 135,367 tonnes of greenhouse gas emissions across its two facilities. For Scope 1, 129,852 tonnes CO2-e, primarily associated with fugitive emissions from the decommissioned underground mines at both facilities was reported and 5,515 tonnes from electricity consumption was reported as Scope 2.
For the 2021-2022 year, operations recommenced at RVC in September 2021 and the monthly RVC greenhouse gas emissions are shown in **Figure 17.** There is no gas drainage at the facility, and the mine was classified as non-gassy for the reporting period.

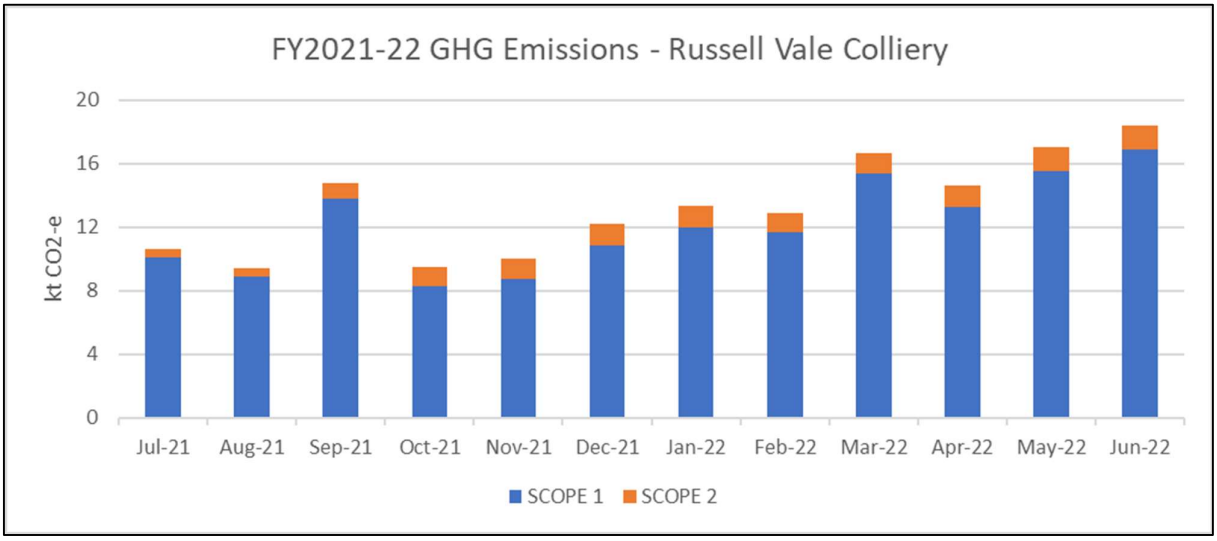

Figure 17: Greenhouse gas emissions for RVC, reported monthly as scope 1 and scope 2 emissions.

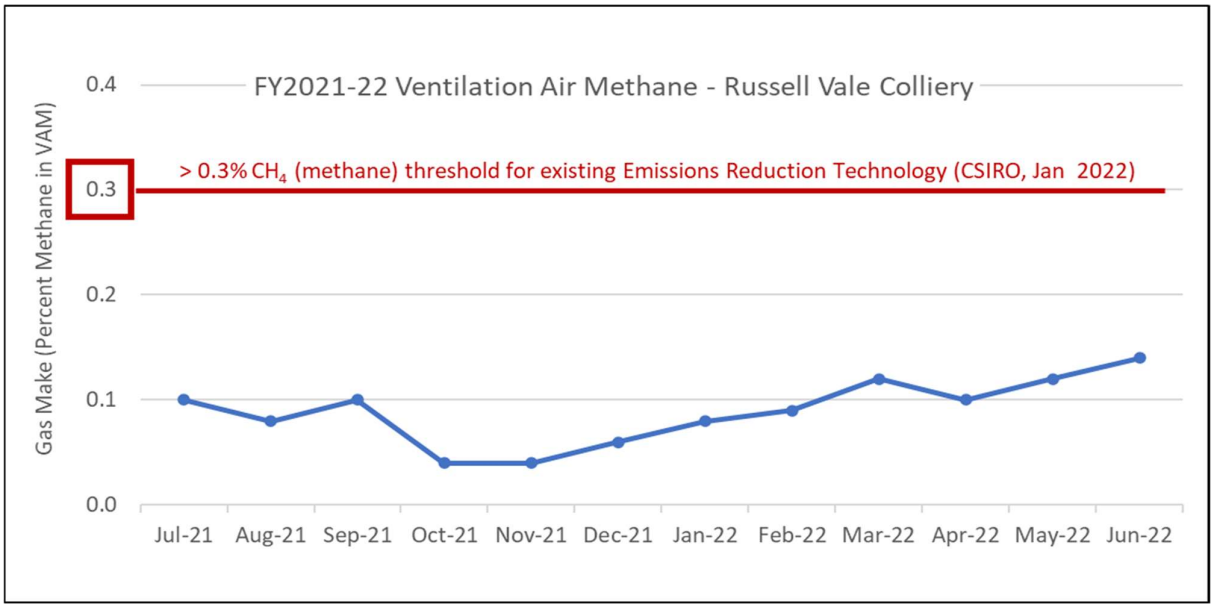

Figure 18: Ventilation Air Methane (VAM) from the Wongawilli seam at RVC for the reporting period, with reference to the minimum VAM required to utilise existing emissions reduction technology.

GHG emission reduction strategies are and will continue to be explored by WRPL at RVC.

- RVC continue to use ultra-low sulfur diesel fuels to reduce emissions
- RVC has solar power systems installed on site to reduce power use from the grid.
- WRPL have achieved savings of over 9,117,000 kWh of electricity with the decommissioning of redundant ventilation fans (4,117,000 kWh, equivalent to 3,335 tCO2-e per annum) in May 2020. In addition, the change from longwall to bord and pillar mining (changing extraction from 2 MT pa to 1 MT pa) reduced electricity consumption by approx 5,000,000 kWh pa, equivalent to 4,050 tCO2-e per annum). This is equivalent to 106,835 trees returned to the planet (seedlings grown for 10 years) (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator).
- WRPL have worked with Symbio Wildlife Park to plant 1,550 trees of the preferred species including 550 Gray Gums (*Eucalyptus punctata*), 450 Forest Red Gums (*Eucalyptus tereticornis*), 350 Swamp Mahogany (*Eucalyptus robusta*) and 100 Cabbage Gums (*Eucalyptus amplifolia*), 50 Nicholii (*Eucalyptus nicholii*) and 50 Pink Flowering Ironbark (*Eucalyptus sideroxylon*). These trees will support the koala breeding program at Symbio Wildlife Park, in addition to sequestering CO_2 from the atmosphere.
- RVC ventilation systems in the Wongawilli Seam have been rationalized to only ventilate essential roadways and production areas to reduce background emissions to as low as possible. WRPL continue to explore emerging technologies to assist low-emissions mines to reduce fugitive emissions, as there is not technology currently available for VAM (ventilation air methane) emissions below 0.3% methane. RVC VAM for the reporting period is shown in **Figure 18.**

6.17 Public Safety

6.17.1 Environmental Management

Russell Vale Site

Perimeter fencing with lockable gates have been installed to protect the site from unauthorised access and the consequential risk to public safety. Security guards patrol the site to ensure unauthorised access is kept to a minimum, and a network of surveillance cameras is in place to observe operational areas and infrastructure.

Signage is in place to identify the following:

- entry gates
- type and nature of chemicals stored or used
- voltage level of electrical equipment within protected enclosures
- areas requiring personal protective equipment
- authorised access areas
- water storages, and
- contents of pipelines (gas, water, compressed air etc.)

Metropolitan Special Area

Perimeter fencing with lockable gates have been installed to protect the No. 1 – No. 5 shafts and from unauthorised access and the consequential risk to public safety. Signage is visible on the gates to identify that the infrastructure is restricted to authorised access only.

6.17.2 Environmental Performance

Russell Vale Site

No observed public safety incidents occurred during the reporting period.

Metropolitan Special Area

No observed public safety incidents occurred during the reporting period.

6.18 Traffic

6.18.1 Environmental Management

Traffic is managed in accordance with the approved Traffic Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B30 of MP 09_0013.

6.18.2 Environmental Performance

Russell Vale Site

RVC hires a fleet of haulage trucks to haul its saleable product to the PKCT. RVC maintains a monitoring program to ensure that the conditions in Schedule 2, Condition B30 of MP 09_0013 are complied with.

Metropolitan Special Area

RVC has no commitments in place for traffic management in the Special Area.

WRPL obey the WaterNSW enforced speed limits for catchment fire trails, to minimise excessive dust kick-up, protect the integrity of the roads, and guarantee the safety of personnel.

7 WATER MANAGEMENT

7.1 Water Supply and Use

7.1.1 Potable Water

Town water is pumped to site and stored in above ground tanks for use in the bathhouse and administration buildings. The total volume of potable water used at RVC during the reporting period was 7728 kL, which is an increase of 284% from the 2718 kL recorded during the previous reporting period. The increased volume of potable water required during the reporting period can be attributed to the increased presence of personnel working at the site as the mine continues to expand its workforce. **Figure 19** compares the potable water used at RVC during the previous two reporting periods.

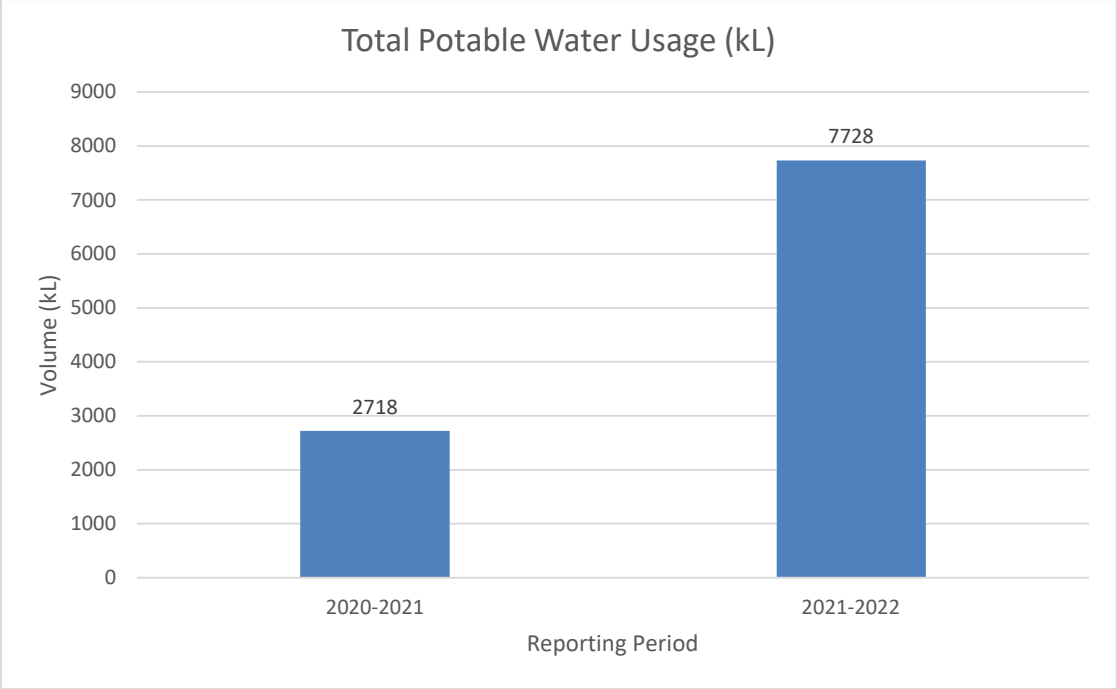

Figure 19: Potable Water Use at RVC

7.1.2 Water Take

Table 17 and **Table 18** summarises the details of RVCs Water Access Licences and compares the water taken by RVC to facilitate its operation throughout the previous two reporting periods. Results have remained zero over the previous two reporting periods, as RVC has not extracted any water from the natural environment, due to ample water storage and efficient recycling of underground discharge to effectively maintain operations.

Table 17: WAL 36484 - Water Take

Water Licence number	36484	
Water Sharing Plan	Greater Metropolitan Region Groundwater Sources 2011	
Source	Sydney Basin Nepean Groundwater Source	
Management Zone	Nepean Management Zone 2	
Entitlement (units or ML)	515.00	
Water Year	**Previous Reporting Period**	**Reporting Period**
Passive take / Inflows	112 units	112 units
Active Pumping	0 units	0 units
Total Take	112 units	112 units

Table 18: WAL 43561 - Water Take

Water Licence number	43561	
Water Sharing Plan	Greater Metropolitan Region Groundwater Sources 2011	
Source	Sydney Basin Nepean Groundwater Source	
Management Zone	Nepean Management Zone 1	
Entitlement (units or ML)	100.00	
Water Year	**Previous Reporting Period**	**Reporting Period**
Passive take / Inflows	0 units	0 units
Active Pumping	0 units	0 units
Total Take	0 units	0 units

7.1.3 Rainfall

Rainfall at RVC is recorded daily at the AWS, discussed in **Section 6.1**. **Figure 20** compares the total rainfall recorded at the AWS and Bureau of Meteorology (BOM) Bellambi Station AW94749 during FY22 and **Figure 21** compares FY22 to the previous 4 years. This comparison highlights the large increase in rainfall experienced at RVC throughout FY22.

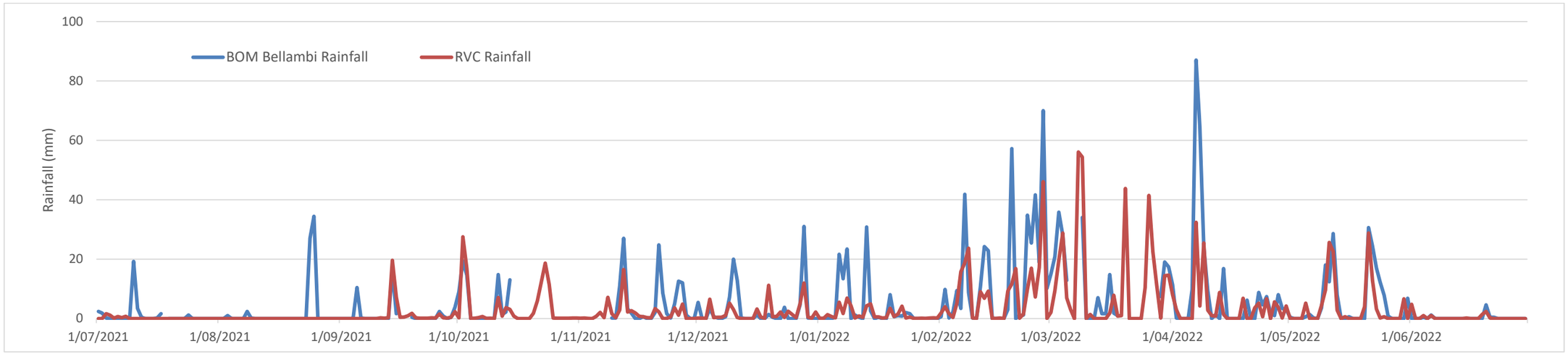

Figure 20: Annual Rainfall Data RVC and BOM Bellambi weather stations FY2021-2022, measured daily (mm)

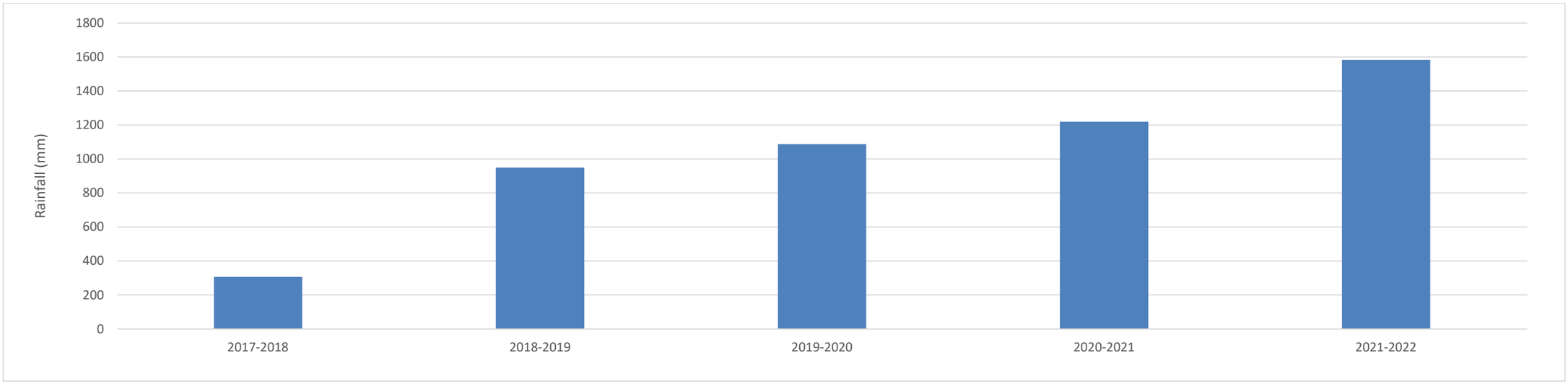

Figure 21: BOM Bellambi Historical Rainfall Data

7.2 Surface Water

7.2.1 Environmental Management

Surface water is managed in accordance with the relevant EPL 12040 conditions and the approved Surface Water Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B17 of MP 09_0013.

Russell Vale Site

RVC maintains several licensed discharge points in accordance with Section 55 of the *Protection of the Environment Operations Act 1997*. They are:

- LDP 1 – Underground drainage from coal stockpile and surrounding forested area
- LDP 2 – Outlet from the water treatment plant pipeline into the Bellambi Gully Stormwater Bypass Channel
- LDP 3 – Water that seeps through the main Storm Water Control Dam
- LDP 9 – Gabion spillway from the Storm Water Control Dam
- LDP 11 – Ambient water quality monitoring – Bellambi Gully leaving site (downstream)
- LDP 12 - Ambient water quality monitoring – Bellambi Gully entering site (upstream)

Clean water system

A series of cut-off drains are established up-slope of RVC surface facilities to capture stormwater run-off and divert it away from the operational areas and into local watercourses. These clean water drains are generally grassed open channels. The system carries the water from above the mine site to discharge through areas of bushland and via unnamed watercourses into tributaries of Bellambi Gully, Towradgi Creek, and Hicks Creek.

Bellambi Gully Diversion works were underway during the reporting period (now complete). Progress was affected due to COVID-19 restrictions and inclement weather conditions. The diversion was designed to minimise flooding and erosive impacts to the downstream reaches of Bellambi Gully, thereby minimising impacts to the remaining riparian areas.

Dirty water system

The dirty water drainage system at RVC is in place where the potential exists for run-off water to be contaminated by surface operations. Operations that normally contribute to the contamination of water run-off include coal handling, stockpile areas, truck loading facilities, workshops, store yards and associated operational and haulage roads.

The dirty water drainage system at RVC consists of several settling ponds and sumps, designed to slow down the movement of water, allowing for and promoting sediment deposition as water moves through the dirty water system.

All ponds and sumps are accessible by mobile equipment for the purpose of removing stored sediment. Cleaning of these ponds and sumps is undertaken as required to maintain the efficiency of the dirty water treatment facilities.

The dirty water system ends at the Storm Water Control Dam (SWCD) where it is transferred to the Water Treatment Plant for recycled use underground or the treated water is discharged offsite to Bellambi Gully via LDP 2.

Table 19 summarises the water storage capacities of the dams and sumps that make up the water management system at RVC.

Table 19: Water Storage Capacities

Water Storage	Storage Capacity (ML)
Dam 1 and 2	7
Dam 5	< 10
Pit Top Dam	8
Fire Dam	2
Highway Dam	0.3
Stormwater Control Dam (SWCD)	62
Dry Detention Basin	2.1
Clean Water Detention Basin	~ 26
Clean Water Storage	12

7.2.2 Environmental Performance

Russell Vale Site

As per the conditions in EPL 12040, surface water samples from LDPs and their flow volume data were collected monthly, if water was being discharged.

Table 20, Table 21, Table 22, Table 23 and **Table 24** compare the results obtained from LDP sampling during the previous two reporting periods.

Electrical Conductivity (EC)

Figure 22 compares the EC results collected from the LDPs over the last five reporting periods. As shown in the graph, EC concentrations have significantly decreased since 2017-18 and stabilised, remaining consistent even as RVC recommenced mining operations during this reporting period.

Turbidity

Figure 23 compares the turbidity results collected from the LDPs over the last five reporting periods. The significant increase in the concentration of turbidity shown for the 2021-22 reporting period, is a direct response to the increased rainfall experienced at RVC. The most significant increase can is seen at LDP12, which is sampled to determine the quality of water entering the RVC site. Subsequently, the increased, but comparably lower concentrations seen at LDP1 and LDP11, reflect the improved quality of the water after it has passed through the RVC dirty water system prior to exiting the site. Water passing through the RVC treatment plant before discharging via LDP2 has remained consistent with previous years despite the increased volume of high-turbidity water entering the system.

Environmental monitoring results assessed against the TARP criteria (Turbidity) have been within the Level 2 category for LDP 11 monthly averages. However the real-time measurements occur every 5 minutes, and rainfall passes through the catchment in pulses. Between December 2021 and May 2022 there were multiple 5-minute readings of turbidity which have exceeded the 300 NTU Level 3 trigger at both the ambient inflow (LDP12) and outflow (LDP11) in Bellambi Gully, these were associated with extreme rainfall events in the Illawarra.

Total Suspended Solids (TSS) and pH

Figure 24 compares the pH (LDP 1 and LDP 2) and TSS (LDP 11 and LDP 12) results collected over the last five reporting periods. pH concentrations have remained stable throughout the five reporting periods, with LDP 1 results fluctuating within an 8% range and LDP 2 results fluctuating within a 9% range.

The significant increase in the concentration of TSS shown at LDP 1 between the 2020-21 and 2021-22 reporting period, is a direct response to the increased rainfall in the region delivering sediment-laden water through the RVC dirty water system. Water passing through the RVC treatment plant before discharging via LDP 2 has remained consistent with previous years despite the increased volume of sediment-laden water entering the system.

In addition to its sampling obligations, RVC staff conducted routine inspections and maintenance of the water management infrastructure on site to ensure that the entire water management system remained functional throughout the reporting period.

Metals and Metalloids

The metal and metalloid readings for the reporting period are presented in Appendix A with reference to the water quality guideline (WQG). A description of the sampling sites is also provided. During this period water samples were initially measured as total metals and switched to dissolved metals later in the reporting period.

RVC has been fully compliant for 12 (arsenic, boron, cadmium, cobalt, lead, manganese, mercury, molybdenum, nickel, selenium, silver and zinc) of the 18 elements required for assessment within the EPBC 2020/8072. These metals have been consistently low at the RVC site and across the catchment as shown in Appendix A.

For six metals/metalloids, exceedances in concentration were periodically detected both on site (LDP11, LDP2) and across the catchment at control sites (Bellambi Gully headwaters control site LDP12, and catchment controls TC-AQ1, CC-AQ1) and downstream from the LDP11 discharge. WRPL are investigating the source of the exceedances related to the pit top operations and maintaining contact with the Department of Climate Change, Energy, Environment and Water (DCCEWW) during the investigation including with limited discharge arrangements from LDP2. Exceedances were associated with extreme rainfall events in the Illawarra, and most exceedances were based on total metal/metalloid concentrations. The majority of exceedances were no longer detected during the reporting period once analysis was changed to dissolved concentrations. The exceedances were detected for:

- Total Aluminium (not dissolved) was regularly detected above the water quality guideline (WQG) limit of 0.150 mg/L across the catchment control sites, and at the ambient inflow (LDP12) to the site and downstream outflow (LDP11), with the lowest readings reported at the RVC treated water point LDP2. Control sites and inflow sites were up to 10 times the WQG. Exceedances were mostly associated with extreme rainfall events in the Illawarra. However these exceedances were no longer detected during the reporting period once analysis was changed to dissolved Al concentrations.
- Antimony concentrations at the downstream outflow (LDP11) were periodically over the WQG (0.009 mg/L) and at the Bellambi Gully downstream 1 site. Exceedances were also detected on occasions of extreme rainfall events in the Illawarra. Antimony was also high at the water treatment plant (LDP2).

- Total chromium concentrations periodically exceeded the WQG across the catchment, particularly at control sites where concentrations were up to 6 times the guideline. No exceedances were associated with treated waters from the site. Speciation analysis showed that hexavalent Cr(VI) was consistently below the guideline across the catchment and on site throughout the reporting period. Exceedances were associated with extreme rainfall events in the Illawarra.
- Total copper (not dissolved) was regularly above the water quality guideline limit of 0.0025 µg Cu/L across the entire catchment (control and impact sites). However these exceedances were no longer detected once analysis was changed to dissolved metal concentrations.
- Total Thallium concentrations were occasionally above the water quality guideline limit across the catchment (control and impact sites), however it was never recorded above guidelines at the water treatment plant (LDP2) prior to discharge. Exceedances were detected on occasions of extreme rainfall events in the Illawarra. However these exceedances were no longer detected once analysis was changed to dissolved metal concentrations.
- Total Vanadium (not dissolved) was regularly detected above the water quality guideline (WQG) limit of 0.006 mg/L across the catchment control sites, at the ambient inflow (LDP12) to the site and downstream from the outflow (LDP11, BG DS 1 and BG DS 2). The RVC treated water at point LDP2 was consistently elevated. Control sites and inflow sites were up to 4 times the WQG. These exceedances improved during the reporting period once analysis was changed to dissolved V concentrations. The source and treatment of anions are being investigated.

Metropolitan Special Area

No surface water monitoring was conducted during the reporting period.

Table 20: LDP 1 Surface Water Sampling Results

Location	Month	pH (pH Unit)		Electroconductivity @ 25°C (µS/cm)		Suspended Solids (mg/L)		Turbidity (NTU)	
		Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period
LDP 1 (EPL 12040)	July	7.6	**7.4**	1821	**1693**	11	**<5**	7.5	**2.4**
	August	7.3	**7.6**	1692	**1854**	11	**9**	12.0	**2.3**
	September	7.5	**7.5**	1912	**1341**	5	**<5**	0.0	**3.8**
	October	7.1	**7.5**	1848	**1471**	8	**14**	4.1	**1.3**
	November	7.3	**7.8**	1695	**1652**	5	**<5**	1.3	**0.9**
	December	7.4	**7.6**	1753	**1584**	5	**6**	0.8	**1.7**
	January	7.4	**8.3**	1371	**1140**	5	**16**	13.6	**10.4**
	February	7.6	**7.7**	1275	**1145**	9	**14**	7.5	**6.9**
	March	7.4	**7.8**	1913	**691**	12	**19**	0.3	**56.4***
	April	7.8	**7.5**	1909	**820**	5	**20**	6.2	**70.3***
	May	7.6	**8.1**	1900	**203**	5	**42**	1.5	**166***
	June	7.6	**7.4**	1394	**1474**	6	**8**	0.9	**0**

* Increased values are the result of rainfall events.

Table 21: LDP 2 Surface Water Sampling Results

Location	Month	pH (pH Unit)		Electroconductivity @ 25°C (µS/cm)		Suspended Solids (mg/L)		Turbidity (NTU)	
		Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period
LDP 2 (EPL 12040)	July	9.0	**9.0**	1861	**1967**	6	**31**	26.0	**42.4**
	August	8.5	**9.1**	859	**2650**	24	**32**	36.3	**48.3**
	September	8.9	**9.2**	1392	**2049**	34	**34**	24.2	**64.8**
	October	9.0	**9.2**	2259	**2740**	20	**6**	46.7	**18.5**
	November	9.0	**9.2**	1513	**1670**	40	**8**	49.0	**16**
	December	9.1	**9.2**	2103	**1444**	10	**12**	17.8	**12.6**
	January	9.1	**9.2**	1796	**1466**	9	**11**	10.8	**12.7**
	February	9.1	**9.0**	293	**1463**	26	**5**	39.3	**11.8**
	March	9.0	**8.8**	1719	**558**	32	**28**	46.7	**58.1**
	April	8.7	**9.0**	1212	**705**	27	**17**	43.3	**26.7**
	May	9.1	**-**	1727	**-**	5	**-**	7.7	**-**
	June	8.8	**No discharge**	1439	**No discharge**	23	**No discharge**	49.2	**No discharge**

* May - Discharge was ceased before monthly sample timeframe had passed.

Table 22: LDP 2 Discharge Volumes

Location	Month	Total Volume Discharged (ML)	Average Volume Discharged (ML)	Discharge Limit (kL/day) (Dry Weather Conditions)
LDP 2 (EPL 12040)	July	14.8	0.48	2.5
	August	4.3	0.14	
	September	2.8	0.09	
	October	11.7	0.38	
	November	14.3	0.48	
	December	8.3	0.27	
	January	1.3	0.04	
	February	14.5	0.52	
	March	45.4	1.44	
	April	44.9	1.50	
	May	29.1	0.94	
	June	No Discharge	0.0	

Table 23: LDP 11 Monitoring Results

Location	Month	Electroconductivity @ 25°C (µS/cm)		Turbidity (NTU)	
		Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period
LDP 11 (EPL 12040)	July	1659	**1987**	33.1	**217**
	August	777	**2095**	179.4	**38.6**
	September	1369	**1779**	8.2	**33.4**
	October	1541	**1427**	18.9	**181**
	November	1319	**1247**	30.2	**85**
	December	1487	**1260**	43.5	**110**
	January	1229	**1189**	20.6	**68.6**
	February	1167	**1095**	27.8	**119**
	March	1113	**630**	42.5	**195**
	April	1063	**679**	37.9	**187**
	May	1104	**938**	263.0	**124**
	June	1472	**1208**	40.9	**100.4**

Table 24: LDP 12 Monitoring Results

Location	Month	Electroconductivity @ 25°C (µS/cm)		Turbidity (NTU)	
		Previous Reporting Period	Reporting Period	Previous Reporting Period	Reporting Period
LDP 12 (EPL 12040)	July	662	**632**	82.9	**19.5**
	August	442	**641**	71.2	**44.0**
	September	620	**758**	9.3	**60.6**
	October	614	**644**	23.4	**45.9**
	November	593	**567**	13.0	**54.6**
	December	639	**582**	16.8	**30.6**
	January	600	**536**	254.0	**42.8**
	February	601	**454**	34.2	**181.0**
	March	588	**287**	128.2	**1080**
	April	555	**278**	27.4	**1029**
	May	536	**500**	106.4	**179**
	June	601	**618**	30.5	**46.5**

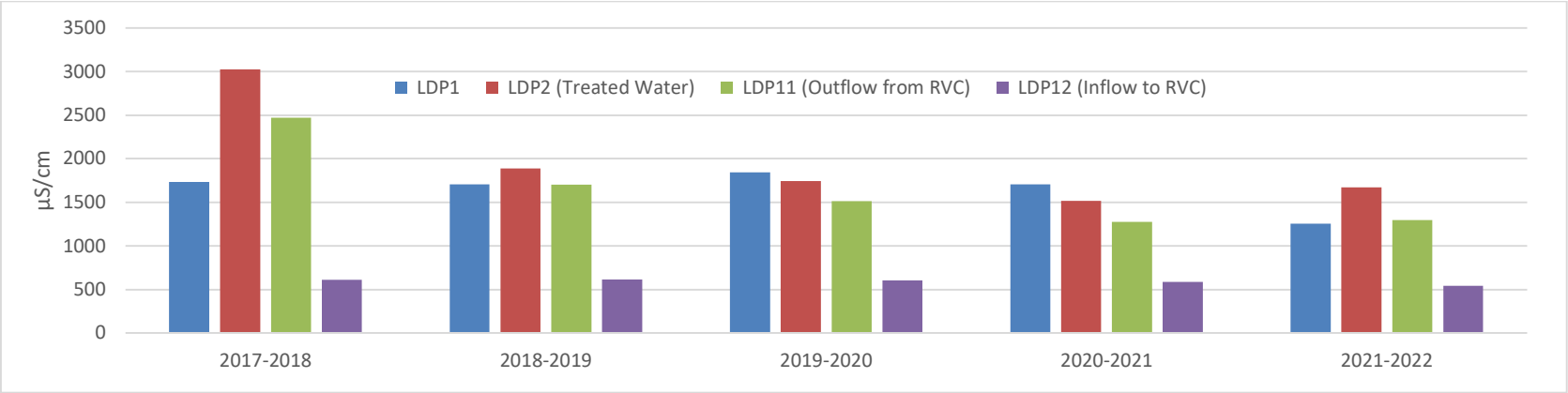

Figure 22: Historical Electroconductivity Data

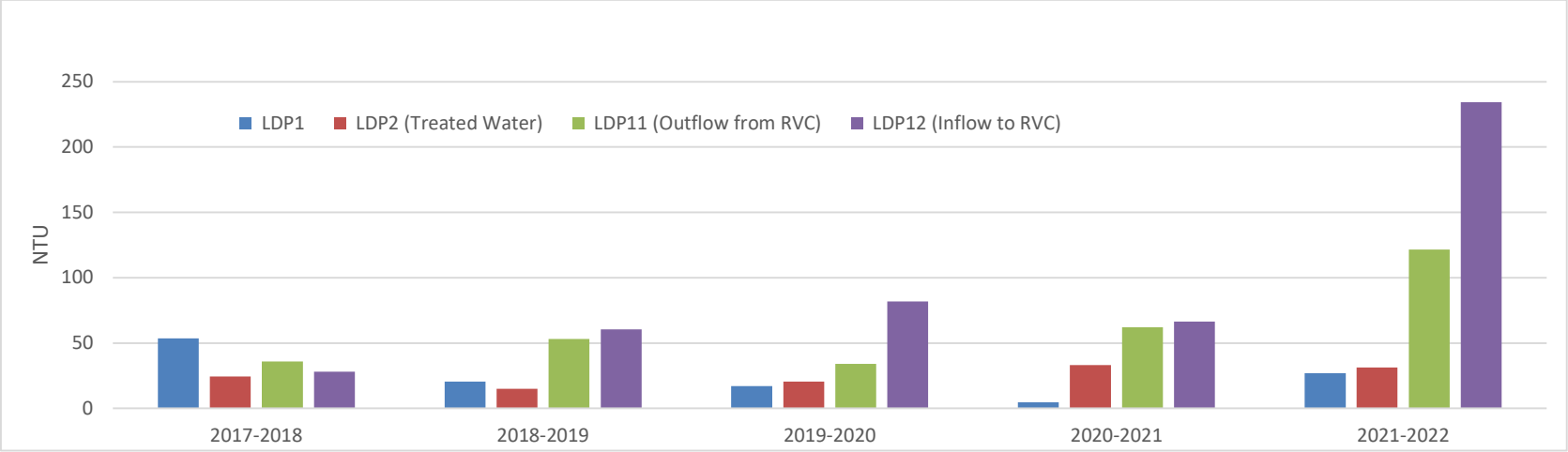

Figure 23: Historical Turbidity Data, with increased turbidity in 2021-22 correlated to extreme rain events.

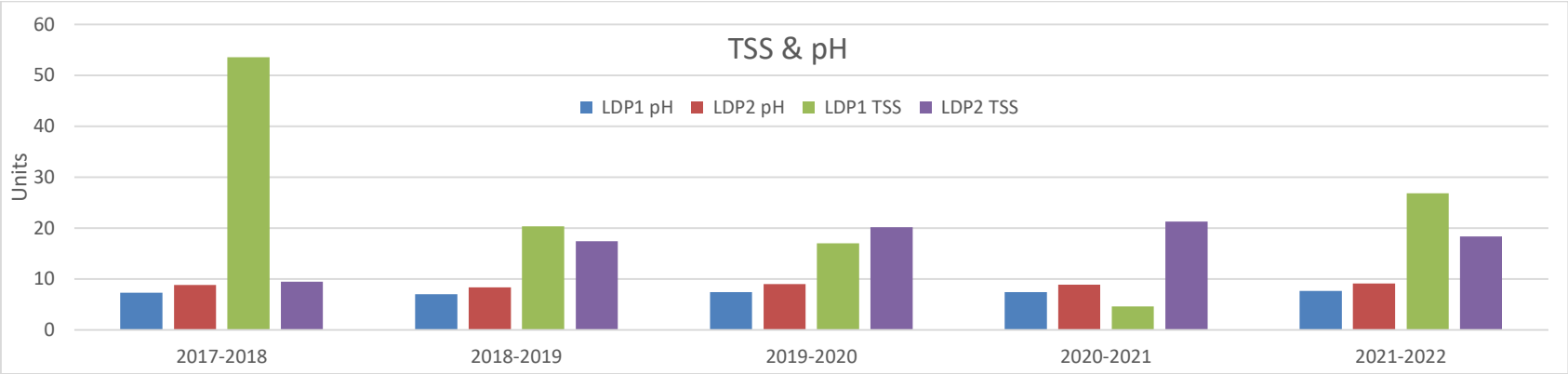

Figure 24: Historical TSS & pH Data

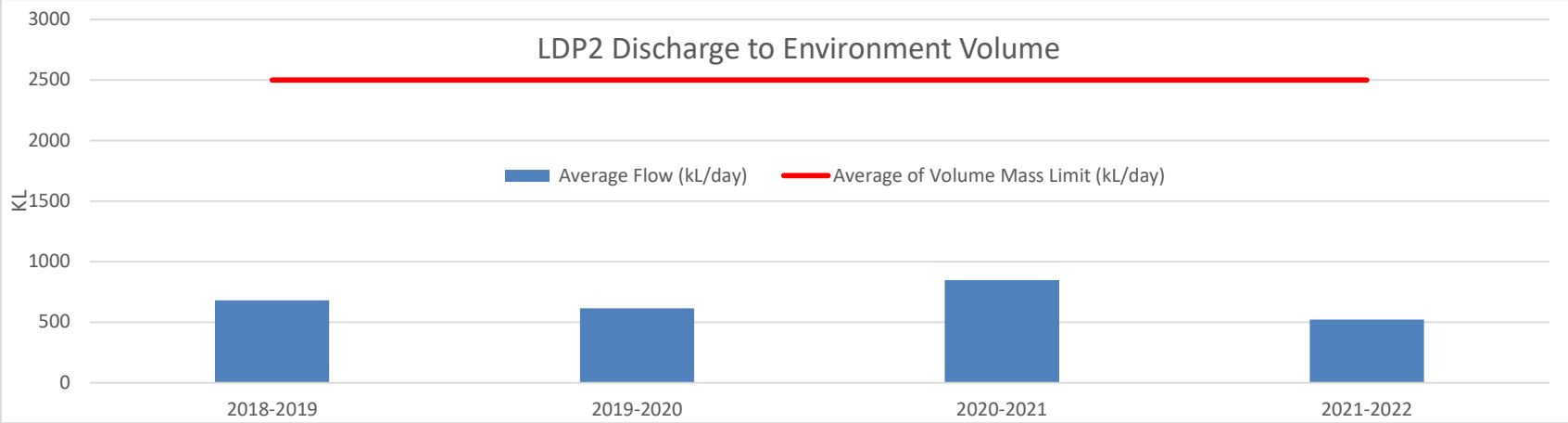

Figure 25: LDP 2 Historical Discharge Data

7.3 Groundwater Management

7.3.1 Environmental Management

Russell Vale Site

Mine De-watering

Groundwater at RVC is moderately alkaline and exhibits dissolved solids predominantly in the form of sodium bicarbonate. This is characteristic of the groundwater quality found in the underground mines of the Illawarra. RVC mine water quality is not expected to vary significantly, as the water quality is primarily determined by the hydrogeology of the region rather than the activities of the mine.

Groundwater is managed in accordance with the approved Water Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B17 of MP 09_0013. It is collected in pits and sumps underground and is prioritised for use in mining activities wherever practical. The primary use of captured groundwater is dust suppression at the operating coal face or on transport roadways and conveyor systems. Mine de-watering is performed via B-Portal when required to ensure access and ventilation is maintained.

A summary of dewatering volumes, monthly field readings and quarterly laboratory analysis summaries can be seen in **Table 28.**

RVC Groundwater Monitoring

Three groundwater monitoring boreholes have been installed at different location across the RVC Pit Top, to satisfy Development Consent MP 09_0013, Schedule 2, Condition B17.

Metropolitan Special Area

The Groundwater Monitoring Plan was written to satisfy Development Consent MP 09_0013, Schedule 2, Condition B17. The Monitoring Boreholes are drilled to depths which target the Hawksbury Sandstone and their associated water tables. The program will generate necessary ground water data to complement the existing and future environmental monitoring programs and future mining approvals.

7.3.2 Environmental Performance

Russell Vale Site

Mine De-watering

During the reporting period, mine de-watering via B-Portal increased by 374%, which can be seen in **Figure 30**. An increased volume of mine de-watering was expected to occur during the reporting period, as RVC transitioned from Care and Maintenance to coal production. Figures are expected to rise further throughout the next reporting period as RVC continues to ramp up its production.

Table 28 summarises the results of the water quality sampling conducted at the B-Portal throughout the reporting period. Fluctuations in the data are visible, as the source of the water, and/or the section of the mine from which the water was pumped was changed. Fluctuations are most significant in electroconductivity results, whereas the other analytes analysed remained relatively consistent throughout the reporting period.

RVC Groundwater monitoring

Three groundwater monitoring boreholes were installed during the last reporting period (**Table 25**). RVC Pit Top groundwater monitoring data for each monitoring sites is shown in **Table 26** Table 25for pH and EC, respectively. The pH and conductivity (EC) is relatively stable in each location.

Table 25: RVC Groundwater Monitoring Boreholes

BORE	CO-ORDINATES (MGA 56)		Elevation (m)	Screen Depth (mbGL)	Purpose
	Easting	Northing			
PB1	306357.511	6196133	48.17	5.5-14.5	OSP installation site for groundwater monitoring
PB2	306777.576	6195778.71	27.564	5-8	OSP installation site for groundwater monitoring
PB3	306405.484	6195558.807	47.904	8.5-14.5	OSP installation site for groundwater monitoring

Table 26: RVC Groundwater pH and Electrical Conductivity (EC)

	pH			EC (µS/cm)		
	PB1	PB2	PB3	PB1	PB2	PB3
20 Jan 2022	5.19	6.94	7.31	177	1324	946
1 March 2022	4.92	6.92	6.01	176	1183	1158
22 March 2022	5.34	7.41	6.70	189	1247	1176
22 April 2022	5.24	7.20	5.68	185	1240	1471
25 May 2022	4.34	6.53	6.20	226	1687	1436

Metropolitan Special Area

During the reporting period, 6 groundwater monitoring boreholes were installed in the Metropolitan Special Area, with three new groundwater monitoring boreholes proposed during FY 23, shown in **Table 27**.

Table 27: Completed & Proposed Metropolitan Special Area Groundwater Monitoring Boreholes

BORE	CO-ORDINATES (MGA 56)		Elevation (m)	Screen Depth (mbGL)
	Easting	Northing		
Completes Boreholes				
RV 39	302937	6196635	373.85	26-35 m
RV 40	302931	6196295	393.63	35-44 m
RV 41	303554	6196560	346.93	26-35 m
RV 42	303374	6196261	375.835	14-23 m
RV 44	303660	6195798	375.91	5-14 m
RV 45	303920	6195974	376.78	8-17 m
Proposed Boreholes				
RV43A	302700	6195481	-	9-15m
RV43	302691	6195477	-	Various to ~270 m
RV48	304375	6196676	-	Various to ~250 m

7.4 Groundwater Quality Trends

RVC Swamp pH and EC

Groundwater quality has been monitored across multiple sites since 2014 for pH and EC, respectively (**Figure 26 and Figure 27)**. Several of the swamps are ephemeral and respond directly to rainfall. The presence of water in the swamps has increased with extreme rainfall events throughout the reporting period. Many of the swamp monitoring piezometers were recorded as dry between July and November 2021. Piezometers PCc2 and PCc4A were dry from July to October and PB4C, PCc10B, PCr1A were predominantly dry throughout the year.

The water levels in all piezometers compared to site rainfall data indicates that there is a lag time of approximately one month for water levels to respond to an increase in rainfall. It is also noted that piezometers installed closer to the middle of swamps respond sooner to rainfall compared to piezometers located on the edge of swamps.

Sites PCc12B, PCc3, PCc6, PCr1D, SP1 and SP2 have been dry since monitoring began in 2014. It is noted that SP1, SP2 and PCc6 are constructed in shallow weathered Hawkesbury Sandstone near swamp Ccus6 and Ccus3, not within a swamp. Sites PCc3 and PCc6B are within mapped swamps Ccus3 and Ccus6, respectively. These swamps are located above the historical Balgownie Seam longwall workings and the Wongawilli Seam longwall workings (Wongawilli LW4,5,6) that commenced in 2012 and ceased operations in 2015. The groundwater impact assessment for the Russell Vale Extension by a consultant replicated subsidence impacts above LW4,5,6 and predicted localised drawdown in the Hawkesbury Sandstone in this area due to the previous mining activities. Consultants has interpreted these results to show that the current mine operations do not directly undermine this area and are not predicted to cause additional impact beyond the existing impacts in this area.

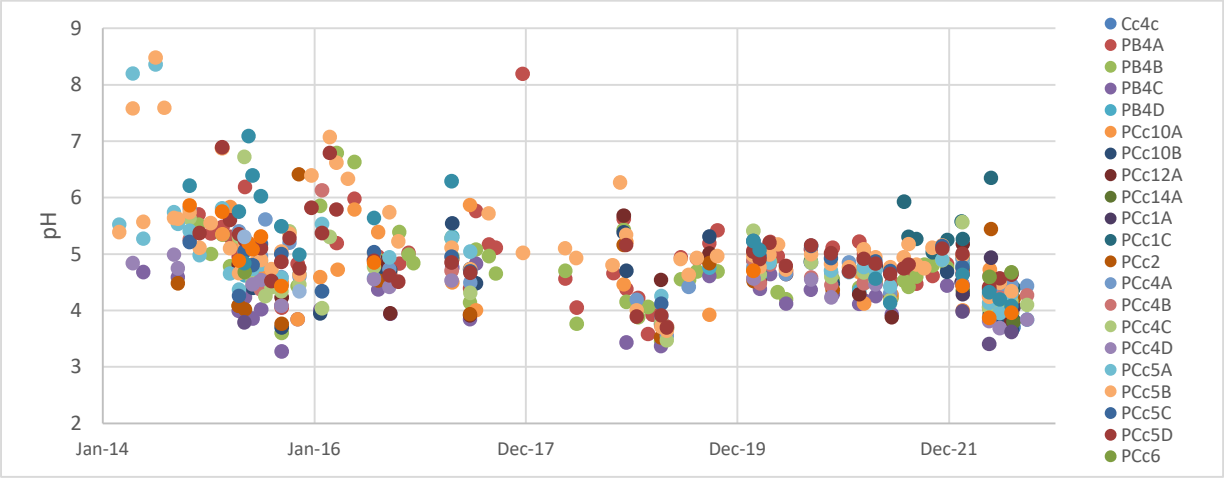

Figure 26: Metropolitan Special Area Swamp pH readings between 2014 – June 2022

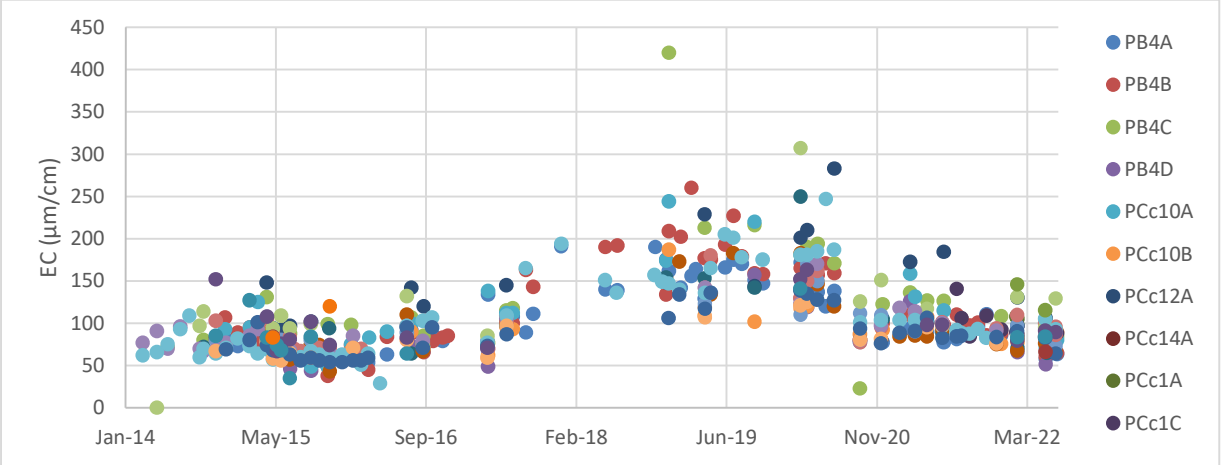

Figure 27: Metropolitan Special Area Swamp EC readings between 2014 – June 2022

Metropolitan Special Area groundwater quality trends

Groundwater quality monitoring data for all monitoring sites compared are shown in **Figure 28 and Figure 29** for pH and EC, respectively. All borehole monitoring sites across the lease area that are monitored by WRPL are included in these figures including sites not listed in the Groundwater Management Plan.

The pH and conductivity (EC) across the catchment have varied consistently since 2016, with intra-site variability likely linked to rainfall (from drought to extreme rainfall).

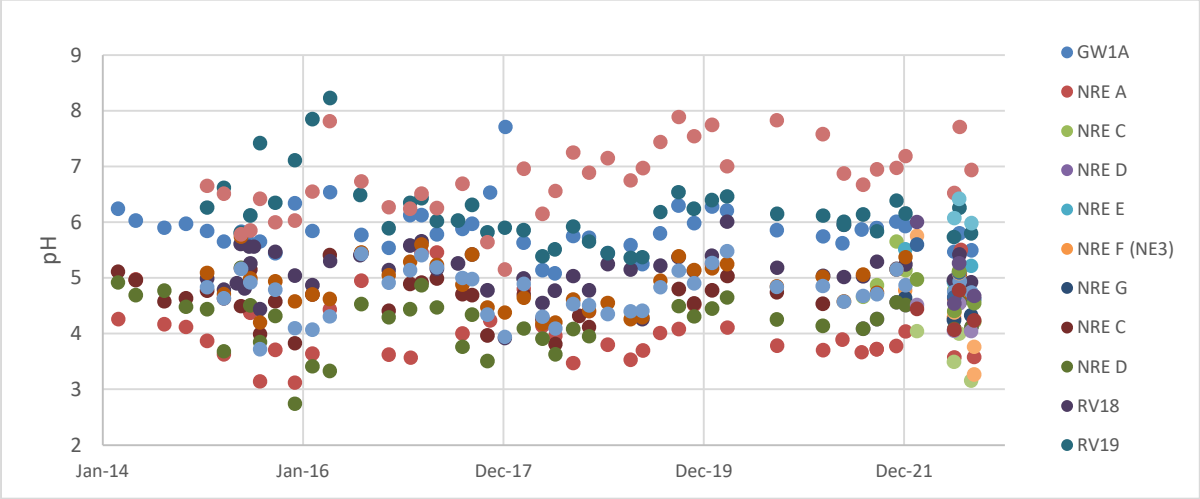

Figure 28: Metropolitan Special Area Borehole pH readings between 2014 – June 2022

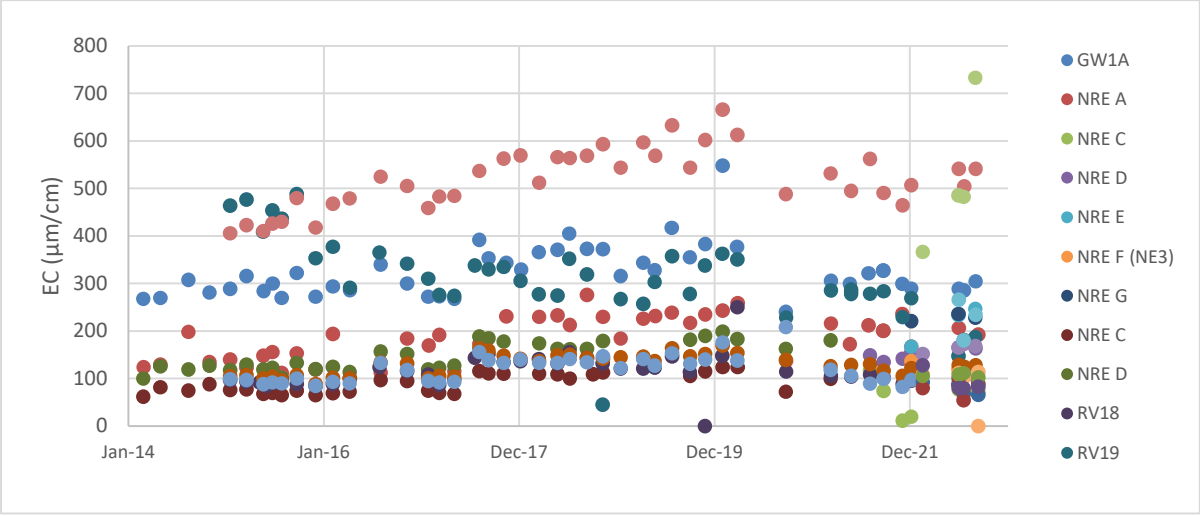

Figure 29: Metropolitan Special Area Borehole EC readings between 2014 -June 2022

Table 28: B-Portal Monitoring Results

Month	pH	Electroconductivity @ 25°C (µS/cm)	Dissolved Aluminium	Dissolved Arsenic	Dissolved Molybdenum	Dissolved Tin	Dissolved Sulfate	Discharge Volume (kL/day)
July	8.9	3020	<0.01	0.009	0.031	<0.001	5	320
August			-	-	-	-	-	342
September	8.8	3050	-	-	-	-	-	326
October			0.03	0.006	0.03	<0.001	72	335
November	9.0	2950	-	-	-	-	-	330
December	9.2	2566	-	-	-	-	-	333
January	9.1	2972	0.02	0.004	0.032	<0.001	73	47
February	9.1	1958	-	-	-	-	-	221
March	8.1	1558	-	-	-	-	-	340
April	9.2	2003	0.03	0.01	0.031	<0.001	84	508
May	9.2	2766	-	-	-	-	-	547
June	8.5	611	-	-	-	-	-	471

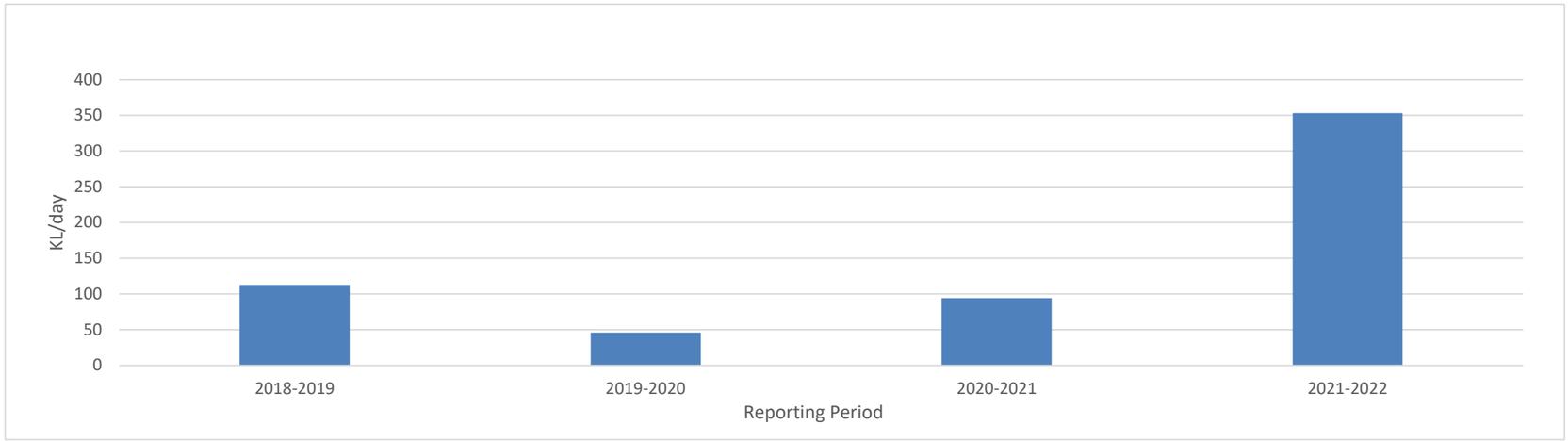

Figure 30: Historical B-Portal Discharge Volumes

8 REHABILITATION

Rehabilitation is managed in accordance with the Rehabilitation Management Plan, prepared to satisfy the requirements of Schedule 2, Condition B45 of MP 09_0013.

8.1 Infrastructure

8.1.1 Buildings

No buildings were renovated or removed during the reporting period.

8.1.2 Adits

No adits were rehabilitated during the reporting period.

8.1.3 Dams, Ponds, Sumps

No dams, ponds or sumps were decommissioned during the reporting period.

8.1.4 Shafts

No shafts were decommissioned during the reporting period.

8.2 Rehabilitation of Disturbed Land

No rehabilitation of disturbed land occurred at RVC during the reporting period.

Table 29 summarises the status of the disturbed areas at the end of the reporting period and the proposed rehabilitation to take place. RVC has recently recommenced operations. There are no plans to increase the total mine footprint, and no plans to change the pit-top operational area.

Table 29: Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2020-2021 (Ha)	2021-2022 (Ha)	2022-2023 (Ha)
A. Total mine footprint	6545	6545	6545
B. Total Active Disturbance	103	103	103
C. Land being prepared for rehabilitation	0	0	0
D. Land under active rehabilitation	0	0	0
E. Completed rehabilitation	0	0	0

8.3 Rehabilitation Trials and Research

No rehabilitation trials or research was conducted at RVC during the reporting period.

9 COMMUNITY RELATIONS

9.1 Community Consultation

In accordance with the requirements of Schedule 2, Condition A19 of MP 09_0013, WRPL has established a Community Consultative Committee (CCC) for RVC that operates generally in accordance with the DPE *Community Consultative Committee Guideline for State Significant Projects (January 2019)*. The CCC is a forum to discuss the development and outcomes of monitoring programs. The CCC meets four times a year and consists of an independent chair, representatives from the community, representatives from Wollongong City Council and representatives from WRPL. Minutes of the meetings are made available on the WRPL website.

9.2 Complaints Handling

WRPL operates a dedicated 24-hour community contact line (02 4223 6800) and email address (community@wcl.net.au). Details of these community contact lines are available on the WRPL website. Complaints are recorded in the complaints register and made publicly available on the WRPL website.

Table 30 summarises the community complaints received by RVC over the reporting period. Details are also recorded on the WRPL website.

RVC recommenced construction and operations in 2021 and were contacted 27 times with complaints and enquiries during this reporting period. Many of the complaints were associated with the increase in activity. The complaints related to the following categories:

- Noise (21) – 10 relating to a generator that was noise level compliant but has now been removed
- Air/Dust (1)
- Other (5) – primarily vegetation

Table 30: Community Complaints Summary

Date	Type	Complaint Details
3 July 29 July	Noise	Complaint x2 regarding operation of generator supplying power to BG pumps involved with construction activities from a resident. Investigation followed and Construction works were being completed within designated hours of construction.
3rd August	Air/Dust	Resident concerned about amount of dust coming into their home from construction activities. Water Cart to run more often during high wind conditions and establishment of vegetation on bare areas planed.
7th September	Noise	Complaint received regarding delivery to site at 5am. RVC investigated and found oversize truck delivery at 445am. Oversize vehicle had to travel on public roads before 530am. In future oversize deliveries will park in truck bay. Turn off engines and any flashing lights designated delivery time reached before proceeding with delivery.
4th October	Noise	Complaint received regarding the operation of generator after designated hours of operation. WRPL contacted resident to advise of matters related to COVID-19 which have led to communication breakdown which led to generator being left on.
15th October	Noise	Complaint received regarding the operation of generator after designated hours of operation. WRPL advised the resident of the new need to run generator to support mining operations as the generator had failed earlier in the day until 10pm.
16th October	Noise	Complaint received regarding the operation of generator after designated hours of operation. WRPL advised the resident of the new need to run generator to support mining operations as the generator had failed earlier in the day until 10pm.
19th October	Noise	Complaint received regarding operation of generator outside of designated hours of operation. WRPL turned off generator.
5th November	Noise	Complaint received regarding operation of generator outside of designated hours of operation. WRPL contacted resident that generator was required to continue to support a wet weather response at RVC after prolonged heavy rainfall.
21st November	Noise	Complaint received regarding operation of generator outside of designated hours of operation. WRPL contacted resident that generator was required to continue to support a wet weather response at RVC after prolonged heavy rainfall. WRPL noted that investigation into a permanent replacement/solution is now progressing.
28th November	Noise	Complaint received regarding operation of generator outside of designated hours of operation. WRPL contacted resident to advise of matters related to COVID-19 which have led to communication breakdown which led to generator being left on.
30th November	Noise	Complaint received regarding operation of generator outside of designated hours of operation Resident stated new unit is louder than old unit. Kennards confirmed that the units produce same sound output.
5th December	Noise	Complaint received regarding operation of generator outside of designated hours of operation. WRPL had meeting with residents to advise they could contact CEO directly to discuss their ongoing concerns with Generator.
17th December	Noise	Resident concerned with noisy truck near generator and asked about activity. WRPL advised the truck was a once off, carry out service location work so permanent power supply can be installed to remove generator.
20th December	Noise	Resident called to report truck with loud brakes on Bellambi Lane. WRPL sent an email to logistics requesting an investigation into squealing truck brake.

Date	Type	Complaint Details (cont.)
10th January	Noise	Resident called to complain that a Western Star Truck and Dog on northern distributor, tailgated complainant and gestured inappropriately. RVC investigation of GPS tracking suggests that no trucks from RVC was on northern distributor at reported time, however WRPL noted that more information and specific location would be helpful in the future.
18th January	Noise	Resident called to complain about an increase in noise from generator. WRPL called supplier 'genset' investigated dB level or frequency from previous generator. Noise investigation showed RVC is in compliance.
24th January	Other	Resident complained about long grass on WRPL property in which backs onto their property. WRPL Discussed concerns with resident, and provided update to planned works in Feb/Mar. Resident satisfied with WRPL actions.
18th February	Other	Resident called to complain about long grass on RVC property boundary which backed onto residents' property. Multiple attempts to contact resident back were made however wrong number phone was supplied.
24th March	Noise	Resident complained about truck noise. Investigation with noise monitors followed, highlighting RVC in compliance with noise limits by 4.5dBa. Logistics manager to investigate further noise mitigation solutions.
10th April	Noise	Resident complained about site noise, specifically 'a constant drone' and low frequency noise. WRPL investigated sources of noise and results showed RVC compliance with noise limits. Unfavourable weather conditions may have caused additional perceived noise.
19th April	Noise	Complaint received from resident about loud fan noise coming from the mine. WRPL discussed noise complaint with resident, who stated the noise was getting louder. Investigation followed, showing RVC was in compliance however adverse weather conditions may have been the cause for additional perceived noise.
April-June	Other	Complaint received by 2 neighbours (residents) about large branches near their properties. WRPL inspected complaint and put the work out for tender. Offending branches were removed by an arborist in June.
16th May	Noise	Complaint received from resident regarding operation noise. Noise investigation was completed on 11/05, which highlighted some noisy rollers and tripper. WRPL passed on information that 'noisy rollers' were to be changed out during maintenance on the 25/5.
27th May	Noise	Complaint received from resident regarding operation noise, particularly vehicle movements. Follow up investigation to follow in favourable weather conditions.
14th June	Other	Complaint received about overhanging branches. Limb has been damaged and hanging precariously. Arborist contacted to complete works. Tree limb removed.
21st June	Other	Complaint received from resident that operational trucks associated with 'pipe cleaning', left tyre marks on the nature strip. WRPL identified suitable material to fill in divot.

10 INDEPENDENT ENVIRONMENTAL AUDIT

As required by Schedule 2, Condition F13 of MP 09_0013, unless the Secretary agrees otherwise, WRPL is required to commission and pay the full costs of an independent environmental audit (IEA) by the end of September 2022 and every three years thereafter.

WRPL commissioned a consultant to conduct an IEA of the RVC in 2022. The audit assessed the compliance of RVC against MP 09_0013, and other relevant environmental approvals and licences for the period of 1 September 2021 to 31 August 2022.

Results of the IEA can be found on the WRPL website: https://wollongongresources.net.au

11 INCIDENTS, NON-COMPLIANCES AND EXCEEDANCES

During the reporting period, RVC was generally compliant with the relevant approvals listed in **Section 3**. All incidents, non-compliances, and exceedances of the criteria recorded during the reporting period are listed in **Table 31**. It is noted that an exceedance of criteria is not necessarily classified as a non-compliance.

No regulatory action occurred during the reporting period.

Table 31: Non-compliance Proposed Action Plan

Date	Relevant Approval	Type and Classification (if required)	Location of event	Details	Investigation/ Review	Corrective Actions
10 December 2021	MP09_0013	Water Management - TARP Level 3	Pit top Licenced Discharge Point LDP11	High Turbidity alarm at inflow and outflow sites of Bellambi Gully during high rainfall event	When compared to the quality of water in Bellambi Gully entering site (as measured at LDP 12), the water quality at LDP 11 followed similar trends, with prolonged elevated turbidity levels, which are expected to be related to the use of the old BGC pipe alignment.	Visual analysis identified brown/clay sediment, likely related to existing Bellambi Gully Diversion works contributing to turbid waters flowing in from catchment. Continued wet weather monitoring undertaken.
17 December 2021	MP09_0013	Noise Monitoring	Pit top South monitor (NM2)	One real-time noise monitor (South Monitor) lost power.	The power was isolated by the provider to conduct works approved under its DA-2021/762. Power not planned to be reinstated until Feb 2022.	Replacement power unit sourced, communicated to DPIE & EPA on 12/01/22.
March 2022	EPL 12040 Condition M2.1	Dust Monitoring	RVC	Depositional Dust Gauge (DDG) sampling container went missing during the March 2022 reporting period.	There was no dust data was available for collection for March 2022.	New container was installed immediately, and data collection resumed.
May 2022	MP09_0013	Technical non-compliance	RVC	Under the MP09_0013, consent MP10_0046 was to be surrendered by April 2022.	Non-compliance: WCL commenced the surrender process on 4 May 2022, outside the time period required by this condition.	This was identified under IEA. RVC notified DPE as part of IEA Report submission. Ongoing communication and assistance from DPE.
May 2022	MP09_0013 EPL 12040 Conditions M4.1 and M8.1	Meteorological Monitoring	Pit top Weather Station	The meteorological station has not been capable of continuously recording real-time measurements for wind speed, wind direction and temperature.	Non-compliance: There is no evidence of the Planning Secretary approving an alternative meteorological station.	This was identified under IEA. RVC notified DPE as part of IEA Report submission. RVC have increased solar panel capacity and position and upgraded battery capacity and inverter.
May 2022	MP09_0013	Water Management - Technical non-compliance	Pit top Licenced Discharge Point LDP11	9 multi-day rain events (41 d) between January-May 2022 where outflow discharges (LDP11) were more turbid than inflow (Point 12). Four of these events were notified to EPA and DPE, but three notifications >24 hours after the high turbidity readings commenced.	WRPL did not follow the requirements of the TARP in the Water Management Plan - failing to notify DPE and EPA of all discharges. There is no evidence of WRPL investigating the higher turbidity levels, and of additional mitigation measures or controls to mitigate future occurrences.	Periods of compliance have been recorded, however not all were reported. This was identified under IEA. WRPL notified DPE as part of IEA Report submission. WRPL will improve reporting practices.
May 2022	MP09_0013	Management Plan - Technical non-compliance	Technical non-compliance	An Adit Discharge Water Management Plan (ADWMP) was not submitted to DPE within 12 months of commencing development under MP09_0013	Non compliance - The AWDMP was not submitted to the Planning Secretary for approval within 12 months of commencing MP09_0013, and WRPL did not notify DPE.	WRPL submitted the ADWMP to the Planning Secretary on 6 May 2022 and has implemented the plan. DPE issued WRPL with a 'Caution' for the non-compliance.
May 2022	MP09_0013	Management Plan - Technical non-compliance	Technical non-compliance	A Social Impact Management Plan (SIMP) was not submitted to DPE within 12 months of commencing development under MP09_0013	Non compliance - The SIMP was not submitted to the Planning Secretary for approval within 12 months of commencing MP09_0013, and WRPL did not notify DPE.	WRPL submitted the SIMP to the Planning Secretary on 24 June 2022 and has implemented the plan. DPE issued WRPL with a 'Caution' for the non-compliance.
13 May 2022	EPBC 2020/8072 Condition 8a	Water Management	Pit-top water	During monitoring required under EPBC Condition 8.b., an exceedance of default guidelines for relevant metals and metalloids was detected within Bellambi Gully at LDP 11 (outflow) and LDP12 (inflow).	Sampling identified exceedances of guideline values outlined in Condition 8.a. RVC ceased discharges to Bellambi Gully. Investigation showed that exceedances at both inflow waters (upstream), with others originating from site.	WRPL are complying with DCCEEW instructions. Monitoring is ongoing, discharge is limited, and water treatment optimisation is underway.

12 ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD

12.1 Construction

The following projects will commence, and be managed in accordance with the revised Construction Environment Management Plan:

1. Continue construction of the Bellambi Gully Diversion project; and
2. Construction of additional bathhouse facilities.

12.2 Environmental Management

To satisfy Schedule 2 Condition F7 of MP 09_0013, RVC will revise all environmental management plans.

Appendix. EPBC 2020/8072 Water Chemistry and Water Quality Guidelines

The Bellambi Gully system is monitored from the headwaters at the base of the Illawarra escarpment, denoted in the EPL as the ambient inflow monitoring Licenced Discharge Point 12 (LDP12). This is the upstream control site. From here, Bellambi Gully flows through the Russell Vale Colliery pit top via an open channel, interrupted by culverts. Treated waters are discharged from the RVC water treatment plant (clarifier, Licenced Discharge Point 2 (LDP2)) into Bellambi Gully to the west of the Princes Highway. The discharge water is diluted with the gully water. Bellambi Gully is monitored as the water leaves the pit top site, denoted in the EPL as the ambient inflow monitoring Licenced Discharge Point 11 (LDP11). The discharge monitoring point is located as the gully passes under the highway, and the gully receives contributions from surface runoff from the Princes Highway. The gully then passes through road crossings, residential and industrial land before passing under major road and rail networks. At its' downstream extent Bellambi Gully passes through maintained recreational playing fields before joining Farrahars Creek, which is estuarine.

Three impact monitoring sites have been established downstream of the pit top discharge point (LDP11) along Bellambi Gully to assess stream health conditions immediately downstream of the discharge point (BGC-AQ1) and in the downstream receiving environments (BGCDS2 and BGC-DS3). Two control sites have been established (CC-AQ1, and TC-AQ1) to compare stream health conditions against impact site BGC-DS1.

Control sites (TC-AQ1, CC-AQ1), Upstream ambient (LDP12), Treated water at RVC Treatment Plant (LDP2), Discharge point (LDP11), Downstream from RVC in Catchment (BG DS 1, BG DS 2).

Figure 32 Appendix – Annual average of 18 metals and metalloids (mixture of data: total and dissolved) in the RVC catchment.

Sites are control sites (TC-AQ1, CC-AQ1 and upstream ambient headwaters LDP12), raw treated water prior to dilution in Bellambi Gully (LDP2), discharge point from RVC mixed with gully waters (LDP11) and downstream sites within the urban/industrial area of Bellambi (BG-DS1, BG-DS2, BG-DS3). Orange line depicts the water quality guideline value (EPBC 2020/8072, ANZECC 2000).