Bloomfield Colliery

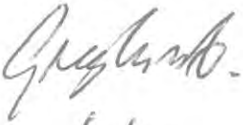
Annual Review Report

2021

Bloomfield Collieries Pty Ltd

Annual Review Report 2021

Table 1: Title Block

Name of Mine	Bloomfield Colliery (including the "Bloomfield Site"		
Project Approval	PA 07_0087 + PA 05_0136 ("Bloomfield Site")		
Name of PA Holder	Bloomfield Collieries Pty Limited		
Titles/Mining Leases	ML1738, CCL761, AMA1001		
Name of leaseholder	Bloomfield Collieries Pty Limited		
Name of Mine Operator	Bloomfield Collieries Pty Limited		
MOP Commencement Date	January 2021	MOP Completion Date	2 July 2022
Annual Review Commencement Date	1/1/2021	Annual Review End Date	31/12/2021
Water Licence	20AL217062 WAL 41506		
Name of Licence holder	Bloomfield Collieries Pty Limited		
I, Greg Lamb, certify that this audit report is a true and accurate record of the compliance status of Bloomfield Colliery for the period 1/1/21 – 31/12/22 and that I am authorised to make this statement on behalf of Bloomfield Collieries 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	Greg Lamb		
Title of Authorised Reporting Officer	Environmental Advisor		
Signature of Authorised Reporting Officer			
Date	20/6/22		

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1 STATEMENT OF COMPLIANCE

Table 2: Statement of Compliance

Were all conditions of the relevant approvals complied with?	
PA 07_0087	No
ML 1738, CCL761, AMA1001	Yes

Table 3 below lists the non-compliances identified during the reporting period. For further details regarding the non-compliances identified refer to Section 11.

Table 3: Non-compliances with PA 07_0087 and EPL 396

Condition	**Non-Compliance**	**Risk Level**	**Where addressed in Annual Return**
Schedule 3, Condition 18, L1 EPL396	Water from sediment dam passively seeping water	Low	Section 7.1.3 Section 11
Schedule 3, Condition 18, L1 EPL396	Water from retention basin passively spilling water	Low	Section 7.1.3 Section 11
Schedule 3, Condition 18, L2 EPL396	TSS exceedance during licenced discharge event	Low	Section 7.1.3 Section 11

2 INTRODUCTION

Bloomfield Collieries (Bloomfield) is one of two open cut coal mines which are part of the Bloomfield Group of Companies (TBG). Bloomfield Colliery is located at Ashtonfield, NSW, (Figure 1) and produces approximately 0.6 million tonnes of product coal by open cut methods per year. Coal has been mined within the area since 1850 . Underground mining by the current owner commenced in 1937 and the last coal extracted from underground operations was in May 1992. The open cut commenced operations in 1966. Bloomfield produces mainly thermal coal with some semi soft coking coal, principally for the Asian export market. The parent company also owns Rix's Creek Mine which is located north of Singleton.

This report covers 1 January 2021 till 31 December 2021.

This report is prepared to meet the requirements for the Annual Review, as outlined by the NSW Department of Planning & Environment (DPE) in the *Annual Review Guideline, October 2015*.

2.1 Consents, Leases and Licences

The lease area for ML1738, the PA 07_0087 & PA 05_0136 "Bloomfield Site" boundaries are shown on Plan 1.

Project Approval (07_0087) was granted by the Minister for Planning under Part 3A of the *Environment Planning & Assessment Act 1979* (EP&A Act*)* to allow for the completion of open cut mining operations and rehabilitation. The approval was issued 3 September 2009 and is subject to a number of conditions. A variation to modify the Project Approval under s75W of the EP&A Act was granted on 16 May 2011 (07_0087_Mod 1). An additional variation to modify the Project Approval under s75W of the EP&A Act was granted on 29 March 2012 (07_0087_Mod 2). A further variation to modify the Project Approval under s75W of the EP&A Act was granted on 20 February 2013 (07_0087_Mod 3). During 2018 a variation to modify the Project Approval under s75W of the EP&A Act was granted on 16 August 2018 (07_0087_Mod 4).

Project Approval (05_0136) for the Abel Underground Mine allows for the operation of the Bloomfield Coal Handling and Preparation Plant (CHPP), Rail Loading Facility (RLF) and other related facilities required for the handling and processing of coal. The operational area under the control of Bloomfield Collieries Pty Limited is defined in PA 05_0136 as the "*Bloomfield Site*".

A revised Mining Operations Plan (MOP) has been prepared in accordance withthe Resources Regulator (RR) ESG3: MOP Guidelines September 2013. The approved new MOP covers the period 2021 – 2023.

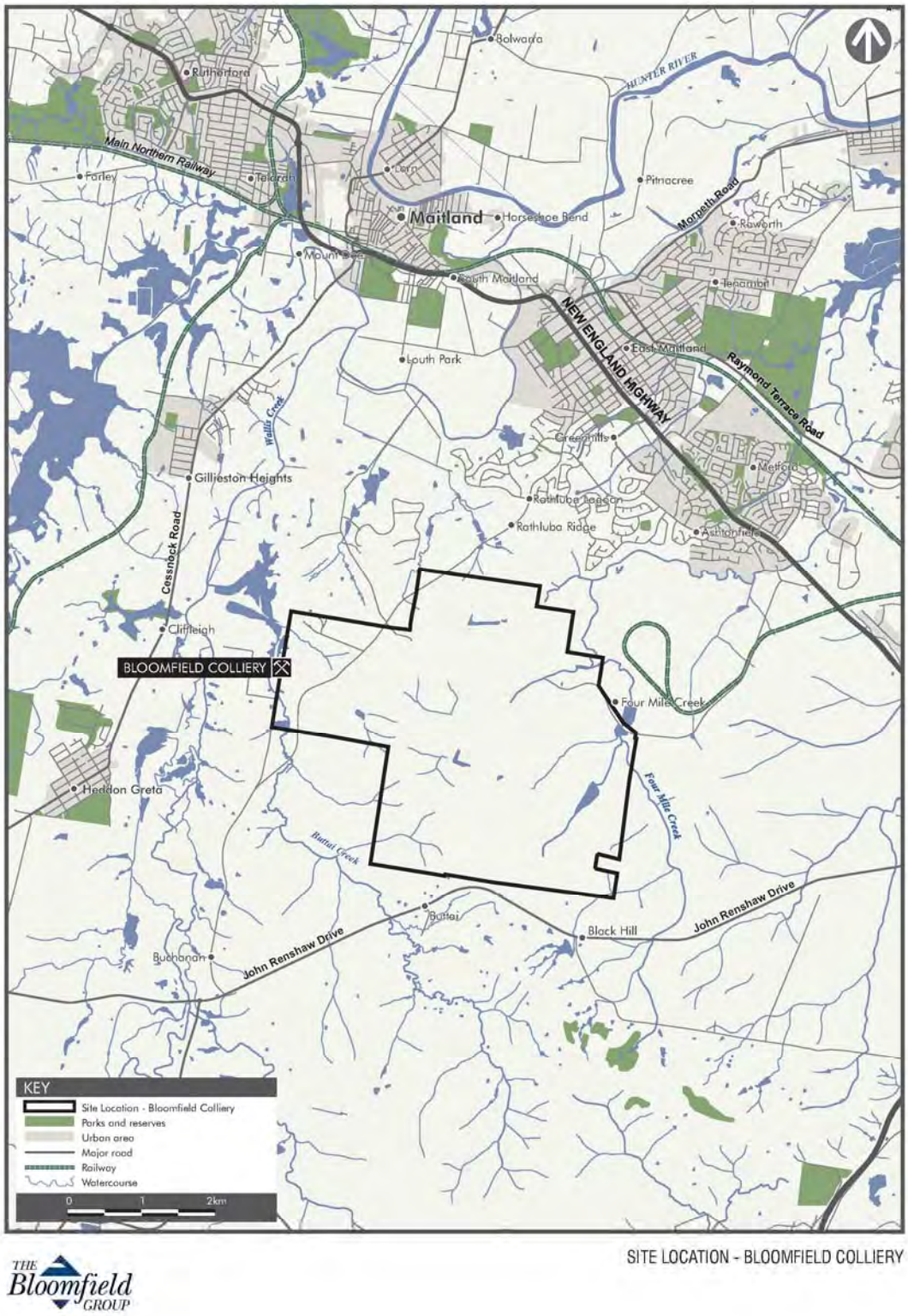
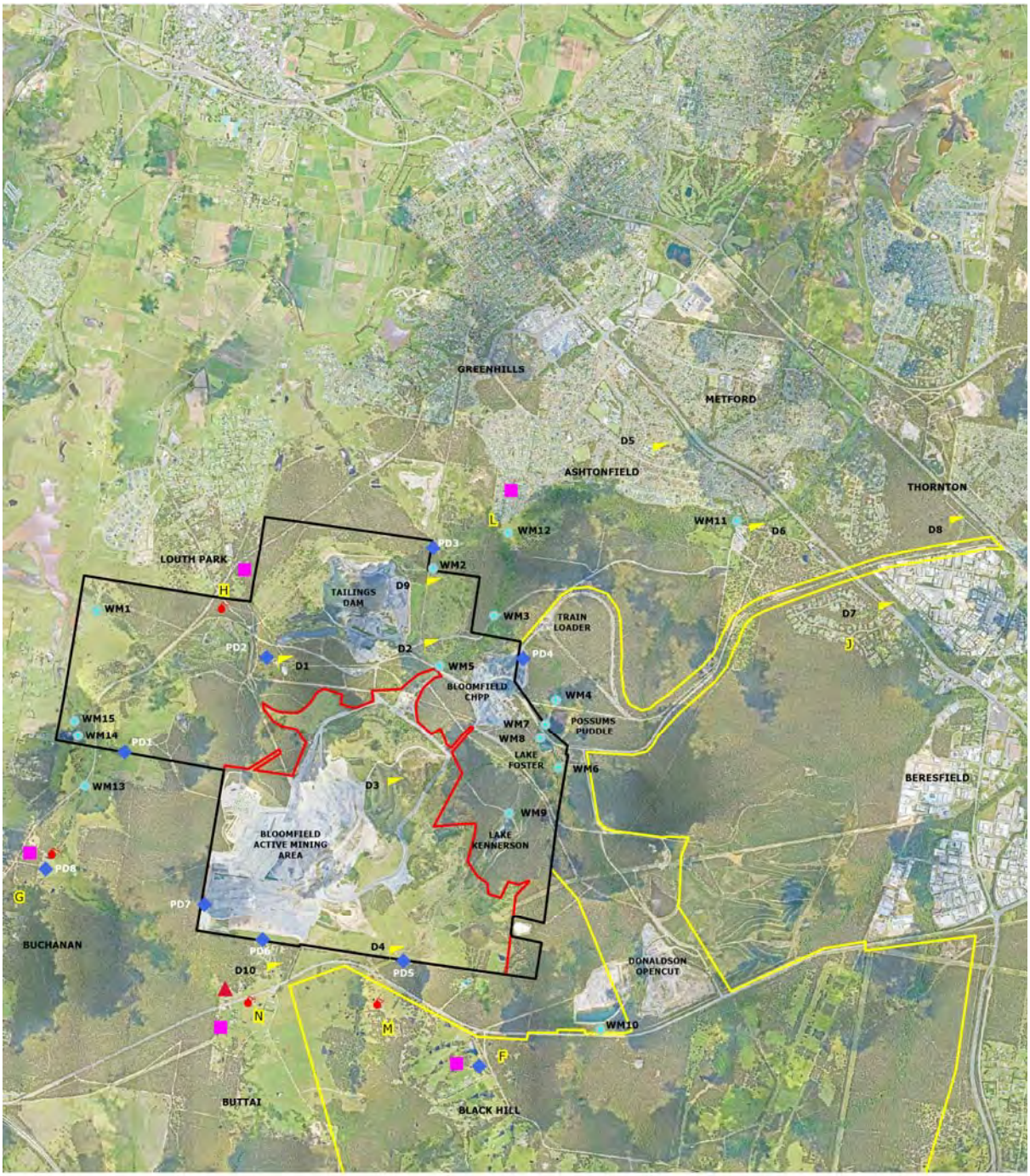


Figure 1: Location of Bloomfield Colliery



THE Bloomfield GROUP

Bloomfield Colliery

Annual Review 2021

Plan 1 Environmental Monitoring Sites

Scale: 1:33,333	Date: February 2021 Photo: 30 December 2021	Drawing: A3

2.2 Mine Contacts

The Bloomfield Colliery Mine Manager, Mr Brad Donoghue, is the primary mining contact and is responsible for regulatory compliance. The Environmental Advisor is Mr Greg Lamb who coordinates environmental management and rehabilitation operations at Bloomfield Colliery.

Mr Brad Donoghue	Mine Manager	Tel: 02 4930 2641 Mob: 0418 923 058 bdonoghue@bloomcoll.com.au
Mr Greg Lamb	Environmental Advisor	Tel: 02 4930 2689 Mob: 0457 819 211 glamb@bloomcoll.com.au
Environmental / Community Hotline		24hr: 02 4930 2680

3 APPROVALS

Bloomfield Colliery operates under the following approvals, leases and licenses as presented in Table 4.

Table 4: Approvals, Leases and Licences

Approval/Lease/License	Issue Date	Expiry Date
Project Approval 07_0087	3 September 2009	31 December 2021
Project Approval 07_0087_ Mod 1	16 May 2011	31 December 2021
Project Approval 07_0087_ Mod 2	29 March 2012	31 December 2021
Project Approval 07_0087_ Mod 3	20 February 2013	31 December 2021
Project Approval 07_0087_ Mod 4	16 August 2018	31 December 2030
Mining Lease 1738	29 June 2016	29 June 2037
Ancillary Mining Activity AMA1001	3 August 2018	29 June 2037
Consolidated Coal Lease (CCL) 761	20 October 1991	8 October 2029
Project Approval 05_0136 (Abel Mine)	7 June 2007	31 December 2030
Environmental Protection License 396	31 December 2007	-
Notification of Dangerous Goods NDG028550	5 July 2021	-
Licence No. 20AL217062 WAL 41506	7 June 2016	6 June 2039

4 MINING OPERATIONS DURING THE REPORTING PERIOD

4.1 Exploration

There were no exploration activities at Bloomfield during the reporting period.

4.2 Land Preparation

Approximately 0.8 Ha of land was prepared for mining during the reporting period. This area was to the west of Creek Cut and had been cleared of vegetation in previous years. The soil material was removed and stockpiled for later use.

4.3 Construction

No construction was undertaken on the site during the reporting period.

4.4 Mining

During the reporting period, Bloomfield operated 15 shifts a week for 48 weeks employing 93 personnel. Production was 725,000 tonnes of raw coal, 483,000 tonnes of saleable coal and 3.7 million cubic metres of overburden moved primarily using a Hitachi 5500 excavator and Caterpillar rear dump trucks.

Mining operations continued throughout the year generally in accordance with the mining methods described in the 2021-2023 MOP. During the next reporting period, mining will continue towards the west.

4.5 Mineral Processing

The Coal Handling and Preparation Plant (CHPP) has a throughput of up to 8.5 Mtpa, as approved under the Abel Consent. The throughput capacity is rated at 1000 tonnes per hour. ROM coal and clean coal volumes are presented in Table 5.

Table 5: Production and Waste Summary

Material	Approved limit	Previous reporting period	This reporting period	Next reporting period (forecast)
Overburden	N/A	4,714,000	3,707,000	3,750,000
ROM Coal	1,300,000	765,000	725,000	625,000
Coarse reject	N/A	231,000	157,000	130,000
Tailings	N/A	125,000	85,000	70,000
Saleable product	N/A	409,000	483,000	425,000

4.6 Waste Management

Process Waste

Process Waste from the CHPP consists of breaker reject, coarse rejects and fine rejects (tailings). Breaker reject consists of large diameter (>150mm) rocks and coal rejects, and is hauled by truck to operational open cut pits and placed under advancing overburden dumps. Coarse rejects which are separated out during processing, and are currently disposed of under advancing overburden dumps. Fine tailings are currently pumped as 20% solids slurry to the tailings dam, a disused open cut pit in north of the mine site. Reject fines settle out of the slurry, gradually backfilling the pit, whilst the decant water is returned to the CHPP for re-use in processing. Process waste volumes are provided in Table 5.

Waste Oil

Waste oil from scheduled maintenance of mining equipment and the workshop oil separator is collected in a storage tank and periodically evacuated for reprocessing and re-use by a licensed waste oil contractor. In 2021 a total of 78,000 litres of waste oil was collected for recycling.

Waste Oil Filters

During the reporting period a recycling bin was installed for disposal of used oil filters. Used oil filters are placed in a 1.5m^3 bin and collected by licensed waste contractor for disposal. In 2021 a total of 6 tonnes of used filters was collected for disposal.

Waste Metal

Bloomfield has a well implemented scrap metal recycling program, and has a high rate of on-site re-use of suitable steel. If no longer suitable for re-use, scrap metal is collected in designated skips and sold for recycling. In 2021 a total of 170 tonnes of scrap metal was collected for recycling.

General Waste

General waste is placed in 1.5m^3 and 3m^3 bins and collected by licensed waste contractor for disposal. In 2021 a total of 94 tonnes of general waste was collected for disposal.

Waste Paper

During the reporting period recycling bins were installed for disposal of paper and cardboard. Waste paper and cardboard waste is placed in 1.5m^3 and 3.0m^3 bins and collected by licensed waste contractor for disposal. In 2021 a total of 8 tonnes of waste paper and cardboard was collected for recycling.

4.7 Product Stockpiles

The ROM stockpile pad has a capacity of 150,000 tonnes and the clean coal stockpiles have a capacity of approximately 500,000 tonnes.

4.8 Hazardous Materials Management

Bloomfield held dangerous goods notification and a licence to store and handle explosives in accordance with WorkCover legislation for substances stored on site. The notification covers depots for explosives, distillate, gas cylinder stores, sodium hydroxide and MIBC reagent.

Explosives are stored in an explosive magazine located on site. The magazine complies with the relevant standards for storage of explosives. Bulk materials are also stored on site in a hopper for loading into a mobile mixing unit. This area is enclosed within concrete bunding and any spillage from this area is directed into a collection tank for periodic removal by a licensed contractor.

A bunded fuel farm, designed in accordance with Australian Standard 1940 (AS1940), is used for bulk distillate storage at the open cut workshop. Spill protected racks are used for small volumes of oil and lubricant storage. Distillate, MIBC and sodium hydroxide used for coal processing in the CHPP are stored in tanks contained in bunded enclosures.

ChemAlert is an online Safety Data Sheet (SDS) database service and is used to provide up to date SDS information. If new chemicals are introduced to site they must comply with requirements and be approved by the Group Safety Manager, the Group Environment Manager and the Mine Manager through a documented workflow system.

No hazardous materials-related environmental incidents were reported during the reporting period.

4.9 Other Infrastructure Management

Silt traps along the edges of haul roads and hard stand areas are cleaned at regular intervals. They have been designed to capture surface run off during rain events and allow sediment to settle. All silt traps, dams, drains, bunds, lines, valves and other infrastructure used to manage runoff are inspected on a quarterly basis as part of the site Environmental Management System (EMS). Issues identified during the inspections are reported and appropriate actions taken to address these matters.

4.10 Bushfire

Weather conditions permitting, hazard reduction burns are conducted periodically by the Rural Fire Service (RFS). Selection of burn location is based on risk levels, as determined by fuel load assessment and location of assets/asset protection zones. Hazard reduction clearing/slashing was also undertaken by Bloomfield along fire trails, asset protection zones and the mine boundary.

An asset protection zone adjacent to residential areas near Ashtonfield and Buchanan was slashed and maintenance work carried out on a number of tracks to enable access for hazard reduction activities by the RFS.

During 2021 there were no hazard reduction burns on Bloomfield controlled land surrounding the Mining Lease or on the Mining Lease.

In consultation with the RFS further areas have been identified for hazard reduction burns on land surrounding the mine in the near future. Hazard reduction burning will continue in consultation with the RFS.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Listed in Table 6 below are the actions required from the review of the 2020 Annual Review. Also listed are the relevant sections of the report that describe the measures taken in response to these actions.

Table 6: Action Required from 2020 Annual Review

Action Required	Requested by	Status	Report Section
As required by Schedule 5 condition 3(d), identify any trends in the monitoring data for all environmental monitoring (air quality, biodiversity, blasting, heritage, noise, rehabilitation and water).	DPE	Complete	Section 6.2 Section 6.4 Section 6.5 Section 8.2 Section 7
As required by Schedule 5 condition 3(e), identify any discrepancies between the predicted and actual impacts of the project for air quality, biodiversity, blasting, heritage, noise, rehabilitation and water.	DPE	Complete	Section 6.2 Section 6.4 Section 6.5 Section 8.2 Section 7

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

Bloomfield Colliery has installed a continuously operating meteorological station in accordance with Project Approval requirements for the operation of the mine. The weather station has real-time capabilities for all personnel to access via computer or phone. The station records the following environmental parameters:

- wind speed;
- wind direction;
- temperature;
- relative humidity;
- rainfall;
- solar radiation and
- evaporation.

A comparison of monthly recorded rainfall for the 2021 reporting period and annual average data is shown in Figure 2. The total rainfall for the twelve month period was 1217 mm. This was 298 mm above the annual average of 919 mm.

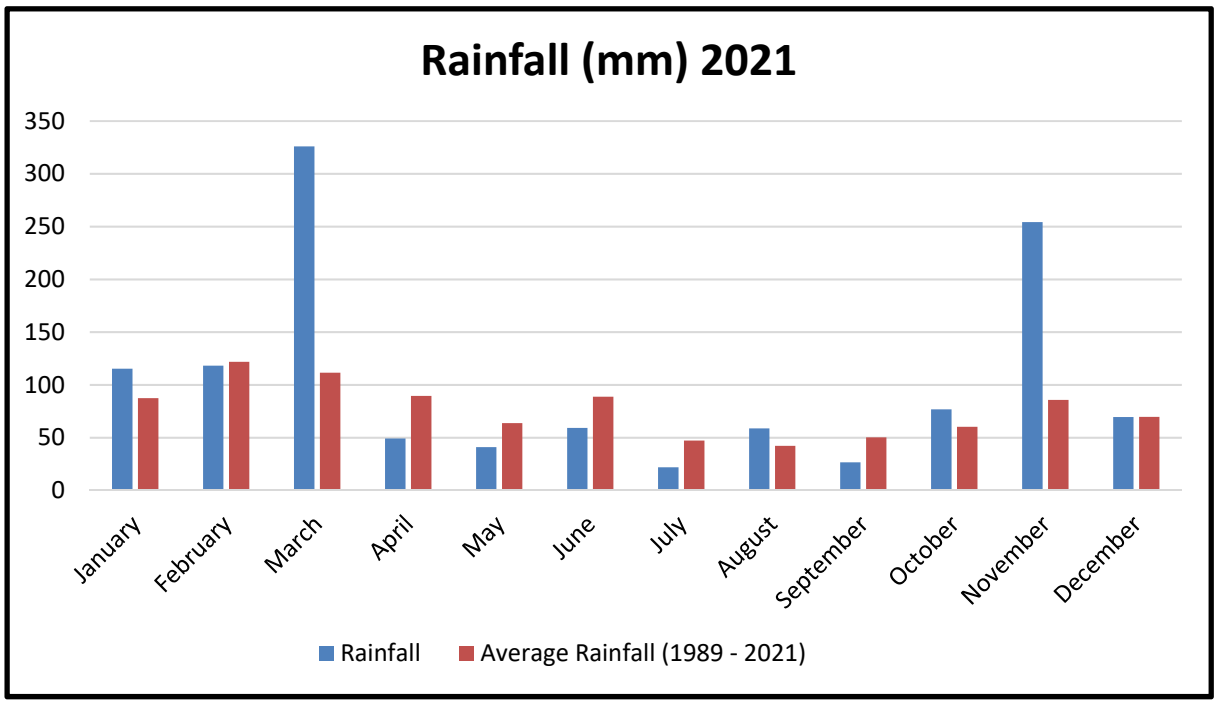


Figure 2: Rainfall 2021

A summary of the rainfall data for the past 33 years is presented in Table 7.

Table 7: Monthly Rainfall Records

Period	Average Monthly Rainfall (mm)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Total**
1989	177	62	168	133	95	208	52	6	15	33	48	43	1038
1990	42	448	80	190	80	58	71	135	73	57	6	39	1278
1991	83	14	4	12	90	104	39	9	6	30	37	167	593
1992	64	235	91	86	23	72	12	22	20	25	87	175	911
1993	125	53	65	16	29	81	109	64	36	31	72	33	713
1994	30	102	89	76	53	36	4	11	0	36	64	13	514
1995	162	48	171	0	129	51	1	0	78	37	184	80	942
1996	70	71	28	7	106	74	50	59	48	24	59	30	625
1997	105	101	63	0	85	78	65	28	50	34	25	56	688
1998	89	81	3	45	203	90	84	155	73	63	108	121	1114
1999	66	74	64	129	8	122	156	47	64	173	36	58	997
2000	95	34	281	149	44	12	51	36	31	58	93	28	912
2001	44	163	174	113	156	7	44	21	21	30	124	46	941
2002	54	235	172	48	55	28	31	26	25	10	43	129	856
2003	1	93	53	72	133	13	42	42	0	112	102	39	701
2004	76	163	72	45	18	10	27	44	64	154	59	38	769
2005	64	135	153	27	112	67	10	1	40	81	72	14	775
2006	38	66	39	23	11	62	50	58	194	21	53	24	635
2007	24	101	103	87	66	377	20	75	28	32	144	94	1150
2008	139	173	46	240	4	131	33	32	195	65	70	59	1184
2009	6	340	107	129	83	66	33	2	31	60	40	48	943
2010	78	35	75	28	75	118	62	43	27	66	151	70	826
2011	32	41	73	125	100	162	127	54	109	100	179	81	1182
2012	65	205	137	122	7	179	57	20	19	6	58	40	915
2013	180	184	121	101	59	99	18	11	22	43	288	22	1147
2014	16	83	138	106	30	47	22	102	38	68	23	169	844
2015	208	53	46	513	111	43	18	34	81	53	86	132	1378
2016	467	32	48	47	12	89	55	77	69	46	33	67	1041
2017	60	72	216	97	14	126	2	6	12	78	65	48	795
2018	3	108	189	56	5	101	3	28	50	116	89	102	850
2019	28	49	178	44	19	86	28	50	79	15	18	5	600
2020	84	254	110	44	53	76	165	37	36	158	59	162	1238
2021	115	118	326	49	41	59	22	59	27	77	254	70	1217
Average	**87**	**122**	**112**	**90**	**64**	**89**	**47**	**42**	**50**	**60**	**86**	**70**	**919**

The results of wind speed and direction monitoring shows a pattern typical in the Hunter Valley. During summer the winds predominate from the south east and winter the west-northwest. Autumn and spring are transitional seasons with winds distributed between both northwest and south-easterly directions. Figure 3 shows the annual windrose generated for the site for 2021.

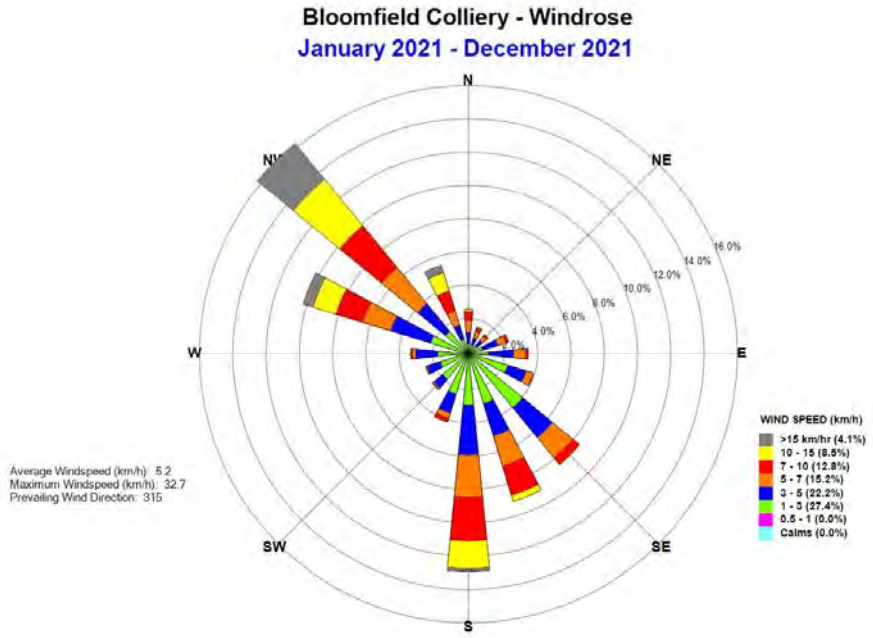


Figure 3: Windrose for Bloomfield Colliery 2021

6.2 Air Quality

6.2.1 Environmental Management

An Air Quality Monitoring Program has been prepared and approved by DPE in accordance with Project Approval 07_0087.

Dust can be generated by the operation of mobile plant on unsealed surfaces, loading and handling of coal and overburden in dry and windy conditions, or by blasting. Operational procedures are in place to minimise dust impacts on the surrounding environment and community. Vehicular generated dust is controlled through the use of water carts on all internal roads and high traffic areas. The company provides a fleet of three water trucks to allow for greater coverage and flexibility in dry and/or windy conditions.

Sprinkler systems operate on coal stockpile areas and the surrounds of the washing plant. Conveyor systems at the washing plant and rail loader are enclosed on at least two sides. Operational practices such as not dumping to exposed locations, minimizing the drop height into trucks during loading are also employed.

The use of a predictive meteorological modelling software program is utilised to assist in planning mine operations. The software incorporates regional weather station data to predict daily weather events that may exacerbate dust impacts from operations.

A dust monitoring program is in place with 10 dust deposition gauges and High Volume Air Samplers (HVOL) located on and around the mine lease area. The locations are listed in Table 8 and are shown in Plan 1. Samples are collected by independent environmental consultants and analysed by a NATA registered laboratory.

During 2018 the modified Project Approval (07_0087_Mod 4) included a condition to monitor for PM2.5 dust emissions. PM2.5 monitoring commenced in November 2018.

Table 8: Dust Monitoring Sites

Site	Location
On Mining Lease	
D1	Adjacent to Buttai Reservoir
D2	Adjacent to Main Haul Road
D3	Communications Tower
D4	Adjacent John Renshaw Drive
D9	Shamrock Lane
Off Mining Lease	
D5	Bali Close Ashtonfield
D6	Off Four Mile Creek Road
D7	Off New England Highway, Avalon Estate
D8	Adjacent of Main North Rail line at Rail Loop
D10	Private property adjacent to John Renshaw Drive
HVOLs	Private property adjacent to John Renshaw Drive

6.2.2 Environmental Performance

Dust Deposition

Table 9 summarises the monthly deposition rates for insoluble solids during the reporting period and includes long-term averages for the site and the EPA guideline of 4 g/m^2/month.

Table 9: Annual Average Dust Deposition

Insoluble Solids (g/m^2/month)										
Site	**D1**	**D2**	**D3**	**D4#**	**D5**	**D6**	**D7**	**D8**	**D9**	**D10**
Jan-21	0.4	0.6	1.3	1.3	1.2	6.6	0.6	0.6	0.5	2.9
Feb-21	1.3	NR	NR	1.0	1.9	NR	1.2	1.2	NR	3.0
Mar-21	0.7	0.6	0.8	1.3	2.4	1.7	0.9	0.6	0.5	4.5
Apr-21	0.5	0.5	0.2	0.3	0.7	0.5	0.9	0.2	1.3	6.1c
May-21	0.4	0.7	1.3	1.4	1.1	1.0	0.8	1.0	0.5	1.3
Jun-21	0.3	0.4	0.8	0.8	0.6	0.3	0.3	0.3	0.2	8.0c
Jul-21	0.7	0.6	1.3	0.5	0.7	0.5	0.5	0.6	0.3	1.2
Aug-21	0.4	1.0	0.6	0.8	0.8	0.7	0.6	0.7	0.9	0.8
Sep-21	0.6	0.8	1.0	0.9	0.8	0.8	0.8	0.9	0.6	17.4c
Oct-21	0.7	0.5	2.0	16.9c	0.9	1.1	NR	1.5	0.8	1.0
Nov-21	0.9	1.0	1.1	0.8	0.7	1.2	1.2	1.0	1.6	1.5
Dec-21	0.8	0.3	0.5	1.5	0.9	1.0	0.7	0.5	0.7	0.9
Annual Averages										
1997-1998	1.2	1.8	1.8	1.5	1.1	1.9	1.6	1.5	1.8	1.7
1998-1999	1.5	2.1	1.8	1.6	1.3	2.4	1.6	1.1	1.8	0.9
1999-2000	1.8	2.6	1.8	1.1	1.5	1.9	2.0	1.3		
2000-2001	1.2	1.6	1.3	1.4	1.2	3.1	1.8	1.1		
2001-2002	1.1	1.8	1.4	6.6	1.3	2.0	2.4	1.3	1.4	1.7
2002-2003	1.7	2.0	1.2	4.3	1.9	2.3	1.9	1.8	1.4	2.2
2003-2004	2.4	1.6	0.8	6.5	1.2	1.5	1.4	1.3	1.0	1.0
2004-2005	1.6	1.5	1.1	3.2	1.1	2.2	1.4	1.4	0.9	1.1
2005-2006	3.4	1.9	1.2	3.1	1.0	1.4	1.5	1.4	1.2	1.9
2006-2007	2.8	2.2	1.5	3.9	3.0	1.7	1.8	1.7	1.2	1.8
2007-2008	2.7	1.9	1.6	5.2	2.1	2.0	1.9	2.2	1.2	2.3
2008-2009	1.8	1.9	3.3	6.0	1.3	1.7	2.0	1.9	1.5	2.9
2009-2010	1.8	2.4	3.2	3.1	1.4	1.6	2.3	1.8	1.5	2.8
2010-2011	1.1	1.6	1.8	1.6	0.9	2.4	1.4	1.4	1.1	2.1
2011-2012	1.6	1.5	1.3	3.4	1.5	3.8	1.2	3.2	1.0	1.9
2012	1.5	1.7	1.9	3.1	1.4	3.4	1.8	1.6	1.1	2.2
2013	1.7	1.6	2.5	1.3	1.5	2.5	1.7	1.7	1.3	1.5
2014	1.2	1.4	1.6	1.5	1.5	2.5	1.4	1.7	1.1	1.5
2015	1.3	1.3	1.5	1.4	1.3	1.3	1.1	1.3	0.9	1.5
2016	0.7	1.3	1.1	1.3	1.3	1.5	1.1	1.4	0.8	2.2
2017	0.6	1.4	1.0	1.3	1.4	1.2	1.4	1.9	0.9	1.6
2018	0.9	1.2	1.0	1.3	1.7	1.6	1.5	1.3	0.9	1.6
2019	1.4	1.4	1.8	1.7	1.4	2.0	2.3	1.8	1.4	1.6
2020	1.1	1.2	1.1	1.8	1.9	1.5	1.9	1.4	1.2	1.6
2021	0.6	0.6	1.0	1.0	1.1	1.4	0.8	0.8	0.7	1.9
Overall*	1.5	1.6	1.6	2.5	1.4	2.0	1.6	1.6	1.1	1.8
EPL 396 Limit	**4**									

Notes: ** - Overall annual average since 1997.*
C - Denotes result contaminated with insects, vegetation or bird droppings and considered non standard.
 # - Site D4 was located adjacent to operational areas and was repositioned in December 2012 to the southern mining lease boundary, adjacent to John Renshaw Drive.
NR – No Result. Equipment damaged by hail storm.

All dust deposition gauges recorded annual averages below the 4g/m^2/month limit for 2021. The long term average annual dust deposition rates are all below the required impact assessment criteria.

Results are graphically provided in Appendix A. Figure A1 in Appendix A shows yearly results since Project Approval (PA 08_0087). The graph shows a general downward trend over the past 10 years. Sites D2 and D3 are located adjacent to operational areas well within lease boundaries. Results from these sites indicate the level of dust generated by mining operations and are unlikely to impact off site.

PM2.5, PM10 and TSP

Table 10 summarises the PM2.5, PM10 and TSP monitoring results during the reporting period and detailed results are provided in Table A1 in Appendix A.

Table 10: PM2.5, PM10 and TSP Results Summary 2021

	PM2.5 24hr (ug/m^3)	**PM10 24hr (ug/m^3)**	**TSP (ug/m^3)**
Maximum 24hr Average result 2021	16	37	81
Project Approval Impact Assessment Criteria 24hr Average	***25***	***50***	***-***
Annual Average 2021	4	11	24
Project Approval Impact Assessment Criteria Annual Average	***8***	***25***	***90***

Due to the close proximity of John Renshaw Drive to the HVOLs (Plan 1) some impacts from vehicular emissions will affect the monitoring results.

The annual average TSP result recorded was below the 90 ug/m^3 limit for 2021.

The annual average PM10 result recorded was below the 25 ug/m^3 limit for 2021. The maximum PM10 24-hour average result recorded was below the 50 ug/m^3 limit for 2021.

The annual average PM2.5 result recorded was below the 8 ug/m^3 limit for 2021. The maximum PM2.5 24-hour average result recorded was below the 25 ug/m^3 limit for 2021.

Figures A2, A3 and A4 in Appendix A shows yearly results of TSP, PM10 and PM2.5 dust levels. The results show seasonal trends as well as rolling averages. In general, higher results occur in the summer months and lower results occur in the winter months.

Dust Predictions

Dust modelling predictions conducted as part of the Environmental Assessment (PA 07_0087 Mod 4) are shown in Table 11. Monitoring during the reporting period indicates that dust results are close to or below predicted levels. As shown in Plan 1, the nearest modelled resident to the monitoring locations is Resident N. The dust monitoring locations are actually situated closer to the mine site than Resident N (refer Plan 1) and as a result the dust results are slightly higher. Dust deposit gauge D10 is located adjacent to John Renshaw Drive which has been undergoing road widening works throughout 2021.

Table 11: Dust Prediction

Resident ID: N	**EA Predictions**	**2021 Actual**
Dust Deposition D10 (g/m^2/month)	1.5	1.9
PM2.5 (ug/m^3) (Annual Average)	6	4
PM10 (ug/m^3) (Annual Average)	16	11
TSP (ug/m^3) (Annual Average)	33	24

6.2.3 Reportable Incidents

No reportable incidents relating to dust management occurred during the reporting period.

6.2.4 Further Improvements

The air quality monitoring program will be continued in accordance with Air Quality Monitoring Plan requirements. The PM2.5 results and location of the HVOL (refer Plan 1) will be reviewed throughout 2022 to assess impacts on the results from vehicle traffic along John Renshaw Drive. If impacts are determined from vehicle emissions, a revised location will be sought for approval by DPE via revision to the Air Quality Management Plan and from NSW EPA via variation to the EPL 396.

6.3 Biodiversity

6.3.1 Environmental Management

The Environmental Assessment included potential impacts associated with the clearance of vegetation. Any clearing of vegetation within the project area must be undertaken in accordance with the requirements of the Project Approval, Rehabilitation Management Plan, Mining Operations Plan and Statement of Commitments.

6.3.2 Environmental Performance

No vegetation was cleared within the Project Area during the reporting period.

A Biodiversity Offset Management Plan has been prepared and approved by DPE in accordance with Project Approval requirements for the operation of the mine. A Biodiversity Offset Area has been established to compensate for future land clearance at the mine. The land was purchased by Bloomfield in December 2011 and consists of 40 Ha of remnant vegetation at Congewai adjacent to the Watagan State Forest. The western boundary abuts a part of Watagan State Forest on the eastern side of the Corrabare Range. Figure 4 shows the location of the Biodiversity Offset Area.

Consultation is underway with the NSW Biodiversity Conservation Trust regarding entering into a conservation agreement over the Biodiversity Offset land under Part 4, Division 12 of the *National Parks and Wildlife Act 1974*.

In accordance with the Biodiversity Offset Management Plan a monitoring program has been implemented to assess weeds infestations and feral animals. During 2021 a visual inspection for weeds was undertaken and some broadleaf were present in wet drainage lines. No control was recommended at this stage.

Three motion cameras were installed for a 13 day period to determine the presence of feral animals. No wild dogs were present during the monitoring period. Foxes and deer were recorded. The details were compared against the CSIRO guidelines. The abundance score for the foxes was Low (7.69%). The abundance score for the deer was Low (2.56%). Wombats and Macropods were the only native species recorded.

6.3.3 Reportable Incidents

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

6.3.4 Further Improvements

Further details on progress of the implementation measures of the Biodiversity Offset Area will be provided in the next Annual Review. Further consultation is underway with the NSW Biodiversity Conservation Trust regarding entering into a conservation agreement. A site meeting with the Trust was conducted in February 2022 to further the application.

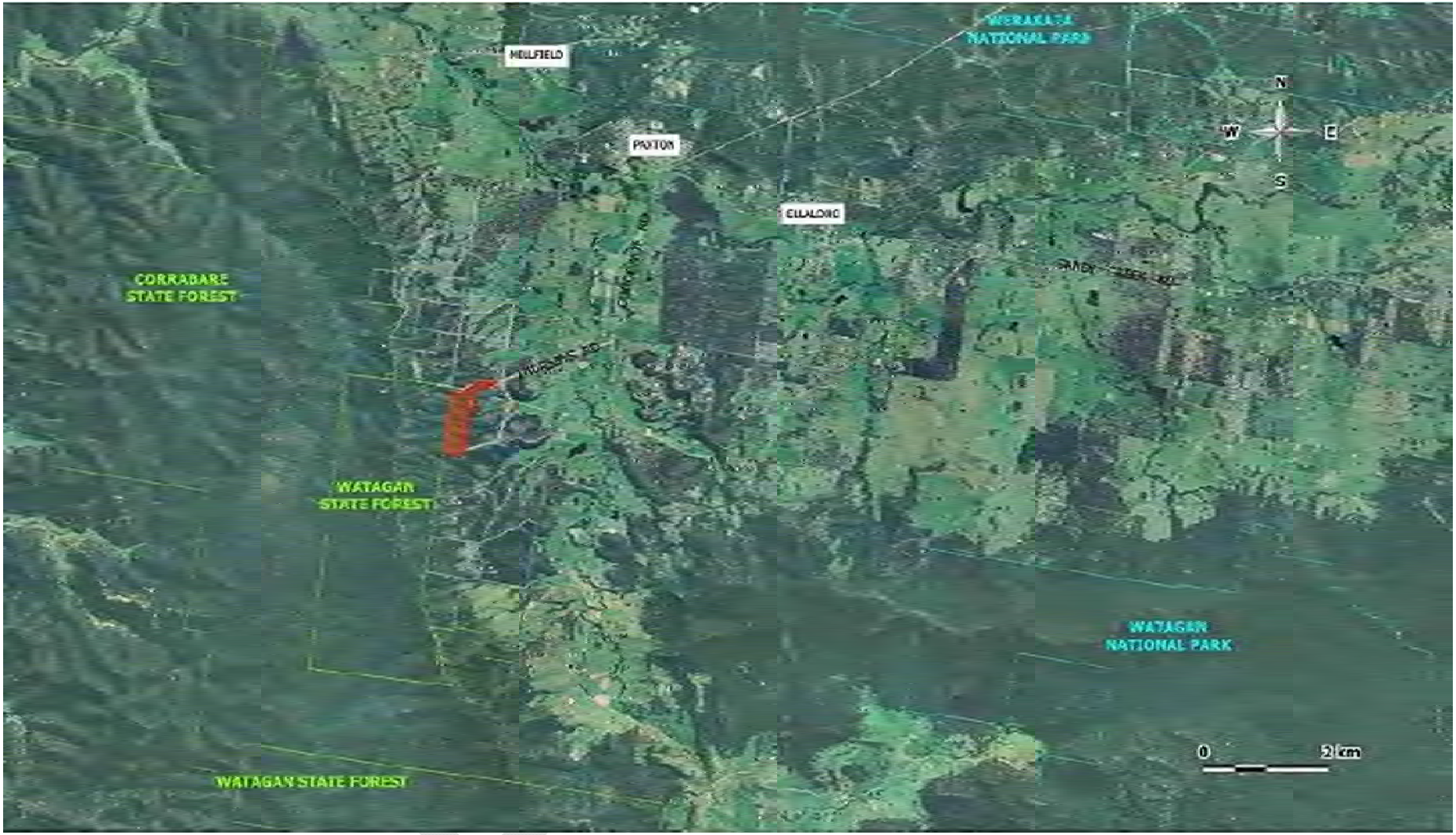


Figure 4: Biodiversity Offset Area

6.4 Blasting

6.4.1 Environmental Management

A Blast Monitoring Plan (BMP) has been prepared and approved by DPE in accordance with Project Approval requirements for the operation of the mine. Blasting activities are licensed under EPL 396. Both the EPL and Project Approval stipulates monitoring requirements, restricts blasting hours, as well as limiting airblast overpressure and ground vibration impacts at the nearest residences.

Blasting techniques have been developed in conjunction with ORICA, utilising the "nonel" initiation system and implemented to achieve maximum fragmentation and maintain levels of ground vibration and overpressure levels within the approved criteria for the site.

Each blast is monitored at four nearby residences for ground vibration and overpressure. Monitors are located at residences to the south, south-east, west and north-west of current open cut operations. The location of the blast monitors is shown on Plan 1. Ground vibration monitoring is also conducted at the Buttai Reservoir in consultation with Hunter Water.

The use of a predictive meteorological modelling software program (ENVMET) is utilised to assist in planning blast operations. The software incorporates regional weather station data to predict daily weather events that may exacerbate overpressure impacts from blasting operations.

6.4.2 Environmental Performance

All blast results for the reporting period are included in Appendix B and are summarised in Table 12.

During the reporting period a total of 35 blasts were initiated on the site. No blasts exceeded 115 dB or 120 dB blast overpressure limits. No blasts exceeded the 5mm/sec or 10mm/sec ground vibration limits.

Table 12: Blast Monitoring Summary

Blasting Criteria Limits	Allowable Exceedance[1]	Results 2021
Airblast Overpressure Level dB (Lin Peak)		
>115	5 %	0 %
>120	0 %	0 %
Ground Vibration Peak Particle Velocity (mm/s)		
>5	5 %	0 %
>10	0 %	0 %

Note: 1. Percentage of the total number of blasts over a period of 12 months

Under the Project Approval blasting must be carried out between 9 am and 5 pm, Monday to Saturday, with no blasting on Sundays and Public Holidays. A maximum of two blasts a day and five blasts a week (averaged over 12 months) are allowed. Appendix B provides the dates and times of all blasts for the reporting year which demonstrates that this Project Approval condition has been met.

Blast modelling predictions conducted as part of the Environmental Assessment (PA 07_0087 Modification 4) are shown in Table 13. The approach of the assessment was to determine the limiting factors to the blast design with the aim of achieving the relevant criteria at all locations. Calculations were conducted using the respective 5% site law equations in order to determine the Maximum Instantaneous Charge (MIC).

For each site law, using statistical analysis of the measured data and assuming a log-normal distribution of data, a 95% confidence line and 50% confidence levels were determined. The ground vibration and airblast criteria cater for the inherent variation in emission levels from a given blast design by allowing a five percent exceedance of a general criterion up to a (never to be exceeded) maximum. Correspondingly, the "5% exceedance" (95% confidence) levels have been used in the blast emission site laws.

The levels of airblast and ground vibration have been predicted using the developed site laws for Bloomfield Colliery. The maximum instantaneous charge (MIC) may exceed (or be less than) the values in Table 13, depending on the location of the area being mined and its relation to the nearest affected receiver.

Table 13: 5% MIC and Blast Predictions

Year	Approximate Distance to Nearest Receiver (m)	MIC Based on Ground Vibration or Airplast (kg)	Blast Emission Prediction Based on MIC	
			Predictive PVS Ground Vibration (mm/s)	Predicted Airblast Level (dB Linear)
2018	1500	280	1.7	115
2021	1200	145	1.4	115
2025	1500	280	1.7	115

Monitoring results summarised in Table 14 for the reporting period indicates that the maximum and mean results are below or close to predicted levels at the nearest receivers.

Table 14: Blast Results Summary

Location	N – Elliotts		M - MacNaughtons		H - Mt Vincent Rd		G - Richards	
	Airblast dBL	Vibration mm/s	Airblast dBL	Vibration mm/s	Airblast dBL	Vibration mm/s	Airblast dBL	Vibration mm/s
Max	113.4	2.4	108.2	1.4	107.5	0.9	112.3	0.8
Mean	103.6	0.6	99.9	0.4	93.8	0.2	98.8	0.3

6.4.3 Reportable Incidents

No reportable incidents relating to blasting occurred during the reporting period.

6.4.4 Further Improvements

Monitoring of blasts will continue in accordance with EPL and Project Approval requirements.

6.5 Operational Noise

6.5.1 Environmental Management

A Noise Monitoring Plan (NMP) has been prepared in accordance with the conditions of the Project Approvals (PA 07_0087 & PA 05_0136 “Bloomfield Site”). The noise monitoring plan has been approved by DPE. Quarterly noise monitoring has been undertaken in accordance with the monitoring plan.

In accordance with the requirements under Schedule 3 Condition 3, the use of a predictive meteorological modelling software program is utilised to assist in planning mine operations. The software incorporates weather models and regional weather station data to predict daily weather events that may exacerbate noise impacts from operations. During 2016 the existing predictive meteorological modelling software program was upgraded to a predictive noise emissions management tool for the mine. In addition to meteorological data it also incorporates terrain data, mining equipment locations and aerial photographs. This predictive model is reviewed on a daily basis and is the main tool for planning noise impacts of daily operations.

6.5.2 Environmental Performance

Attended and unattended quarterly noise monitoring was undertaken during the reporting period which assessed noise impacts from Bloomfield Colliery against relevant criteria detailed within PA 07_0087 and PA 05_016 (Abel Mine) at five monitoring locations (see Plan 1). Monitoring results are summarised in Tables 15 and 16. Copies of the noise reports are available upon email request to info@bloomcoll.com.au.

All noise monitoring indicated that compliance with consent criteria was met at all locations during day, evening and the night-time periods. Night time sleep disturbance criteria ($LA1_{(1min)}$) were in compliance during all monitoring events.

Table 15: Summary of Attended Noise Monitoring Results

Location	Estimated Bloomfield LAeq(15minute) Contribution			Consent Conditions LAeq(15 minute)			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
March Quarter Results									
F – Black Hill Road, Black Hill[1]	Inaudible at all times			35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible at all times			39	42	37	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	<30	Inaudible	35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	<30	Inaudible	40[2]	40[2]	40[2]	Yes	Yes	Yes
M – John Renshaw Drive, Buttai	Inaudible at all times			39	39	37	Yes	Yes	Yes
N – Lings Road, Buttai	Inaudible at all times			42	42	35	Yes	Yes	Yes
June Quarter Results									
F – Black Hill Road, Black Hill[1]	Inaudible at all times			35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	38	27	39	42	37	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible at all times			35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible at all times			40[2]	40[2]	40[2]	Yes	Yes	Yes
M – John Renshaw Drive, Buttai	Inaudible at all times			39	39	37	Yes	Yes	Yes
N – Lings Road, Buttai	Inaudible at all times			42	42	35	Yes	Yes	Yes
September Quarter Results									
F – Black Hill Road, Black Hill[1]	Inaudible at all times			35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	41	Inaudible	39	42	37	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible at all times			35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible at all times			40[2]	40[2]	40[2]	Yes	Yes	Yes
M – John Renshaw Drive, Buttai	Inaudible at all times			39	39	37	Yes	Yes	Yes
N – Lings Road, Buttai	Inaudible	33	Inaudible	42	42	35	Yes	Yes	Yes

1 - Mine owned property
2 – Abel Coal Mine (PA 05_0136) noise criteria.

Location	Estimated Bloomfield LAeq(15minute) Contribution			Consent Conditions LAeq(15 minute)			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
December Quarter Results									
F – Black Hill Road, Black Hill[1]	Inaudible at all times			35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	38	Inaudible	39	42	37	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	25	Inaudible	35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	25	Inaudible	40[2]	40[2]	40[2]	Yes	Yes	Yes
M – John Renshaw Drive, Buttai	Inaudible at all times			39	39	37	Yes	Yes	Yes
N – Lings Road, Buttai	Inaudible at all times			42	42	35	Yes	Yes	Yes

1 - Mine owned property
2 – Abel Coal Mine (PA 05_0136) noise criteria.

Table 16: Summary of Sleep Disturbance Results

Location	Estimated Bloomfield LA1(1 minute) Contribution	Consent Conditions LA1(1 minute)	Compliance
March Quarter Results			
F – Black Hill Road, Black Hill[1]	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47[2]	Yes
M – John Renshaw Drive, Buttai	Inaudible	46	Yes
N – Lings Road, Buttai	Inaudible	46	Yes
June Quarter Results			
F – Black Hill Road, Black Hill[1]	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	43	45	Yes
L – Kilshanny Ave, Ashtonfield	43	47[2]	Yes
M – John Renshaw Drive, Buttai	<30	46	Yes
N – Lings Road, Buttai	Inaudible	46	Yes

1 – Mine owned property
2 – Abel Coal Mine (PA 05_0136) noise criteria.

Location	Estimated Bloomfield LA1(1 minute) Contribution	Consent Conditions LA1(1 minute)	Compliance
September Quarter Results			
F – Black Hill Road, Black Hill[1]	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47[2]	Yes
M – John Renshaw Drive, Buttai	Inaudible	46	Yes
N – Lings Road, Buttai	Inaudible	46	Yes
December Quarter Results			
F – Black Hill Road, Black Hill[1]	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47[2]	Yes
M – John Renshaw Drive, Buttai	Inaudible	46	Yes
N – Lings Road, Buttai	Inaudible	46	Yes

1 – Mine owned property
2 – Abel Coal Mine (PA 05_0136) noise criteria.

6.5.3 Reportable Incidents

No reportable incidents relating to operational noise occurred during the reporting period.

6.5.4 Further Improvements

The noise monitoring program will be continued in accordance with Noise Monitoring Plan requirements.

6.5.5 Noise Complaints

Five complaints were received in relation to noise during 2021. Further information of the complaints is included in Section 9.

6.6 Aboriginal Heritage

6.6.1 Environmental Management

An Aboriginal Cultural Heritage Management Plan (ACHMP) was prepared in consultation with Mindaribba LALC. The plan was endorsed by OEH and approved by DPE.

6.6.2 Environmental Performance

A number of Aboriginal sites identified during the Project Approval process were previously salvaged in 2010 in accordance with the ACHMP. Representatives from Mindaribba LALC participated and monitored the process ahead of preparation for mining activities. In all, 80 artefacts were salvaged and are being stored at Bloomfield Colliery.

In 2014 an additional 3 Ha was stripped of topsoil in preparation for mining activities. In accordance with the approved ACHMP Bloomfield engaged an archaeologist and the Mindaribba LALC to monitor the ground disturbance works and salvage identified artefacts. A further 6 artefacts were salvaged and are being stored at Bloomfield Colliery.

In 2016 an additional 3 Ha was cleared of vegetation and stripped of topsoil in preparation for mining activities. In accordance with the approved ACHMP Bloomfield engaged an archaeologist and the Mindaribba LALC to monitor the ground disturbance works and salvage identified artefacts. An additional artefact was salvaged and is being stored at Bloomfield Colliery.

6.6.3 Reportable Incidents

No reportable incidents relating to Aboriginal heritage occurred during the reporting period.

6.6.4 Further Improvements

Any Aboriginal heritage evidence that is identified will be managed in accordance with the ACHMP and reported in the 2022 Annual Review. The Aboriginal Cultural Heritage Management Plan (ACHMP) is under review in consultation with Mindaribba LALC and is expected to be finalised in the near furure.

6.7 Non-Aboriginal Heritage

6.7.1 Environmental Management

A Historic Heritage Conservation Management Plan for the Buttai No. 1 & 2 Reservoirs and Buttai Cemetery was approved by DPE in December 2021. The plan was prepared in consultation with OEH, Hunter Water and Cessnock Council.

6.7.2 Environmental Performance

Blasting undertaken as part of the mining process at Bloomfield Colliery is the key activity with the potential to adversely impact the Buttai Reservoirs No 1 and No 2 and Buttai Cemetery. Specifically, it is the ground vibration from blasting activities that has the potential to cause superficial and structural damage to these sites.

A blast monitor at the Buttai Reservoirs No 1 and No 2 has been established and used as the ground vibration monitoring location for comparison against trigger values. Two levels of trigger values for blast monitoring have been determined to be appropriate, as follows:

- Level 1 trigger set at >5mm/ sec ppv; and
- Level 2 trigger set at >10mm/ sec ppv.

During monitoring conducted in 2021 the maximum ground vibration recorded at Buttai Reservoir was 0.96mm/s (average 0.34mm/s). The blast results demonstrate that neither trigger level has been reached.

Monitoring of the Buttai Cemetery will consist of an annual visual inspection to identify any damage that may have been caused by blasting operations. The inspections will commence in 2021.

6.7.3 Reportable Incidents

No reportable incidents relating to Non-Aboriginal heritage occurred during the reporting period.

6.7.4 Further Improvements

Monitoring of the Buttai No. 1 & 2 Reservoirs and Buttai Cemetery will continue in accordance with the approved Historic Heritage Conservation Management Plan.

7 WATER MANAGEMENT

The water management system has been designed with three primary goals and objectives:

- separation of clean water and mine water;
- safe storage and priority use of mine water on-site;
- management of water that is discharged so as to preserve the environmental values of Four Mile Creek and comply with the conditions of EPL 396.

In meeting these objectives, the following components of the system have been constructed or implemented.

Mine Water

Bloomfield has two major mine water storage facilities referred to as Lake Kennerson and Lake Foster (see Plan 1). Water pumped from the open cuts (S Cut and Creek Cut) reports via open drains to Lake Kennerson. Run off from disturbed areas (i.e. high wall, haul roads, overburden dumps awaiting rehabilitation) which has the potential to carry suspended solids, is also directed to Lake Kennerson. Lake Kennerson dissipates velocity and allows the settlement of suspended solids. Project Approval (05_0136) for the Abel Mine allows for the transfer of water to Bloomfield Colliery which is transferred to Lake Kennerson.

Lake Kennerson has a valve controlled pipe which, when opened, feeds to Lake Foster. Lake Foster also receives decant water from the tailings storage facility (U Cut) and water from the stockpile dam, which collects the runoff from the CHPP and coal stockpile pads. Mine water is pumped, primarily from Lake Foster, to the CHPP for use in coal processing and for dust suppression spraying on the coal stockpile pads.

Mine water is discharged, via lockable valve pipes, into an open drain that flows to Four Mile Creek. Discharges are undertaken in accordance with conditions of the Environmental Protection Licence (EPL 396). Water samples are collected during discharge for independent water quality analysis. A monitoring station located downstream in Four Mile Creek continuously measures electrical conductivity (EC) and water level. Monthly background sampling is conducted in Lake Kennerson, Lake Foster and various upstream and downstream watercourses (see Section 7.2 for details).

During the reporting period, fine coal rejects (tailings) was transferred for disposal to an approved prescribed tailings dam located within a disused open cut pit (U Cut). Water from the historic underground workings is used in dust suppression and coal processing. Water storage volumes are presented in Table 17.

Table 17: Stored Water

	Volumes held (ML)		
	Start of Reporting Period	**End of Reporting Period**	**Storage Capacity**
Clean Water	90	90	90
Dirty Water			
Lake Kennerson	100	80	190
Lake Foster	40	40	45
Tailings Dam	0	190	600
S Cut (operational pit)	0	0	-
Creek Cut (operational pit)	0	0	-
Controlled Discharge Water (EPL 396)		1765	
Contaminated Water	NIL	NIL	NIL

Water taken during the water year 1 July 2020 to 30 June 2021 is provided in Table 18.

Table 18: Water Take

Water Licence	Source	Entitlement (ML)	Total (ML)
WAL41506	Sydney Basin – North Coast Groundwater	500	274

Clean Water

Run off from undisturbed and rehabilitated areas is directed away from operational areas and mine water storages via diversion banks and channels. These banks and channels direct this run off into clean water dams or natural watercourses. The major clean water storage dam is Possums Puddle. No clean water is accessed for operational purposes and these dams overflow into natural drainage systems. Further isolation of smaller rehabilitated catchment areas from the mine water system will continue as rehabilitation work progresses.

The major natural creek running through the site is Four Mile Creek. Most of the operational mining areas at Bloomfield are located within the catchment of Four Mile Creek. A series of drains and levees direct Four Mile Creek around Lake Foster (mine water storage) and into Possums Puddle (clean water storage). From Possums Puddle clean water overflows back into Four Mile Creek.

Waste Water

Wastewater generated on site, consisting of domestic waste from bathhouses, administration offices and associated amenity areas, passes through a Cessnock City Council approved anaerobic waste water treatment system.

Compensatory Water

In accordance with the Water Management Plan (WMP) if it is found that downstream water users have been adversely impacted the landholder will be consulted regarding the provision of an alternative water supply or some other appropriate agreement negotiated between the parties. To date it has not been necessary to provide of any ‘compensatory water’ to other users.

7.1 Surface Water

7.1.1 Environmental Management

A Water Management Plan (WMP) has been prepared and approved by DPE in accordance with Project Approval requirements for the operation of the mine. The Plans prescribe the process water source and supply requirements, site-water balance, storage, impact management and monitoring of surface water in the vicinity of the mining operations.

Bloomfield has several sources of surface water (mine water) that require management to avoid pollution, or a non-compliance with the site EPL.

In addition to the physical, or infrastructure, components of the mine water management system, the two major management controls for surface water pollution are *water quality monitoring* and *licensed mine water discharge*.

Water Quality Monitoring

The water monitoring program at Bloomfield consists of discharge sampling, (EPL Licenced discharge point), and background monitoring. The background monitoring sites are centred on Four Mile Creek and its tributaries and Wallis Creek tributaries to the west of the mining lease. Plan 1 shows the location of the monitoring sites and Table 19 lists the monitoring sites. During 2021 two additional monitoring sites were included on Buttai Creek (a tributary of Wallis Creek) and are identified as WM14 and WM15.

Table 19: Background Water Sample Locations

Creek	ID	Location
Four Mile Creek	WM10	John Renshaw Drive
	WM6	Upstream from Lake Foster
	WM7	Possums Puddle
	WM4	Possums Puddle Overflow
	WM3	Elwells Creek & Four Mile Creek junction
	WM12	Shamrocks Creek & Four Mile Creek junction
	WM11	New England Highway
Four Mile Creek tributary	WM2	Shamrock Creek
	WM5	Elwells Creek
Wallis Creek tributary	WM1	Adjacent old Rathluba Colliery
	WM13	Buttai Creek
	WM14	Buttai Creek
	WM15	Buttai Creek
On-site water storage	WM8	Lake Foster
	WM9	Lake Kennerson

Table 20 outlines the background surface water analysis program undertaken at Bloomfield Colliery.

Table 20: Background Water Analysis

Analyte	Monthly	Quarterly	6 Monthly
pH	✓	✓	✓
Electrical Conductivity (EC)	✓	✓	✓
Dissolved Oxygen	✓	✓	✓
Turbidity	✓	✓	✓
Total Suspended Solids		✓	✓
Total Dissolved Solids		✓	✓
Filterable Iron		✓	✓
Chloride			✓
Sulphate			✓
Alkalinity			✓
Calcium			✓
Magnesium			✓
Sodium			✓
Potassium			✓

These results are reviewed and, if required, remedial action or further investigation initiated to identify the cause of anomalies.

Licenced Mine Water Discharge (EPL 396)

Mine water is discharged in accordance with conditions P1, L2 and L3 of EPL 396. These conditions allow discharge of 40ML of mine water per day, within water quality limits, dependent on rainfall. Representative samples are collected at the discharge point and at the Four Mile Creek monitoring station during each day of discharge. Samples are tested on site to ensure discharge water is within the allowed water quality limits, before being dispatched to an independent NATA accredited laboratory for analysis. Discharge samples are tested for:

- pH;
- EC;
- Total Suspended Solids (TSS);
- Total Dissolved Solids (TDS); and
- Filterable Iron (for discharge point samples).

A permanent monitoring station is located on Four Mile Creek, approximately 500m upstream of the New England Highway. It records EC and water level (via pressure sensor and V-notch weir) every 15 minutes and logs the results every hour.

Other Management

All infrastructure (i.e. drains, dams, spillways, discharge pipes and valves) used for the separation of clean water and mine water, or the discharge of mine water, are inspected as part of the site EMS, with a documented quarterly check sheet being completed.

7.1.2 Environmental Performance

Background Monitoring Results

The background surface water monitoring results for the reporting period are shown in Figures 5 to 10 below. Figures 5 to 10 provide a graphical presentation of EC and pH which are the main surface water parameters, with the full data set provided in Appendix C.

Figure 5 and 6 shows EC and pH results for the Four Mile Creek sites. Figure 5 shows salinity levels are slightly elevated in the lower end the catchment. Four Mile Creek is ephemeral and the EC level varies due to rainfall and licenced mine discharges. The higher salinity results along Four Mile Creek (Elwells Creek and Shamrock Creek junctions and New England Hwy) reflect concentration of solutes in ponds during low flow periods and from licensed discharges in addition to offsite sources such as historic underground workings.

As outlined later, there were 33 licensed discharges throughout the reporting period. EC levels vary due to rainfall, creek flow volumes and mine discharge therefore monthly and yearly trends cannot be assessed.

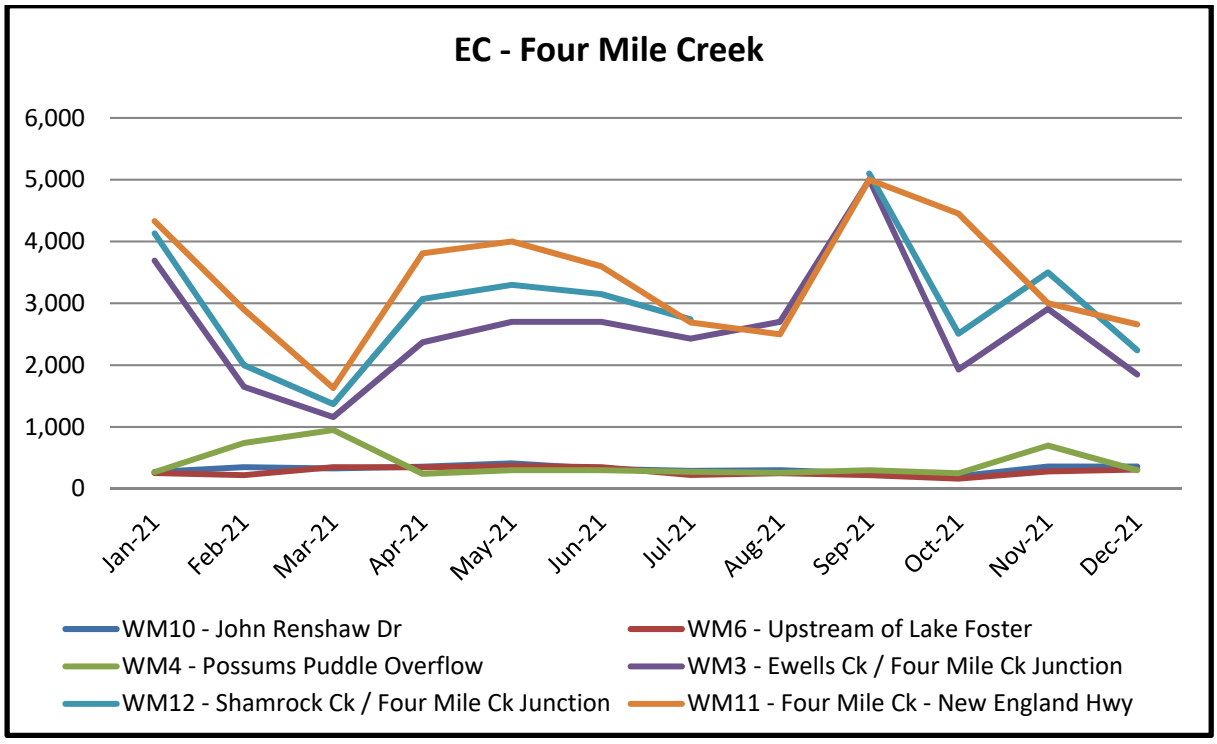


Figure 5: Four Mile Creek Catchment Electrical Conductivity

Figure 6 shows the pH levels in Four Mile Creek are generally consistent with ANZECC water quality guidelines (pH 6.5-8.5). pH levels vary due to rainfall and mine discharge therefore monthly and yearly trends cannot be assessed.

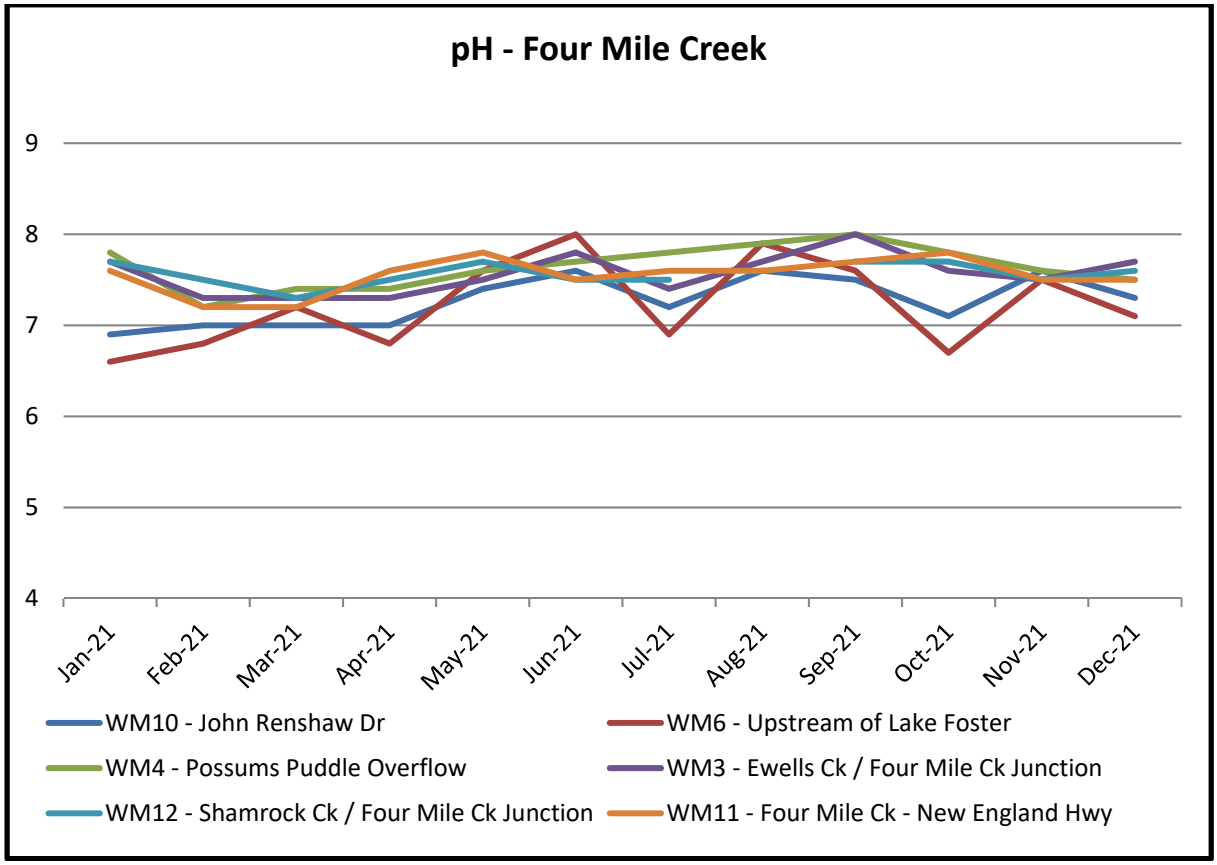


Figure 6: pH of Four Mile Creek

Figure 7 shows EC and pH results for water storage dams. Water quality within the mine water storage dams (Lake Kennerson and Lake Foster) varies throughout the year depending on rainfall capture in the open cut pits, transfers from Abel Mine, CHPP water usage and frequency of licensed discharge events, which are also rainfall dependent. The freshwater dam (Possums Puddle) remains fairly constant throughout the year as it is separate from mining influences.

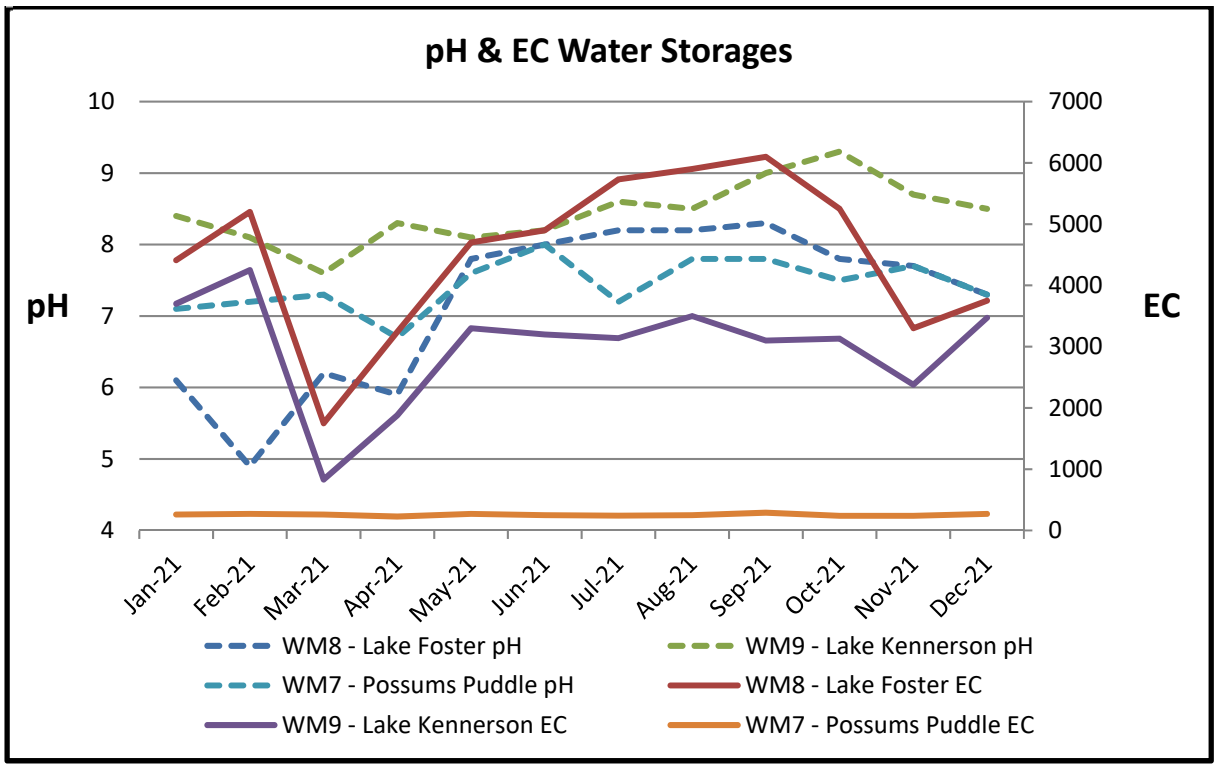


Figure 7: pH and EC in Site Water Storages

Figure 8 shows the pH and salinity levels in two Four Mile Creek tributaries. These tributaries are ephemeral streams and are often dry or not flowing (evaporating) resulting in gaps in the graphed data.

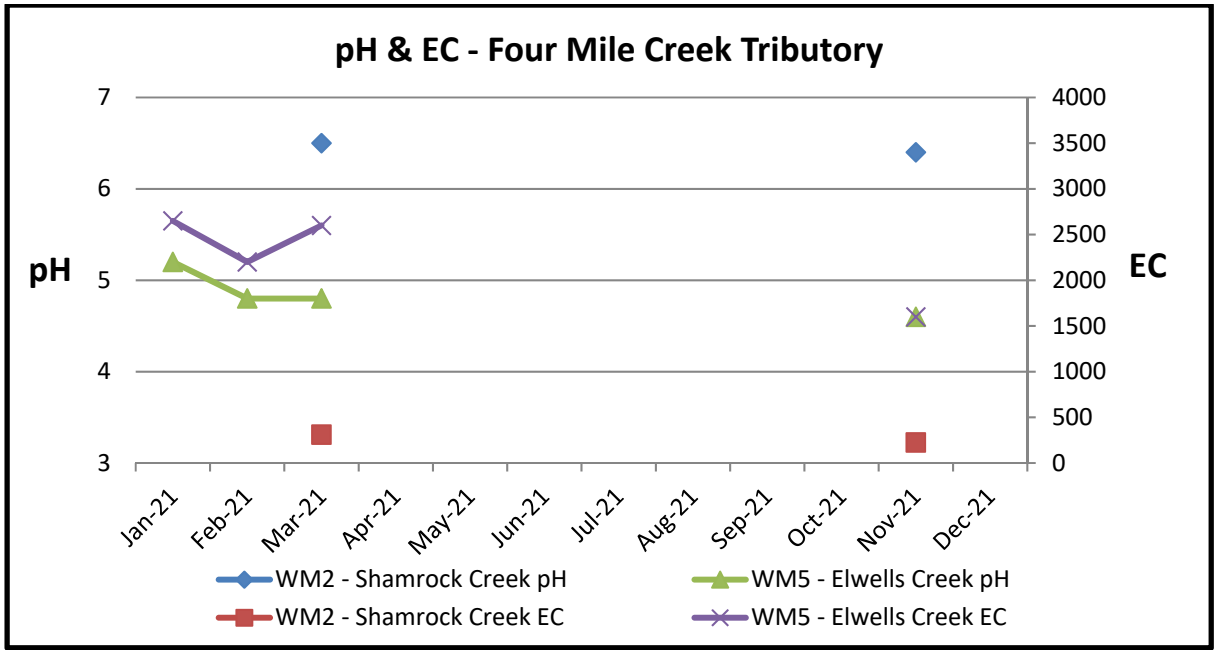


Figure 8: pH and EC in Four Mile Creek Tributary

Figure 9 shows the pH levels in Wallis Creek tributaries are generally consistent with ANZECC water quality guidelines (pH 6.5-8.5).

Previous results indicate that the surface flow adjacent to the old Rathluba pit top (Plan 1 – Location WM1) has historically been of low pH, regardless of mining impacts. Prior to 2006 pH results were less than 4 however pH levels have been steadily increasing since then. This drainage line carries surface flow from non-mining land and rehabilitated mining land, indicating that other off-site effects may be influencing the water quality in the area. The drainage line is ephemeral and is usually dry or evaporating resulting in gaps in the graphed data.

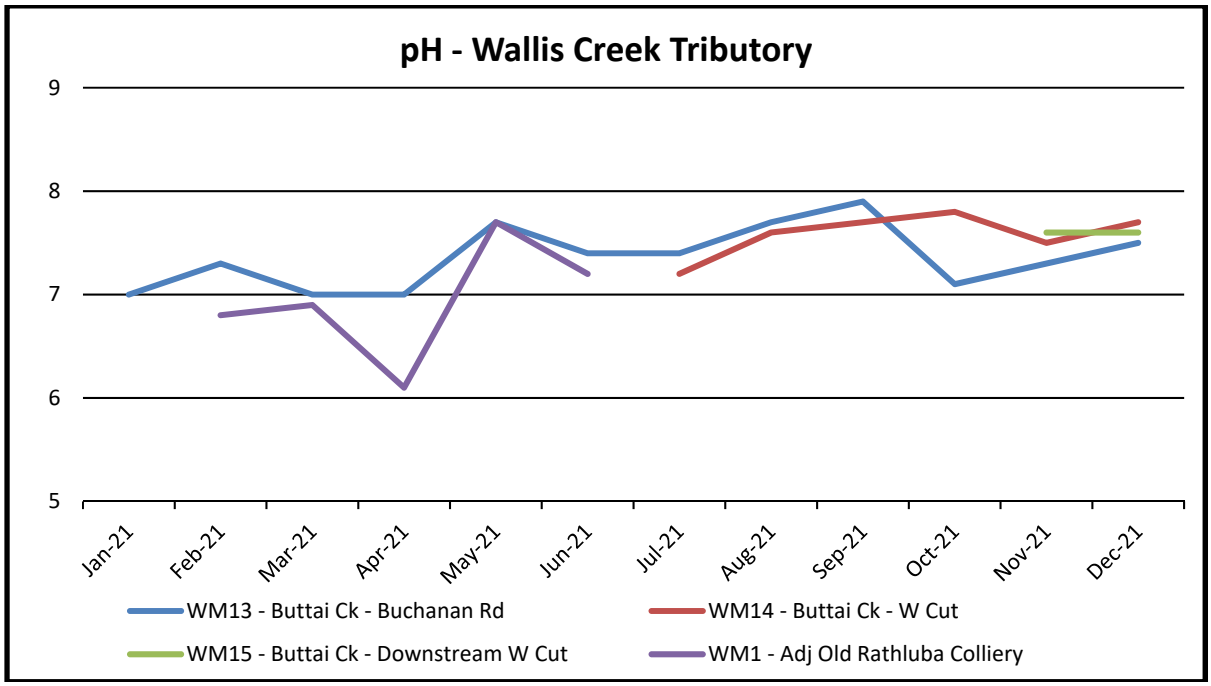


Figure 9: pH in Wallis Creek Tributary

Figure 10 shows the EC levels in Wallis Creek tributaries are generally consistent with ANZECC water quality guidelines (EC 125-2200). These tributaries are ephemeral streams and are often dry or not flowing (evaporating) resulting in gaps in the graphed data.

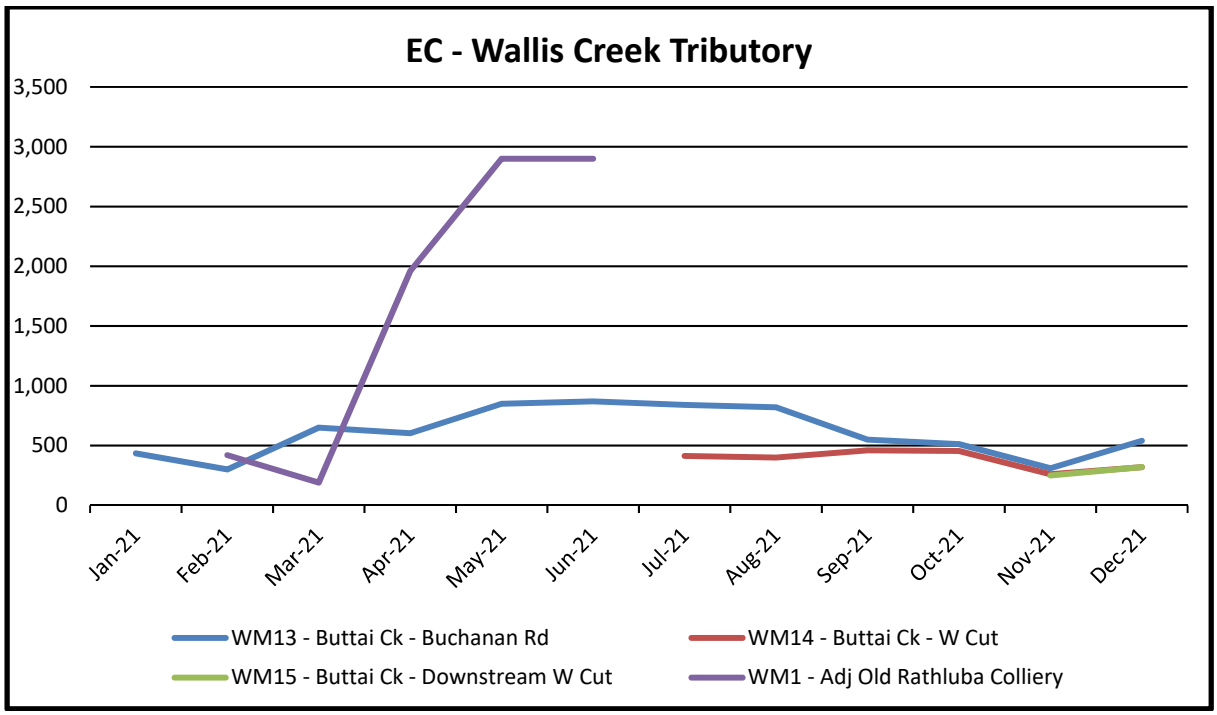


Figure 10: EC in Wallis Creek Tributary

The WMP details water quality trigger values for Buttai Creek (WM13) and Elwells Creek (WM5). Table 21 summarises the results, with the full data set provided in Appendix C. EC results were within either WMP or ANZECC 2000 trigger. The low pH levels at WM5 are attributed to stagnate evaporating pools during drier non-flow periods.

Table 21: Trigger Values

Sampling Site	pH	EC	TSS
WM5 – Elwells Creek	4.6 to 5.2	1600 to 2650	5 to 113
WMP Trigger Level	5.2 - 8.0	430 - 4000	4 - 85
WM13 – Buttai Creek	7.0 to 7.9	300 to 870	5 to 20
WMP Trigger Level	6.4 – 7.8	380 - 1100	5 - 45
ANZECC 2000 Trigger Level	6.5 - 8.5	125 - 2200	50*

* Standard Industry Criterion

Elwells Creek is an ephemeral tributary of Four Mile Creek. Sample site WM5 recorded a result of pH 4.3 in November. These ephemeral streams are often dry or not flowing (evaporating) resulting in gaps in the data.

The next downstream sampling site is WM3 located in Four Mile Creek below the junction with Elwells Creek (Plan 1). In April WM3 recorded a result of pH 7.5 (Figure 6). Throughout the reporting year WM3 pH results ranged from 7.3 to 8.0. This indicates that there is no detrimental impacts downstream of Elwells Creek.

Discharge Monitoring Results

There were 33 licensed discharge events conducted during the reporting period, with a total discharge volume of 1765 ML. Table 22 shows the average, maximum and minimum water quality results at the discharge point, compared to EPA discharge water quality thresholds. Detailed daily discharge results are provided in Table C1 in Appendix C.

Table 22: Discharge Sampling Analytical Results

DATE	pH	TOTAL SUSPENDED SOLIDS (mg/L)	CONDUCTIVITY (uS/cm)	IRON (mg/L)	DISCHARGE VOLUME (ML/day)
EPA Limits	**6.5-8.5**	**30**	**6,000**	**1**	**40**
Average	8.0	9	5,017	<0.04	28
Maximum	8.3	78	5,990	0.45	40
Minimum	6.5	2	688	<0.01	5

7.1.3 Environmental Incidents

There were three reportable surface water incidents during the 2021 reporting period. Refer to Section 11 for further details.

On Tuesday 23/2/2021 during a routine inspection by DPE Compliance where two sediment dams were passively seeping water following recent rainfall. The release was determined by DPE officers as an incident. This incident was reported to EPA Pollution Line and Incident no. C02606-2021 was issued and an incident report subsequently provided to DPE, RR and NSW EPA.

An incident was identified on 20/03/2021 where during the recent heavy rain period, a mine water dam (known as the Overland Dam) was passively spilling water. A pump is located on the dam, however did not keep up with the rainfall and on occasion continued to passively release when recharged. The incident was reported to EPA Pollution Line on 22/03/2021 and Incident no. EPA116704 was issued. An incident report subsequently provided to to DPE, RR and NSW EPA

On 21 March 2021 a water discharge was undertaken in accordance with EPL 396 conditions. During the discharge the Total Suspended Solids (TSS) exceeded the EPL limits. The incident was reported to the EPA Pollution Line and reference number C04379-2021 was issued.

7.1.4 Further Improvements

The surface water monitoring program will be continued in accordance with WMP requirements.

7.2 Ground Water

7.2.1 Environmental Management

A Water Management Plan (WMP) has been prepared and approved by DPE in accordance with Project Approval requirements for the operation of the mine. The WMP prescribes the process water source and supply requirements, site-water balance, storage, impact management and monitoring of groundwater in the vicinity of the mining operations.

Plan 1 shows the location of the groundwater monitoring sites and Table 23 outlines the groundwater monitoring program undertaken at Bloomfield Colliery.

Table 23: Groundwater Monitoring Program

Analyte	Quarterly	6 Monthly	Annual
Water Levels	✓	✓	✓
pH		✓	✓
Electrical Conductivity		✓	✓
Total Dissolved Solids		✓	✓
Filterable Iron			✓
Chloride			✓
Sulphate			✓
Alkalinity			✓
Calcium			✓
Magnesium			✓
Sodium			✓
Potassium			✓

7.2.2 Environmental Performance

A graphical presentation of the groundwater levels for PD1 to PD8 are provided in Appendix D. Groundwater levels show the accumulated effects of long-term mining. Due to the long period of time mining has occurred on the site (170 years), there is no evidence to suggest what pre-mining groundwater levels might have been.

Predicted groundwater heads have been modelled to show groundwater levels and drawdown at the completion of mining in 2025. Drawdown as a result of mining activities are expected to reach a maximum in 2025.

Groundwater in the vicinity of the Mine Lease is saline and of negligible value for beneficial users. The Groundwater Impact Assessment concludes that no adverse impacts on groundwater supply, quality or any groundwater dependent ecosystems are expected as a result of the Project. Recorded EC and pH levels are relatively stable showing no real trend (Figures 11 & 12).

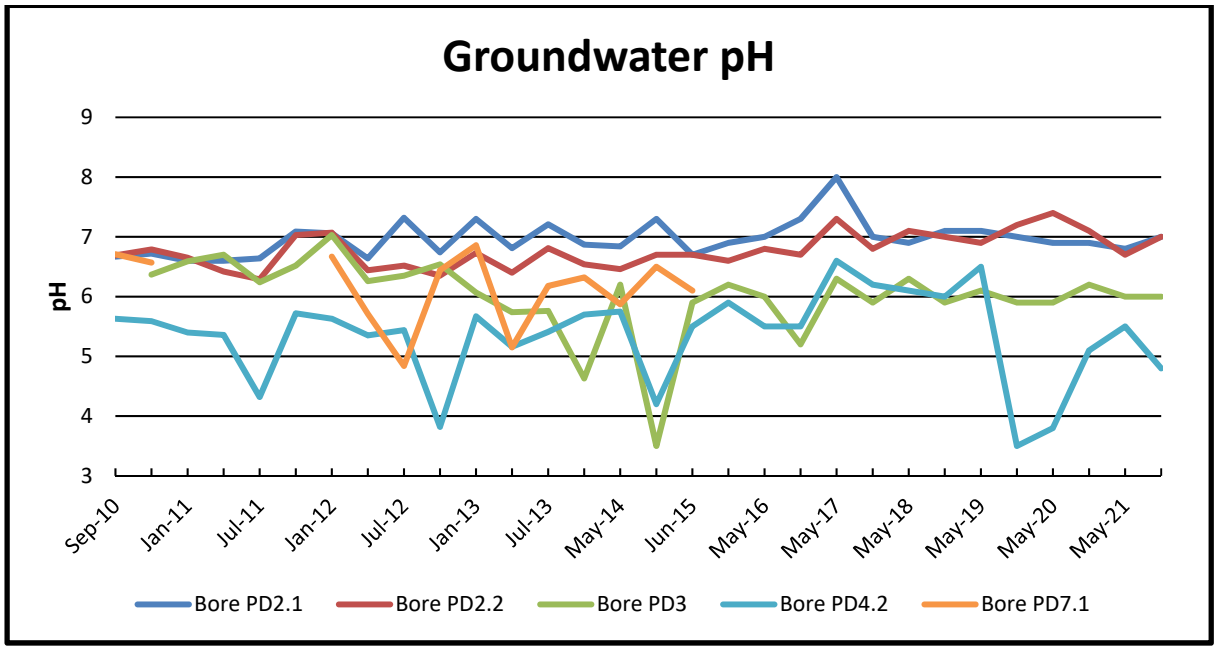


Figure 11: Groundwater pH

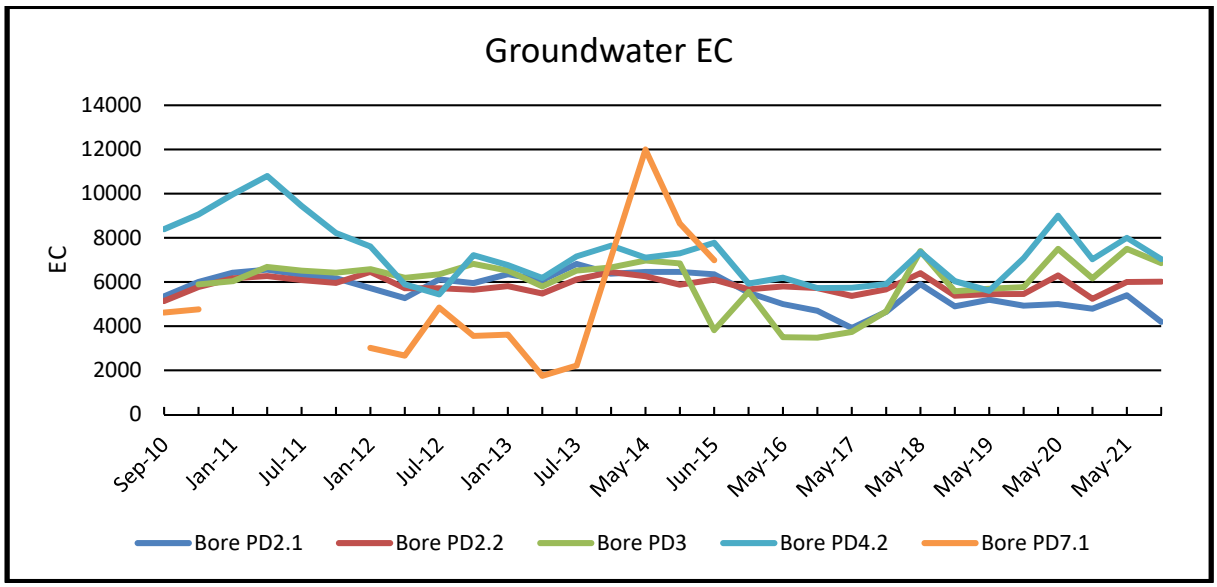


Figure 12: Groundwater EC

Predicted groundwater extractions via mine inflows are expected to peak in the water year 2020/21 at 482 ML. Table 18 shows the actual water take for the water year 2020/21 was 274 ML.

7.2.3 Environmental Incidents

No reportable incidents relating to groundwater occurred during the reporting period.

7.2.4 Further Improvements

The groundwater monitoring program will be continued in accordance with WMP requirements. As more groundwater data is collected any long-term trends may be identified.

8 REHABILITATION

8.1 Buildings

There have been no buildings or structures decommissioned over the site during the reporting period.

8.2 Rehabilitation of Disturbed Land

A range of final land uses have previously been considered by Bloomfield and the landowner. Selection of an appropriate post-mining land use and development of a suitable post mining landform is detailed in the 2008 EA, 2017 EA (Mod 4) and in the current MOP.

As the site and surrounding area has been identified as having potential for industrial-type uses in the future, the mine site area will be rehabilitated in such a way that does not conflict with this future land use. Such rehabilitation will mean providing a flat to undulating topography suitable for mixed use industrial, seeded with grasses to stabilise, together with areas of trees for habitat, until such time as detailed determinations are made regarding any future industrial use of the site. Should no such future development eventuate, the site would remain as a stable, rural landscape. The objectives of the rehabilitation program being:

- To establish post-mining surfaces and vegetation cover which ensure a safe and stable landform of land capability class equal to that which existed prior to mining disturbance.
- Return the land to a condition for a final landuse suitable for grazing, without restricting future post relinquishment development opportunities including a range of post-mining landuses, which take into account the proximity of the site to the urban areas of Maitland and possible future development demands.
- Create landforms that can accommodate overburden and waste products produced during coal mining and processing, and merge with adjoining undisturbed landforms.
- Reinstate a surface drainage network on the rehabilitated landforms that is hydrologically stable and incorporates adequate erosion and sediment control structures so as to effectively protect adjoining areas from potential water-borne impacts.
- Undertake a maintenance program to ensure the continued sustainability of previously rehabilitated areas.

Landscape re-contouring, topsoil handling and revegetation techniques are well established at Bloomfield. Rehabilitation is carried out throughout the year, with the aim of timing vegetation seeding operations in spring and autumn. The majority of the lease area is relatively undisturbed remnant native bushland and no other activities are carried out on the area other than the mining operation. To date 498 Ha has been rehabilitated.

As reported in the previous Annual Review, the major rehabilitation program undertaken over the past decade has now resulted in only relatively small areas becoming available for rehabilitation each year. Combined with this was an expansion of dumping area over areas previously categorised as rehabilitated.

A total of 7 ha of land were rehabilitated during the reporting period. This is ahead of the MOP rehabilitation for 2021 which was estimated to be nil Ha. Throughout 2021 overburden emplacement operations were carried out within the mine void. This involved backfilling the lower areas of the void and against existing highwalls towards the final landform. The highwalls on the southern and western lease boundary will eventually be backfilled to ground level. Shaping and rehabilitation of existing overburden emplacement areas will not be able to continue until backfilling areas within the void has reached the final landform.

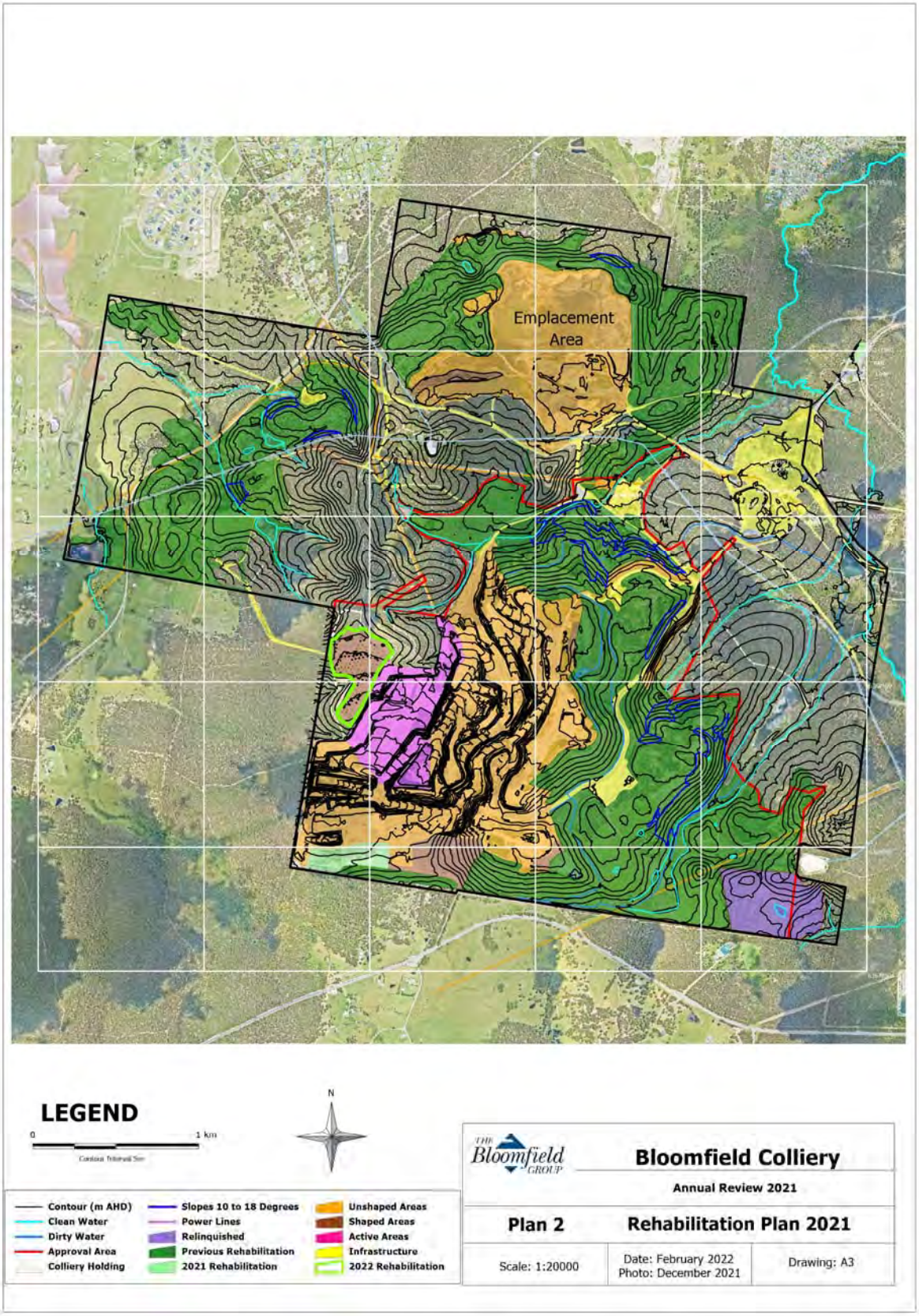
Plan 2 provides an overview of the site showing areas previously rehabilitated, shaped and unshaped areas (active dumps), and active mining areas.

Table 24 provides a summary of the disturbed and rehabilitated areas at Bloomfield Colliery.

Table 24: Rehabilitation Summary

	Area Affected/Rehabilitated (hectares)			
	To date	**Last report**	**Next Report (estimated)**	
A: MINE LEASE AREA				
A1 Mine Lease(s) Area	1,453			
B: DISTURBED AREAS				
B1 Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	70	71	70	
B2: Active Mining Area (excluding items B3 – B5 below)	37	59	37	
B3 Waste emplacements, (active/unshaped/in or out-of-pit)	180	184	180	
B4 Tailings emplacements, (active/unshaped/uncapped)	79	79	79	
B5 Shaped waste emplacement (awaits final vegetation)	28	6	18	
ALL DISTURBED AREAS	394	399	384	F1
C REHABILITATION PROGRESS				
C1 Total Rehabilitated area (except for maintenance)	498	491	508	F2
D: REHABILITATION ON SLOPES				
D1 10 to 18 degrees	28	28	28	
D2 Greater than 18 degrees	-	-	-	
E: SURFACE OF REHABILITATED LAND				
E1 Pasture and grasses	494	487	503	
E2 Native forest/ecosystems	-	-	-	
E3 Plantations and crops	4	4	5	
E4 Other (include nonvegetative outcomes)	-	-	-	

The 498 Ha total rehabilitated area includes 21 Ha of rehabilitated and relinquished lands.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Active Areas
Infrastructure
2022 Rehabilitation
THE Bloomfield GROUP
Bloomfield Colliery
Annual Review 2021
Plan 2
Rehabilitation Plan 2021
Scale: 1:20000
Date: February 2022
Photo: December 2021
Drawing: A3

Table 25 provides a summary of the maintenance activities during the period and activities proposed for the next reporting period.

Table 25: Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report period	Next period	Comment/control strategies/ treatment detail
Additional erosion control works (drains re-contouring, rock protection**)**	-	-	Repair and rehabilitation of drain and gully erosion.
Re-covering (detail – further topsoil, subsoil sealing etc)	-	10	Areas treated with fertiliser and re-seeded during the next reporting period. Actual areas small and difficult to calculate.
Soil treatment (detail – fertiliser, lime, gypsum etc)	-	-	See ”Re-covering” above.
Treatment/Management (detail – grazing, cropping, slashing etc)	-	5	Slashing of established rehabilitation to encourage nutrient recycling and, where needed, fertiliser application.
Re-seeding/Replanting (detail – species density, season etc)	-	-	See ”Re-covering” above.
Adversely Affected by Weeds (detail - type and treatment)	ML1738	ML1738	Continual localised areas of weed treatment across all disturbed and undisturbed areas (see Section 3.7), but no specific areas of intensive treatment.
Feral animal control (detail – additional fencing, trapping, baiting etc)	1500	1500	Feral dog baiting undertaken during the reporting period in consultation with other large land holders in the area and Local Land Services.

8.2.1 Rehabilitation Monitoring

Rehabilitation monitoring at Bloomfield is undertaken in accordance with the Rehabilitation Management Plan, which was developed to satisfy the requirements of the Project Approval for the operation.

The monitoring program is based on the Landscape Function Analysis (LFA) tool developed by the CSIRO. LFA is the core of the monitoring procedures and uses visually assessed indicators of soil surface processes that gauge how effectively a hillslope is operating as a biophysical system. It is mainly based on processes involved in surface hydrology: rainfall, infiltration, runoff, erosion, plant growth and nutrient cycling. In addition to LFA monitoring, the monitoring program also assesses the performance of rehabilitated lands in terms of ground cover protection, erosion, vegetation community composition and structure, soil properties and pasture productivity.

Rehabilitation monitoring at Bloomfield is carried on a biennial basis (i.e. every 2 years) and did not commence until 2008, at the time where much of the existing rehabilitated areas were already established. Monitoring events were subsequently conducted in 2011, 2013, 2015, 2017, 2019 and 2021. The monitoring program currently includes a total of 30 monitoring sites, comprised of 28 sites within the rehabilitated areas plus two analogue sites. Plan 3 shows the

monitoring transect sites in the rehabilitation areas, the analogue sites and the history of the rehabilitation areas.

Key findings of the 2021 rehabilitation monitoring program include the following:

- Landscape function yielded excellent results in terms of stability, and moderately good results for infiltration and nutrient cycling indices. Reference sites experienced a trajectory similar to the rehabilitated sites, which indicates a trend towards landscape scale recovery after the prolonged period of drought.
- Species diversity has increased overall since 2019 and remains on an upward trajectory since the monitoring commenced.
- The majority of sites with mid and upper storeys appeared to be in good health and exhibited signs of natural regeneration and recovery from dieback in previous years. Most dieback observed in 2021 is from naturally senescent *Acacia* species approaching the end of their lifecycle and is not reflective of management practices.
- Some minor areas of weed infestation were identified.
- Almost all sites displayed excellent soil characteristics in terms of topsoil cover, soil acidity, salinity, and sodicity.
- Land and soil capability were generally very good across rehabilitated areas. Rehabilitated sites performed similar to, or better than reference sites.
- A majority of completion criteria were met across all sites.

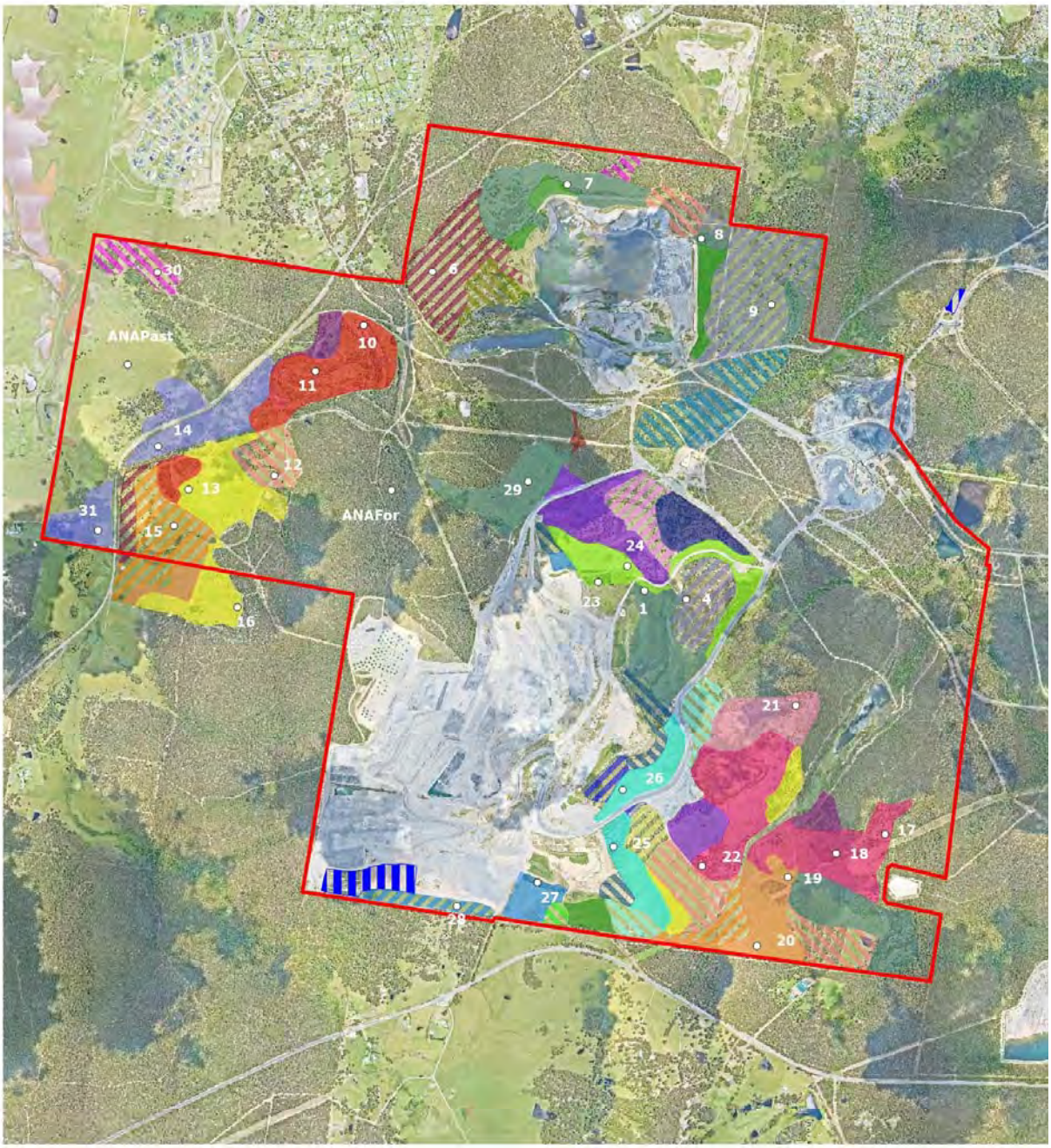
8.3 Other Infrastructure

No infrastructure was decommissioned during the reporting period.

8.4 Rehabilitation Trials and Research

Pastures have been established on rehabilitated land. The aim is to support a productive and sustainable grazing land use.

During 2021 a monitoring program was continued to assess progress in achieving a long term sustainable agricultural land use of the rehabilitated land. These areas of rehabilitated mined lands have been grazed with beef cattle. The program is run over a full year on a quarterly basis to provide data covering summer, autumn, winter and spring conditions. Further details on the results of the monitoring program will be reported in the 2022 Annual Review.



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THE Bloomfield GROUP **Bloomfield Colliery**

Annual Review 2021

Plan 3 History of Mine Rehabiliation Areas and Rehabiliation Monitoring Transects

8.5 Overview of Potential Rehabilitation Issues

The key issues associated with site rehabilitation have been assessed using the maximum reasonable consequence ratings, likelihood ratings, risk matrix and classifications presented in the approved MOP. Table 26 outlines the key issues and proposed mitigation measures that would be implemented.

Table 26: Overview of Rehabilitation Issues

Issue	Proposed Mitigation Measure
Geotechnical failure of emplacement area such as slumping.	Review emplacement design, including survey if required. Undertake reshaping of emplacement area minimising slopes >10°.
Wind and water erosion leading to degradation of growth medium and rehabilitation quality.	Ensure appropriate erosion and sedimentation controls and drainage lines will be employed during rehabilitation activities. Maintenance earth and revegetation works will be undertaken in the areas where erosion has been noted. Annual monitoring detailed above will be designed to determine the type, source, degree, and location of potential erosion sites and source of sediment.
Inadequate or insufficient topsoil to create/enhance the desired ecological communities.	Review soil management procedures and amend as appropriate. Implement maintenance revegetation program including seeding, tubestock planting of native overstorey species, fertiliser. Implement soil testing and amend growing media by the addition of soil ameliorants as required eg; lime, gypsum, mulch, biosolids. Assess soil for weed contamination and treat affected soil.
Impact of weeds and /or vertebrate pest animal leading to widespread failure of revegetation ecosystems.	Careful use of weed free topsoil and/or topsoil management. Encourage rapid establishment of ground cover species designed to outcompete weed species. Assessment and management of weed incursions on topsoil stockpiles prior to respreading. Weed control undertaken in accordance with the requirements of the *Noxious Weeds Act 1993.* Control of pest animal species in accordance with industry guidelines.
Poor vegetation establishment success.	Review species mix and, if required, adjust to achieve the targeted ecosystem. Pasture species selection will be reviewed in context of pasture productivity. Conduct remedial treatment such as soil amelioration, reseeding etc.
Pasture areas not suitable for grazing productively.	Pasture species selection will be reviewed in context of pasture productivity. Conduct remedial treatment such as soil amelioration, reseeding etc.

Issue	Proposed Mitigation Measure
Spontaneous combustion destabilising land surface and impeding vegetation establishment	Apply capping, or dig out affected area where possible and seal, remedial earthworks with inert material and revegetate. Spontaneous Combustion Management Plan
Major storm event resulting in flooding, geotechnical instability, major erosion and/or widespread damage to rehabilitated areas.	Design final landforms, drainage structures and revegetation to cope with major storm events. Implement maintenance program on rehabilitation and sediment structures.
Severe and/or prolonged drought leading to widespread failure of revegetation.	Re-seeding with a selection of drought-tolerant species for revegetation. Selection of species aligned to desired vegetation community. Time seeding/plantings to take advantage of ideal weather conditions. Assess against reference site to determine if impact rehabilitation specific.

8.6 Weeds & Pests

A Weed Management Plan has been developed to provide a plan for weed management at Bloomfield Colliery. The purpose of the Weed Management Plan is to conduct regular surveys to identify weed species requiring control, identify and map weed infestation locations, and implement a weed control priority action plan to control weeds. Bloomfield undertakes regular inspections and has a treatment program to control weeds across the site. A contract weed-sprayer is employed in addition to mechanical support from a slasher when required.

Periodic feral animal control programs are undertaken in conjunction with neighbouring mines and landowners. Activities include feral dog baiting programs. These programs are conducted annually in consultation with Local Land Services.

Approximately $94,000 was spent across the site on weed control during the reporting period. This consisted of a combination of spraying and slashing. Weed control works included rehabilitation areas and remnant vegetation within the Project Area as well as land outside the project area under the control of Bloomfield. No Class 1 or Class 2 declared weeds were identified onsite. Table 27 lists the weed species identified and treated on site.

Table 27: Weed Priority Level

Common Name	Scientific Name	Priority Level
African Daisy	*Senecio pterophorus*	Medium
Blackberry	*Rubus fruticosus*	Medium
Castor Oil	*Ricinus communis*	Low
Crofton Weed	*Ageratina adenophora*	Low
Farmers Friend	*Bidens pilosa*	Low
Giant Parramatta Grass	*Sporobolus fertilis*	Low
Lantana	*Lantana camara*	High
Mother of Millions	*Bryophyllum delagoense*	Low
Pampas Grass	*Cortaderia selloana*	High
Morning Glory	*Ipomoea indica*	Low
Tobacco Bush	*Solanum mauritianum*	Low

During the reporting period a wild dog and fox baiting program was undertaken in conjunction with local landholders and the Hunter Local Land Services. This was conducted in September / October 2021. The baiting program proved to be successful with 30 baits taken.

8.7 Further Development of the Final Rehabilitation Plan

Under Project Approval 07_0087 mining operations can continue to 2030. The Bloomfield washery, rail loader and tailings facility is approved to continue to operate after the mining operations are scheduled to be completed. The continued use of the washery, rail loader and tailings facility is defined as the "*Bloomfield Site*" and approved under Project Approval 05_0136 for the Abel Underground Mine. These items associated with the operation of the washery are approved to process coal from Bloomfield, Abel or the Tasman extended mines. When mining is completed at Bloomfield Colliery, the washery may continue processing coal from the Abel and or Tasman Extended mines. Abel Project Approval 05_0136 permits operations until 2030.

During 2021 a Mine Closure Strategy was developed to assist in planning for the end of mining and final rehabilitation of the site. In addition, a Broad Brush Risk Assessment was conducted to identify works for closure as summarised in Table 28 which are underway in 2022.

Table 28: Mine Closure Studies

Study / Research	Scope / Objective
Site Contamination Assessment	Development of a plan for the investigation that identifies the test locations, type of tests and quantity.
	Soil, sediment and groundwater sampling and subsequent laboratory analysis.
	Preparation of the Contaminated Land Assessment on the findings/observations and data interpretation made during the investigation. The Contaminated Land Assessment has had regard to relevant state and national guidelines. Development of a Remediation Action Plan (RAP).
Site Geochemical Assessment	Development of a plan for the investigation, for review and approval by Bloomfield, prior to the commencement of the works. The plan should identify the test locations, type of tests and quantity.
	Overburden, sediment, waste and groundwater sampling and laboratory analysis
	Development of a Remediation Action Plan (RAP).
Erosion Design	Undertake an assessment of the proposed final landform, capping design and existing rehabilitation monitoring reports and complete a review of the erosion and sediment mobilisation risks to ensure that it is within acceptable erosion and sediment mobilisation rates.
	Identification of high risk areas. Review the cover design proposed by Bloomfield.
	Assessment of potential soil erosion.
	Where the risk of erosion or soil loss is not acceptable, different treatment options, assessment of risk, and recommendation for an appropriate approach.
Surface Water Study	Undertake a water study to ensure that post-mining surface water quality criteria for the Site are met (preventing adverse impacts on the environment and pollution incidents), without active treatment or reticulation.
	Undertake a surface water assessment for the site based on the conceptual final landform incorporating gaps and limitations identified in the 2021 water study.
Groundwater Study	Undertake a water study to ensure that post-mining groundwater water quality criteria for the Site are met (preventing adverse impacts on the environment and pollution incidents), without active treatment or reticulation
	Undertake a groundwater assessment for the site including a detailed site water model incorporating gaps and limitations identified in the 2021 water study.
Ecological / Rehabilitation Assessment	Undertake an assessment of historically disturbed areas to support the Bloomfield in achieving rehabilitation completion and sign off.
Historical Underground Mining and Entry Seals	Undertake an assessment of the underground mine entries including physical site investigation of all mine openings and an assessment of the risk of failure and adequacy of the existing seals.
Rehabilitation Management Plan	Compile the Rehabilitation Management Plan (RMP) to replace existing MOP as outlined in the Resource Regulator's rehabilitation reforms.
Structural Inspections	Undertake a review of the structural integrity for all buildings and infrastructure to be retained as required under NSW Resource Regulator Guideline 3.

Study / Research	Scope / Objective
Tailings Storage Facility Design	Undertake a review of the Bloomfield conceptual final landform including: • Review existing design; • Development of design / modelling inputs; • Assessment of design against relevant guiltiness • Recommendations for any changes to proposed landform design, • Conceptual design report.

9 COMMUNITY RELATIONS

9.1 Environmental Complaints

Three community complaints were received during the reporting period and a summary is provided below in Table 29. The complaints register for the reporting period is presented in Appendix E.

Table 29: Community Complaints Summary

Date	Issue	Type	Location
09-Feb-21	Noise	Resident	Unknown
09-Feb-21	Noise	Resident	Ashtonfield
11-May-21	Noise	Resident	Louth Park
21-May-21	Noise	Resident	Ashtonfield
29-Oct-21	Noise	Resident	Ashtonfield

Figure 13 displays a comparison of complaints with previous reporting periods, which demonstrates a decline in the number of complaints received.

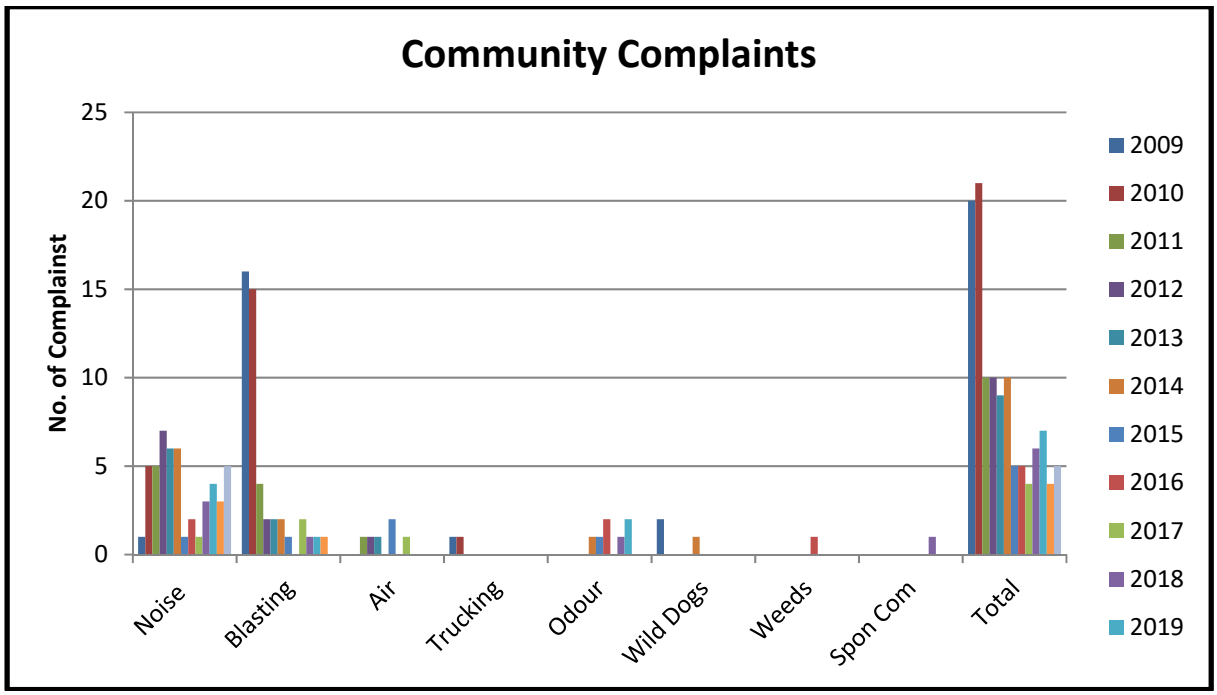


Figure 13: Community Complaints

A 24 hour Blasting and Community Information Line is established and noted on The Bloomfield Group website at https://www.bloomcoll.com.au/

Email: info@bloomcoll.com.au
24 hour phone line: 02 4930 2680

9.2 Community Liaison

9.2.1 Community Consultative Committee

In accordance with the Project Approval, a Community Consultative Committee (CCC) has been established. The CCC meets three times a year. The minutes of the CCC meetings can be viewed on the Bloomfield website.

https://www.bloomcoll.com.au/sustainability/environmental-management/bloomfield-assessments/ccc-minutes

Additional information about the operation has been included on the company website (www.bloomcoll.com.au) and information about blasting schedules advertised quarterly in local newspapers.

9.2.2 Adopt-a-Road Program

Bloomfield is a participant in Cessnock City Council's Adopt-a-Road program. Bloomfield has entered into an agreement with the Council to undertake litter collection campaigns along Buchanan Road, between John Renshaw Drive and Louth Park Road, Buchanan, including Valley View Lane. .

9.2.3 Community Sponsorship

The Bloomfield Group has a commitment to support local community projects and activities. As part of this commitment, during 2021 financial sponsorship and donations were provided for the following local community groups, schools, charities and community events:

- Australian Museum of Clothing (Maitland)
- Benwerrin Rural Fire Brigade
- Beyond Blue
- Camp Quality
- Gresford Public School P&C
- Karuah Rugby League Football Club
- Lifeline Direct
- Maitland Polocrosse Association
- Maitland Rugby Blacks Netball Juniors
- Maitland Show
- Mt Pleasant Public School P&C
- Multiple Sclerosis Australia
- Police Citizens Youth Club (Singleton)
- Rare Cancers Australia
- Salvation Army (Newcastle)
- Salvation Army (Singleton)
- Singleton Business Chamber
- Singleton Fire Brigade Social Club
- Singleton Hospital

- Singleton Legacy
- Singleton Neighbourhood Centre
- Singleton Netball Association
- Singleton Show
- The Samaritans (Singleton)
- University of Newcastle
- Youth Off The Streets

In addition to the above, in accordance with Schedule 2 Condition 14 of the Approval a Community Enhancement Fund with a minimum $500,000 was established and to be expended over the ten calendar years 2010-2019. The expenditure of this Fund was completed in 2019.

10 INDEPENDENT AUDIT

In accordance with the Bloomfield Project Approval (PA 07_0087) every three years Bloomfield is required to undertake an Independent Environmental Audit of the project. During the reporting period Umwelt (Australia) Pty Limited (Umwelt) was commissioned by Bloomfield to conduct the Independent Environmental Audit against Project Approval 07_0087 for Bloomfield Colliery and covered the period 1 November 2018 to 30 October 2021.

The audit was conducted by Daniel Sullivan (Exemplar Global International Certified Auditor 113202) and Joshua Wheatley (Environmental Auditor) from Umwelt. Umwelt were supported during the audit by experts in a number of fields including:

- Luke Bettridge (Rehabilitation)
- Shane Lakmaker (Air Quality)
- Tim Procter (Noise Specialist)
- Chris Bonomini (Water Specialist) and
- Arne Bishop (Biodiversity).

As required by the Project Approval, the audit team was approved by DPE to undertake the audit. The field visit component of the audit was completed on 1 November 2021. The audit consisted of a detailed desktop review of documentation, interviews with key Bloomfield staff and a field inspection of the mining and rehabilitation areas. The audit was conducted generally consistent with '*ISO 14011 - Procedures for Environmental Auditing*' and the '*Independent Audit Guideline. Post-approval requirements for State significant developments* (NSW Government, 2015)'.

Table 30 below lists the non-compliances identified during the audit.

Table 30: Non-Compliances

	Condition No.	Condition Description	Compliance Status
1	Schedule 2 Condition 15	Evidence of consultation	Non-compliant (Low)
2	Schedule 3 Condition 18	Discharge	Non-compliant (Low)
3	Schedule 3 Condition 19	Water Management Plan	Non-compliant (Administrative)
4	Schedule 3 Condition 23	Groundwater monitoring program	Non-compliant (Low)
5	Schedule 3 Condition 26	Landscape Management Plan	Non-compliant (Low)
6	Schedule 3 Condition 29	Mine Closure Plan	Non-compliant (Low)
7	Schedule 3 Condition 31	Aboriginal Heritage Management Plan	Non-compliant (Low)
8	Schedule 3 Condition 33	Energy Savings Action Plan	Non-compliant (Low)
9	Schedule 5 Condition 4	Revision of plans and programs	Non-compliant (Low)
10	Schedule 5 Condition 6	Incident reporting	Non-compliant (Low)

Table 31 outlines the recommendations arising from the audit and an update on progress made in implementing the action plan developed as an outcome of the audit.

The next Independent Environmental Audit of Project Approval 07_0087 will be conducted in 2024.

Table 31: Audit Recommendations

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 2 Condition 15	The revision of management plans going forward will need to consider the outcomes of the required consultation in further detail to ensure compliance with this condition. Further for future revisions of management plans it should be confirmed with Department of Planning, Industry and Environment upfront whether additional consultation is required with listed agencies (in addition to consultation that has occurred for the original versions of the management plans).	When future revisions of management plans are required Bloomfield will confirm with DPI&E upfront whether additional consultation is required with listed agencies.	As and when required.
Schedule 3 Condition 3 (a)	It is recommended a program to monitor the effectiveness of the modelling software (comparing to monitoring data) to be incorporated into the noise monitoring program to ensure the accuracy of the software is maintained.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 3 (c)	It is recommended the Annual Review detail other noise mitigation measures such as noise suppression equipment to provide a comprehensive overview of the measures implemented at Bloomfield Colliery.	To be included in future Annual Reviews.	March 2022
Schedule 3 Condition 16	It recommended Air Quality Monitoring Program to be updated to: • Ensure that the protocol in the Air Quality Monitoring Program provides clarity on how the incremental impact is determined so that compliance with the air quality impact assessment criteria in PA 07_0087 can more easily be evaluated. • include the locations of the two DustTrak monitors and meteorological station. • a description on how extraordinary events are identified.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 3 Condition 21	It is recommended that sediment dams be dewatered to the site water management system as required by *Managing Urban Stormwater: Soils and Construction Volume 2E – Mines and Quarries (DECC 2008).*and that this requirement be appropriately documented in the WMP and site EMS.	Noted. A documented process will be developed to record dewatering activities as required.	
Schedule 3 Condition 21	As per the recommendation in the approved Erosion and Sediment Control Plan within the Water Management Plan Bloomfield should build up the toe of the rehabilitated batter on the main ROM haul road to act as armouring against the erosive fast flowing runoff water during intense storm events.	Noted. The area is adjacent to a main haul road and is used for the catchment of dirty water from the road surface The area will be shaped and rehabilitated during mine closure.	
Schedule 3 Condition 23 (f)	It is recommended that the Groundwater Management Plan be revised to include procedures for the verification of the groundwater model as required.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 23 (f)	It is recommended to ensure consistency that reference to Bore IDs in the Groundwater Management Plan and Annual Reviews be updated correctly for future reporting.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 25	It is noted that the performance indicators / completion criteria are different in the Mine Operations Plan, Rehabilitation Management Plan and Closure Plan for the site. The performance indicators and completion criteria are to be included in revised versions of the documents which are to be developed in accordance regulators authorities as required by the respective Project Approval Conditions.	The MOP is the most recent document. As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 3 Condition 25	As noted in Section 7.1 of the Mine Operations Plan, the development and finalisation of the capping design for the U Cut tailings dam is in progress and due for completion by end December 2021. The outcomes of the capping strategy are to be included in an updated Mine Operations Plan to be prepared for the site following the completion of the additional studies scheduled for completion during December 2021, as detailed in Section 8.2.2 of the Mine Operations Plan.	The Resource Regulator has introduced new standard rehabilitation and reporting conditions on all mining leases. These new conditions will replace existing rehabilitation conditions and replaces current Mining Operations Plans. Bloomfield has engaged consultants GHD to assist in preparation of the Rehabilitation Management Plan as required under the reforms implemented by the Resource Regulator.	July 2022
Schedule 3 Condition 25A	It is recommended to develop a rehabilitation plan for the remediation of the gullying observed to the east of U Cut Tailings Dam.	Gully observed in existing rehabilitation scheduled to be repaired as part of 2022 rehabilitation program.	2022
Schedule 3 Condition 25A	Undertake and complete the Landform and Rehabilitation Assessment as committed in the Mine Operations Plan. This assessment includes an objective of confirming if the historical and current landform is consistent with the approved operations. The outcomes of this assessment are to be included in a revised Mine Operations Plan to assist in the determination of whether the constructed landform is consistent with approved operations.	Landform and Rehabilitation Assessment in progress. The Resource Regulator has introduced new standard rehabilitation and reporting conditions on all mining leases. These new conditions will replace existing rehabilitation conditions and replaces current Mining Operations Plans. Bloomfield has engaged consultants GHD to assist in preparation of the targeted Rehabilitation Management Plan as required under the reforms implemented by the Resource Regulator.	July 2022
Schedule 3 Condition 25A	In conjunction with the completion of the proposed mitigation measures as detailed Table 20 (Section 9.2) of the Mine Operations Plan, it is recommended Bloomfield align the material balances of production and rehabilitation scheduling in the Mine Operations Plan (which are no longer current due to changes in mine planning, rates of mining and earlier completion of mining) to the new planned production and rehabilitation schedules to achieve the final landform.	The Resource Regulator has introduced new standard rehabilitation and reporting conditions on all mining leases. These new conditions will replace existing rehabilitation conditions and replaces current Mining Operations Plans. Bloomfield has engaged consultants GHD to assist in preparation of the targeted Rehabilitation Management Plan as required under the reforms implemented by the Resource Regulator.	July 2022
Schedule 3 Condition 26	It is recommended the Landscape Management Plan to be revised in consultation with Office of Environment and Heritage, DoI and Council.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 3 Condition 27	It is recommended that site capping material balances are reviewed following the finalisation of the tailings dam capping strategy. The topsoil balance is also to be reviewed to confirm whether adequate topsoil material is available for the completion of rehabilitation works onsite. If adequate topsoil is not available to achieve the nominated 100 mm placement of topsoil across remaining rehabilitation areas, identify priority utilisation areas or strategies to achieve successful rehabilitation relinquishment utilising the reduced topsoil volumes.	Soil balances to be reviewed when annual aerial photo and Lidar data capture is completed.	March 2022
Schedule 3 Condition 27	Topsoil and capping materials are to be demarcated and signposted in the field, with the volumes and quality of the material to be recorded as part of the site data management system.	Soil balances to be reviewed when annual aerial photo and Lidar data capture is completed.	March 2022
Schedule 3 Condition 27	It is noted that the performance indicators / completion criteria are different in the Mine Operations Plan, Rehabilitation Management Plan and Closure Plan for the site. The performance indicators and completion criteria are to be included in revised versions of the documents which are to be developed in accordance with regulatory authorities as required by the respective Project Approval Conditions.	The MOP is the most recent document. As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 28	It is recommended the location of final void in the Mine Operations Plan and Final Void Management Plan is reviewed to confirm a consistent void location is identified in each plan.	The MOP is the most recent document. As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 29	The Mine Closure Plan is required to be developed in consultation with DRG and Council. The rehabilitation objectives, performance indicators and completion criteria included in the Mine Closure Plan are also required to be updated to ensure they are consistent with other documents including the Mine Operations Plan and Rehabilitation Management Plan.	The MOP is the most recent document. As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 3 Condition 29	The Mine Closure Plan is required to be updated to reflect the outcomes of the Closure Execution Plan as defined in Section 8.2.2 of the Mine Operations Plan, which is due to be completed December 2021 as defined in the Mine Operations Plan.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 3 Condition 29A	It is recommended that Bloomfield finalise the process of securing management of the site under Part 4, Division 12 of the National Parks and Wildlife Act 1974 with Biodiversity Conservation Trust.	Consultation with the NSW Biodiversity Conservation Trust (BCT) is ongoing. Bloomfield will contact BCT to progress site meeting proposed in BCT's last correspondence.	In progress. Site meeting completed.
Schedule 3 Condition 29C	It is recommended that Bloomfield finalise the Biodiversity Stewardship Agreement for the offset site with Biodiversity Conservation Trust.	Consultation with the NSW Biodiversity Conservation Trust (BCT) is ongoing. Bloomfield will contact BCT to progress site meeting proposed in BCT's last correspondence.	In progress. Site meeting completed.
Schedule 3 Condition 31	It is recommended Bloomfield Colliery review and update the Aboriginal Cultural Heritage Management Plan in consultation with the Mindaribba Land Council and Office of Environment and Heritage as required and submit the plan to the Secretary for approval. As part of this review it is recommended Bloomfield consult with Abel to discuss the status of the regional monitoring network for Aboriginal heritage across the Abel mining area (including Bloomfield) as described in the plan and ensure annual monitoring is being conducted as outlined in the Aboriginal and Cultural Management Plan or make revisions as appropriate to account for current operations.	Updated draft Aboriginal Cultural Heritage Management Plan forwarded to Mindaribba Land Council for consultation. As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	Ongoing
Schedule 3 Condition 31A	It is recommended that Bloomfield seek confirmation from the Secretary that the Condition Assessments completed as per the requirements of this condition have been completed to their satisfaction.	The condition surveys of the Buttai Reservoir and Buttai Cemetery were submitted to the Department on 18 December 2018. Bloomfield will contact the Department to enquire about progress on the review of the surveys.	March 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Schedule 3 Condition 33	It is recommended that the Energy Savings Action Plan should be reviewed and revised in accordance with the requirements of this condition and submitted to the Secretary for approval. The revised plan should consider energy use by mobile equipment and include a details of a program to monitor the effectiveness of energy saving measures to reduce energy use on site.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Schedule 5 Condition 4	It is recommended Bloomfield develop and implement an appropriate review tracking system to monitor and track plans and document reviews to demonstrate compliance with the requirements of this condition.	In 2021 Bloomfield implemented a compliance database (INX) to ensure that all requirements are adequately addressed.	Completed
Schedule 5 Condition 6	It is recommended that Bloomfield notify the Department and Resource Regulator of the TSS exceedances that occurred on 21/22 March 2021 against the EPL for the Project.	The TSS exceedance was reported to the EPA on 23 March 2021 and EPA reference number C04379-2021 was issued. This was a non-compliant discharge under Bloomfield EPL 396 and not an exceedance of the Project Criteria and therefore not required to be reported. Bloomfield believes that the event did not constitute environmental harm and therefore not reportable to the Department or Resource Regulator.	Complete
Noise Monitoring Program	It is recommended that Bloomfield's Noise Monitoring Program be subject to review and revision to ensure that noise monitoring covers Bloomfield operations within the Bloomfield Infrastructure Site in order to demonstrate compliance with applicable criteria (including rail criteria).	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022
Air Quality Monitoring Program	It is recommended that Bloomfield's Air Quality Monitoring Program be subject to review and revision to ensure that air quality monitoring covers Bloomfield operations within the Bloomfield Infrastructure Site in order to demonstrate compliance with applicable criteria.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

Auditors Conclusions and Recommendations		Bloomfield Response	Timeline
Water Management Plan	It is recommended that Bloomfield seek to engage with DPE and have the revised WMP reviewed and approved so that it can be implemented. The revisions in the revised plan were made to ensure that water management covers Bloomfield operations within the Bloomfield Infrastructure Site	Revised Water Management Plan submitted via Portal on 12 August 2021. Notification of commencement of detailed assessment of the Plan made by Department on 24 November 2021.	In progress.
Rehabilitation	The rehabilitation maintenance inspection and works program is to be detailed in the Mine Operations Plan, with clarification of how the outcomes of the site inspection undertaken by site personnel will be utilised in the development of rehabilitation maintenance programs. The Mine Operations Plan update is also to include how the outcomes of the biennial rehabilitation monitoring will be utilised to determine whether there are any rehabilitation maintenance works required to be competed at site.	The Resource Regulator has introduced new standard rehabilitation and reporting conditions on all mining leases. These new conditions will replace existing rehabilitation conditions and replaces current Mining Operations Plans. Bloomfield has engaged consultants GHD to assist in preparation of the targeted Rehabilitation Management Plan as required under the reforms implemented by the Resource Regulator.	July 2022
Water Management	It is recommended that the Overland Dam be resized appropriately to account for the large area of catchment that reports to it and ensure its design capacity prevents future uncontrolled discharges.	Works have commenced on increasing pump capacity, desilting and enlarging the Overland Dam.	In progress
Water Management	It is recommended Bloomfield incorporate requirement to monitoring in accordance with Approved methods for sampling and analysis of water pollutants in NSW (NSW EPA, 2021 version currently in draft format) into the Water Management Plan and confirm that their sampling procedures and the laboratory analysis undertaken is in accordance with the document.	As required under Schedule 5 Condition 4 all management plans will be reviewed and, if necessary, revised to the satisfaction of the Secretary.	May 2022

11 INCIDENTS AND NON-COMPLIANCE

As mentioned in Section 1 and Section 7.1.3, three reportable environmental incidents occurred at Bloomfield Colliery during the 2021 reporting period. A brief summary of the reportable incidents are presented below. The incident reports with further details of the events are provided in Appendix F.

11.1 Passive seepage of water – 23 February 2021

On Tuesday 23/2/2021 during a routine inspection by DPE Compliance where two sediment dams were passively seeping water following recent rainfall. The release was determined by DPE officers as an incident. This incident was reported to EPA Pollution Line and Incident no. C02606-2021 was issued and a full report is provided in Appendix F.

A warning letter was issued by NSW DPE for the incident in relation to the “Bloomfield site” as defined under Development Approval MP 0136.

11.2 Passive spilling from dam – 20 March 2021

An incident was identified on 20/03/2021 where during the recent heavy rain period, a mine water dam (known as the Overland Dam) was passively spilling of water. A pump is located on the dam, however did not keep up with the rainfall and on occasion continued to passively release when recharged. The incident was reported to EPA Pollution Line and Incident no. EPA116704 was issued. The full report is provided in Appendix F.

11.3 Discharge (TSS) Exceedance – 21 March 2021

On 21 March 2021 a water discharge was undertaken in accordance with EPL 396 conditions. During the discharge the Total Suspended Solids (TSS) exceeded the EPL limits. The incident was reported to the EPA Pollution Line and reference number C04379-2021 was issued. The reporting of the incident to the EPA is provided in Appendix F.

12 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

The site activities for the ensuing year will generally be in accordance with the rehabilitation and landscape management strategy outlined in the Environmental Assessment and the MOP schedule. Environmental activities proposed for the next Annual Review period have been previously reported within relevant sections of this document.

Section 8.7 outlines mine closure works which will be conducted during 2022.

APPENDIX A

DUST MONITORING RESULTS

Table A1: PM2.5, PM10 and TSP Results 2021

Date	TSP Concentration (ug/m^3)	PM_{10} Concentration (ug/m^3)	$PM_{2.5}$ Concentration (ug/m^3)
3/01/2021	15	7	2
9/01/2021	13	6	2
15/01/2021	81	37	16
21/01/2021	31	14	5
27/01/2021	55	25	16
2/02/2021	28	13	6
8/02/2021	35	16	4
14/02/2021	50	23	8
20/02/2021	25	11	4
26/02/2021	-	-	7
4/03/2021	18	8	3
8/03/2021	23	11	-
10/03/2021	36	16	5
16/03/2021	14	6	2
22/03/2021	-	-	3
28/03/2021	18	8	4
3/04/2021	17	8	5
7/04/2021	11	5	-
9/04/2021	19	9	-
15/04/2021	42	19	-
21/04/2021	22	10	-
23/04/2021	-	-	4
27/04/2021	22	10	3
29/04/2021	-	-	4
3/05/2021	47	22	9
9/05/2021	24	11	7
13/05/2021	-	-	1
15/05/2021	14	6	0.4
21/05/2021	30	14	7
29/05/2021	13	6	3
2/06/2021	32	15	8
8/06/2021	20	9	6
14/06/2021	18	8	5
20/06/2021	7	3	2
26/06/2021	13	6	1
2/07/2021	11	5	3
8/07/2021	22	10	6
14/07/2021	20	9	5
20/07/2021	10	4	2
26/07/2021	19	9	3
1/08/2021	30	14	7
7/08/2021	17	8	2
13/08/2021	28	13	4
19/08/2021	37	17	7
25/08/2021	1	0.4	0
31/08/2021	34	16	7
6/09/2021	16	7	1
12/09/2021	36	16	7

Date	TSP Concentration (ug/m3)	PM10 Concentration (ug/m3)	PM2.5 Concentration (ug/m3)
18/09/2021	20	9	3
24/09/2021	27	12	3
30/09/2021	17	8	4
6/10/2021	32	15	6
12/10/2021	14	6	2
18/10/2021	26	12	5
24/10/2021	29	13	5
30/10/2021	36	16	3
5/11/2021	14	6	2
11/11/2021	25	11	5
17/11/2021	26	12	4
23/11/2021	14	6	3
29/11/2021	39	18	6
5/12/2021	26	12	3
11/12/2021	12	5	2
17/12/2021	29	13	5
23/12/2021	22	10	3
29/12/2021	9	4	1
Maximum 24 hr Average	81	37	16
EPA Limit 24hr Average	-	**50**	**25**
Annual Average	24	11	4
EPA Limit Annual Average	**90**	**25**	**8**

Figure A1

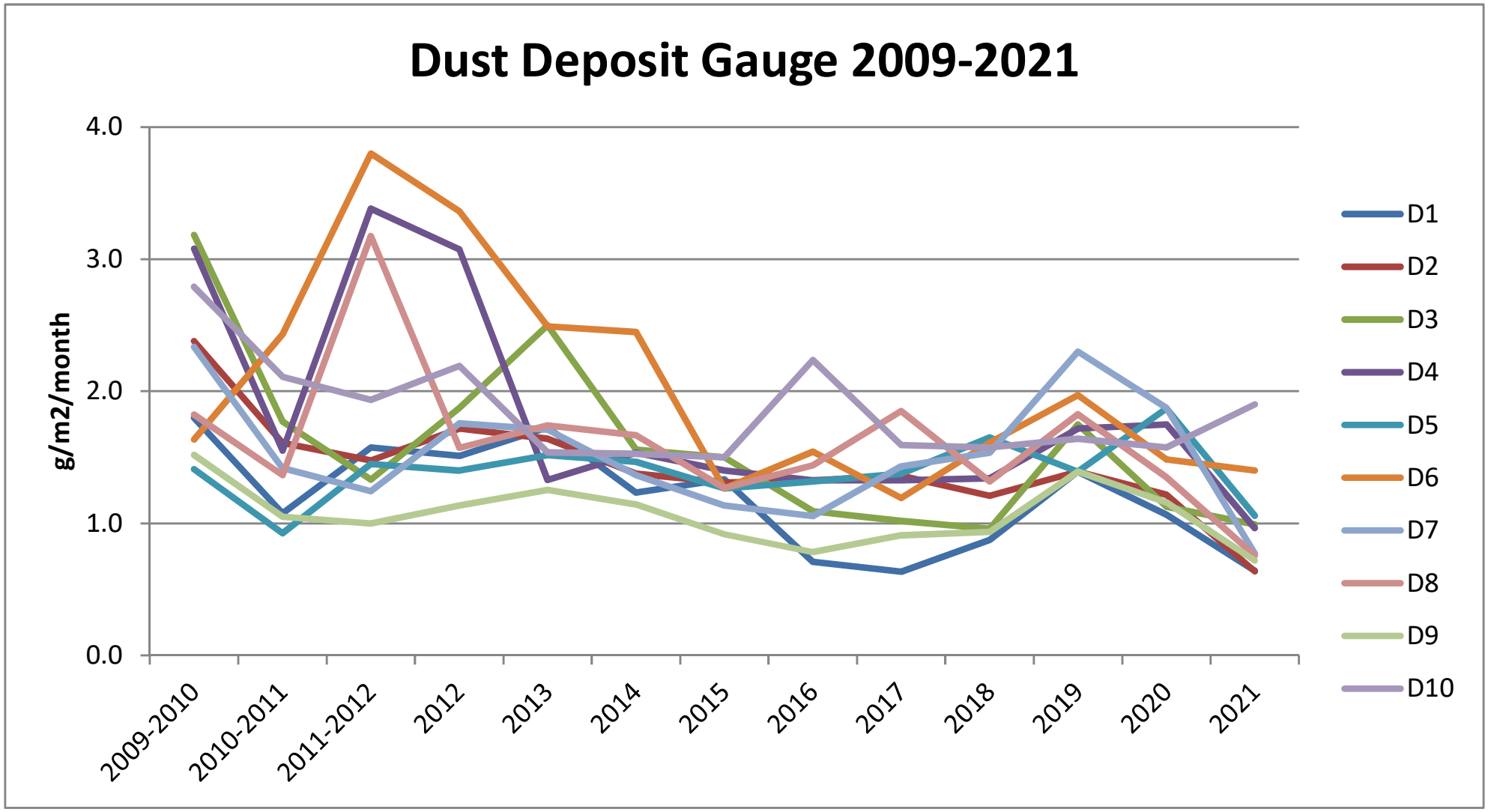
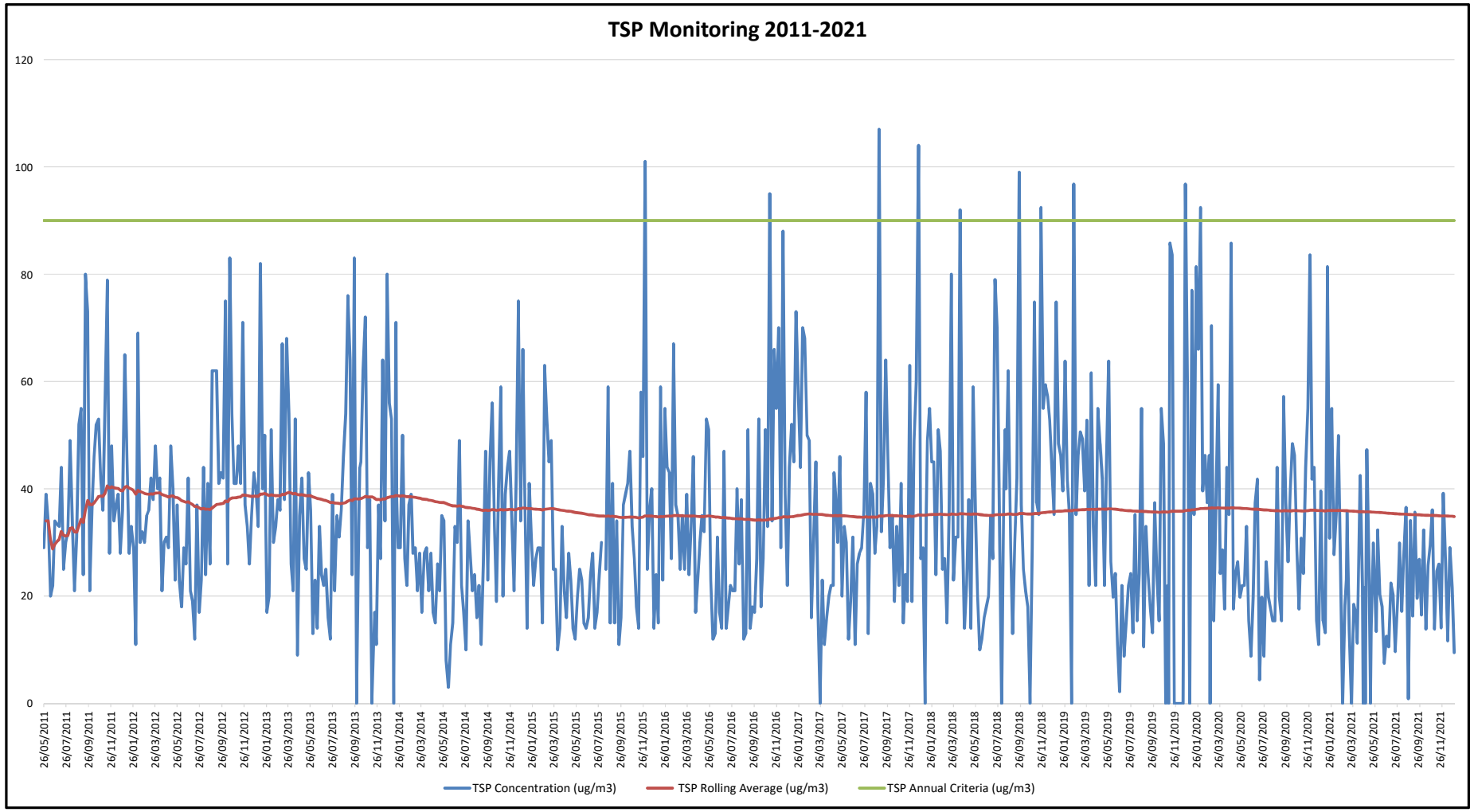

Dust Deposit Gauge 2009-2021
g/m2/month
4.0
3.0
2.0
1.0
0.0
2009-2010
2010-2011
2011-2012
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10

Figure A2


TSP Monitoring 2011-2021
120
100
80
60
40
20
0
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
26/03/2012
26/05/2012
26/07/2012
26/09/2012
26/11/2012
26/01/2013
26/03/2013
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26/11/2020
26/01/2021
26/03/2021
26/05/2021
26/07/2021
26/09/2021
26/11/2021
TSP Concentration (ug/m3)
TSP Rolling Average (ug/m3)
TSP Annual Criteria (ug/m3)

Figure A3

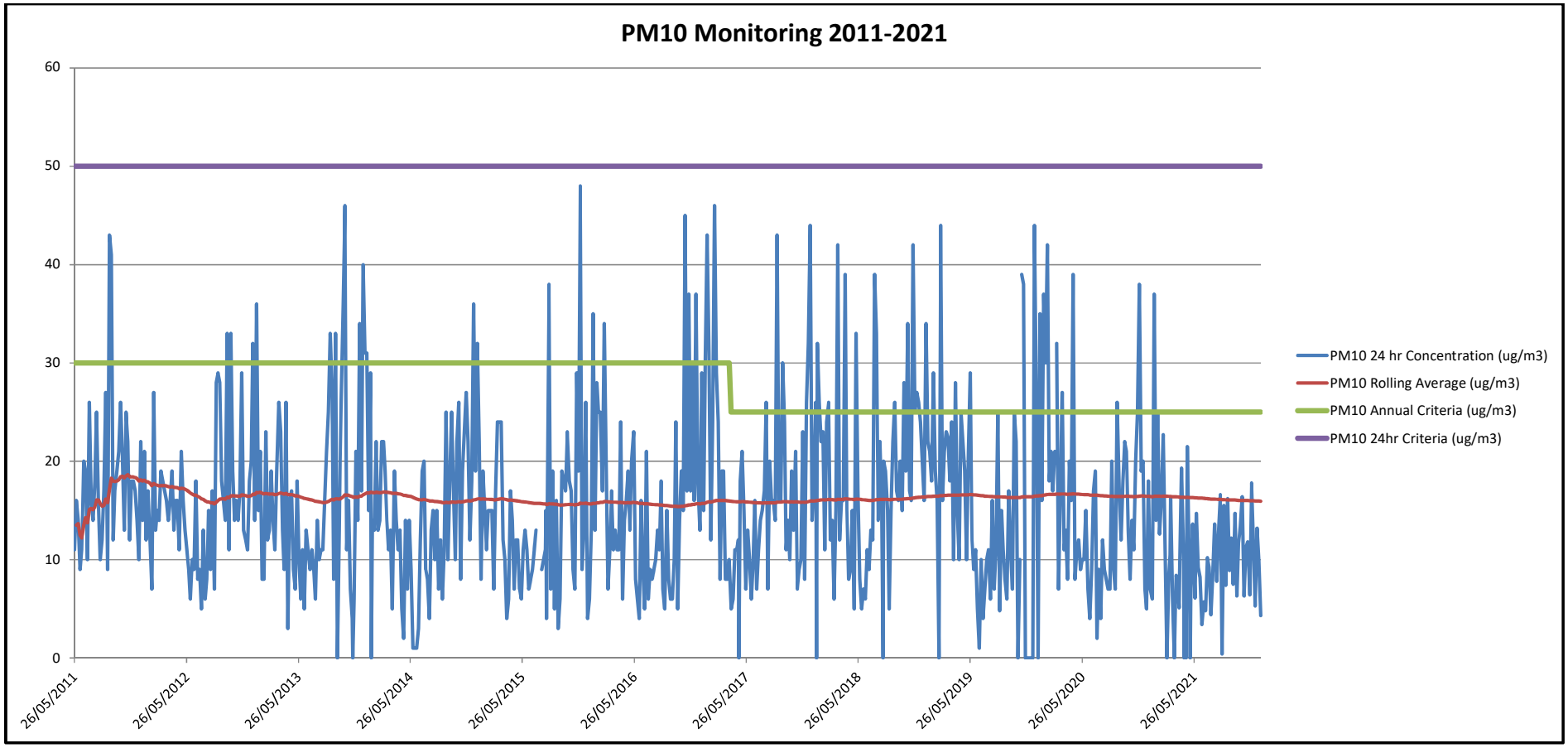
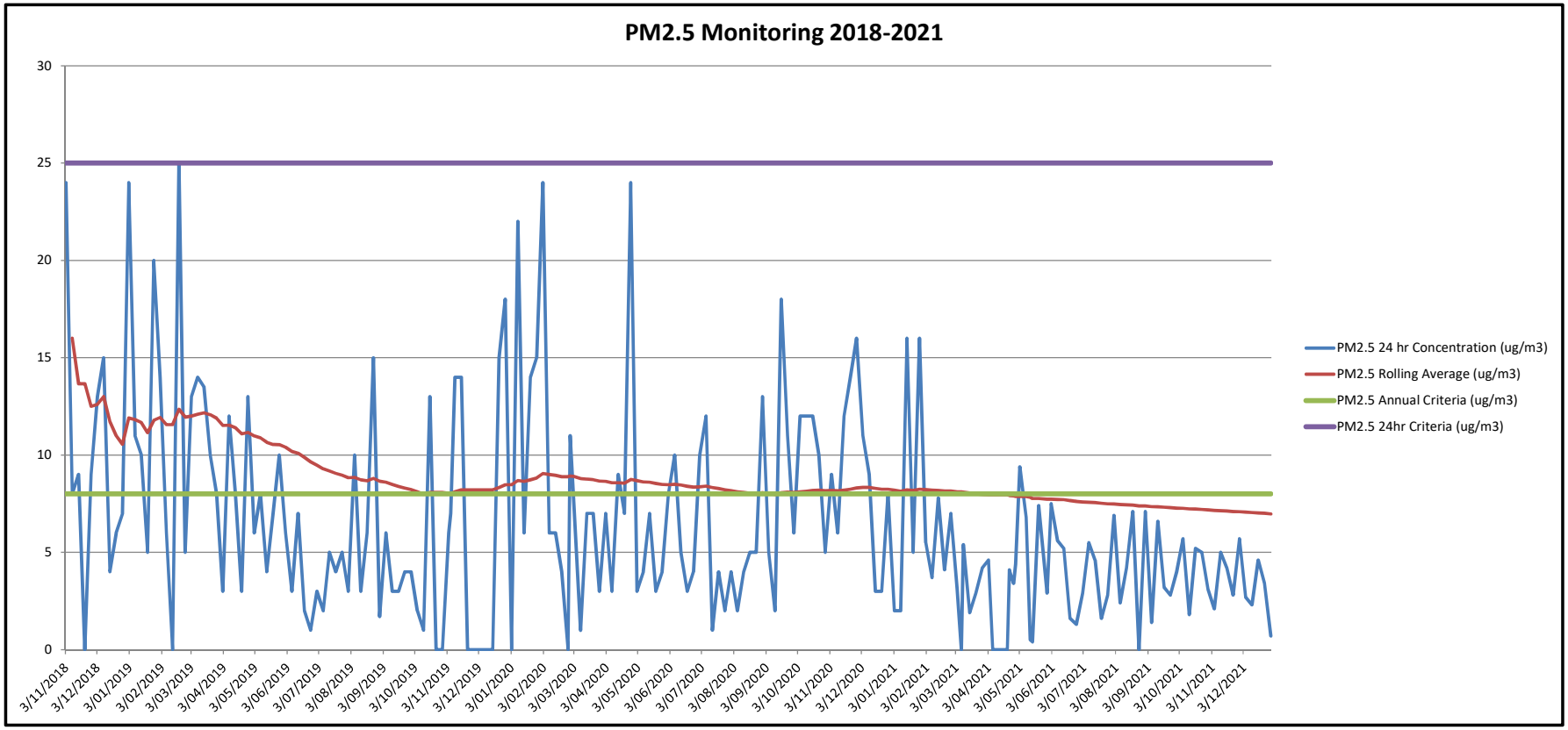

PM10 Monitoring 2011-2021
60
50
40
30
20
10
0
26/05/2011
26/05/2012
26/05/2013
26/05/2014
26/05/2015
26/05/2016
26/05/2017
26/05/2018
26/05/2019
26/05/2020
26/05/2021
PM10 24 hr Concentration (ug/m3)
PM10 Rolling Average (ug/m3)
PM10 Annual Criteria (ug/m3)
PM10 24hr Criteria (ug/m3)

Figure A4


PM2.5 Monitoring 2018-2021
30
25
20
15
10
5
0
3/11/2018
3/12/2018
3/01/2019
3/02/2019
3/03/2019
3/04/2019
3/05/2019
3/06/2019
3/07/2019
3/08/2019
3/09/2019
3/10/2019
3/11/2019
3/12/2019
3/01/2020
3/02/2020
3/03/2020
3/04/2020
3/05/2020
3/06/2020
3/07/2020
3/08/2020
3/09/2020
3/10/2020
3/11/2020
3/12/2020
3/01/2021
3/02/2021
3/03/2021
3/04/2021
3/05/2021
3/06/2021
3/07/2021
3/08/2021
3/09/2021
3/10/2021
3/11/2021
3/12/2021
PM2.5 24 hr Concentration (ug/m3)
PM2.5 Rolling Average (ug/m3)
PM2.5 Annual Criteria (ug/m3)
PM2.5 24hr Criteria (ug/m3)

APPENDIX B

BLAST MONITORING RESULTS

BLAST RESULTS 2021

EPL No. 396
Licencee: Bloomfield Collieries Pty Ltd
Premises: Bloomfield Colliery
Four Mile Creek Rd
Astonfield NSW 2323

Monitoring Frequency: Every blast
Airblast Overpressure Limit: 120 dB(Lin Peak)
Ground Vibration Limit: 10 mm/s

		Blast Monitor Location											
		EPA ID No. 5 - Elliot's			EPA ID No. 4 - McNaughton's			EPA ID No. 3 - Mt Vincent Rd			EPA ID No. 6 - Richards		
Shot No.	Date & Time	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)
6933	22/01/2021 1:56pm	0.56	99.2	1,345	0.47	100.5	1,597	0.32	89.1	2,821	0.29	92.3	2,492
6934	4/02/2021 1:59pm	0.34	101.5	1,322	0.34	101.9	1,625	0.12	98.6	2,814	0.16	102	2,429
6935	5/02/2021 1:59pm	0.15	99.2	1,503	0.21	100	1,858	0.07	90.8	2,593	0.11	98.6	2,322
6936	12/02/2021 1:53pm	0.4	103	1,419	0.23	103.4	1,793	0.08	99.7	2,675	0.12	105.8	2,310
6937	19/02/2021 9:58pm	0.19	104.7	1,376	0.22	102	1,779	0.07	105.9	2,709	0.12	112.3	2,279
6938	24/02/2021 12:48pm	0.31	112.6	1,259	0.29	107.1	1,710	0.13	98.4	2,817	0.12	106.1	2,248
6939	10/03/2021 1:54pm	0.53	104.7	1,479	0.68	101.2	1,837	0.22	96.1	2,617	0.33	105.8	2,323
6940	26/03/2021 1:56pm	1.19	100.3	1,401	1.25	102.9	1,763	0.32	92	2,699	0.61	93.8	2,332
6941	1/04/2021 1:52pm	1.33	104.9	1,290	1.01	102.2	1,708	0.38	96.1	2,796	0.72	103.4	2,283
6942	20/04/2021 1:50pm	0.9	112.4	1,313	0.53	105.9	1,633	0.2	86	2,816	0.68	100.2	2,409
6943	27/04/2021 1:52pm	1.4	103.9	1,314	0.72	100.7	1,555	0.35	95.9	2,861	0.38	107.1	2,510
6944	13/05/2021 1:54pm	0.54	105.3	1,839	0.46	101	2,246	0.77	90.4	2,222	0.51	94.6	2,203
6945	15/06/2021 1:56pm	1.45	103.1	1,372	0.95	101.7	1,610	0.4	88.1	2,800	0.8	97.7	2,504
6946	21/06/2021 1:50pm	0.37	97.9	1,296	0.04	92.1	1,656	0.03	98.6	2,814	0.03	103.1	2,360
6947	1/07/2021 1:55pm	1.64	108.6	1,336	1.36	106.4	1,612	0.47	95.3	2,815	0.75	98.9	2,461
6948	5/07/2021 1:52pm	0.07	105.5	1,241	0.04	105.6	1,705	0.02	81.3	2,833	0.02	86.4	2,236
6949	13/07/2021 1:58pm	0.44	107.6	1,864	0.34	108.2	2,141	0.44	90.9	2,251	0.36	96.5	2,424
6950	12/08/2021 2:03pm	0.11	100.6	1,357	0.14	99.4	1,603	0.07	90.3	2,810	0.05	95.4	2,496
6951	13/08/2021 1:54pm	0.04	98.7	1,286	0.03	97.7	1,602	0.03	87.4	2,847	0.02	90.2	2,421
6952	17/08/2021 2:03pm	0.05	103.4	1,398	0.08	101.3	1,706	0.03	91.2	2,729	0.04	91.7	2,407
6953	6/09/2021 2:06pm	2.42	104.6	1,304	1.11	99.4	1,667	0.45	97.1	2,804	0.57	102.3	2,354
6954	9/09/2021 10:40am	1.39	108.3	1,230	0.97	96.7	1,621	0.52	95.2	2,871	0.5	89.6	2,338
6955	22/09/2021 10:12am	1.94	102.9	1,943	1.32	98.5	2,169	0.85	102	2,203	0.71	93.1	2,513
6956	28/09/2021 2:00pm	0.07	105.2	1,292	0.07	104.2	1,670	0.03	88.8	2,810	0.05	96.9	2,336
6957	22/10/2021 10:14am	1.3	103.1	1,294	0.84	102.6	1,728	0.39	91.2	2,786	0.48	97.6	2,259
6958	26/10/2021 1:58pm	0.23	102.4	1,628	0.26	99.7	1,958	0.16	102.3	2,471	0.22	105.3	2,344
6959	3/11/2021 2:00pm	0.19	101.3	2,022	0.21	101.4	2,252	0.12	100.4	2,118	0.13	106.1	2,517
6960	11/11/2021 1:54pm	0.29	98.4	1,785	0.29	96.1	2,050	0.31	107.5	2,341	0.28	106.3	2,440
6961	18/11/2021 2:01pm	0.5	113.4	1,758	0.32	99.1	2,127	0.49	101.7	2,318	0.47	105.1	2,272
6962	25/11/2021 11:04am	0.04	105.4	1,419	0.04	100.8	1,761	0.02	85.7	2,689	0.02	92	2,356

BLAST RESULTS 2021

EPL No. 396
Licencee: Bloomfield Collieries Pty Ltd
Premises: Bloomfield Colliery
Four Mile Creek Rd
Astonfield NSW 2323

Monitoring Frequency: Every blast
Airblast Overpressure Limit: 120 dB(Lin Peak)
Ground Vibration Limit: 10 mm/s

		Blast Monitor Location											
		EPA ID No. 5 - Elliot's			EPA ID No. 4 - McNaughton's			EPA ID No. 3 - Mt Vincent Rd			EPA ID No. 6 - Richards		
Shot No.	Date & Time	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)	Vibration (mm/s)	Airblast (dB)	Distance (m)
6963	29/11/2021 2:02pm	0.38	102	1,818	0.32	90	2,154	0.31	99	2,269	0.37	108.1	2,325
6964	30/11/2021 1:56pm	0.04	100.4	1,359	0.03	86.2	1,744	0.02	90.6	2,734	0.03	103.2	2,309
6965	3/12/2021 11:02am	0.04	102	1,311	0.03	92.9	1,728	0.03	80	2,773	0.03	89.2	2,277
6966	14/12/2021 11:07am	0.05	102	1,234	0.08	93.2	1,707	0.03	89.5	2,837	0.03	89.5	2,226
6967	15/12/2021 11:09am	0.04	98.9	1,222	0.03	96.1	1,661	0.02	91.5	2,861	0.02	93	2,276

APPENDIX C

WATER MONITORING RESULTS

Site **WM1** **Adjacent Rathluba Colliery**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09														Dry
13-Oct-09														Dry
03-Nov-09														Dry
13-Dec-09														Dry
13-Jan-10														Dry
09-Feb-10														Dry
04-Mar-10														Dry
08-Apr-10														Dry
14-May-10														Dry
10-Jun-10														Dry
07-Jul-10														Dry
25-Aug-10														Dry
20-Sep-10	4.22	4,820	18	3,940	0.38		1	1710	837	195	186	788	15	
19-Oct-10														Dry
19-Nov-10	4.61	1,990	4	1,360	0.06									
21-Dec-10														Dry
14-Jan-11														Dry
22-Feb-11														Dry
24-Mar-11														Dry
27-Apr-11														Dry
26-May-11														Dry
27-Jun-11	5.00	1,980	18	1,330	0.15									Dry
25-Jul-11	5.76	952	16	650	0.16		5	254	85	36	28	85	8	
26-Aug-11	5.41	1,820	5	1,220	0.06									
21-Sep-11	5.68	2224	16	1540	0.09									
26-Oct-11	6.24	2002	17	1350	0.28		2	544	256	79	68	247	9	
22-Nov-11	5.75	1508	12	1050	0.4									
15-Dec-11														Dry
25-Jan-12														Dry
17-Feb-12														Dry
30-Mar-12	6.58	1490	12	1010	0.05									
02-May-12	6.17	1,440	5	1,030	0.05		1	443	178	66	53	181	7	
24-May-12														Dry
27-Jun-12	6.67	1351	38	908	0.17									
27-Jul-12	5.82	1516	78	1140	0.1		16	580	183	79	62	214	7	
30-Aug-12														Dry
25-Sep-12														Dry
25-Oct-12														Dry
29-Nov-12														Dry
20-Dec-12														Dry
24-Jan-13														Dry
25-Feb-13	7.73	2530	52	1590	0.15									
22-Mar-13	7.39	900	56	582	4.44									
22-Apr-13	6.64	1580	17	1080	0.25		18	424	208	50	48	219	11	
17-May-13														Dry
21-Jun-13														Dry
24-Jul-13														Dry
28-Aug-13														Dry
17-Sep-13	7.71	1340	8	831	0.13									
22-Oct-13														Dry
14-Nov-13														Dry
11-Dec-13														Dry
24-Jan-14														Dry
20-Feb-14														Dry
25-Mar-14														Dry
30-Apr-14														Dry
28-May-14														Dry
26-Jun-14														Dry
28-Jul-14														Dry
31-Aug-14	7.14	336	12		2.3									
22-Sep-14														Dry
27-Oct-14														Dry
21-Nov-14														Dry
22-Dec-14														Dry

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	6.4	730	9	530	0.09	14.5								
23-Feb-15														Dry
30-Mar-15														Dry
28-Apr-15	6.4	116	79	86	0.62	190	17	12	17	2.7	2.8	14	6	Floodwater
28-May-15	6	1500				4								Floodwater
24-Jun-15	5.9	1900				4								
29-Jul-15														Dry
27-Aug-15														Dry
28-Sep-15	6.7	2300				4								
22-Oct-15														Dry
30-Nov-15														Dry
21-Dec-15														Dry
29-Jan-16	5.6	1450	2	1050	0.01	2								
26-Feb-16														Dry
31-Mar-16														Dry
28-Apr-16														Dry
26-May-16														Dry
29-Jun-16														Dry
19-Jul-16														Dry
23-Aug-16	6.2	1700				13								Not flowing
28-Sep-16	6.3	1800				8								Not flowing
20-Oct-16														Dry
24-Nov-16														Dry
21-Dec-16														Dry
31-Jan-17														Dry
27-Feb-17														Dry
31-Mar-17	6.3	900				6								Not flowing
26-Apr-17														Dry
30-May-17														Dry
28-Jun-17	5	1380				4								Not flowing
26-Jul-17														Dry
30-Aug-17														Dry
28-Sep-17														Dry
24-Oct-17														Dry
28-Nov-17														Dry
13-Dec-17														Dry
29-Jan-18														Dry
22-Feb-18														Dry
29-Mar-18	6.1	1200				7								
26-Apr-18														Dry
21-May-18														Dry
26-Jun-18														Dry
25-Jul-18														Dry
29-Aug-18														Dry
28-Sep-18														Dry
24-Oct-18														Dry
29-Nov-18														Dry
18-Dec-18	6.1	560				18								
31-Jan-19														Dry
28-Feb-19														Dry
28-Mar-19														Dry
10-Apr-19	6.5	519	53	360	0.25	87	30	150	39	20	15	50	11	
27-May-19														Dry
28-Jun-19														Dry
30-Jul-19														Dry
29-Aug-19														Dry
24-Sep-19	6.5	540				46								
29-Oct-19														Dry
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	6.8	850				25								
31-Mar-20	7.7	810				39								
29-Apr-20														Dry
28-May-20														Dry

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20														Dry
24-Jul-20														Dry
21-Aug-20	6.1	1250				13								
28-Sep-20														Dry
23-Oct-20														Dry
26-Nov-20														Dry
21-Dec-20	7.4	480				32								
27-Jan-21														Dry
24-Feb-21	6.8	420				12								
30-Mar-21	6.9	190												Flooded
27-Apr-21	6.1	1960	21	1650	0.03		30	680	250	74	78	260	11	
25-May-21	7.7	2900				12								
24-Jun-21	7.2	2900				22								
28-Jul-21														Dry
23-Aug-21														Dry
29-Sep-21														Dry
25-Oct-21														Dry
25-Nov-21	6.2	1100				4								
22-Dec-21														Dry

Site WM2 **Shamrock Creek @ Shamrock Hill Lane**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	7.50	1,900			0.55	90								
13-Oct-09														
03-Nov-09	7.70	5,900	14	510	0.63	70								
13-Dec-09														
13-Jan-10														
09-Feb-10	5.50	1,900			0.07	19								
04-Mar-10														
08-Apr-10														
14-May-10														
10-Jun-10	6.90	282	109	330	0.29	209								
07-Jul-10	7.10	333	56	204	0.30	196	5		27	7	10	32	6	
25-Aug-10	7.80	408	8	294	0.18	47								
20-Sep-10	6.54	448	20	350	0.27		21	123	33	11	17	43	7	
19-Oct-10	7.24	522	41	316	0.05									
19-Nov-10	6.19	290	59	250	0.36									
21-Dec-10	7.46	2,740	5	1,980	0.08									
14-Jan-11	7.36	3,860	8	2,880	0.05		160	1410	290	152	164	529	22	
22-Feb-11	7.65	4,120	5	3,470	0.05									
24-Mar-11	7.45	4,820	24	3,980	0.05									
27-Apr-11	6.57	1,160	16	760	0.05		13	398	72	42	47	113	15	
26-May-11	6.26	931	40	786	0.05									
27-Jun-11	6.02	562	16	482	0.21									
25-Jul-11	5.66	343	52	330	0.40		3	102	16	10	12	27	6	
26-Aug-11	6.36	650	10	400	0.05									
21-Sep-11	7.75	243	8	448	0.05									
26-Oct-11	7.36	555	16	390	0.27		10	184	26	17	22	47	9	
22-Nov-11	6.34	878	19	612	0.20									
15-Dec-11	7.86	439	79	334	0.30									
25-Jan-12	7.93	658	14	510	0.19		39	230	30	22	30	64	9	
17-Feb-12	5.84	439	137	320	0.71									
30-Mar-12	6.74	514	20	390	0.63									
27-Apr-12	6.35	561	30	296	0.62		13	164	20	18	21	32	8	
24-May-12	7.92	528	6	282	0.18									
27-Jun-12	8.09	365	46	282	0.34									
27-Jul-12	7.69	549	5	376	0.09		4	201	28	24	28	37	6	
30-Aug-12	4.82	647	292	436	0.34									
25-Sep-12	4.96	2,860	118	2,080	1.32									
25-Oct-12														Dry
29-Nov-12														Dry
20-Dec-12														Dry
24-Jan-13														Dry
25-Feb-13	8.41	5,020	54	3,270	0.05									
22-Mar-13	6.78	415	38	266	1.24									
22-Apr-13	8.23	4,170	51	2,870	0.05		284	1380	431	107	148	756	15	
17-May-13														Dry
21-Jun-13	5.42	556	5	361	0.02									
24-Jul-13	5.46	486	14	318	0.3		1	174	27	19	21	39	7	
28-Aug-13	5.03	574	33	338	5.18									
17-Sep-13														Dry
22-Oct-13														Dry
14-Nov-13														Dry
11-Dec-13	6.37	330	5	247	1.03									
24-Jan-14														Dry
20-Feb-14														Dry
25-Mar-14														Dry
30-Apr-14	6.35	277	28	263	0.92		4	102	14	14	14	24	12	
28-May-14	5.76	295	29		0.52									
26-Jun-14														Dry
28-Jul-14														Dry
31-Aug-14	6.73	330	35		0.44									
22-Sep-14	5.9	330				63								
27-Oct-14	5.5	340	40	220	0.05	39.7	5	130	20	13	13	21	8	
21-Nov-14														Dry
22-Dec-14														Dry

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	5.6	180	42	234	1.4	126								
23-Feb-15	7.3	210				16.5								
30-Mar-15														Dry
28-Apr-15	5	1,040	47	790	0.04	74	5	485	37	45	66	76	13	
28-May-15														Dry
24-Jun-15														Dry
29-Jul-15														Dry
27-Aug-15														Dry
28-Sep-15														Dry
22-Oct-15														Dry
30-Nov-15	7	280				43.8								
29-Jan-15	5.6	180	42	234	1.4	126								
29-Jan-16	6.2	276	47	238	1.1	69								
26-Feb-16	6.7	260				23								
31-Mar-16	7.3	640				161								
28-Apr-16														Dry
26-May-16														Dry
29-Jun-16	6	440				24								
19-Jul-16	5.5	450	4	341	0.17	7								
22-Aug-16	6.7	350				31								
28-Sep-16	7.5	390				11								
20-Oct-16	5	480	10	347	0.09	15	5	180	17	19	21	35	9	
24-Nov-16														Dry
21-Dec-16														Dry
30-Jan-17														Dry
27-Feb-17														Dry
30-Mar-17	5	370				86								Not flowing
26-Apr-17	6.2	270	21	256	3.2	94	16	94	18	12	13	17	9	Not flowing
30-May-17	5.6	460				44								Not flowing
28-Jun-17	5.6	395				27								Not flowing
27-Jul-17														Dry
30-Aug-17														Dry
28-Sep-17														Dry
24-Oct-17	6.4	5,560	10	5,620	0.05	22	150	3100	410	330	330	920	36	
28-Nov-17														Dry
13-Dec-17														Dry
29-Jan-18														Dry
22-Feb-18														Dry
29-Mar-18	5.1	470				26								
26-Apr-18	5	2,630	54	2,290	0.14	30	30	1100	140	110	130	380	24	
21-May-18														Dry
25-Jun-18	4.5	750				7								
25-Jul-18														Dry
29-Aug-18														Dry
29-Sep-18														Dry
24-Oct-18	4.5	830	15	604	0.48	17	30	330	26	38	35	64	14	
29-Nov-18														Dry
18-Dec-18	4.1	700				14								
31-Jan-19														Dry
28-Feb-19														Dry
28-Mar-19														Dry
10-Apr-19	4	458	13	309	0.89	19	30	160	12	20	17	13	11	
27-May-19														Dry
28-Jun-19														Dry
30-Jul-19														Dry
29-Aug-19														Dry
24-Sep-19	4.9	570				9								
29-Oct-19														Dry
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	6	300				32								
31-Mar-20														Dry
29-Apr-20														Dry
28-May-20														Dry

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20														Dry
24-Jul-20														Dry
21-Aug-20	5.5	360				5								
28-Sep-20														Dry
23-Oct-20														Dry
26-Nov-20														Dry
21-Dec-20	5.5	315				87								
27-Jan-21														Dry
24-Feb-21														No flow
30-Mar-21	6.5	310												
27-Apr-21														Dry
25-May-21														Dry
24-Jun-21														Dry
28-Jul-21														Dry
23-Aug-21														Dry
29-Sep-21														Dry
25-Oct-21														Dry
25-Nov-21	6.4	225				32								
22-Dec-21														Dry

Site
WM3

Elwells Creek / Four Mile Creek Junction

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.80	360	14	220	0.74	34								
13-Oct-09	8.10	310	370	210	0.61	46	52		38	15	10	39	3	
03-Nov-09	8.30	640	10	500	0.70	27								
13-Dec-09	7.60	410	8	140	0.23	18								
13-Jan-10	6.80	280	10	200	0.61	17	92		39	14	10	34	3	
09-Feb-10	7.30	220	14	130	0.28	14								
04-Mar-10	8.90	280	9	200	0.35	86								
08-Apr-10	8.70	323	7	220	0.20	23	54		42	18	9	33	3	
14-May-10	7.50	193	7	131	0.10	10								
10-Jun-10	6.80	462	41	370	0.14	65								
07-Jul-10	7.30	581	14	354	0.21	33	75		57	19	16	67	4	
25-Aug-10	6.10	419	10	266	0.29	28								
20-Sep-10	7.42	1,950	10	1,390	0.11		89	710	143	95	81	256	9	
19-Oct-10	7.38	336	7	166	0.15									
19-Nov-10	7.94	2,840	31	1,740	0.05									
21-Dec-10	7.44	1,150	9	674	0.30									
14-Jan-11	7.74	2,140	9	1,430	0.09		181	642	217	59	70	353	8	
22-Feb-11	7.93	4,590	10	3,730	0.05									
24-Mar-11	7.96	4,940	12	3,630	0.06									
27-Apr-11	7.01	326	16	234	0.46		60	52	39	14	9	41	3	
26-May-11	8.24	5,460	24	3,800	0.05									
27-Jun-11	7.44	2,950	21	2,230	0.05									
25-Jul-11	7.78	2,420	67	1,440	0.20		148	504	311	56	57	358	7	
26-Aug-11	7.24	780	20	514	0.32									
21-Sep-11	8.02	1497	15	934	0.12									
26-Oct-11	7.71	627	190	436	0.39		43	140	74	19	18	80	5	
22-Nov-11	7.43	1871	29	1330	0.13									
15-Dec-11	7.76	3180	32	2190	0.05									
25-Jan-12	8.17	4810	14	3770	0.07		327	1760	513	109	201	813	18	
17-Feb-12	6.9	442	45	372	0.72									
30-Mar-12	8	3150	17	2190	0.05									
27-Apr-12	7.17	426	24	314	0.95		45	84	48	14	13	49	6	
24-May-12	7.58	351	23	224	1.25									
27-Jun-12	8.21	4810	24	3740	0.63									
27-Jul-12	7.45	1912	35	1370	0.39		82	689	192	85	81	269	8	
30-Aug-12	7.68	711	30	508	0.42									
25-Sep-12	7.94	2140	15	1330	0.1									
25-Oct-12	7.78	786	17	458	0.36		86	147	91	22	23	104	5	
29-Nov-12	8.06	4790	14	3180	0.05									
20-Dec-12	8.14	3620	12	2420	0.05									
24-Jan-13	8.03	2290	6	1510	0.06		204	690	253	62	79	400	9	
25-Feb-13	7.96	2450	54	1560	0.09									
22-Mar-13	7.58	1640	8	1110	0.27									
22-Apr-13	8.29	4150	54	2940	0.09		286	1370	427	109	149	734	15	
17-May-13	7.64	935	54	498	0.59									
21-Jun-13	7.64	860	10	580	0.35									
24-Jul-13	7.48	650	49	416	0.44		52	150	57	19	19	78	4	
28-Aug-13	7.58	596	15	345	0.34									
17-Sep-13	7.52	1180	38	758	0.17									
22-Oct-13	7.79	1250	8	703	0.17		137	246	135	23	31	192	5	
14-Nov-13	7.94	4210	14	2820	0.05									
11-Dec-13	7.29	718	15	447	0.24									
24-Jan-14	8.47	3840	26		0.07									
20-Feb-14	8.1	2810	58		0.05									
25-Mar-14	7.98	1270	17		0.07									
30-Apr-14	7.78	2600	20	1860	0.05		189	965	240	100	109	452	12	
28-May-14	6.94	357	15		0.46									
26-Jun-14	7.85	667	6		0.31									
28-Jul-14	8.36	4960	19	3890	0.05									
31-Aug-14	7.84	1090	23		0.23									
22-Sep-14	7.4	750				62								
27-Oct-14	7.2	1100	17	702	0.26	20.6	108	323	116	25	32	163	5	
21-Nov-14	8	1000				19.3								
22-Dec-14	8	2700				15.9								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	8.4	3000	26	2120	0.05	29.2								
20-Feb-15	8.2	4000				8.7								
30-Mar-15	7.7	960				18.1								
28-Apr-15	7.1	984	33	636	0.25	48	41	330	82	34	38	115	6	
28-May-15	7	890				62								
24-Jun-15	7.4	690				57								
29-Jul-15	7.5	554	8	382	0.41	29.9								
27-Aug-15	8.3	4840				31								
28-Sep-15	7.7	1980				16								
22-Oct-15	6.5	960	25	633	0.09	38.4	78	280	78	39	36	110	5	
30-Nov-15	7.7	2040				20.6								
21-Dec-15	7.7	5400				14								
29-Jan-16	7.4	1290	28	942	0.37	73								
26-Feb-16	7.1	1300				45								
31-Mar-16	8.1	5000				14								
28-Apr-16	7.5	1400	8	992	0.01	14	195	440	97	39	46	210	6	
26-May-16	7.5	670				51								
29-Jun-16	6.7	2400				18								
19-Jul-16	7.1	1100	7	812	0.27	20								
22-Aug-16	7.2	960				27								
28-Sep-16	8.1	4320				11								
20-Oct-16	8.3	3100	7	2460	0.02	14	240	1100	200	92	140	640	11	
28-Nov-16	8.1	3900				22								
21-Dec-16	8	5300				6								
30-Jan-17	8.2	4490	4	3860	0.01	5								
27-Feb-17	7.5	5320				7								
30-Mar-17	7.2	2100				12								
26-Apr-17	7.5	738	10	567	0.45	19	79	210	85	28	29	110	5	
30-May-17	7.4	1420				17								
28-Jun-17	7.1	923				30								
27-Jul-17	7.1	481	8	312	0.61	23								
30-Aug-17	7	1400				8								Not flowing
28-Sep-17	8.2	3790				6								Not flowing
24-Oct-17	8.2	5510	7	5210	0.01	9	410	2300	390	200	290	1200	22	
28-Nov-17	7.4	3100				3								Not flowing
13-Dec-17	7.9	3100				4								Not flowing
29-Jan-18														Dry
22-Feb-18	7.5	1030				108								Stagnant pool
29-Mar-18	7.5	1300				32								
26-Apr-18	7.4	3300	14	2770	0.01	14	220	1200	210	150	150	550	12	
21-May-18	7.4	2600				12								
25-Jun-18	7.6	2250				11								
25-Jul-18	7.1	713	6	512	0.14	17								
29-Aug-18	7.9	4500				7								
28-Sep-18	7.5	2700				7								
24-Oct-18	7.5	2280	3	1660	0.02	10	160	760	180	76	82	400	7.8	
29-Nov-18	8	4150				10								Discharging
29-Jan-18														Dry
31-Jan-19	7.9	1930	7	1170	0.03	10								No flow
28-Feb-19	8.1	5400				8								No flow
28-Mar-19	6.9	910				11								
10-Apr-19	7.6	3050	4	2810	0.01	6	220	1400	240	130	140	560	13	
27-May-19	7.8	5000				6								No flow
28-Jun-19	7.6	4100				7								
30-Jul-19	7.7	2660	4	2460	0.01	27								
29-Aug-19	8.5	3600				6								No flow
24-Sep-19	7	990				8								
29-Oct-19	7.8	2040	3	1620	0.01	4	160	770	200	89	97	300	9.3	
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	7.4	3900				13								
31-Mar-20	7.7	4670				10								
29-Apr-20	8.2	5710	5	4580	0.02	5	470	2200	390	170	240	960	14	
28-May-20	8.5	4700				2								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.8	860				5								
24-Jul-20	7.4	1390	8	920	0.01	4								
21-Aug-20	7.3	930				24								
28-Sep-20	7.7	5570				21								
23-Oct-20	8	5250	4	4340	0.02	5	310	2100	320	150	210	870	14	
26-Nov-20	7.4	5300				16								
21-Dec-20	7.8	4850				3								
27-Jan-21	7.7	3690	2	2890	0.02	6								
24-Feb-21	7.3	1650				8								
30-Mar-21	7.3	1160				10								
27-Apr-21	7.3	2370	6	1940	0.41		170	890	160	83	100	340	6.4	
25-May-21	7.5	2700				35								
24-Jun-21	7.8	2700				14								
28-Jul-21	7.4	2430	10	1950	0.01	11								
23-Aug-21	7.7	2700				1								
29-Sep-21	8	5000				44								
25-Oct-21	7.6	1930	8	1460	0.1	14	140	690	130	65	88	280	12	
25-Nov-21	7.5	2910				7								
22-Dec-21	7.7	1850												

Site WM4 **Four Mile Creek @ Possums Puddle Discharge**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.70	160	6	120	0.72	5								
13-Oct-09	7.10	170	4	140	0.61	10	33		28	11	4	20	3	
03-Nov-09	8.80	150	6	130	0.44	22								
13-Dec-09	7.10	160	2	90	0.13	22								
13-Jan-10	7.10	150	6	120	0.17	8	46		24	12	4	14	2	
09-Feb-10	6.30	70	2	110	0.22	5								
04-Mar-10	9.30	190	4	120	0.18	12								
08-Apr-10	8.90	171	1	130	0.59	4	43		25	13	4	14	2	
14-May-10	7.40	157	2	117	0.05	2								
10-Jun-10	6.80	1,250	58	858	0.12	83								
07-Jul-10	7.30	190	13	148	0.24	31	34		27	11	4	13	2	
25-Aug-10	6.49	192	5	136	0.36	28								
20-Sep-10	7.74	180	2	128	0.46		31	15	22	13	4	13	2	
19-Oct-10	7.62	180	4	103	0.12									
19-Nov-10	7.69	332	12	226	0.63									
21-Dec-10	7.50	194	<5	164	0.70									
14-Jan-11	8.12	192	<5	123	0.37		39	14	30	10	4	18	3	
22-Feb-11	8.36	812	<5	656	0.12									
24-Mar-11	8.13	601	7	432	0.18									
27-Apr-11	7.43	185	12	116	0.50		41	12	21	13	4	16	2	
26-May-11	8.37	5,460	24	3,640	0.05									
27-Jun-11	8.04	3,250	20	2,480	0.05									
25-Jul-11	8.18	2,790	57	1,760	0.12		179	610	366	66	70	462	8	
26-Aug-11	7.36	319	14	257	0.41									
21-Sep-11	8.48	243	10	186	0.6									
26-Oct-11	8.71	4670	232	3480	0.5		328	1640	478	132	173	824	17	
22-Nov-11	7.94	760	126	534	0.37									
15-Dec-11	7.57	3340	22	2300	0.05									
25-Jan-12	8.65	2430	110	1770	0.36		126	733	250	52	87	373	10	
17-Feb-12	7.44	241	23	240	1.15									
30-Mar-12	7.8	521	5	374	0.69									
27-Apr-12	7.82	216	11	322	0.91		29	24	32	7	6	26	4	
24-May-12	7.73	206	6	163	1.02									
27-Jun-12	8.35	4710	29	3540	0.05									
27-Jul-12	7.09	342	15	289	47.7		42	52	50	14	10	41	4	
30-Aug-12	8.07	404	15	302	0.55									
25-Sep-12	7.68	255	10	160	0.58									
25-Oct-12	7.68	308	8	155	0.47		34	19	39	11	5	24	3	
29-Nov-12	8.23	550	5	364	0.33									
20-Dec-12	8.07	495	7	290	0.28									
24-Jan-13	8.25	290	6	229	0.14		51	38	32	16	7	30	3	
25-Feb-13	7.79	843	37	554	0.42									
22-Mar-13	7.54	764	8	474	0.63									
22-Apr-13	8.34	4430	16	3110	0.05		310	1510	463	119	159	810	16	
17-May-13	7.55	194	5	150	0.9									
21-Jun-13	7.6	261	5	174	0.62									
24-Jul-13	7.54	232	5	165	0.6		28	25	25	9	5	26	3	
28-Aug-13	7.69	179	5	136	0.37									
17-Sep-13	8.35	5750	25	4400	0.05									
22-Oct-13	8.05	180	5	136	0.41		37	12	22	10	3	16	2	
14-Nov-13	8.17	890	7	511	0.23									
11-Dec-13	7.67	202	5	160	0.56									
24-Jan-14	8.36	253	5		0.44									
20-Feb-14	7.56	413	18		0.23									
25-Mar-14	7.73	189	5		0.14									
30-Apr-14	7.74	493	9	321	0.39		53	120	45	17	16	74	4	
28-May-14	8.13	133	7		0.55									
26-Jun-14	7.91	187	5		0.47									
28-Jul-14	8.4	5220	8	3540	0.05									
31-Aug-14	8.17	297	6		0.32									
22-Sep-14	6.5	140				12.9								
27-Oct-14	7.9	230	3	112	0.24	5	30	10	30	10	3	15	2	
21-Nov-14	7	180				5								
22-Dec-14	8.3	140				3.7								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	8.5	3220	28	2270	0.03	32								
20-Feb-15	8.2	480				5.7								
30-Mar-15	7.9	130				4.5								
28-Apr-15	7.1	1030	46	702	0.23	57	26	400	65	42	48	105	6.4	
28-May-15														No access
24-Jun-15	7.8	390				44								
29-Jul-15	7.6	308	5	222	0.61	29.1								
27-Aug-15	7.9	590				19								
28-Sep-15	7.6	300				19.7								
22-Oct-15	6.8	260	2	168	0.29	9.3	42	43	30	17	7.6	26	2.2	
30-Nov-15	8.4	210				2.5								
21-Dec-15	7	220				4								
29-Jan-16	7.2	680	10	491	0.48	35.2								
26-Feb-16	7	210				10								
31-Mar-16	8.2	4950				12								
28-Apr-16	7.3	320	5	232	0.53		49	64	33	11	10	40	4	
26-May-16	7.9	240				15								
29-Jun-16	7.4	390				13								
19-Jul-16	7.3	230	4	178	0.41	10								
22-Aug-16	7.6	200				11								
28-Sep-16	7.8	760				6								
20-Nov-16	8	200	1	147	0.21	3	40	28	22	12	6	24	3	
24-Nov-16	8.1	190				4								
21-Dec-16	7	220				4								
30-Jan-17	8.4	322	2	146	0.08	5								
27-Feb-17	8.3	5380				3								Discharging
30-Mar-17	7.3	350				6								
26-Apr-17	7.8	330	5	221	0.73	11	46	71	50	12	10	45	5	
30-May-17														No access
28-Jun-17	7.4	500				21								
27-Jul-17	7.3	228	4	159	0.7	17								
30-Aug-17	7.3	250				22								
28-Sep-17	8.3	240				15								
24-Oct-17	8.3	5100	4	4770	0.01	7	340	2200	360	190	260	1000	20	Discharging
28-Nov-17	6.9	270				9								
13-Dec-17	7.8	310				11								Not flowing
29-Jan-18														Dry
22-Feb-18	7.5	1400				99								Stagnant pool
29-Mar-18	7.3	360				28								
26-Apr-18	7.9	560	12	439	0.31	18	52	140	53	16	16	95	4	
21-May-18	7.8	220				15								
25-Jun-18	7.8	540				14								
25-Jul-18	7.7	214	3	157	0.29	15								
29-Aug-18	7.8	4500				7								
28-Sep-18	7.6	220				8								
24-Oct-18	8.3	350	5	221	0.28	7	31	71	37	11	8.8	48	3.4	
29-Nov-18	8	4500				12								Discharging
18-Dec-18	7	300				25								
31-Jan-19	7.3	280	5	146	0.11	9								No flow
28-Feb-19	8.1	5000				3								No flow
28-Mar-19	6.7	190				11								
10-Apr-19	8	663	3	431	0.12	4	65	170	54	24	20	86	4	
27-May-19	7	680				7								No flow
28-Jun-19	7.9	1000				7								
30-Jul-19	8	250	2	155	0.28	7								
29-Aug-19	7.8	220				7								
24-Sep-19	7	310				5								
29-Oct-19	7.5	284	2	164	0.04	1	49	29	37	11	7.1	34	3.4	
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	7.5	340				19								
31-Mar-20	7.1	290				7								
27-Apr-20	8.5	4800	5	3620	0.04	4	390	1700	320	140	190	930	12	
28-May-20	7.8	4800				7								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.9	390				5								
24-Jul-20	7.6	260	4	181	0.36	7								
21-Aug-20	7.7	330				5								
28-Sep-20	8.1	430				12								
23-Oct-20	8.3	4140	4	3250	0.02	6	300	1500	250	97	150	690	11	
26-Nov-20	7.5	270				8								
21-Dec-20	7.5	2000				6								
27-Jan-21	7.8	270	5	180	0.77	11								
24-Feb-21	7.2	740				4								
30-Mar-21	7.4	950				3								
27-Apr-21	7.4	242	3	243	1.4		30	20	59	6.9	5.9	28	4.2	
25-May-21	7.6	300				32								
24-Jun-21	7.7	300				27								
28-Jul-21	7.8	275	5	217	1.5	11								
23-Aug-21	7.9	260				12								
29-Sep-21	8	300				8								
25-Oct-21	7.8	251	5	175	1.3	3	31	24	38	8.5	6.3	32	4	
25-Nov-21	7.6	700				4								
22-Dec-21	7.5	300												

Site WM5 **Elwells Creek @ Haul Road**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	6.40	1,500			0.77	101								
13-Oct-09	8.20	250			0.31	114	54		20	1	9	21	2	
03-Nov-09														Dry
13-Dec-09														Dry
13-Jan-10														Dry
09-Feb-10														Dry
04-Mar-10														Dry
08-Apr-10														Dry
14-May-10														Dry
10-Jun-10														Dry
07-Jul-10														Dry
25-Aug-10														Dry
20-Sep-10														Dry
19-Oct-10														Dry
19-Nov-10	6.66	1,420	58	930	0.11									
21-Dec-10														Dry
14-Jan-11														Dry
22-Feb-11														Dry
24-Mar-11														Dry
27-Apr-11														Dry
26-May-11	6.14	1,640	53	1,280	0.11									
27-Jun-11	7.38	272	22	214	0.31									
25-Jul-11	6.64	1,950	46	1,330	0.47		70	626	116	94	83	175	9	
26-Aug-11	6.88	2,000	86	1,410	0.40									
21-Sep-11														Dry
26-Oct-11	7.90	1,552	276	1,110	0.88		34	591	86	81	69	162	8	
22-Nov-11	7.31	1,080	152	842	0.34									
15-Dec-11														Dry
25-Jan-12														Dry
17-Feb-12	6.96	1,503	58	1,230	0.33									
30-Mar-12														Dry
27-Apr-12														Dry
24-May-12														Dry
27-Jun-12														Dry
27-Jul-12														Dry
30-Aug-12														Dry
25-Sep-12														Dry
25-Oct-12														Dry
29-Nov-12														Dry
20-Dec-12														Dry
24-Jan-13														Dry
25-Feb-13	7.96	2,460	66	1,570	0.1									
22-Mar-13														Dry
22-Apr-13														Dry
17-May-13														Dry
21-Jun-13														Dry
24-Jul-13	7.55	323	157	205	0.08		40	68	17	17	10	29	2	
28-Aug-13														Dry
17-Sep-13	7.48	1,700	118	1,180	0.05									
22-Oct-13														Dry
14-Nov-13														Dry
11-Dec-13														Dry
24-Jan-14														Dry
20-Feb-14	7.89	2,810	160		0.08									
25-Mar-14														Dry
30-Apr-14														No access
28-May-14														Dry
26-Jun-14														Dry
28-Jul-14	7.62	633	9	471	0.05									
31-Aug-14	8.27	964	46		0.11									
22-Sep-14	7.20	1,030				22								
27-Oct-14	7.20	900	9	640	0.06	18.9	54	356	58	42	37	94	5	
21-Nov-14														Dry
22-Dec-14														Dry

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	6.90	1,300	19	1,020	0.05	35.7								
20-Feb-15	6.80	1,700				5								
30-Mar-15														Dry
28-Apr-15	5.20	2,240	13	1,890	0.03	8	5	1190	77	160	135	185	10	
28-May-15	6.60	1,730				6								
24-Jun-15	7.20	1,400				4								
29-Jul-15	7.10	768	5	550	0.05	8.2								
27-Aug-15	6.60	1,500				5								
28-Sep-15	7.70	1,920				4.5								
22-Oct-15	6.30	2,600	10	2,380	0.04	10.7	10	1400	110	205	160	220	12	
30-Nov-15														Dry
21-Dec-15														Dry
29-Jan-16	6.40	1,760	9	1,280	0.04	12.7								
26-Feb-16														Dry
31-Mar-16	7.00	2,300				12.5								
28-Apr-16														Dry
26-May-16														Dry
29-Jun-16	6.60	1,730				4								
19-Jul-16	6.30	1,900	8	1,540	0.09	12								
22-Aug-16	6.20	2,010				31								Not flowing
28-Sep-16	7.20	1,560				6								Not flowing
20-Nov-16														Dry
24-Nov-16														Dry
21-Dec-16	6.60	2,300				15								Not flowing
30-Jan-17														Dry
27-Feb-17	4.20	3,050				3								Not flowing
30-Mar-17	5.20	2,000				17								Not flowing
26-Apr-17	4.40	1,820	20	1,900	0.22	33	5	1100	89	120	130	200	9	Not flowing
30-May-17														Dry
28-Jun-17	4.50	1,110				2								
27-Jul-17	5.50	1,190	36	978	0.13	11								Not flowing
30-Aug-17														Dry
28-Sep-17														Dry
24-Oct-17	3.70	2,130	4	1,880	5.4	6	5	1200	71	130	130	180	7	Not flowing
28-Nov-17														Not flowing
13-Dec-17														Dry
29-Jan-18														Dry
22-Feb-18														Dry
29-Mar-18	5.00	2,300				4								
26-Apr-18	3.20	2,630	2	2,320	8.7	7	30	1500	62	140	170	160	6	
21-May-18														No flow
25-Jun-18	5.00	1,350				5								
25-Jul-18														Dry
29-Aug-18	7.40	450				11								
28-Sep-18														No flow
24-Oct-18	4.00	1,980	19	1,680	2.6	40	30	970	84	100	110	200	8	
29-Nov-18	4.00	1,350				62								
18-Dec-18	4.60	1,400				5								
31-Jan-19														Dry
28-Feb-19														No flow
28-Mar-19	5.50	1,200				9								
10-Apr-19	3.60	1,470	5	1,220	1.3	7	30	740	51	87	81	100	5	
27-May-19														No flow
28-Jun-19	4.20	1,700				20								
30-Jul-19	6.10	1,930	48	2,010	0.01	10								
29-Aug-19														Dry
24-Sep-19	4.90	2,000				14								
29-Oct-19														Dry
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	4.90	2,400				7								
31-Mar-20	4.90	3,000				3								
27-Apr-20	4.20	3,120	4	2,590	1.7	4	30	1600	110	190	190	260	8	
28-May-20	4.80	2,600				1								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	5.40	2,500				6								
24-Jul-20														No flow
21-Aug-20	5.50	2,300				2								
28-Sep-20														Dry
23-Oct-20														Dry
26-Nov-20														Dry
21-Dec-20	4.90	1,280				3								
27-Jan-21	5.20	2,650	113	2,370	0.01	3								
24-Feb-21	4.80	2,200				2								
30-Mar-21	4.80	2,600												
27-Apr-21														No flow
25-May-21														No flow
24-Jun-21														No flow
28-Jul-21														Dry
23-Aug-21														Dry
29-Sep-21														Dry
25-Oct-21														Dry
25-Nov-21	4.60	1,600				3								
22-Dec-21														Dry

Site WM6 **Four Mile Creek U/S Possums Puddle**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	9.10	120	10	80	0.86	42								
13-Oct-09	8.30	110	10	85	0.54	23	38		13	12	2	8	1	
03-Nov-09	8.80	120	12	120	0.40	31								
13-Dec-09	7.90	120	5	50	0.19	13								
13-Jan-10	6.70	110	5	88	0.62	110	47		12	13	2	8	1	
09-Feb-10	7.60	150	38	130	0.77	52								
04-Mar-10	8.90	140	90	350	0.24	24								
08-Apr-10	9.00	122	29	200	0.50	10	35		13	14	2	6	1	
14-May-10	8.20	124	6	87	0.17	18								
10-Jun-10	6.70	250	73	268	0.67	122								
07-Jul-10	7.40	130	10	75	0.19	6	35		11	13	2	6	1	
25-Aug-10	6.87	156	13	103	0.22	20								
20-Sep-10	7.35	141	9	101	0.23		32	9	12	15	2	8	1	
19-Oct-10	7.14	127	5	69	0.19									
19-Nov-10	6.80	274	65	417	1.59									
21-Dec-10	7.13	164	24	156	0.94									
14-Jan-11	6.91	135	7	85	0.71		40	2	19	13	2	8	2	
22-Feb-11	7.16	129	<5	83	0.57									
24-Mar-11	7.34	119	5	94	0.18									
27-Apr-11	7.07	125	78	175	0.42		30	8	15	12	2	10	2	
26-May-11	7.17	125	40	144	0.05									
27-Jun-11	7.38	272	22	214	0.31									
25-Jul-11	6.84	305	30	238	0.79		21	20	60	6	6	40	5	
26-Aug-11	7.11	245	70	256	0.46									
21-Sep-11	7.15	158	18	115	0.18									
26-Oct-11	8.04	185	30	139	0.38		33	12	25	12	4	19	2	
22-Nov-11	7.53	167	51	157	0.38									
15-Dec-11	6.78	225	95	246	1.13									
25-Jan-12	8.21	171	9	105	1.06		45	3	24	13	4	13	2	
17-Feb-12	6.68	189	38	242	1.31									
30-Mar-12	7.3	284	21	230	0.94									
27-Apr-12	7.03	248	37	268	1.16		39	15	41	8	6	30	4	
24-May-12	7.32	176	28	107	0.52									
27-Jun-12	8.18	324	22	190	0.72									
27-Jul-12	7.15	292	44	270	1.14		38	17	57	9	7	34	4	
30-Aug-12	6.5	147	9	121	0.15									
25-Sep-12	7.27	166	14	97	0.23									
25-Oct-12	7.53	144	164	89	0.24		39	7	14	14	3	11	2	
29-Nov-12	7.44	141	12	121	0.69									
20-Dec-12	8.19	499	8	278	0.14									
24-Jan-13	7.4	160	54	109	0.59		50	3	14	18	3	10	2	
25-Feb-13	8.24	2780	31	1760	0.05									
22-Mar-13	7.23	297	8	200	1.25									
22-Apr-13	7.41	166	136	198	0.25		28	17	22	9	4	17	2	
17-May-13	7.29	173	69	115	0.24									
21-Jun-13	7.28	161	9	114	0.18									
24-Jul-13	7.24	159	16	114	0.33		27	7	13	10	3	14	2	
28-Aug-13	7.29	130	5	89	0.1									
17-Sep-13	7.36	138	7	82	0.21									
22-Oct-13	7.3	138	5	111	0.15		43	5	10	11	2	8	1	
14-Nov-13	7.12	271	5	165	0.16									
11-Dec-13	6.97	206	11	145	0.59									
24-Jan-14	7.81	237	5		1.11									
20-Feb-14	8.13	196	38		0.55									
25-Mar-14	7.39	145	5		0.25									
30-Apr-14	7.75	141	14	154	0.77		18	13	28	6	3	24	3	
28-May-14	8.22	112	6		0.15									
26-Jun-14	7.57	136	16		0.1									
28-Jul-14	7.47	109	7	79	0.13									
31-Aug-14	7.87	233	30		0.64									
22-Sep-14	6.9	150				34.7								
27-Oct-14	7.9	150	6	84	0.32	11.5	32	10	23	10	2	9	1	
21-Nov-14	6.3	120				10.8								
22-Dec-14	7.5	130				14.9								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	6.6	150	56	20	0.88	121								
20-Feb-15	7.2	120				12.8								
30-Mar-15	7.6	100				15.4								
28-Apr-15	6.7	337	30	254	0.97	80	22	29	64	10	8.5	37	4.8	
28-May-15	7.9	200				58								
24-Jun-15	8.2	190				63								
27-Jul-15	7.3	171	14	114	0.2	33.2								
27-Aug-15	8	110				36								
28-Sep-15	7.7	140				27								
22-Oct-15	7.1	140	5	108	0.49	7.4	48	10	16	19	3.1	9	1.1	
30-Nov-15	7.3	150				9								
21-Dec-15	6.5	120				8								
29-Jan-16	6.8	220	12	176	1	37.3								
26-Feb-16	7	190				11.8								
31-Mar-16	7.1	140				9								
28-Apr-16	7.1	120	6	98	0.41	13	39	8	14	12	4	9	2	
26-May-16	7.6	120				18								
29-Jun-16	7.5	130				44								
19-Jul-16	7.4	120	13	107	0.14	37								
22-Aug-16	7.9	140				21								
28-Sep-16	8	120				18								
20-Nov-16	7.7	130	6	104	0.26	6	43	8	16	15	3	10	1	
24-Nov-16	7.5	120				11								
21-Dec-16	6.7	150				5								
30-Jan-17	7.2	174	2	104	0.02	3								
27-Feb-17	7.4	130				4								
31-Mar-17	7.6	300				62								
26-Apr-17	7.1	195	5	168	0.77	9	39	15	38	12	5	20	3	
30-May-17	7.3	250				8								
28-Jun-17	6.8	285				15								
27-Jul-17	6.8	124	4	35	0.13	9								
30-Aug-17	7.1	150				11								
28-Sep-17	7.7	225				7								
24-Oct-17	6.7	241	2	133	0.04	3	32	49	18	21	5	14	1	
28-Nov-17	7.1	180				5								
13-Dec-17	7.6	210				5								
29-Jan-18	7	214	4	126	0.49	7								
22-Feb-18	7.5	200				4								No flow
29-Mar-18	7.2	320				19								
26-Apr-18	7.6	260	5	178	0.72	6	41	32	39	14	5.5	27	3.1	
21-May-18	8.2	230				7								
25-Jun-18	7.7	200				60								
25-Jul-18	6.8	124	3	74	0.04	6								
29-Aug-18	7.9	150				5								
28-Sep-18	7.4	190				6								
24-Oct-18	7.3	190	12	122	0.37	17	30	23	22	7.9	3.8	17	1.5	
29-Nov-18	7.3	140				89								
18-Dec-18	7	150				64								
31-Jan-19	7	280	9	175	0.38	13								
28-Feb-19	7.5	280				9								
28-Mar-19	6.9	190				12								
10-May-19	6.8	186	7	151	0.39	21	36	17	23	11	3.7	15	2.3	
27-May-19	7.7	180				6								
28-Jun-19	7.6	200				24								
30-Jul-19	7	224	3	119	0.02	10								
29-Aug-19	7.3	220				4								
24-Sep-19	6.6	200				60								
29-Oct-19	6.8	186	2	119	0.3	8	42	9	31	9.5	4	20	2.1	
27-Nov-19	7.2	250				7								
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	6.3	400				48								
31-Mar-20	6.9	330				30								
27-Apr-20	7.4	300	14	146	0.76	20	56	10	34	16	6.2	27	3.9	
28-May-20	7.5	250				25								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.9	495				9								
24-Jul-20	6.8	191	23	131	0.17	26								
21-Aug-20	7.2	470				26								
28-Sep-20	7.8	350				12								
23-Oct-20	6.9	310	14	183	0.4	23	53	5	41	9.4	5.1	34	3.5	
26-Nov-20	7.7	320				9								
21-Dec-20	7.3	370				27								
27-Jan-21	6.6	253	4	170	1	11								
24-Feb-21	6.8	220				21								
30-Mar-21	7.2	350				14								
27-Apr-21	6.8	346	9	250	1.7		48	20	120	9.8	8.2	41	4.7	
25-May-21	7.6	370				15								
24-Jun-21	8	350				7								
28-Jul-21	6.9	222	5	139	0.17	16								
23-Aug-21	7.9	250				1								
29-Sep-21	7.6	220				6								
25-Oct-21	6.7	165	8	101	0.61	2	39	9	18	10	4	13	2	
25-Nov-21	7.5	280				21								
22-Dec-21	7.1	310												

Site WM7 **Possums Puddle**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.50	170	7	110	0.81	82								
13-Oct-09	7.10	170	6	130	0.57	41	36		27	10	4	19	3	
03-Nov-09	8.70	160	4	140	0.38	108								
13-Dec-09	7.00	160	3	40	0.45	67								
13-Jan-10	6.80	150	2	110	0.16	11	44		24	12	4	14	2	
09-Feb-10	6.50	160	10	120	0.11	7								
04-Mar-10	8.80	170	9	97	0.81	12								
08-Apr-10	8.60	187	1	130	0.25	6	43		25	14	4	13	1	
14-May-10	7.30	158	2	119	<0.05	4								
10-Jun-10	6.80	167	46	161	0.16	75								
07-Jul-10	7.30	186	8	128	0.33	30	34		25	11	4	13	2	
25-Aug-10	6.93	188	6	145	0.37	32								
20-Sep-10	7.41	174	2	132	0.42		34	14	21	13	4	12	2	
19-Oct-10	7.40	174	6	107	0.12									
19-Nov-10	6.95	211	14	197	0.68									
21-Dec-10	7.08	194	12	159	0.77									
14-Jan-11	7.53	193	6	131	0.29		39	14	30	11	4	18	3	
22-Feb-11	7.69	175	<5	119	0.18									
24-Mar-11	7.29	164	<5	128	0.24									
27-Apr-11	7.03	178	5	133	0.49		41	8	22	13	4	15	2	
26-May-11	7.08	173	15	176	0.27									
27-Jun-11	6.94	235	50	270	0.48									
25-Jul-11	6.70	231	35	228	0.74		13	16	42	4	4	28	4	
26-Aug-11	7.01	247	16	230	0.38									
21-Sep-11	6.54	229	10	147	0.56									
26-Oct-11	8.45	202	5	142	0.35		34	10	24	11	4	18	2	
22-Nov-11	7.61	187	14	151	0.59									
15-Dec-11														No access
25-Jan-12	8.71	217	8	172	0.54		27	12	28	6	5	26	3	
17-Feb-12	6.9	194	38	218	0.94									
30-Mar-12	7.29	215	6	187	0.84									
27-Apr-12	7.41	219	26	152	0.89		28	11	29	6	4	23	4	
24-May-12	7.44	211	6	154	1.12									
27-Jun-12														No access
27-Jul-12	7.51	215	14	202	0.8		27	17	40	8	5	23	4	
30-Aug-12	7.02	202	9	191	0.66									
25-Sep-12	7.43	230	5	133	0.57									
25-Oct-12	7.8	204	5	143	0.44		32	14	35	11	4	21	3	
29-Nov-12	8.04	213	5	130	0.35									
20-Dec-12	7.84	213	5	133	0.21									
24-Jan-13	7.81	213	5	137	0.19		41	13	24	14	5	20	3	
25-Feb-13														No access
22-Mar-13	7.08	209	5	161	0.74									
22-Apr-13														No access
17-May-13	7.25	196	5	155	0.9									
21-Jun-13	8.06	4960	5	3580	0.05									
24-Jul-13	7.27	197	6	147	0.61		28	13	24	8	4	21	3	
28-Aug-13	7.44	179	5	137	0.44									
17-Sep-13	7.38	162	6	83	0.23									
22-Oct-13	7.64	182	5	127	0.43		38	12	22	9	3	16	3	
14-Nov-13	7.6	184	5	118	0.28									
11-Dec-13	7.37	204	5	156	0.5									
24-Jan-14	8.17	279	5		0.39									
20-Feb-14	7.6	202	8		0.25									
25-Mar-14	7.59	188	5		0.13									
30-Apr-14	7.65	163	5	106	0.48		34	13	25	7	4	24	4	
28-May-14	7.79	127	5		0.66									
26-Jun-14	7.6	176	5		0.42									
28-Jul-14	7.49	128	5	92	0.36									
31-Aug-14	7.91	210	2		0.33									
22-Sep-14	6.8	150				11.3								
27-Oct-14	7.7	190	3	107	0.23	12.4	30	10	30	10	3	15	2	
21-Nov-14	7.2	170				7.8								
22-Dec-14	8	150				3.4								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	7.4	140	16	122	0.29	35								
20-Feb-15	7.5	140				3.8								
30-Mar-15	7.6	130				5.1								
28-Apr-15	6.5	410	48	302	0.75	93	16	105	45	12	13	48	4.9	
28-May-15	7.7	350				58								
24-Jun-15	7.8	320				45								
27-Jul-15	7.4	290	7	202	0.5	31								
27-Aug-15	8.2	230				19								
28-Sep-15	7.6	230				9								
22-Oct-15	7.8	210	2	157	0.36	4.5	44	32	27	17	5.9	22	2	
30-Nov-15	8.6	220				2.5								
21-Dec-15	6.6	200				4								
29-Jan-16	6.8	210	23	173	0.86	45.2								
26-Feb-16	7.5	220				9.4								
31-Mar-16	7	210				7								
28-Apr-16	7	250	5	206	0.46	9	41	47	28	11	7	32	3	
26-May-16	8	260				10								
29-Jun-16	7.4	220				14								
19-Jul-16	7.2	220	4	153	0.41	12								
22-Aug-16	7.7	190				9								
28-Sep-16	7.5	200				5								
20-Oct-16	7.8	200	3	153	0.19	10	39	28	23	12	5	19	3	
24-Nov-16	7.7	190				8								
21-Dec-16	6.7	200				4								
30-Jan-17	7.8	227	2	139	0.08	2								
27-Feb-17	7.6	200				5								
31-Mar-17	7.3	210				9								
26-Apr-17	7.2	230	5	181	0.66	10	28	30	41	9	6	29	4	
30-May-17	7	300				11								
28-Jun-17	7.2	235				22								
27-Jul-17	6.9	228	6	152	0.62	17								
30-Aug-17	6.9	200				17								
28-Sep-17	7.9	235				8								
24-Oct-17	7.2	246	3	182	0.22	7	29	33	33	11	5	28	3	
28-Nov-17	6.5	220				6								
13-Dec-17	7.9	240				4								
29-Jan-18	7.8	289	5	168	0.09	4								
22-Feb-18	7.6	270				6								
29-Mar-18	7.2	170				25								
26-Apr-18	7.9	210	4	174	0.46	11	30	25	29	6.8	4.4	26	2.8	
21-May-18	7.5	210				12								
25-Jun-18	7.6	212				14								
25-Jul-18	7	210	4	140	0.33	13								
29-Aug-18	7.8	200				11								
28-Sep-18	7.3	210				5								
24-Oct-18	7.7	200	6	120	0.3	6	30	29	27	8.8	4.4	20	3	
29-Nov-18	7.6	210				14								
18-Dec-18	7	200				23								
31-Jan-19	7.5	228	7	126	0.28	10								
28-Feb-19	8.2	225				16								
28-Mar-19	6.7	160				14								
10-Apr-19	7.3	200	6	126	0.14	4	32	19	26	12	4.2	15	2.9	
27-May-19	7	230				6								
28-Jun-19	7.6	190				7								
30-Jul-19	7.3	207	2	128	0.29	6								
29-Aug-19	7.8	200				6								
24-Sep-19	7	220				9								
29-Oct-19	8.2	221	3	123	0.09	8	34	22	26	11	4.8	21	3.3	
27-Nov-19	7.9	250				8								
23-Dec-19	8.2	380				7								
29-Jan-20	7.8	238	3	138	0.06	7								
25-Feb-20	7.2	250				11								
31-Mar-20	8.4	250				8								
27-Apr-20	7.7	260	7	135	0.63	12	30	21	30	9.6	5.2	24	4.6	
28-May-20	7.8	260				5								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.8	398				4								
24-Jul-20	7	219	4	145	0.37	9								
21-Aug-20	7.8	270				24								
28-Sep-20	7.6	280				10								
23-Oct-20	7.2	286	9	160	0.63	5	30	20	39	7.8	5.1	31	4	
26-Nov-20	7.6	260				4								
21-Dec-20	7.2	260				6								
27-Jan-21	7.1	260	4	173	0.73	3								
24-Feb-21	7.2	270				3								
30-Mar-21	7.3	260				4								
27-Apr-21	6.7	228	6	23	1.5		30	14	34	6.6	5.5	27	4.3	
25-May-21	7.6	270				23								
24-Jun-21	8	250				13								
28-Jul-21	7.2	243	5	190	1.6	5								
23-Aug-21	7.8	250				7								
29-Sep-21	7.8	290				7								
25-Oct-21	7.5	240	5	168	1.3	4	31	20	37	8.2	5.9	31	4	
25-Nov-21	7.7	240				10								
22-Dec-21	7.3	270												

Site WM8 **Lake Foster**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.30	5,900	10	4,400	0.06	51								
13-Oct-09	8.10	5,900	11	4,700	0.05	6	340		456	213	251	846	28	
03-Nov-09	8.50	5,000	3	3,600	0.06	29								
13-Dec-09	8.10	6,300	3	6,200	0.08	45								
13-Jan-10	7.80	6,600	14	5,600	0.05	9	271		497	265	290	1050	30	
09-Feb-10	7.60	9,300	13	5,200	0.05	11								
04-Mar-10	8.70	9,700	1	110	0.16	8								
08-Apr-10	8.70	7,720	4	6,100	0.05	6	315		556	302	318	1210	32	
14-May-10	8.20	7,670	9	5,730	0.05	7								
10-Jun-10	7.50	4,800	8	4,320	0.05	7								
07-Jul-10	8.10	5,610	6	4,390	0.05	3	325		459	237	270	988	23	
25-Aug-10	8.08	6,000	5	4,730	0.05	3								
20-Sep-10	8.15	5,110	5	4,610	0.05		375	2100	478	192	245	887	20	
19-Oct-10	8.31	5,710	2	4,600	0.05									
19-Nov-10	7.94	5,670	6	4,420	0.05									
21-Dec-10	7.89	6,110	<5	4,960	0.05									
14-Jan-11	8.26	6,410	8	4,890	0.05		275	2840	489	286	397	960	29	
22-Feb-11	8.28	5,700	<5	5,500	0.05									
24-Mar-11	8.33	6,560	8	5,530	0.09									
27-Apr-11	8.05	4,960	9	3,650	0.05		200	1640	508	136	179	811	18	
26-May-11	8.10	6,330	23	5,120	0.05									
27-Jun-11	8.03	4,160	6	3,210	0.05									
25-Jul-11	6.83	2,410	22	1,630	0.11		55	848	163	94	87	291	9	
26-Aug-11	8.10	4,750	7	3,710	0.05									
21-Sep-11	8.29	5720	12	4510	0.05									
26-Oct-11	8.5	5360	12	4330	0.05		245	2210	414	224	234	843	25	
22-Nov-11	8.1	5500	12	4670	0.06									
15-Dec-11														No access
25-Jan-12	8.47	5710	10	4950	0.05		307	2330	486	186	259	903	25	
17-Feb-12	7.02	5150	8	4170	0.05									
30-Mar-12	8.27	4070	11	3130	0.05									
27-Apr-12	7.77	3980	8	3490	0.05		122	2010	277	206	205	646	21	
24-May-12	8.12	5310	26	4480	0.05									
27-Jun-12	7.7	4160	12	3460	0.05									
27-Jul-12	7.43	4960	35	4220	0.05		235	2250	440	237	246	857	24	
30-Aug-12	7.95	5770	18	4840	0.05									
25-Sep-12	8.1	6060	50	4340	0.05									
25-Oct-12	8.36	5910	21	4330	0.05		329	2340	561	157	232	953	25	
29-Nov-12	8.31	6750	6	5100	0.05									
20-Dec-12	8.36	6750	18	5290	0.05									
24-Jan-13	8.28	7070	12	5350	0.05		428	2990	648	144	260	1460	22	
25-Feb-13	7.79	2110	68	1420	0.12									
22-Mar-13	8.25	5360	15	3850	0.05									
22-Apr-13	7.75	5200	12	4160	0.05		213	2310	404	182	221	945	25	
17-May-13	8.17	6580	12	5020	0.05									
21-Jun-13	7.99	6230	5	4930	0.05									
24-Jul-13	7.96	5810	6	4320	0.05		131	2580	374	232	201	1030	22	
28-Aug-13	8.24	5940	5	2910	0.05									
17-Sep-13	8.21	7090	10	5690	0.05									
22-Oct-03	8.25	7140	5	5920	0.05		354	3090	569	246	324	1160	31	
14-Nov-13	8.45	6230	5	4730	0.05									
11-Dec-13	8.23	4910	5	3910	0.05									
24-Jan-14	8.32	8200	5		0.05									
20-Feb-14	8.42	5610	23		0.05									
25-Mar-14	8.41	6860	5		0.05									
30-Apr-14	8.45	4130	21	2570	0.05		94	1620	282	155	149	619	18	
28-May-14	7.86	4510	5		0.05									
26-Jun-14	8.1	5940	5		0.05									
28-Jul-14	8.28	5260	9	3730	0.05									
31-Aug-14	7.33	4050	10		0.05									
22-Sep-14	7.5	5400				4.6								
27-Oct-14	7.7	5500	7	4980	0.12	4.7	176	2420	422	266	262	829	26	
21-Nov-14	8	6900				34								
22-Dec-14	8.5	6100				5.7								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	7.6	3080	24	2380	0.01	35.2								
20-Feb-15	8.1	5520				5.9								
30-Mar-15	8.1	7060				6.9								
28-Apr-15	7.3	1400	61	986	0.05	114	63	530	83	58	60	155	7.8	
28-May-15	7.4	2900				11								
24-Jun-15	7.7	4040				8								
27-Jul-15	8.3	4940	4	4620	0.01	4								
27-Aug-15	8.3	5830				3								
28-Sep-15	8	5800				3.7								
22-Oct-15	8.4	5990	5	5150	0.02	7.8	300	2630	425	275	300	790	31	
30-Nov-15	8.5	6100				3								
21-Dec-15	7.3	4720				7								
29-Jan-16	5.9	1650	5	1230	0.06	10.5								
26-Feb-16	7.5	5030				7.2								
31-Mar-16	8.1	5210				11								
28-Apr-16	8	5210	3	5510	0.01	4	160	3000	385	300	300	865	30	
26-May-16	8.3	4600				3.5								
29-Jun-16	7.6	4840				2								
19-Jul-16	7.8	5000	1	4460	0.01	4								
22-Aug-16	8.1	3850				4								
28-Sep-16	8.4	4900				2								
20-Oct-16	7.8	5900	2	5490	0.01	1	240	2800	370	260	300	1000	28	
24-Nov-16	8	3950				48								
21-Dec-16	8.2	5800				4								
30-Jan-17	8.4	5230	4	5890	0.01	4								
27-Feb-17	8.4	5360				3								
31-Mar-17	7.8	2750				7								
26-Apr-17	7.3	3120	10	3030	0.01	4	44	1600	210	170	190	510	14	
30-May-17														Too low to sample
28-Jun-17	5.5	2720				5								
27-Jul-17	7.9	4870	2	4890	0.01	5								
30-Aug-17	8.3	6200				5								
28-Sep-17														Too low to sample
24-Oct-17	7.5	6280	6	6290	0.01	7	170	3200	420	320	350	1200	34	
28-Nov-17	8.2	5800				8								
13-Dec-17	8.3	6100				3								
29-Jan-18	8.3	5470	6	5830	0.01	5								
22-Feb-18	7.9	6300				4								
29-Mar-18	7.3	1720				8								
26-Apr-18	8.1	3380	2	2740	0.01	3	170	1200	210	120	140	610	14	
21-May-18	8.5	5500				4								
25-Jun-18	8.1	4400				3								
25-Jul-18	8.2	5840	2	5730	0.01	4								
29-Aug-18	7.9	6300				4								
28-Sep-18	7.8	6520				3								
24-Oct-18	8.1	4850	3	5010	0.01	4	120	2800	360	230	260	670	25	
29-Nov-18	7.8	5400				26								
18-Dec-18	6.4	3600				13								
31-Jan-19	8.1	4850	3	5930	0.01	4								
28-Feb-19	8.2	6400				5								
28-Mar-19	6.5	4650				6								
10-Apr-19	4.3	3960	4	4190	0.15	7	30	2400	240	240	240	610	20	
27-May-19	7.6	6600				5								
28-Jun-19	6.7	5000				5								
30-Jul-19	7.8	4600	2	6080	0.01	5								
29-Aug-19	7.9	6400				6								
24-Sep-19	4.8	3200				9								
29-Oct-19	8.5	4140	2	4110	0.01	4	190	2100	340	180	230	870	19	
27-Nov-19	8.2	7500				6								
23-Dec-19	8.1	7400				6								
29-Jan-20	8.4	8400	7	8140	0.01	6								
25-Feb-20	7.2	3630				7								
31-Mar-20	6.9	5100				6								
27-Apr-20	8.1	5500	2	4870	0.01	1	63	2700	330	290	280	830	22	
28-May-20	5.8	5800				11								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.8	6000				1								
24-Jul-20	6	5000	4	4630	0.22	1								
21-Aug-20	6.8	2800				7								
28-Sep-20	7.4	5400				6								
23-Oct-20	7.6	5920	10	5580	0.01	7	80	2900	310	290	290	820	25	
26-Nov-20	8	4160				0								
21-Dec-20	7.3	5300				1								
27-Jan-21	6.1	4410	4	4130	0.04	2								
24-Feb-21	4.9	5200				4								
30-Mar-21	6.2	1750												
27-Apr-21	5.9	3240	4	3040	0.05		30	1700	170	180	170	390	13	
25-May-21	7.8	4700				2								
24-Jun-21	8	4900				2								
28-Jul-21	8.2	5730	5	5950	0.03	4								
23-Aug-21	8.2	5900				1								
29-Sep-21	8.3	6100				3								
25-Oct-21	7.8	5250	5	5120	0.01	5	86	2900	300	260	320	870	33	
25-Nov-21	7.7	3300				3								
22-Dec-21	7.3	3750												

Site WM9 **Lake Kennerson**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	10.00	3,000	23	1,900	0.05	11								
13-Oct-09	9.90	3,600	8	2,400	0.21	19	38		355	45	131	528	12	
03-Nov-09	9.60	4,500	29	3,200	0.05	31								
13-Dec-09	8.10	6,000	5	5,500	0.05	27								
13-Jan-10	7.70	5,600	18	4,300	0.05	6	355		602	122	257	1100	24	
09-Feb-10	8.30	8,500	14	4,400	0.05	18								
04-Mar-10	8.90	8,800	15	530	0.05	6								
08-Apr-10	9.00	8,830	6	4,700	0.06	20	331		652	110	251	1130	23	
14-May-10	8.10	9,000	6	4,800	0.05	14								
10-Jun-10	7.80	2,190	30	1,800	0.06	48								
07-Jul-10	8.30	2,790	8	1,840	0.05	2	177		237	74	98	488	12	
25-Aug-10														
20-Sep-10	8.36	4,100	2	3,080	0.05		242	1440	373	105	167	648	15	
19-Oct-10	8.64	4,090	2	2,760	0.05									
19-Nov-10	9.15	2,990	3	1,680	0.05									
21-Dec-10	8.44	3,850	5	2,200	0.05									
14-Jan-11	8.59	4,440	7	2,970	0.05		310	983	638	88	132	816	15	
22-Feb-11	8.53	4,820	16	3,770	0.05									
24-Mar-11	8.68	5,070	6	3,690	0.08									
27-Apr-11	8.48	3,600	7	2,350	0.05		244	864	484	56	113	636	13	
26-May-11	8.65	4,730	78	2,790	0.07									
27-Jun-11	8.70	3,060	5	1,890	0.05									
25-Jul-11	8.20	2,770	58	1,640	0.05		186	435	482	50	55	497	7	
26-Aug-11	8.59	3,310	26	1,920	0.05									
21-Sep-11	8.68	4320	5	2900	0.05									
26-Oct-11	8.92	3960	6	2760	0.05		280	1350	419	118	134	673	13	
22-Nov-11	8.73	3250	36	2250	0.10									
15-Dec-11	7.90	2350	48	1370	0.05									
25-Jan-12	8.76	4900	12	4070	0.05		305	1780	575	97	204	852	18	
17-Feb-12	7.34	2389	20	1460	0.05									
30-Mar-12	8.35	2320	18	1410	0.05									
27-Apr-12	8.92	2,140	8	1,430	0.05		169	499	307	59	59	368	9	
24-May-12	8.55	2,910	18	1,810	0.05									
27-Jun-12	8.67	2,510	20	1,580	0.05									
27-Jul-12	8.25	2,620	12	1,630	0.05		224	418	549	50	46	532	8	
30-Aug-12	8.61	3,860	102	2,650	0.05									
25-Sep-12	8.52	4,270	5	2,800	0.05									
25-Oct-12	8.87	3,860	6	2,590	0.05		204	853	623	32	106	722	12	
29-Nov-12	9.2	4,450	6	2,920	0.05									
20-Dec-12	8.63	5,270	103	3,520	0.05									
24-Jan-13	8.39	6,650	8	4,770	0.05		505	2500	672	59	214	1440	16	
25-Feb-13	8.44	5,000	30	3,230	0.05									
22-Mar-13	8.36	4,240	5	3,040	0.05									
22-Apr-13	8.44	4,010	294	2,670	0.05		272	1070	501	80	115	738	13	
17-May-13	8.35	5,090	8	3,560	0.05									
21-Jun-13	8.38	4,460	5	2,770	0.05									
24-Jul-13	8.29	4,800	5	3,320	0.05		384	1430	525	126	159	873	14	
28-Aug-13	8.52	4,270	5	1,820	0.05									
17-Sep-13	8.66	4,640	5	2,910	0.05									
22-Oct-13	8.83	5,470	8	3,740	0.05		256	1880	571	74	225	938	17	
14-Nov-13	9.07	5,710	5	4,030	0.05									
11-Dec-13	8.23	5,370	5	3,760	0.05									
24-Jan-14	8.63	7,520	5		0.05									
20-Feb-14	8.23	4,910	38		0.05									
25-Mar-14	8.27	6,190	6		0.05									
30-Apr-14	8.44	4,070	19	3,000	0.05		365	1610	395	139	178	809	20	
28-May-14	8.51	3,790	5		0.05									
26-Jun-14	8.45	4,290	6		0.05									
28-Jul-14	8.39	5,190	5	3,530	0.05									
31-Aug-14	8.39	5,430	6		0.05									
22-Sep-14	8.4	6,000				3.8								
27-Oct-14	8.3	6,700	4	4,360	0.05	8.6	534	2020	605	85	210	1060	19	
21-Nov-14	8.5	6,000				3.8								
22-Dec-14	8.3	6,300				17								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	8.5	4,100	23	2,980	0.01	36.8								
20-Feb-15	8.4	5,480				4.9								
30-Mar-15	8.6	5,760				30.3								
28-Apr-15	7.7	1,490	167	954	0.05	314	205	350	130	37	39	215	8.1	
28-May-15	8.3	1,390				62								
24-Jun-15	8.2	3,230				7								
27-Jul-15	8.4	4,530	5	3,640	0.01	2.3								
27-Aug-15	8.5	1,940				17								
28-Sep-15	8.3	3,300				3.7								
22-Oct-15	8.5	5,580	3	4,370	0.03	6	475	1940	480	150	220	875	24	
30-Nov-15	8.5	5,810				4.3								
21-Dec-15	8.3	5,610				6								
29-Jan-16	8.2	1,530	20	1,020	0.02	38.9								
26-Feb-16	7.5	5,800				12								
31-Mar-16	8.3	5,010				15.1								
28-Apr-16	8.1	4,640	4	4,570	0.01	5	415	2360	320	190	230	910	17	
26-May-16	8.2	5,600				4								
29-Jun-16	7.8	3,450				4								
19-Jul-16	7.8	5,170	1	4,230	0.01	2								
22-Aug-16	8.2	5,490				4								
28-Sep-16	8.7	4,710				5								
20-Oct-16	8.5	5,900	1	5,100	0.02	2	360	2500	360	170	280	1100	20	
28-Nov-16	8	5,800				11								
21-Dec-16	8	5,700				11								
30-Jan-17	7.9	4,810	13	4,440	0.01	15								
27-Feb-17	8	5,400				3								
31-Mar-17	7.7	4,600				3								
26-Apr-17	8.4	3,590	4	3,250	0.01	3	370	1500	290	150	160	780	15	
30-May-17	8.4	5,160				4								
28-Jun-17	8.6	3,540				9								
27-Jul-17	8.4	4,300	4	4,030	0.01	6								
30-Aug-17	8.6	5,400				2								
28-Sep-17	8.5	5,900				3								
24-Oct-17	8	5,450	4	5,210	0.02	6	430	2300	370	220	290	1100	23	
28-Nov-17	7.8	6,400				5								
13-Dec-17	8.2	6,200				4								
29-Jan-18	8.8	4,440	17	3,770	0.01	19								
22-Feb-18	8.3	5,100				4								
29-Mar-18	8	1,520				19								
26-Apr-18	8.6	3,390	7	2,190	0.01	11	760	390	360	28	31	880	6.7	
21-May-18	8.5	4,450				6								
25-Jun-18	8.3	4,000				5								
25-Jul-18	8.4	4,340	2	3,400	0.01	4								
29-Aug-18	8.2	4,200				5								
28-Sep-18	8.3	4,510				5								
24-Oct-18	8.5	3,660	3	2,300	0.01	5	500	820	380	42	75	860	9.2	
29-Nov-18	8.2	4,300				8								
18-Dec-18	7.7	1,350				46								
31-Jan-19	8.1	2,910	3	2,900	0.01	3								
28-Feb-19	8.5	3,900				9								
28-Mar-19	8	6,100				9								
10-Apr-19	8.6	3,090	35	2,230	0.01	30	30	750	360	48	71	720	8.9	
27-May-19	7.9	4,800				6								
28-Jun-19	8.4	3,100				26								
30-Jul-19	9	3,310	6	2,460	0.01	7								
29-Aug-19	9.1	3,800				5								
24-Sep-19	8.7	1,700				38								
29-Oct-19	9.3	2,830	6	2,180	0.01	9	260	980	280	42	100	610	12	
27-Nov-19	8.5	5,400				12								
23-Dec-19	8.2	5,500				7								
29-Jan-20	8.6	5,760	5	4,190	0.01	8								
25-Feb-20	8.5	4,570				22								
31-Mar-20	8.9	3,460				14								
27-Apr-20	9	3,700	7	2,240	0.01	3	520	740	380	34	79	780	7.2	
28-May-20	8.5	4,750				1								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	8.9	4,260				1								
24-Jul-20	8.7	3,560	2	2,230	0.01	1								
21-Aug-20	8.5	2,850				4								
28-Sep-20	8.3	4,500				5								
23-Oct-20	8.7	4,680	2	3,520	0.01	4	380	1600	310	78	160	860	11	
26-Nov-20	8.4	4,200				0								
21-Dec-20	7.7	5,900				1								
27-Jan-21	8.4	3,700	5	2,560	0.01	0								
24-Feb-21	8.1	4,250				2								
30-Mar-21	7.6	830												
27-Apr-21	8.3	1,880	3	1,350	0.01		250	540	140	59	56	290	6.8	
25-May-21	8.1	3,300				8								
24-Jun-21	8.2	3,200				9								
28-Jul-21	8.6	3,140	6	2,310	0.01	7								
23-Aug-21	8.5	3,500				3								
29-Sep-21	9	3,100				9								
25-Oct-21	9.3	3,130	18	2,010	0.01	4	490	590	380	18	74	750	11	
25-Nov-21	8.7	2,380				2								
22-Dec-21	8.5	3,470												

Site WM10 **Four Mile Creek @ John Renshaw Drive**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.50	460			2.33									
13-Oct-09	8.30	440			1.26	66	84		109	10	13	73	7	
03-Nov-09	8.50	380	18	430	2.10	120								
13-Dec-09														Dry
13-Jan-10														Dry
09-Feb-10														Dry
04-Mar-10														Dry
08-Apr-10	8.70	241	17	230	1.28	21	74		29	9	7	31	4	
14-May-10	8.00	255	50	210	0.61	21								
10-Jun-10	7.70	408	14	324	0.69	47								
07-Jul-10	7.80	470	28	262	0.77	16	52		88	12	11	63	5	
25-Aug-10	7.74	512	4	308	0.90	17								
20-Sep-10	7.42	516	5	306	1.07		63	17	109	14	10	72	6	
19-Oct-10	7.47	512	12	268	0.42									
19-Nov-10	7.07	448	13	312	1.21									
21-Dec-10	7.20	505	8	352	2.91									
14-Jan-11	7.13	478	32	294	1.96		73	1	92	9	10	60	8	
22-Feb-11														Dry
24-Mar-11														Dry
27-Apr-11	6.96	258	21	174	0.73		60	21	25	11	7	29	4	
26-May-11	7.03	261	17	251	0.63									
27-Jun-11	7.23	559	16	308	0.62									
25-Jul-11	6.53	401	14	282	0.67		24	23	87	5	8	52	6	
26-Aug-11	7.25	411	8	290	0.86									
21-Sep-11	7.65	527	8	250	1.3									
26-Oct-11	7.32	595	42	362	0.98		56	22	138	14	14	83	7	
22-Nov-11	7.72	446	26	306	2.36									
15-Dec-11	8.29	369	12	268	1.34									
25-Jan-12	7.03	514	10	322	3.55		79	1	100	11	12	64	7	
17-Feb-12	5.68	316	8	272	1.16									
30-Mar-12	7.24	456	6	278	1.28									
27-Apr-12	7.78	375	10	280	1.6		46	14	85	8	10	54	6	
24-May-12	7.6	525	12	202	1.64									
27-Jun-12	7.51	501	18	324	1.22									
27-Jul-12	7.42	352	21	298	1.5		46	15	77	6	9	51	6	
30-Aug-12	6.08	527	11	348	1.86									
25-Sep-12	7.18	432	20	254	0.86									
25-Oct-12	7.92	470	84	302	1.32		72	10	95	10	11	60	8	
29-Nov-12	7.51	4,900	24	3,390	0.05									
20-Dec-12														Dry
24-Jan-13	7.63	428	5	260	1.08		106	10	75	12	12	55	12	
25-Feb-13	6.86	388	41	360										
22-Mar-13	6.94	353	7	268	1.1									
22-Apr-13	7.31	238	92	262	1.13		31	10	41	4	5	39	5	
17-May-13	7.32	274	36	276	1.2									
21-Jun-13	7.22	328	5	244	1.09									
24-Jul-13	6.97	382	10	249	1.24		45	12	70	6	8	49	6	
28-Aug-13	7.24	373	15	258	0.98									
17-Sep-13	7.4	362	14	234	1.1									
22-Oct-13	7.39	475	21	334	2.31		88	10	86	9	10	60	10	
14-Nov-13	6.75	199	6	197	1									
11-Dec-13	6.69	328	5	262	0.95									
24-Jan-14	7.94	465	18		1.52									
20-Feb-14														Dry
25-Mar-14	7.33	187	5		0.46									
30-Apr-14	7.35	168	17	217	1.17		29	11	34	4	4	31	5	
28-May-14	6.39	175	8		0.65									
26-Jun-14	7.14	194	7		0.57									
28-Jul-14	7.01	144	6	188	0.38									
31-Aug-14	7.16	348	7		0.88									
22-Sep-14	7.5	400				38.7								
27-Oct-14	7.2	250	19	207	1.63	32.1	51	10	50	7	6	34	6	
21-Nov-14	7.3	260				37.6								
22-Dec-14	7.2	230				36								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	6.5	180	20	217	1	38.9								
23-Feb-15	7	190				31.5								
30-Mar-15	7	130				31.1								
28-Apr-15	6.8	255	25	230	0.88	75	20	20	48	5.8	7	28	6.5	
28-May-15	7.2	160				47								
24-Jun-15	7.3	160				67								
27-Jul-15	7.2	247	11	215	2.1	43								
27-Aug-15	7.4	250				27								
28-Sep-15	7.8	240				29.6								
22-Oct-15	7.2	230	10	230	1.4	18.8	78	9	23	17	9.9	17	4.6	
30-Nov-15	7.3	220				26.1								
21-Dec-15	7.1	320				41								
29-Jan-16	6.9	210	14	190	1.4	34.3								
26-Feb-16	6.8	260				22								
31-Mar-16	7.2	220				36								
28-Apr-16	7.3	230	5	220	3.6	36	62	7	26	9	8	20	7	
26-May-16	6.8	190				58								
29-Jun-16	6.8	120				65								
19-Jul-16	7.3	150	8	176	1.1	43								
23-Aug-16	7	120				66								
28-Sep-16	7.3	160				40								
20-Oct-16	7.5	170	8	179	4.3	30	72	3	19	9	7	18	5	
28-Nov-16	7.2	190				14								
21-Dec-16	7.1	180				14								
30-Jan-17	6.9	177	19	147	0.77	23								
27-Feb-17	7.2	110				45								
30-Mar-17	7.3	180				22								
26-Apr-17	7.2	280	10	236	3.5	18	48	11	64	9	9	43	7	
30-May-17	6.7	295				25								
28-Jun-17	6.9	310				27								
27-Jul-17	7.1	383	4	232	2.3	28								
30-Aug-17	6.8	330				23								
28-Sep-17	7.5	380				15								
24-Oct-17	7.1	265	12	233	1.1	28	65	20	26	12	7	32	3	
28-Nov-17	6.9	190				37								
13-Dec-17	7.7	220				34								
29-Jan-18														Dry
22-Feb-18	7	165												Stagnant
29-Mar-18	6.9	230				28								
26-Apr-18	6.8	280	5	263	6.1	23	55	11	46	8.7	7.3	39	6.3	
21-May-18	7.7	330				32								
26-Jun-18	7.3	215				45								
25-Jul-18	7.2	253	4	316	0.49	35								
29-Aug-18	7.5	120				124								
28-Sep-18	7.5	210				30								
24-Oct-18	7	400	4	300	1.2	25	40	23	77	10	8.5	61	5.8	
29-Nov-18	7.5	180				77								
18-Dec-18	7	240				32								
31-Jan-19	7	350	38	211	1.3	134								No flow
28-Feb-19														Dry
28-Mar-19	6.7	150				31								
10-Apr-19	7	182	7	145	1.3	20	43	13	16	8.3	4.8	15	4.6	
27-May-19														Dry
28-Jun-19	7.3	150				77								
30-Jul-19	7	173	8	218	0.54	60								
29-Aug-19														Dry
24-Sep-19	6.6	180				63								
29-Oct-19	7	217	17	241	0.64	43	68	4	23	12	6	21	6.1	
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20	6.5	198	125	201	0.54	174								
25-Feb-20	6.8	290				10								
31-Mar-20	7	330				11								
27-Apr-20	7.4	325	12	230	2.9	8	90	3	32	16	9.8	32	6.7	
28-May-20	7.6	240				37								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.2	440				69								
24-Jul-20	7	201	13	142	0.34	43								
21-Aug-20	7.3	320				17								
28-Sep-20	7.5	270				15								
23-Oct-20	6.9	207	13	167	0.69	34	46	6	20	6.3	4.4	20	4.5	
26-Nov-20	7	380				10								
21-Dec-20	7.3	270				35								
27-Jan-21	6.9	271	16	221	2.6	18								
24-Feb-21	7	350				14								
30-Mar-21	7	330												
27-Apr-21	7	357	2	280	2.2		58	13	66	8	8.6	44	5.7	
25-May-21	7.4	410				15								
24-Jun-21	7.6	320				18								
28-Jul-21	7.2	291	5	206	1.1	33								
23-Aug-21	7.6	300				14								
29-Sep-21	7.5	250				8								
25-Oct-21	7.1	201	5	202	1.6	17	71	8	14	13	6.8	16	4	
25-Nov-21	7.6	360				24								
22-Dec-21	7.3	360												

Site WM11 **Four Mile Creek U/S New England Highway**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.10	3,100	8	2,100	0.23	14								
13-Oct-09	7.40	3,500	24	2,700	0.10	16	166		240	139	136	452	17	
03-Nov-09	8.10	4,400	33	3,200	0.10	17								
13-Dec-09	7.30	3,100	55	3,500	0.05	27								
13-Jan-10	6.50	530	18	370	0.38	11	146		63	22	18	81	6	
09-Feb-10	6.10	320	45	310	0.33	10								
04-Mar-10	8.40	550	16	4,500	0.05	15								
08-Apr-10	8.60	356	10	260	0.32	18	76		49	16	10	48	4	
14-May-10	8.20	818	27	202	0.08	117								
10-Jun-10	6.60	721	21	476	0.18	30								
07-Jul-10	7.80	2,840	10	2,050	0.05	8	114		203	110	113	438	13	
25-Aug-10	6.59	3,240	6	2,430	0.05	8								
20-Sep-10	7.59	3,860	5	3,020	0.05		145	1590	264	168	163	509	16	
19-Oct-10	7.43	712	8	402	0.11									
19-Nov-10	7.70	3,630	12	2,410	0.13									
21-Dec-10	7.60	3,080	5	2,200	0.20									
14-Jan-11	7.70	5,420	11	4,030	0.05		284	2330	472	217	231	843	23	
22-Feb-11	7.68	4,530	<5	3,840	0.07									
24-Mar-11	7.86	5,040	6	3,750	0.06									
27-Apr-11	7.18	671	14	432	0.26		89	109	72	17	18	89	4	
26-May-11	8.02	5,710	16	4,470	0.05									
27-Jun-11	7.47	2,690	16	1,920	0.08									
25-Jul-11	7.69	2,510	41	1,580	0.14		138	586	299	61	65	388	9	
26-Aug-11	7.26	2,580	30	1,880	0.10									
21-Sep-11	8.17	3560	10	2630	0.05									
26-Oct-11	7.90	890	22	524	0.15		51	184	125	23	23	126	5	
22-Nov-11	7.92	1243	32	832	0.32									
15-Dec-11	8.14	3160	40	2180	0.05									
25-Jan-12	8.29	4950	24	4050	0.08		318	1910	546	115	209	841	19	
17-Feb-12	6.98	1428	24	1140	0.72									
30-Mar-12	8.04	3430	16	2390	0.05									
27-Apr-12	7.74	3000	15	1490	0.21		133	1190	244	133	138	438	16	
24-May-12	7.72	2650	24	1880	0.18									
27-Jun-12	8.12	4680	42	3570	0.05									
27-Jul-12	7.23	3040	25	2250	0.07		228	938	400	105	120	525	12	
30-Aug-12	6.48	1,043	25	724	0.27									
25-Sep-12	7.94	4,240	14	2,900	0.06									
25-Oct-12	7.52	1,706	32	1,000	0.18		163	332	222	40	52	257	9	
29-Nov-12	7.90	4,580	19	3,000	0.05									
20-Dec-12	8.18	5,020	12	3,510	0.07									
24-Jan-13	7.78	2,940	34	1,970	0.18		242	825	301	82	103	475	13	
25-Feb-13	7.80	2,530	47	1,580	0.14									
22-Mar-13	7.72	4,150	8	3,070	0.05									
22-Apr-13	8.24	4,120	30	2,880	0.05		275	1310	415	104	149	716	15	
17-May-13	7.92	3,370	14	2,510	0.06									
21-Jun-13	8.06	2,480	5	1,610	0.05									
24-Jul-13	7.78	2,710	5	1,920	0.08		107	1020	205	109	116	386	12	
28-Aug-13	7.86	1,960	5	1,270	0.09									
17-Sep-13	7.75	1,710	7	1,040	0.12									
22-Oct-13	7.86	2,420	6	1,500	0.06		247	537	297	46	67	141	10	
14-Nov-13	7.84	5,270	15	3,570	0.06									
11-Dec-13	7.48	3,790	17	2,730	0.06									
24-Jan-14	7.65	8,070	5		0.27									
20-Feb-14	6.74	1,582	22		0.09									
25-Mar-14	7.82	2,830	43		0.37									
30-Apr-14	8.01	3,970	14	2,960	0.05		328	1610	379	154	176	757	19	
28-May-14	7.61	880	8		0.09									
26-Jun-14	7.98	2,840	6		0.05									
28-Jul-14	8.41	4,890	5	3,990	0.05									
31-Aug-14	7.75	2,551	13		0.07									
22-Sep-14	6.90	4,050				15.7								
27-Oct-14	7.90	2,650	9	1,700	0.06	14.2	237	756	259	49	76	398	9	
21-Nov-14	7.20	1,300				73								
22-Dec-14	8.00	3,950				14.5								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	8.20	2,390	18	1,590		30.9								
20-Feb-15	8.00	4,700				6.6								
30-Mar-15	7.60	1,960				11.8								
28-Apr-15	7.40	2,280	21	1,640	0.10	42	86	870	180	89	95	275	11	
28-May-15	7.50	2,430				23								
24-Jun-15	7.50	1,960				29								
27-Jul-15	7.60	931	7	632	0.16	20								
27-Aug-15	8.20	5,100				10								
28-Sep-15	8.20	4,570				14.9								
22-Oct-15	7.40	1,030	37	658	0.07	60	105	230	120	31	31	135	7.1	
30-Nov-15	8.20	3,300				22.8								
21-Dec-15	7.80	3,600				64								
29-Jan-16	7.50	3,510	12	2,810	0.11	19.7								
26-Feb-16	7.50	4,200				36.7								
31-Mar-16	8.30	4,900				10								
28-Apr-16	7.80	3,620	39	3,000	0.01	40	28	1380	265	110	130	510	12	
26-May-16	7.50	1,600				27								
29-Jun-16	7.30	4,000				19								
19-Jul-16	7.70	4,100	14	3,460	0.01	23								
22-Aug-16	7.60	1,800				33								
28-Sep-16	8.10	4,580				11								
20-Oct-16	8.40	4,300	24	3,520	0.01	33	330	1700	310	130	190	880	15	
28-Nov-16	8.20	4,300				72								
21-Dec-16	7.60	4,300				41								
30-Jan-17	8.00	4,240	46	3,680	<0.01	16								
27-Feb-17	8.10	5,100				4								
30-Mar-17	7.40	3,900				12								
26-Apr-17	7.70	1,300	12	1,050	0.23	16	150	390	150	48	53	240	8	
30-May-17	8.00	3,550				13								
28-Jun-17	7.50	2,516				13								
27-Jul-17	7.40	720	22	879	0.32	32								
30-Aug-17	6.60	1,730				37								Not flowing
28-Sep-17	7.80	5,150				68								
24-Oct-17	8.10	5,080	22	4,520	0.01	21	360	1700	290	160	250	1000	19	
28-Nov-17	7.50	3,150				42								Not flowing
13-Dec-17	7.80	3,540				48								Not flowing
29-Jan-18	7.80	1,670	50	1,320	0.06	67								Not flowing
22-Feb-18	5.60	1,280				19								Ashtonfield runoff
29-Mar-18	6.50	2,000				29								
26-Apr-18	7.60	3,560	8	2,810	0.01	15	240	1200	250	110	140	670	13	
21-May-18	7.60	2,600				16								
25-Jun-18	7.70	3,400				13								
25-Jul-18	7.40	866	7	541	0.07	17								
29-Aug-18	7.80	4,800				9								
28-Sep-18	7.50	3,400				17								
24-Oct-18	7.60	2,400	26	1,310	0.01	36	210	720	210	67	77	460	9.6	
29-Nov-18	7.80	3,900				23								Discharging
18-Dec-18	6.70	550				27								
31-Jan-19	7.90	1,350	56			33								No flow
28-Feb-19	7.60	5,400				23								
28-Mar-19	6.90	890				28								
10-Apr-19	7.70	3,590	11	3,400	0.01	17	230	1900	310	160	190	690	16	
27-May-19	7.80	2,900				29								No flow
28-Jun-19	7.80	4,400				6								
30-Jul-19	7.80	3,110	20	3,020	0.01	28								
29-Aug-19	8.00	3,800				25								No flow
24-Sep-19	7.10	1,100				26								
29-Oct-19	7.60	1,250	18	801	0.09	22	190	210	170	35	39	180	7.4	
27-Nov-19	8.00	1,850				22								
23-Dec-19	8.00	1,900				26								
29-Jan-20	4.10	2,170	9	1,740	0.41	11								Stagnant pool
25-Feb-20	7.20	3,680				13								
31-Mar-20	7.90	4,570				9								
27-Apr-20	7.90	5,750	8	5,380	0.03	6	400	2400	370	200	250	870	16	
28-May-20	8.40	5,090				3								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.30	1,300				5								
24-Jul-20	7.80	3,220	2	2,500	0.01	1								
21-Aug-20	7.70	1,830				18								
28-Sep-20	7.60	5,450				13								
23-Oct-20	7.90	5,060	8	4,110	0.01	11	290	2000	310	150	200	850	15	
26-Nov-20	7.60	3,600				36								
21-Dec-20	7.70	5,300				10								
27-Jan-21	7.60	4,330	16	3,490	0.01	20								
24-Feb-21	7.20	2,900				4								
30-Mar-21	7.20	1,630				10								
27-Apr-21	7.60	3,810	17	3,240	0.01		270	1500	290	140	170	550	11	
25-May-21	7.80	4,000				11								
24-Jun-21	7.50	3,600				4								
28-Jul-21	7.60	2,690	20	2,150	0.01	26								
23-Aug-21	7.60	2,500				53								
29-Sep-21	7.70	5,000				33								
25-Oct-21	7.80	4,450	20	3,950	0.02	20	270	2000	310	170	240	760	26	
25-Nov-21	7.50	3,000				7								
22-Dec-21	7.50	2,660												

Site WM12 **Shamrock Creek / Four Mile Creek Junction**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Sep-09	8.00	2,800	16	1,800	0.74	52								
13-Oct-09	7.10	3,500	16	2,500	0.22	20	193		217	139	139	448	17	
03-Nov-09	8.30	6,200	2	5,200	<0.05	5								
13-Dec-09	7.30	550	64	300	<0.05	10								
13-Jan-10	6.10	310	6	190	0.30	16	90		39	13	8	32	4	
09-Feb-10	5.50	230	22	150	0.29	58								
04-Mar-10														
08-Apr-10	8.70	276	10	190	0.19	21	55		37	16	8	27	3	
14-May-10	7.50	200	6	171	0.07	9								
10-Jun-10	7.10	1,560	36	1,380	0.09	44								
07-Jul-10	7.70	2,750	16	1,960	0.09	17	110		194	111	110	414	13	
25-Aug-10	7.54	3,150	10	2,360	<0.05	20								
20-Sep-10	7.58	2,650	8	1,970	0.14		106	1050	183	116	111	364	12	
19-Oct-10	7.40	1,520	8	936	0.07									
19-Nov-10	7.86	4,370	30	3,080	0.06									
21-Dec-10	7.67	3,920	10	3,010	0.55									
14-Jan-11	7.78	5,840	12	4,420	<0.05		252	2230	462	245	244	813	26	
22-Feb-11	7.91	4,680	12	3,720	<0.05									
24-Mar-11	8.07	5,060	16	3,670	0.07									
27-Apr-11	7.41	420	26	304	0.43		66	66	44	14	11	51	3	
26-May-11	8.24	5,690	24	3,980	<0.05									
27-Jun-11	7.49	3,390	16	2,640	<0.05									
25-Jul-11	7.81	2,800	44	1,860	0.13		160	702	327	75	77	434	10	
26-Aug-11	7.62	2,130	22	1,510	0.17									
21-Sep-11	7.14	1,943	16	1,230	0.05									
26-Oct-11	8.17	774	134	502	0.33		43	189	86	25	25	93	5	
22-Nov-11	8.13	2,341	58	1,630	0.18									
15-Dec-11	8.12	3,440	30	2,420	0.05									
25-Jan-12	8.17	4,940	12	4,050	0.05		333	1910	527	116	216	843	19	
17-Feb-12	6.62	1,582	18	1,200	0.7									
30-Mar-12	8.03	4,510	18	3,470	0.05									
27-Apr-12	7.76	3,300	18	2,700	0.3		147	1580	254	166	171	532	18	
24-May-12	7.66	1,066	63	684	0.62									
27-Jun-12	8	4,860	32	3,800	0.14									
27-Jul-12	6.48	2,180	43	2,270	0.25		104	824	232	91	95	331	10	
30-Aug-12	6.83	1,029	62	712	0.26									
25-Sep-12	7.92	2,930	22	1,910	0.05									
25-Oct-12	7.57	728	145	446	0.15		92	138	89	21	22	98	5	
29-Nov-12	7.95	4,950	24	3,270	0.05									
20-Dec-12	6.4	4,480	12	3,040	0.05									
24-Jan-13														Dry
25-Feb-13														No Access
22-Mar-13	7.69	3,430	6	2,530	0.17									
22-Apr-13														No access
17-May-13														No access
21-Jun-13														No access
24-Jul-13	7.87	3,280	19	2,530	0.12		124	1350	228	144	151	477	15	
28-Aug-13	7.74	1,040	5	669	0.29									
17-Sep-13														Dry
22-Oct-13	7.75	1,370	5	742	0.06		160	270	152	25	34	217	6	
14-Nov-13	7.98	5,140	7	3,700	0.05									
11-Dec-13	7.44	1,830	6	1,250	0.13									
24-Jan-14	8.2	8,260	8		0.05									
20-Feb-14	8.42	4,170	29		0.05									
25-Mar-14	7.95	3,910	5		0.06									
30-Apr-14	7.85	4,390	10	3,250	0.05		306	2000	397	199	210	817	22	
28-May-14	7.34	1,752	6		0.11									
26-Jun-14	8	2,790	5		0.05									
28-Jul-14	8.44	5,000	18	3,660	0.05									
31-Aug-14	7.6	2,570	15		0.12									
22-Sep-14	7.3	5,030				8.1								
27-Oct-14	7.6	1,200	9	778	0.76	13.8	124	340	122	26	35	175	5	
21-Nov-14	7.4	1,000				8.8								
22-Dec-14	8	2,640				6.8								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-15	8.5	2,940	22	2,060	0.04	28								
23-Feb-15	8	2,000				9								
30-Mar-15	7.6	1,100				9.3								
28-Apr-15	7.5	2,350	34	1,740	0.12	59	90	880	170	92	97	280	11	
28-May-15	7.5	1,460				58								
24-Jun-15	7.6	2,490				36								
27-Jul-15	7.5	675	6	458	0.3	26								
27-Aug-15	8.3	4,990				12								
28-Sep-15	8	4,980				6.2								
22-Oct-15	7.5	980	25	661	0.06	41.4	96	260	89	35	34	125	6	
30-Nov-15	8.1	2,100				7.5								
21-Dec-15	7.8	4,800				23.8								
29-Jan-16	7.5	3,070	16	2,470	0.15	39.8								
26-Feb-16	7.3	3,500				43								
31-Mar-16	8.2	4,850				11								
28-Apr-16	7.5	1,730	12	1,210	0.17	16	155	560	115	51	60	260	7	
26-May-16	7.6	750				56								
29-Jun-16	7.2	3,120				7								
19-Jul-16	7.2	1,300	7	927	0.24	20								
22-Aug-16	7.3	1,100				25								
28-Sep-16	8.2	4,520				8								
20-Oct-16	8.5	4,700	3	4,100	0.02	7	350	2000	320	140	220	990	16	
28-Nov-16	8.2	4,500				16								
21-Dec-16	7.9	5,300				10								
30-Jan-17	8.2	4,500	9	3,930	0.01	11								
27-Feb-17	8	5,330				8								
30-Mar-17	7.3	4,000				8								
26-Apr-17	7.6	1,038	8	854	0.33	19	110	320	110	41	42	170	7	
30-May-17	7.6	1,630				13								
28-Jun-17	7.4	1,921				23								
27-Jul-17	7.2	566	7	405	0.51	31								
30-Aug-17	6.8	1,300				6								Not flowing
28-Sep-17	7.9	4,520				4								
24-Oct-17	8.3	5,490	8	5,100	0.01	9	410	1900	310	190	280	1100	22	
28-Nov-17	7.5	4,500				5								Not flowing
13-Dec-17														Dry
29-Jan-18														Dry
22-Feb-18														Dry
29-Mar-18	7.1	1,900				38								
26-Apr-18	7.6	3,860	8	3,040	0.01	13	350	1200	280	120	130	770	13	
21-May-18	7.7	3,000				8								
25-Jun-18	7.5	3,500				4								
25-Jul-18	7.3	626	13	425	0.14	20								
29-Aug-18	8.1	4,520				7								
28-Sep-18	7.2	2,800				5								Not flowing
24-Oct-18	7.7	2,340	2	1,840	0.01	5	180	790	180	77	85	420	8.9	
29-Nov-18	7.6	4,100				6								Discharging
18-Dec-18	6.7	500				19								
31-Jan-19														Dry
28-Feb-19	7.8	5,400				10								
28-Mar-19	6.9	900				7								
10-Apr-19	7.8	3,630	6	3,700	0.01	7	190	2000	290	180	190	690	17	
27-May-19	8	6,000												No flow
28-Jun-19	8.1	4,500				4								
30-Jul-19	7.9	2,610	2	2,530	0.01	3								
29-Aug-19														Dry
24-Sep-19	7.1	1,080				9								
29-Oct-19														Dry
27-Nov-19														Dry
23-Dec-19														Dry
29-Jan-20														Dry
25-Feb-20	7.3	4,120				9								
31-Mar-20	7.9	4,900				6								
27-Apr-20	8	5,730	6	6,790	0.04	4	470	2200	390	170	230	890	14	
28-May-20	8.3	4,790				2								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jun-20	7.4	1,010				6								
24-Jul-20	7.6	1,820	5	1,300	0.01	1								
21-Aug-20	7.3	1,200				24								
28-Sep-20	7.2	5,700				8								
23-Oct-20	7.9	5,240	2	4,330	0.01	5	310	2100	320	150	210	860	15	
26-Nov-20	7.4	5,200				1								
21-Dec-20	7.7	5,500				5								
27-Jan-21	7.7	4,130	5	3,340	0.01	0								
24-Feb-21	7.5	2,000				4								
30-Mar-21	7.3	1,370				10								
27-Apr-21	7.5	3,070	9	2,610	0.03		230	1200	200	110	130	420	9.9	
25-May-21	7.7	3,300				16								
24-Jun-21	7.5	3,150				33								
28-Jul-21	7.5	2,740	6	2,310	0.03	10								
23-Aug-21														Dry
29-Sep-21	7.7	5,100				8								
25-Oct-21	7.7	2,510	8	1,980	0.02	8	180	950	160	85	120	390	16	
25-Nov-21	7.5	3,500				9								
22-Dec-21	7.6	2,240												

Site WM13 **Buttai Creek @ Buchanan Road**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
20-Sep-10	7.33	556	5	378	1.54		56	28	120	10	12	81	7	
19-Oct-10	7.36	603	4	320	0.81									
19-Nov-10	6.75	359	13	260	2.17									
21-Dec-10	7.36	525	5	338	2.00									
14-Jan-11	7.17	542	5	320	1.05		86	14	101	11	12	74	5	
22-Feb-11	7.38	495	5	480	0.62									
24-Mar-11	7.63	594	10	416	0.39									
27-Apr-11	6.07	1100	24	766	0.05		5	378	76	39	44	118	8	
26-May-11	6.59	1110	22	880	0.05									
27-Jun-11	7.02	826	10	518	0.28									
25-Jul-11	6.39	413	22	302	0.57		17	35	83	6	8	54	5	
26-Aug-11	7.01	593	35	372	0.76									
21-Sep-11	7.19	868	24	490	0.34									
26-Oct-11	7.84	949	21	554	0.48		55	44	237	15	22	145	6	
22-Nov-11	7.47	1,323	27	860	0.37									
15-Dec-11	8.46	386	74	380	1.03									
25-Jan-12	7.82	906	36	612	0.52		83	113	170	18	24	137	6	
17-Feb-12	6.37	291	50	339	1.06									
30-Mar-12	7.42	966	40	548	0.13									
27-Apr-12	7.3	459	26	384	1.2		51	41	96	11	13	69	5	
24-May-12	7.39	1,044	37	550	0.3									
27-Jun-12	7.44	882	32	526	0.78									
27-Jul-12	6.36	575	50	591	0.78		43	42	150	13	16	85	5	
30-Aug-12	6.89	135	37	788	0.19									
25-Sep-12														Dry
25-Oct-12	7.58	1,573	18	844	0.05		105	91	408	27	37	242	9	
29-Nov-12														Dry
20-Dec-12														Dry
24-Jan-13														Dry
25-Feb-13	6.94	475	35	358	0.62									
22-Mar-13	7.21	1,010	5	574	0.48									
22-Apr-13	6.78	1,600	14	1,020	0.25		22	407	253	51	48	248	11	
17-May-13	7.38	907	38	540	0.05									
21-Jun-13	7.24	1,120	6	646	0.16									
24-Jul-13	7.28	727	11	417	0.46		54	45	151	11	15	105	6	
28-Aug-13	7.53	869	5	443	0.11									
17-Sep-13	7.59	930	6	469	0.06									
22-Oct-13	7.53	1,080	8	541	0.05		74	74	218	19	23	155	9	
14-Nov-13	7.39	1,100	15	577	0.05									
11-Dec-13	6.81	599	18	364	0.56									
24-Jan-14	8.05	941	30		0.05									
20-Feb-14	8.35	957	22		0.05									
25-Mar-14	7.59	849	12		0.05									
30-Apr-14	6.89	282	6	204	0.91		33	21	66	4	6	55	7	
28-May-14	6.63	472	5		0.93									
26-Jun-14	7.65	475	5		0.3									
28-Jul-14	7.32	580	5	384	0.11									
31-Aug-14	7.57	352	13		0.73									
22-Sep-14	7.7	570				41.8								
27-Oct-14	7.4	560	60	337	1.33	15.9	69	10	116	9	12	74	8	
21-Nov-14	7.6	660				18.6								
22-Dec-14	7.5	690				16.4								
29-Jan-15	6.8	240	16	236	1.3	38.5								
23-Feb-15	7.2	560				7.8								
30-Mar-15	7	600				9.3								
28-Apr-15	6.5	274	44	234	3.5	63	41	22	42	11	8.2	25	8.3	Floodwater
28-May-15	7.3	640				33								
24-Jun-15	6.7	620				47								
27-Jul-15	7.6	919	4	542	0.42	9								
27-Aug-15	7.2	1,100				7								
28-Sep-15	7.5	760				9.1								
22-Oct-15	7.1	900	2	533	0.28	5	88	21	210	19	21	120	7.2	
30-Nov-15	7.5	590				10.2								
21-Dec-15	7	640				9.4								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
29-Jan-16	7	640	11	383	0.94	12.5								
26-Feb-16	6.9	840				7								
31-Mar-16	7.1	450				13								
28-Apr-16	8	930	3	524	0.04	4	115	14	210	19	21	130	6	
26-May-16	7.6	960				19								
29-Jun-16	6.9	1,200				5								
19-Jul-16	7.8	1,180	8	757	0.01	7								Stagnant
22-Aug-16	7.5	790				13								Stagnant
28-Sep-16	7.5	800				5								
20-Oct-16	7.6	860	2	536	0.35	3	97	81	150	25	24	130	13	
28-Nov-16	7.6	940				11								Stagnant
21-Dec-16	7.7	960				9								Stagnant
30-Jan-17	8	1,060	8	623	0.02	8								
27-Feb-17	8.1	1,100				270								Cattle
30-Mar-17	7.4	390				41								
26-Apr-17	7.3	454	8	356	2.1	10	65	26	110	13	13	72	8	
30-May-17	7.1	580				7								
28-Jun-17	6.7	510				28								
27-Jul-17	7.2	547	4	364	1	12								
30-Aug-17	7.6	590				6								Not flowing
28-Sep-17	7.9	695				6								Not flowing
24-Oct-17	7.5	711	2	428	0.19	6	77	53	120	16	16	110	8	
28-Nov-17	7.5	630				8								Not flowing
13-Dec-17	7.7	670				8								Not flowing
29-Jan-18	7.8	779	22	489	0.08	29								Not flowing
22-Feb-18	8	800				39								Stagnant - cattle
29-Mar-18	7	500				18								Cattle
26-Apr-18	6.5	560	6	367	2	12	64	31	110	13	13	84	7.3	Cattle
21-May-18	8	610				8								
26-Jun-18	7.7	500				19								
25-Jul-18	7.6	536	2	334	1.1	6								
29-Aug-18	7.7	520				6								
28-Sep-18	8.1	550				5								Not flowing
24-Oct-18	7.1	450	13	486	1.6	13	57	22	83	8.5	9.4	71	7	
29-Nov-18	8.3	480				13								
18-Dec-18	6.4	250				40								
31-Jan-19	7.4	410	6	222	1.8	8								No flow
28-Feb-19	8	450				16								
28-Mar-19	7	280				38								
10-Apr-19	7.1	364	11	251	1.1	18	40	17	65	7.6	7.5	48	7.6	
27-May-19	7.7	544				19								
28-Jun-19	7.4	380				15								
30-Jul-19	7.4	405	15	206	0.06	20								
29-Aug-19	8.1	560				18								
24-Sep-19	6.7	270				69								
29-Oct-19	7.7	323	14	206	1.1	19	50	12	54	7.8	6.9	43	5.9	
27-Nov-19	7.4	390				16								
23-Dec-19	7.5	490				55								
29-Jan-20														Muddy pool - cattle
25-Feb-20	6.9	357				11								
31-Mar-20	7.3	320				9								
27-Apr-20	7.7	395	5	257	3.9	5	77	8	55	12	10	46	8.2	
28-May-20	7.7	280				13								
29-Jun-20	7.3	560				15								
24-Jul-20	7.1	409	11	285	0.87	9								
21-Aug-20	6.9	550				9								
28-Sep-20	7.6	630				6								
23-Oct-20	7.7	650	9	182	0.31	6	72	13	120	12	13	73	6.4	
26-Nov-20	7.2	420				7								
21-Dec-20	7.4	482				22								
21-Jul-21	7	434	10	242	1.8	15								
24-Feb-21	7.3	300				10								
30-Mar-21	7	650												
27-Apr-21	7	603	5	404	0.66		71	28	120	12	14	71	5.8	
25-May-21	7.7	850				25								

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
24-Jun-21	7.4	870				4								
28-Jul-21	7.4	840	5	475	0.14	27								
23-Aug-21	7.7	820				6								
29-Sep-21	7.9	550				7								
25-Oct-21	7.1	512	6	297	0.74	9	68	18	98	11	12	67	6.7	
25-Nov-21	7.3	310				15								
22-Dec-21	7.5	540												

Site WM14 **Buttai Creek @ W Cut**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
28-Jul-21	7.2	413	5	268	0.14	10								
23-Aug-21	7.6	400				11								
29-Sep-21	7.7	460				4								
25-Oct-21	7.8	455	5	269	0.91	9	39	24	92	9	10	62	7	
25-Nov-21	7.5	260				37								
22-Dec-21	7.7	320												

Site WM15 **Buttai Creek – Downstream W Cut**

Date	pH	Specific Conductance (µS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Iron (mg/l)	Turbidity (NTU)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Comments
25-Nov-21	7.6	250				41								
22-Dec-21	7.6	320												

Table C1 - Discharge Monitoring Results 2021

DATE	pH	TOTAL SUSPENDED SOLIDS (mg/l)	TOTAL DISSOLVED SOLIDS (mg/l)	SPECIFIC CONDUCTANCE (uS/cm)	IRON (mg/l)	DISCHARGE VOLUME (ML/day)
05-Jan-21	7.9	7	4,800	5,610	<0.01	30
06-Jan-21	8.0	6	4,170	4,960	<0.01	20
15-Jan-21	8.1	6	4,880	5,780	<0.01	20
16-Jan-21	8.2	6	4,820	5,580	<0.01	20
17-Jan-21	8.3	2	3,980	4,970	<0.01	20
29-Jan-21	7.9	8	5,010	5,620	<0.01	40
30-Jan-21	8.0	5	4,970	5,680	<0.01	25
31-Jan-21	8.2	2	4,230	5,120	<0.01	5
02-Feb-21	8.0	4	4,820	5,570	0.01	10
17-Feb-21	8.3	4	4,830	5,580	<0.01	30
18-Feb-21	8.2	10	5,150	5,730	<0.01	20
19-Feb-21	8.1	10	5,030	5,730	<0.01	10
14-Mar-21	8.0	5	5,230	5,740	0.01	40
15-Mar-21	8.0	4	5,140	5,690	<0.01	30
16-Mar-21	8.0	3	5,040	5,520	<0.01	25
17-Mar-21	8.1	4	4,610	5,350	<0.01	20
18-Mar-21	8.1	5	4,600	5,360	<0.01	10
19-Mar-21	8.1	4	4,190	5,020	<0.01	10
20-Mar-21	7.5	5	5,490	5,640	<0.01	10
21-Mar-21	7.5	78	1,070	1,410	0.07	40
22-Mar-21	7.5	74	993	1,370	0.07	40
23-Mar-21	7.4	36	468	688	0.45	10
24-Mar-21	7.6	26	1,840	2,290	0.03	40
25-Mar-21	6.5	15	2,120	2,540	0.02	10
07-Apr-21	7.7	7	4,760	4,820	<0.01	40
08-Apr-21	7.6	7	4,700	4,960	<0.01	40
09-Apr-21	7.6	7	4,450	4,640	<0.01	30
18-Apr-21	7.9	9	5,080	5,640	<0.01	30
07-May-21	7.9	4	5,720	5,220	<0.01	40
08-May-21	8.1	5	5,490	5,150	<0.01	30
09-May-21	8.0	5	4,070	4,180	<0.01	30
4-Jun-21	8.0	5	6,050	5,280	<0.01	40
5-Jun-21	8.1	5	4,880	4,750	<0.01	35
9-Jun-21	8.1	6	5,980	5,400	<0.01	35
29-Jun-21	8.0	5	6,320	5,580	<0.01	40
30-Jun-21	8.0	5	6,200	5,760	<0.01	30
24-Aug-21	7.9	5	6,150	5,590	<0.01	40
25-Aug-21	8.1	5	6,130	5,600	<0.01	30

DATE	pH	TOTAL SUSPENDED SOLIDS (mg/l)	TOTAL DISSOLVED SOLIDS (mg/l)	SPECIFIC CONDUCTANCE (uS/cm)	IRON (mg/l)	DISCHARGE VOLUME (ML/day)
26-Aug-21	8.1	5	5,580	5,110	<0.01	30
27-Aug-21	8.2	5	3,680	3,890	<0.01	20
14-Sep-21	8.0	5	6,160	5,590	<0.01	40
15-Sep-21	8.0	5	6,440	5,960	<0.01	40
11-Oct-21	8.0	13	6,220	5,830	0.05	40
12-Oct-21	8.2	8	5,870	5,590	0.05	30
14-Oct-21	8.2	6	5,560	5,510	0.05	20
15-Oct-21	8.0	6	4,880	5,090	0.06	20
08-Nov-21	8.1	14	6,140	5,990	0.01	40
09-Nov-21	8.1	5	5,550	5,870	0.01	40
10-Nov-21	8.1	8	5,450	5,760	0.01	20
11-Nov-21	8.1	10	4,710	5,110	0.01	20
12-Nov-21	8.1	22	4,110	4,470	0.01	20
13-Nov-21	7.6	6	5,590	5,320	0.03	20
14-Nov-21	7.7	11	5,830	5,540	0.04	20
21-Nov-21	7.9	6	5,570	5,450	0.01	40
22-Nov-21	7.9	5	5,590	5,600	0.01	40
23-Nov-21	7.9	5	4,420	4,600	0.05	40
26-Nov-21	7.9	5	5,190	5,200	0.01	20
27-Nov-21	8.1	5	4,340	4,450	0.01	20
28-Nov-21	8.1	6	4,000	4,460	0.01	20
03-Dec-21	8.1	5	4,660	5,170	0.01	40
04-Dec-21	8.0	5	4,160	4,540	0.01	20
28-Dec-21	8.0	5	5,410	5,650	<0.01	40
29-Dec-21	8.0	5	4,720	5,220	0.04	40
Max	8.3	78	6440	5780	0.45	40
Min	6.5	2	468	688	0.01	5
Average	7.9	11	4714	4831	0.04	27

APPENDIX D

GROUNDWATER MONITORING RESULTS

Bore PD2.1 **Buttai Reservoir**

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
20-Sep-10	22.87	56.33	6.67	5350	3780	569	730	1330	32	74	1150	24	0.29
19-Oct-10	22.63	56.57	6.72	6000	3100	553	802	1210	34	78	1330	27	2.45
14-Jan-11	22.84	56.36	6.6	6420	3750	598	718	1260	30	73	1310	28	1.47
27-Apr-11	22.61	56.59	6.6	6560	3610	483	953	1120	32	90	1200	26	2.14
25-Jul-11	23.13	56.07	6.64	6320	3810	541	621	1230	30	72	1280	28	1.28
26-Oct-11	23.64	55.56	7.09	6170	3660	503	506	1290	27	67	1270	29	1.61
25-Jan-12	24.02	55.18	7.06	5720	3330	430	607	1300	34	56	1180	29	1.39
27-Apr-12	24.44	54.76	6.64	5270	3490	409	418	1270	36	47	1130	29	1
27-Jul-12	24.71	54.49	7.32	6120	3830	355	608	1650	134	74	1320	35	0.05
31-Oct-12	24.64	54.56	6.74	5950	3990	592	874	1240	48	79	1370	33	11.4
24-Jan-13	24.80	54.40	7.3	6360	4130	590	816	1190	67	78	1320	31	0.85
22-Apr-13	25.23	53.97	6.81	6080	4170	549	654	1210	54	79	1220	30	0.79
24-Jul-13	25.00	54.20	7.21	6820	3830	212	450	1700	159	34	1290	37	1.99
28-Oct-13	24.82	54.38	6.87	6380	3990	622	726	1200	38	80	1310	31	2.06
02-May-14	25.34	53.86	6.84	6460	3800								
29-Nov-14	25.40	53.80	7.3	6460	3740	560	503	1600	96	53	1220	27	0.05
24-Feb-15	25.42	53.78											
03-Jun-15	26.72	52.48	6.7	6350	3170								
26-Aug-15	25.87	53.33											
30-Nov-15	25.92	53.28	6.9	5520	3420	350	310	1300	87	33	1300	33	0.05
21-Mar-16	25.92	53.28											
25-May-16	25.70	53.50	7	5000	2600								
19-Aug-16	25.17	54.03											
30-Nov-16	25.12	54.08	7.3	4700	3010	330	220	1200	120	16	1100	29	0.01
27-Feb-17	24.89	54.31											
01-May-17	25.54	53.66	8	3920	2513								
31-Aug-17	24.86	54.34											
29-Nov-17	24.74	54.46	7	4650	3020	280	400	1200	72	25	1100	24	0.02
28-Feb-18	24.61	54.59											
29-May-18	25.28	53.92	6.9	5900	3770								
30-Aug-18	25.02	54.18											
30-Nov-18	24.94	54.26	7.1	4900	3490	440	600	1200	120	170	590	24	0.01
27-Feb-19	24.90	54.30											
31-May-19	24.82	54.38	7.1	5200	3600								
27-Aug-19	24.78	54.42											
27-Nov-19	24.76	54.44	7	4930	3640	540	770	1200	48	70	1200	31	0.01
27-Feb-20	24.50	54.70											
27-May-20	24.70	54.50	6.9	5000	2500								
24-Aug-20	24.87	54.33											
30-Nov-20	24.95	54.25	6.9	4790	3250	370	570	1100	42	43	1000	22	0.87

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
26-Feb-21	24.95	54.25											
31-May-21	25.47	53.73	6.8	5400	4320								
31-Aug-21	25.17	54.03											
30-Nov-21	25.50	53.70	7	4200	2460	120	240	1100	43	9.1	950	20	0.01

Bore PD2.2 **Buttai Reservoir**

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
20-Sep-10	16.29	63.37	6.69	5140	4500	319	1890	695	183	180	943	20	4.22
19-Oct-10	15.88	63.78	6.79	5780	4300	333	2010	706	185	180	1040	22	8.83
14-Jan-11	16.38	63.28	6.65	6170	4220	342	2300	728	191	189	1070	24	9.19
27-Apr-11	15.87	63.79	6.42	6270	4500	288	1890	701	171	206	952	23	7.52
25-Jul-11	17.12	62.54	6.29	6090	4250	239	1800	806	167	209	972	27	31.1
26-Oct-11	18.58	61.08	7.03	5960	4320	206	1740	791	157	204	1000	29	6.23
25-Jan-12	18.81	60.85	7.07	6460	4840	483	1480	1130	100	177	1170	33	0.05
27-Apr-12	19.23	60.43	6.44	5720	4230	282	1360	1110	106	194	1090	33	23.6
27-Jul-12	19.21	60.45	6.52	5720	4390	272	1710	1070	97	182	1110	32	30.5
31-Oct-12	19.23	60.43	6.35	5650	4040	205	1840	892	100	178	1190	33	32.9
24-Jan-13	19.36	60.30	6.73	5810	4110	241	1820	838	115	203	1140	31	29.1
22-Apr-13	19.95	59.71	6.4	5480	3990	217	1480	852	76	160	1070	30	32.4
24-Jul-13	19.53	60.13	6.81	6120	4100	246	1520	899	84	168	1140	32	12.2
28-Oct-13	19.65	60.01	6.54	6450	4140	271	1490	901	79	154	1160	30	26.4
02-May-14	19.94	59.72	6.46	6260									
29-Nov-14	19.36	60.30	6.7	5880	3610	302	1440	1010	70	127	1040	24	0.05
24-Feb-15	20.35	59.31											
03-Jun-15	20.44	59.22	6.7	6110	3050								
26-Aug-15	20.22	59.44											
30-Nov-15	20.16	59.50	6.6	5670	4180	310	1300	890	66	150	1200	34	10
21-Mar-16	19.90	59.76											
25-May-16	19.79	59.87	6.8	5800									
19-Aug-16	19.36	60.30											
30-Nov-16	19.24	60.42	6.7	5730	5510	400	2100	690	280	230	1200	25	1.9
27-Feb-17	19.18	60.48											
01-May-17	19.32	60.34	7.3	5370	3447								
31-Aug-17	19.60	60.06											
29-Nov-17	19.63	60.03	6.8	5670	4030	360	1300	1100	55	120	1400	28	0.01
28-Feb-18	19.62	60.04											
29-May-18	19.82	59.84	7.1	6400	4050								
30-Aug-18	19.99	59.67											
30-Nov-18	19.99	59.67	7	5380	4170	420	1300	1100	50	110	1000	27	0.01
27-Feb-19	19.80	59.86											
31-May-19	19.79	59.87	6.9	5450	4200								
27-Aug-19	19.83	59.83											
27-Nov-19	19.91	59.75	7.2	5460	4130	400	1300	1100	60	130	1200	31	0.01
27-Feb-20	19.97	59.69											
27-May-20	19.96	59.70	7.4	6300	3200								
24-Aug-20	20.04	59.62											
30-Nov-20	20.09	59.57	7.1	5240	3810	410	1200	1000	48	100	1100	23	0.01

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
26-Feb-21	19.95	59.71											
31-May-21	20.15	59.51	6.7	6000	4800								
31-Aug-21	19.80	59.86											
30-Nov-21	19.88	59.78	7	6020	4180	420	1100	960	54	110	1100	25	0.01

Bore PD3 **Shamrock Lane**

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
20-Sep-10	23.88	7.12	4.1	2660	2090	1	958	220	34	112	374	21	0.09
19-Oct-10	23.62	7.38	6.37	5890	5120	217	2710	510	262	311	884	27	22.6
14-Jan-11	23.78	7.22	6.59	6040	4940	168	2890	507	247	300	878	29	0.05
27-Apr-11	23.27	7.73	6.7	6680	5390	134	2790	545	256	333	863	28	0.05
25-Jul-11	24.75	6.25	6.24	6520	5280	134	2440	614	247	309	874	30	7.05
26-Oct-11	23.97	7.03	6.52	6420	5170	120	2780	615	267	328	1010	34	0.05
25-Jan-12	23.62	7.38	7.03	6580	6640	130	3160	595	273	347	980	33	0.06
27-Apr-12	24.97	6.03	6.26	6190	5280	185	2670	604	286	331	957	33	0.38
27-Jul-12	24.29	6.71	6.35	6350	5860	158	3530	622	308	345	985	33	0.61
25-Oct-12	24.38	6.62	6.54	6820	5880	98	3280	599	362	380	1020	35	0.05
24-Jan-13	23.70	7.30	6.07	6520	5430	2	3880	484	354	365	977	33	0.11
22-Apr-13	24.01	6.99	5.74	5800	5340	46	3070	433	210	354	896	34	113
24-Jul-13	24.61	6.39	5.76	6520	5720	85	3240	448	281	377	915	35	34.2
22-Oct-13	23.92	7.08	4.63	6660	5480	1	3030	444	241	351	874	35	62.1
02-May-14	24.48	6.52	6.2	6970									
29-Nov-14	24.17	6.83	3.5	6840	6390	5	3690	547	317	332	870	28	2.97
24-Feb-15	23.98	7.02											
03-Jun-15	24.36	6.64	5.9	3820	1900								
26-Aug-15	24.27	6.73											
30-Nov-15	23.98	7.02	6.2	5550	5720	110	2700	400	290	330	960	37	71
21-Mar-16	23.93	7.07											
25-May-16	23.84	7.16	6	3500	1800								
19-Aug-16	24.02	6.98											
30-Nov-16	23.89	7.11	5.2	3480	3190	15	1500	220	130	170	640	24	0.01
27-Feb-17	24.03	6.97											
01-May-17	24.33	6.67	6.3	3740	2399								
31-Aug-17	23.97	7.03											
29-Nov-17	24.24	6.76	5.9	4670	4660	28	2600	390	240	270	990	29	17
28-Feb-18	23.75	7.25											
29-May-18	24.03	6.97	6.3	7400	4750								
30-Aug-18	23.89	7.11											
30-Nov-18	23.83	7.17	5.9	5580	6920	34	3600	550	320	360	890	33	34
27-Feb-19	23.75	7.25											
31-May-19	23.80	7.20	6.1	5700	4600								
27-Aug-19	23.88	7.12											
27-Nov-19	23.88	7.12	5.9	5770	6930	57	3800	530	370	410	1100	38	18
27-Feb-20	23.70	7.30											
27-May-20	23.68	7.32	5.9	7500	3750								
24-Aug-20	23.77	7.23											
30-Nov-20	23.86	7.14	6.2	6170	6620	100	3900	540	330	360	1000	30	53

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
26-Feb-21	23.76	7.24											
31-May-21	23.83	7.17	6	7500	6000								
31-Aug-21	23.64	7.36											
30-Nov-21	23.83	7.17	6	6860	7100	48	3400	560	330	380	1000	32	0.9

Bore PD4.1 **Product Stockpile Pad**

Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
20-Sep-10	5.23	21.35	7.17	12600	8200	520	306	3950	190	298	1980	32	0.05
19-Oct-10	3.61	22.97	7.48	12800	7760	534	309	4390	188	291	2230	35	0.05
14-Jan-11	2.42	24.16	7.16	13600	8290	548	359	4110	173	276	2180	38	0.05
27-Apr-11	1.21	25.37	7.18	14800	7750	561	354	4130	178	301	2100	37	0.05
25-Jul-11	-0.06	26.64	7.15	13700	7840	522	271	4230	176	295	2210	39	0.05
26-Oct-11	2.36	24.22	7.53	13300	7760	461	387	4210	175	309	2350	43	0.05
25-Jan-12	2.46	24.12	7.61	13100	8340	502	640	4320	164	331	2240	42	0.21
27-Apr-12	14.00	12.58	6.24	2420	1890	28	1150	98	127	96	328	12	0.13
27-Jul-12	22.97	3.61	6.34	6340	1950	27	1240	56	116	97	295	14	0.2
25-Oct-12	23.98	2.60	6.54	10470	7350	244	2680	2040	198	402	1870	35	14.8
24-Jan-13	24.13	2.45	6.64	10440	7040	324	2180	2600	189	352	1880	32	9.07
22-Apr-13	22.89	3.69	6.59	10670	7700	284	1900	2600	191	384	2010	32	6.54
24-Jul-13	21.35	5.23	6.78	11170	7400	303	1810	2560	209	386	1930	35	5.32
28-Oct-13	19.88	6.70	7.09	11650	7460	353	1830	2640	192	360	1870	34	0.15
02-May-14	18.69	7.89	7.06	11300									
29-Nov-14	18.41	8.17	7.2	10800	7610	400	1800	2810	193	321	1760	25	0.05
24-Feb-15	15.93	10.65											
03-Jun-15	15.96	10.62	6.8	10760	5380								
26-Aug-15	13.18	13.40											
30-Nov-15	13.21	13.37	7.1	9200	7650	390	2000	2800	190	370	2300	39	0.04
21-Mar-16	13.31	13.27											
25-May-16	14.62	11.96	5.9	2020	1010								
19-Aug-16	14.00	12.58											
30-Nov-16	14.08	12.50	6.7	4030	3200	130	980	720	150	160	780	20	0.14
27-Feb-17	13.32	13.26											
01-May-17	13.37	13.21	7.1	2580	1638								
31-Aug-17	12.64	13.94											
29-Nov-17	12.70	13.88	6.7	4650	3660	150	1200	1000	160	180	930	21	0.07
28-Feb-18	11.81	14.77											
29-May-18	11.87	14.71	6.7	10500	6690								
30-Aug-18	10.43	16.15											

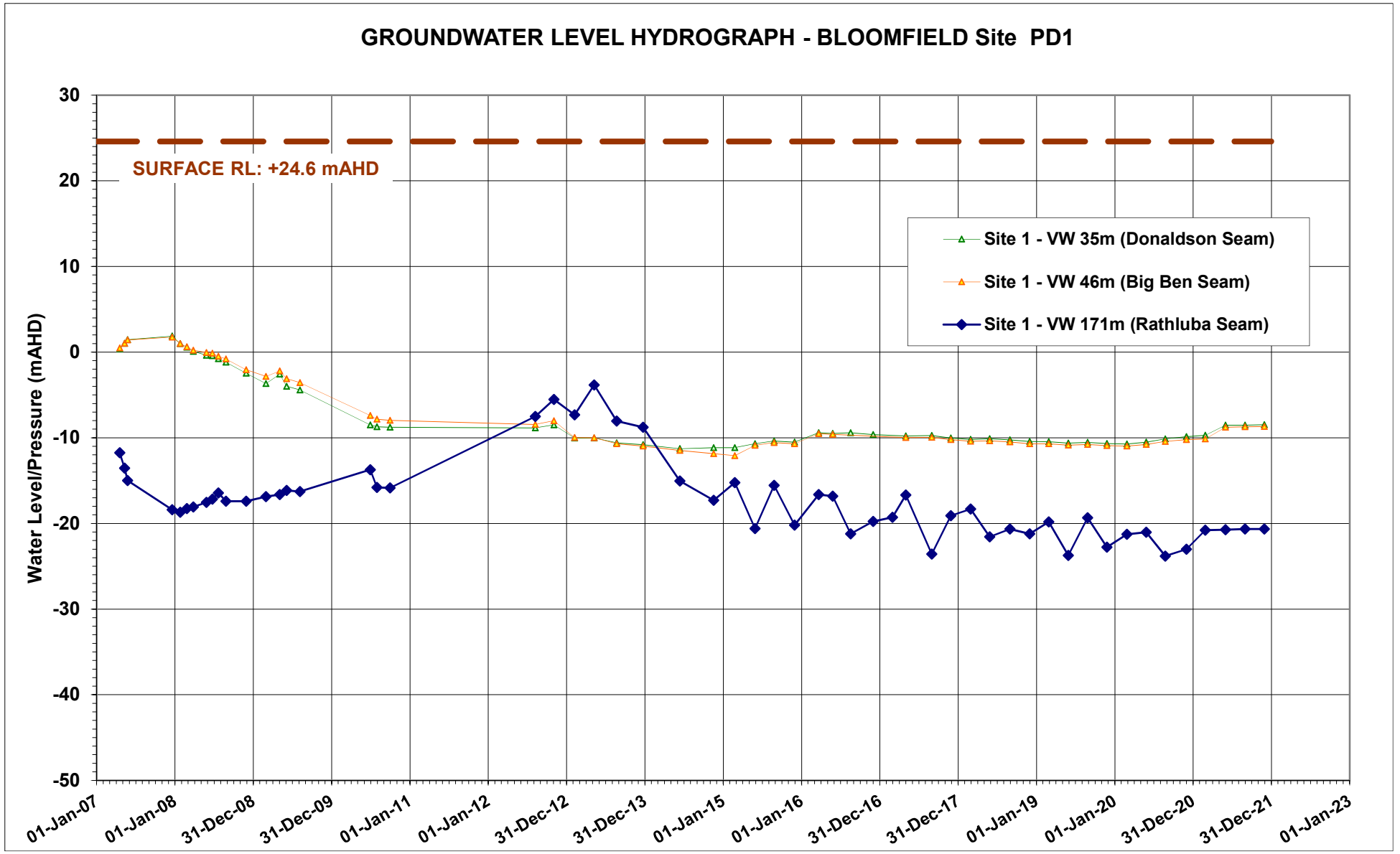
Bore PD4.2 **Product Stockpile Pad**

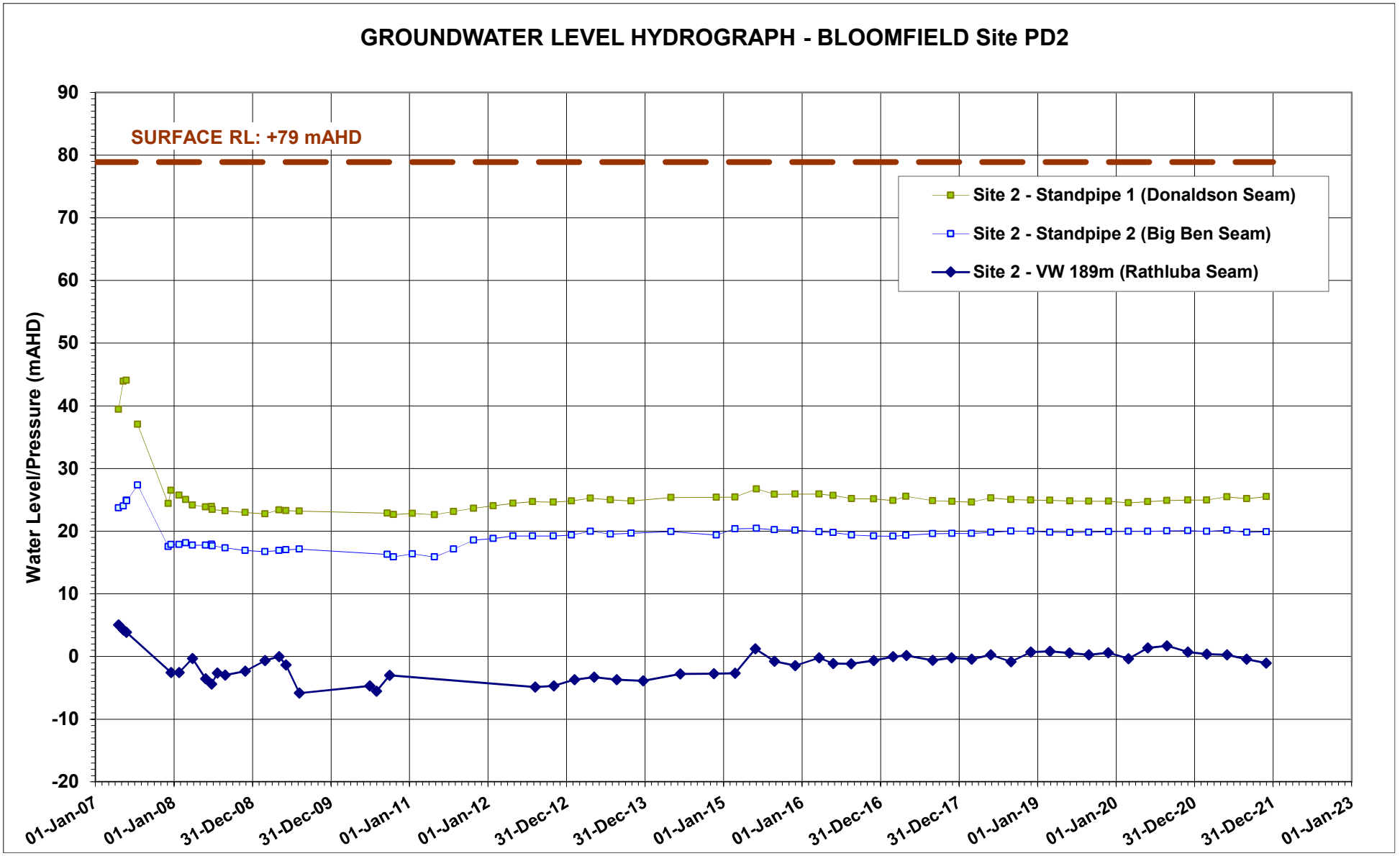
Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
20-Sep-10	24.30	2.69	5.63	8390	7870	69	3900	1150	123	424	1500	30	19.5
19-Oct-10	24.24	2.75	5.59	9060	8630	73	4870	438	163	527	1700	34	45
14-Jan-11	24.31	2.68	5.4	9970	8880	55	5740	462	134	492	1790	37	36.8
27-Apr-11	24.33	2.66	5.36	10800	8770	45	5470	398	147	531	1690	37	33
25-Jul-11	24.99	2	4.32	9440	5990	1	4670	364	179	510	1540	37	0.87
26-Oct-11	24.96	2.03	5.72	8220	4600	24	4550	358	261	520	1330	34	57.1
25-Jan-12	24.80	2.19	5.63	7610	8550	7	4370	277	195	482	1180	31	50.6
27-Apr-12	24.89	2.10	5.35	5890	5710	1	3210	230	168	366	930	26	63.3
27-Jul-12	25.19	1.80	5.44	5440	6400	12	4260	238	182	415	1030	29	44.1
25-Oct-12	24.46	2.53	3.82	7210	6780	1	4580	245	286	489	1110	31	65.4
24-Jan-13	24.48	2.51	5.67	6760	5960	26	4940	176	298	465	1060	27	71
22-Apr-13	24.98	2.01	5.16	6180	6430	22	4500	156	272	465	1030	26	89.2
24-Jul-13	24.80	2.19	5.41	7160	6940	26	4410	184	351	475	1010	26	79.4
28-Oct-13	24.34	2.65	5.7	7650	7390	1	4370	229	326	474	1050	26	77.5
02-May-14	24.99	2.00	5.75	7100									
29-Nov-14	24.91	2.08	4.2	7300	7260	5	4600	338	410	403	958	21	16.5
24-Feb-15	25.24	1.75											
03-Jun-15	25.28	1.71	5.5	7780	3870								
26-Aug-15	25.26	1.73											
30-Nov-15	25.29	1.70	5.9	5930	7310	49	4400	270	360	400	1100	31	50
21-Mar-16	25.41	1.58											
25-May-16	25.39	1.60	5.5	6200	3400								
19-Aug-16	25.38	1.61											
30-Nov-16	25.26	1.73	5.5	5730	6640	25	3900	230	360	360	1000	25	0.06
27-Feb-17	25.40	1.59											
01-May-17	25.41	1.58	6.6	5740	3681								
31-Aug-17	24.88	2.11											
29-Nov-17	25.02	1.97	6.2	5910	7420	49	4500	220	440	390	1200	26	36
28-Feb-18	24.78	2.21											
29-May-18	24.81	2.18	6.1	7360	4720								
30-Aug-18	25.00	1.99											
30-Nov-18	25.10	1.89	6	6040	9970	47	5900	130	490	530	990	24	140
27-Feb-19	24.79	2.20											
31-May-19	25.12	1.87	6.5	5600	4000								
27-Aug-19	24.95	2.04											
27-Nov-19	24.89	2.10	3.5	7080	9720	30	6600	110	480	680	1100	28	110
27-Feb-20	25.23	1.76											
27-May-20	25.22	1.77	3.8	9000	4500								
24-Aug-20	25.19	1.80											
30-Nov-20	25.19	1.80	5.1	7030	11200	30	7400	87	370	710	760	20	670

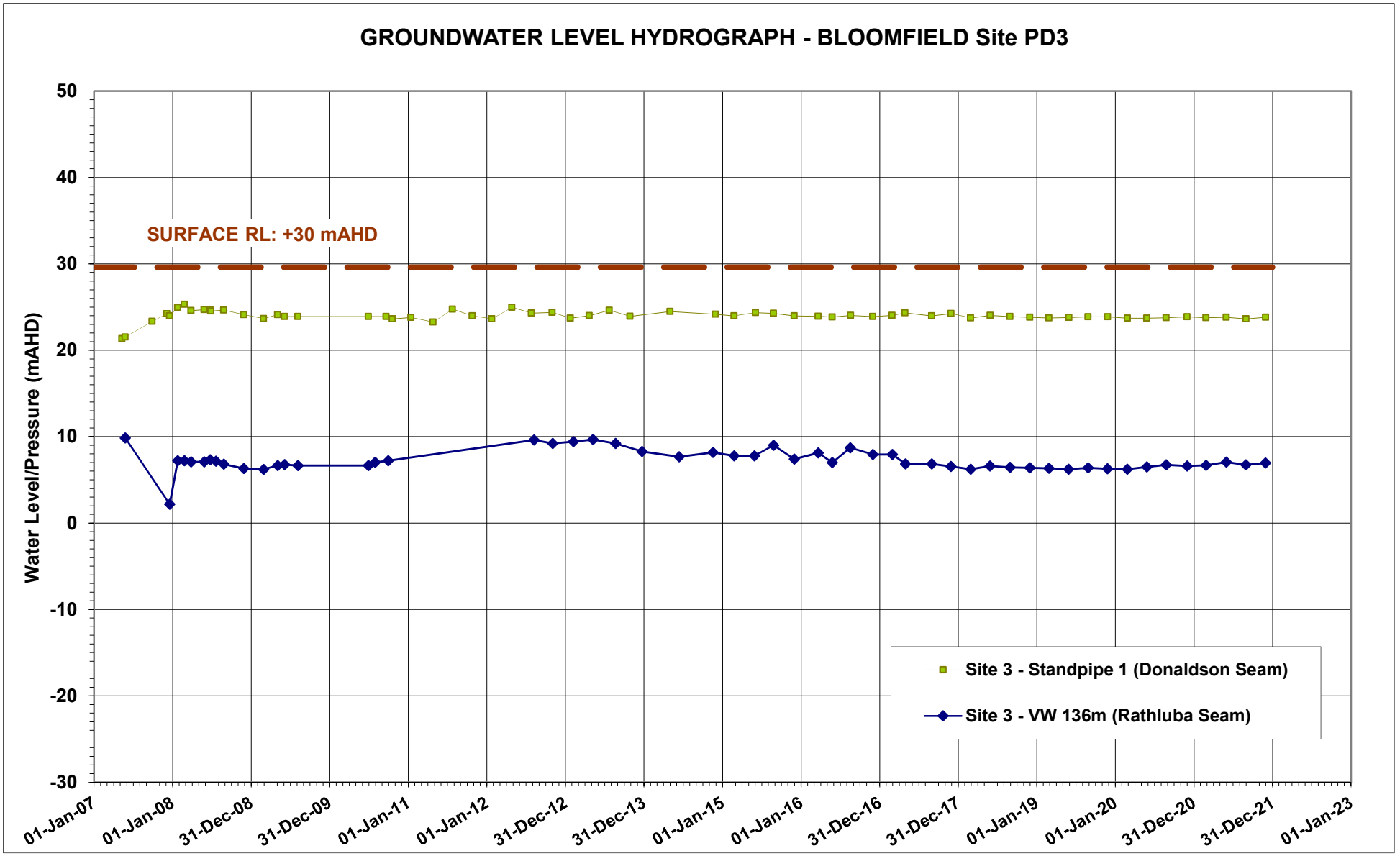
Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)
26-Feb-21	25.41	1.58											
31-May-21	25.12	1.87	5.5	8000	6400								
31-Aug-21	25.13	1.86											
30-Nov-21	25.34	1.65	4.8	7040	10200	30	5900	84	390	660	750	19	560

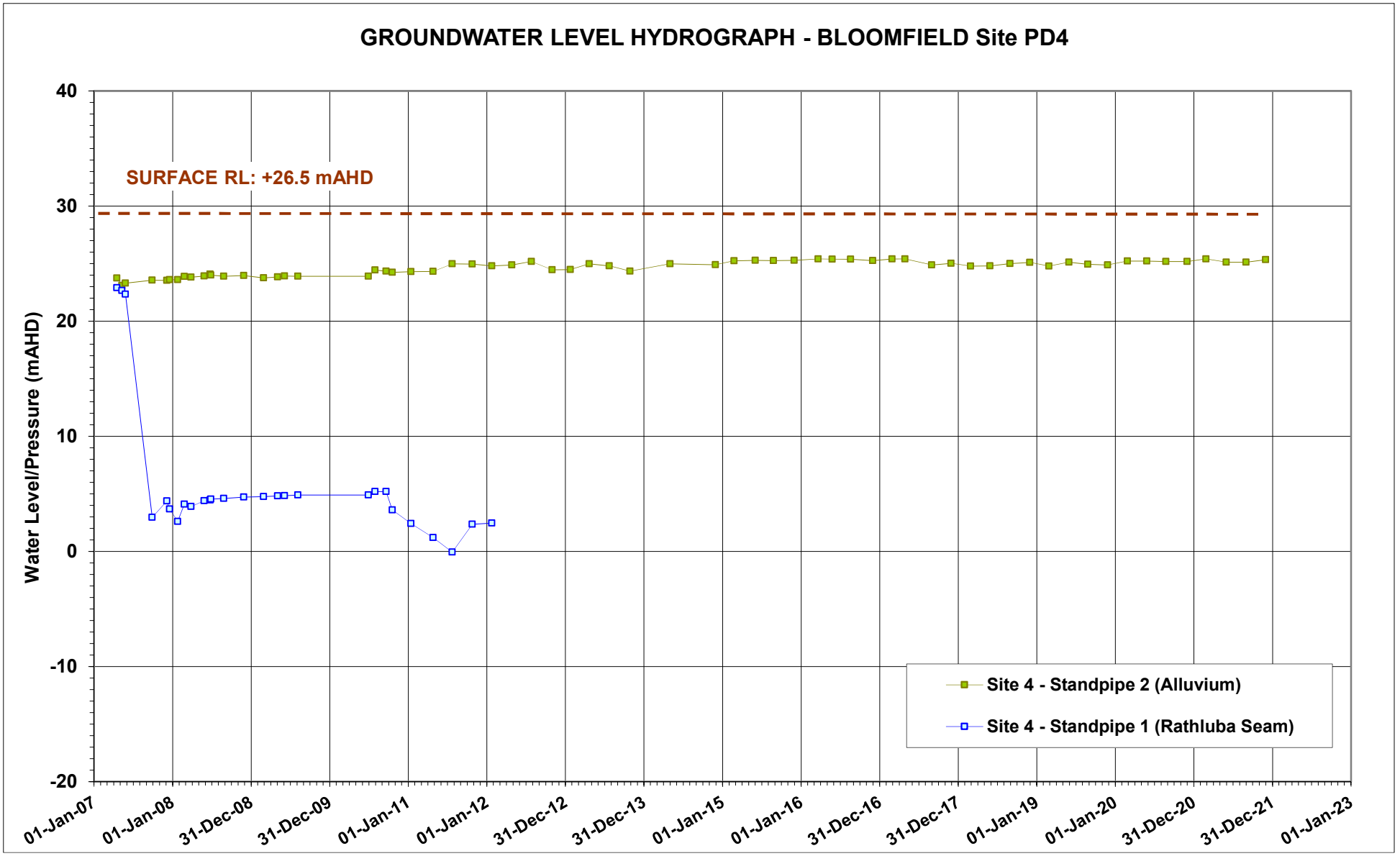
Bore PD7.1 **South Cut Boundary**

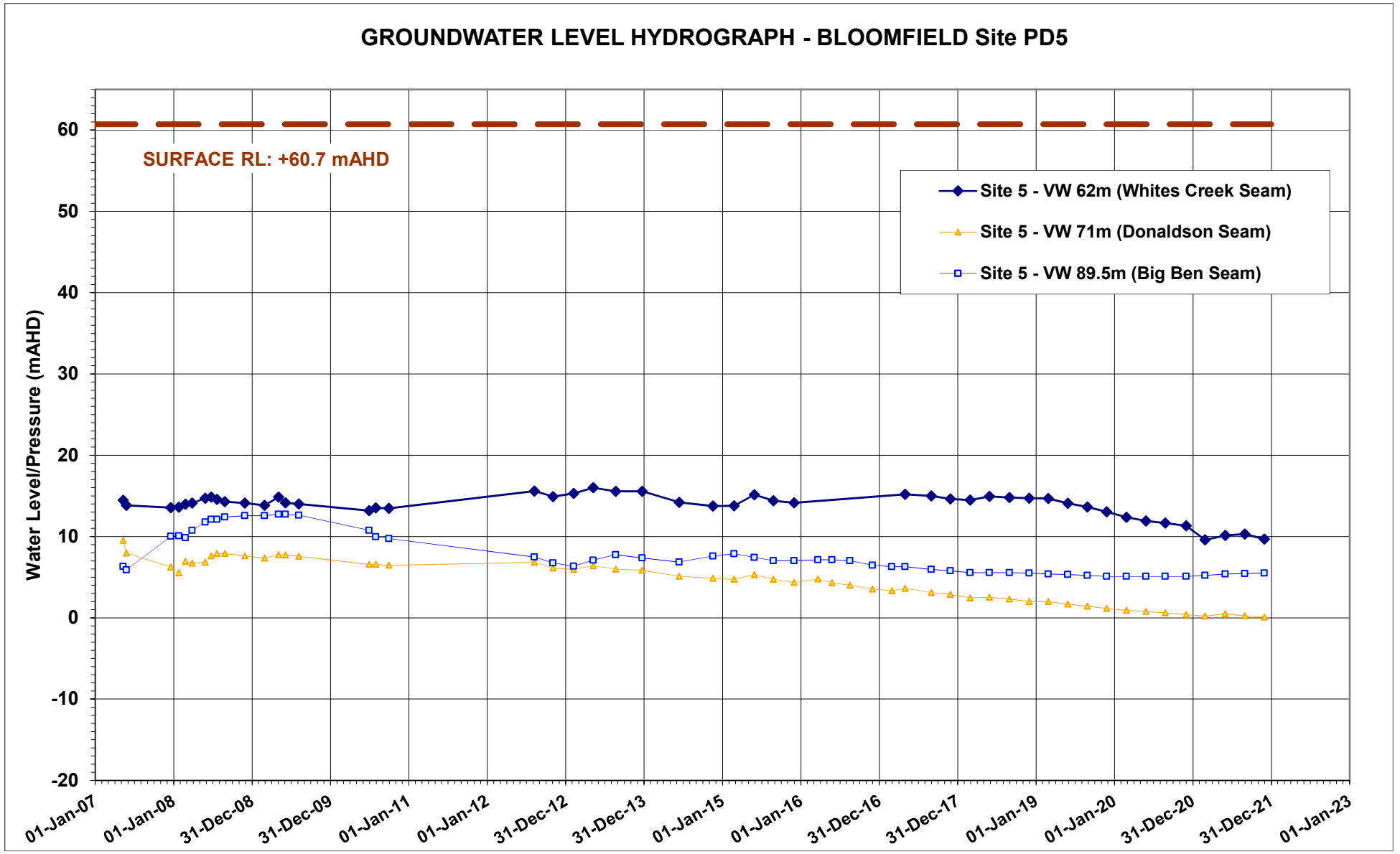
Date	RL	Depth (m)	pH	EC (uS/cm)	TDS (mg/L)	Alkalinity (mg/L)	Sulphate (mg/L)	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Iron (mg/L)	Comments
20-Sep-10	17.13	10.37	6.71	4620										
19-Oct-10	16.94	10.56	6.57	4760	2640	418	477	1020	160	124	731	14	8.66	
14-Jan-11	16.78	10.72												No access
27-Apr-11														No access
25-Jul-11														No access
26-Oct-11														No access
25-Jan-12	17.65	9.85	6.67	3020	1720	508	99	693	73	69	455	14	0.74	
27-Apr-12	19.08	8.42	5.71	2670	1850	30	434	571	75	77	408	11	13.9	
27-Jul-12	20.14	7.36	4.84	4840	1540	2	290	741	40	58	415	10	22.7	
31-Oct-12	17.48	10.02	6.44	3560	2340	211	507	848	132	110	587	14	32	
24-Jan-13	17.11	10.39	6.86	3620	2340	234	559	756	125	104	557	14	13.4	
22-Apr-13	19.52	7.98	5.15	1754	1210	7	243	446	25	36	340	7	0.27	
24-Jul-13	17.96	9.54	6.18	2220	1240	74	289	475	45	46	376	9	1.91	
28-Oct-13	17.31	10.19	6.32	7120	4680	95	444	1810	208	217	904	21	28.1	
02-May-14	17.36	10.14	5.87	12000										
29-Nov-14	17.05	10.45	6.5	8650	6420	187	562	2870	237	270	1130	19	31.3	
24-Feb-15	16.80	10.70												
03-Jun-15	16.95	10.55	6.1	6990	3480									
26-Aug-15	16.33	11.17												
30-Nov-15														Dry
21-Mar-16														Dry
25-May-16														Dry
19-Aug-16														Dry
30-Nov-16														Dry
27-Feb-17														Dry
01-May-17														Dry
31-Aug-17														Dry
29-Nov-17														Dry

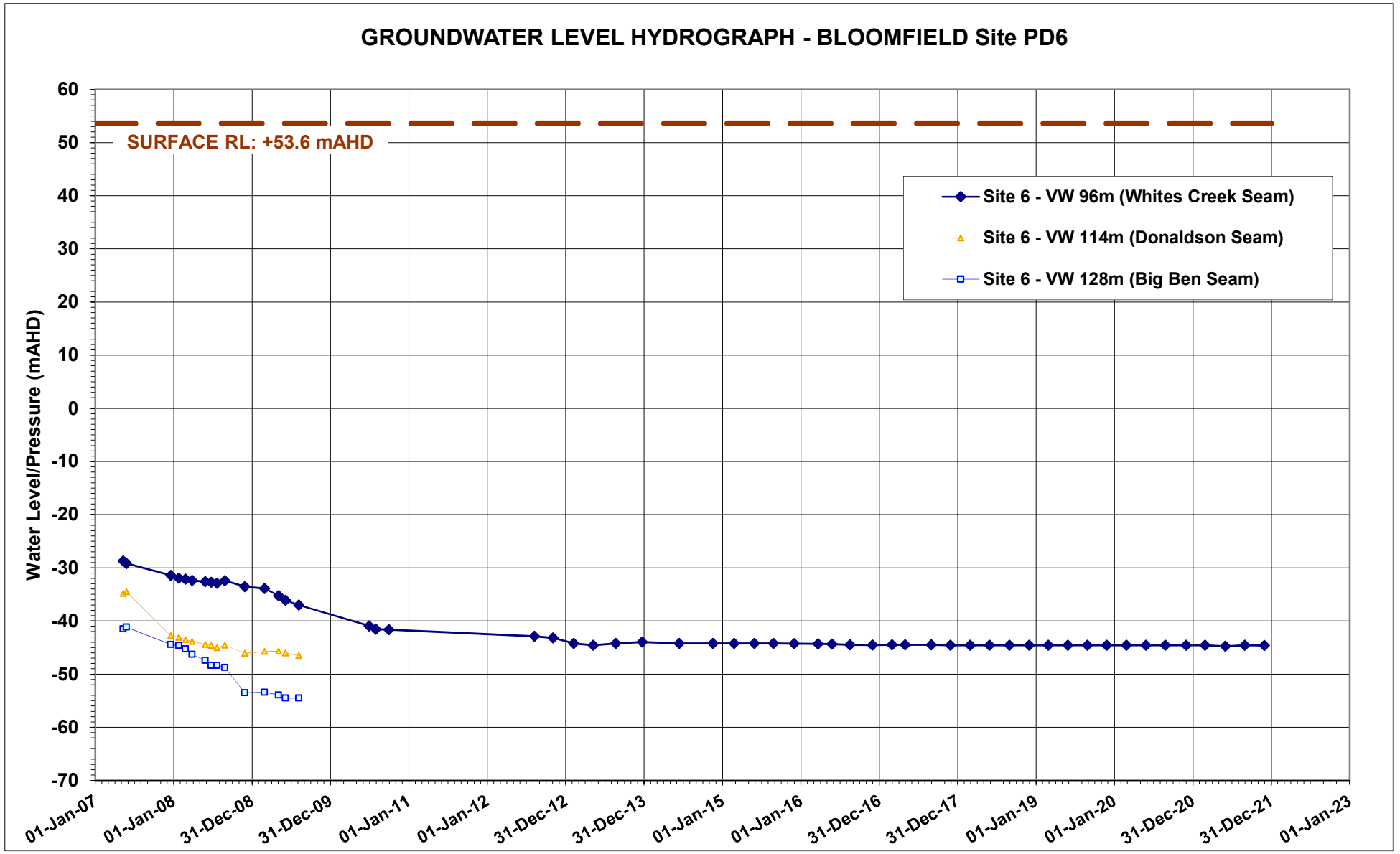

GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD1
SURFACE RL: +24.6 mAHD
Site 1 - VW 35m (Donaldson Seam)
Site 1 - VW 46m (Big Ben Seam)
Site 1 - VW 171m (Rathluba Seam)
Water Level/Pressure (mAHD)
30
20
10
0
-10
-20
-30
-40
-50
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23

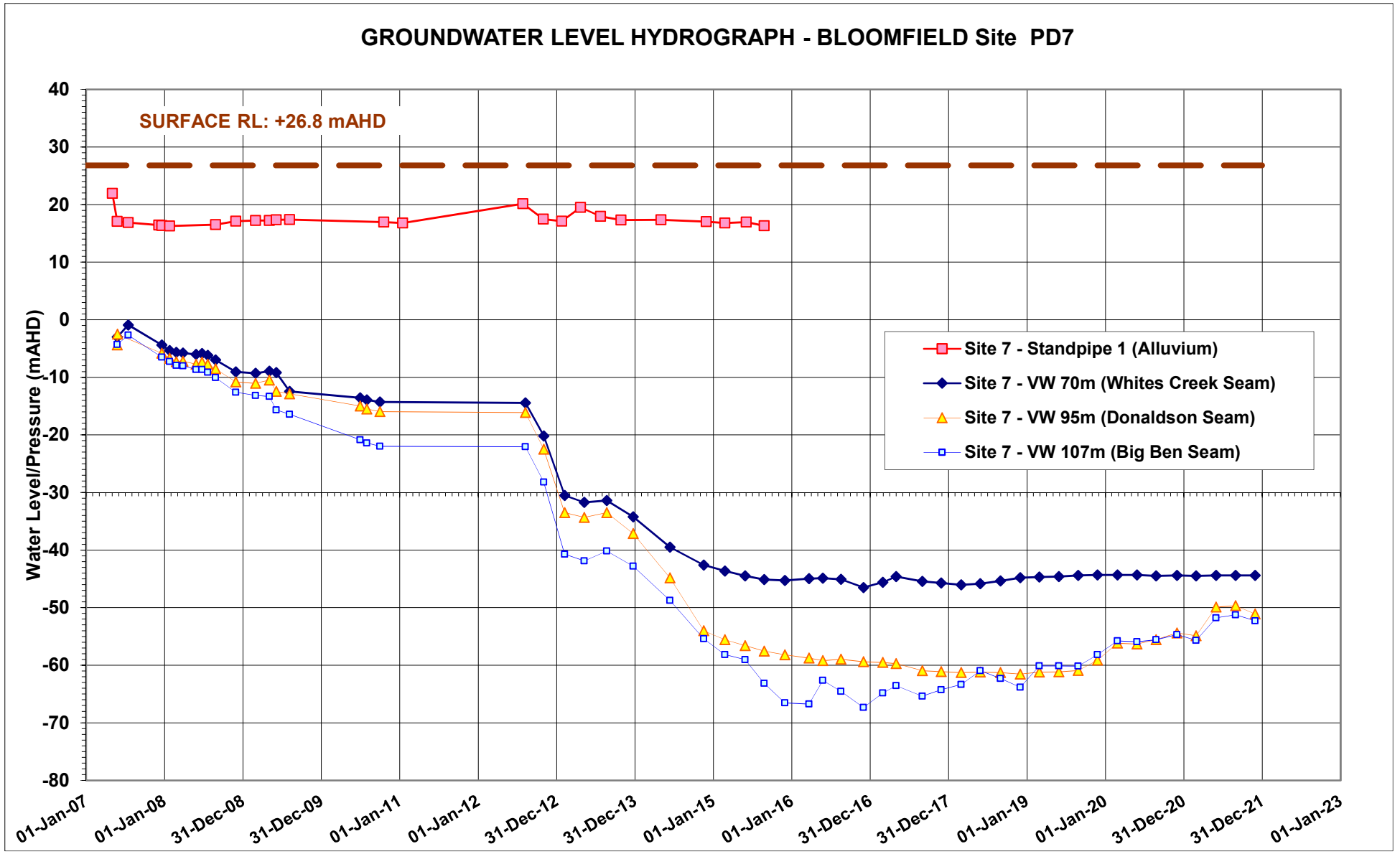

GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD2
SURFACE RL: +79 mAHD
Site 2 - Standpipe 1 (Donaldson Seam)
Site 2 - Standpipe 2 (Big Ben Seam)
Site 2 - VW 189m (Rathluba Seam)
Water Level/Pressure (mAHD)
90
80
70
60
50
40
30
20
10
0
-10
-20
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23

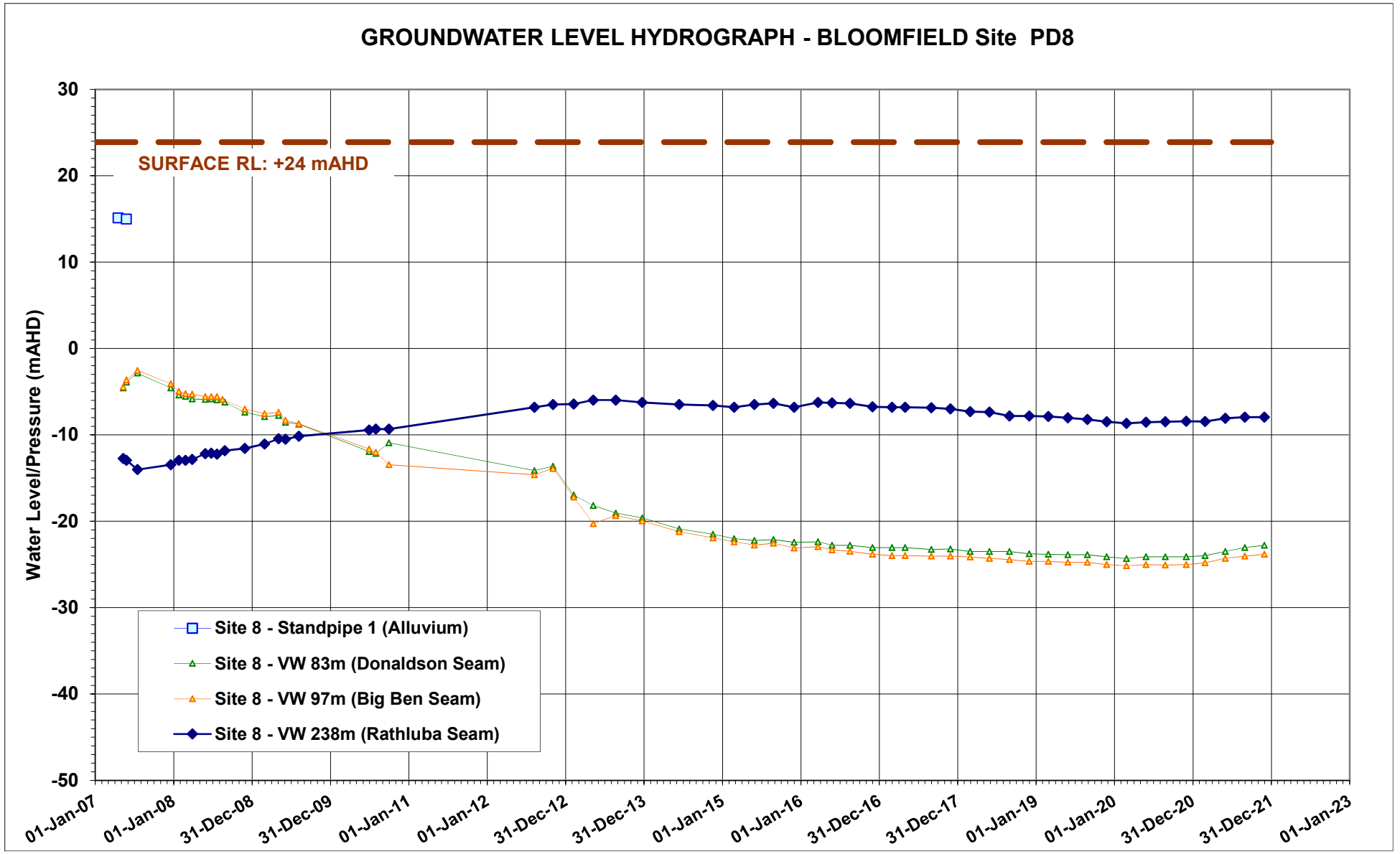

GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD3
SURFACE RL: +30 mAHD
Water Level/Pressure (mAHD)
50
40
30
20
10
0
-10
-20
-30
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23
Site 3 - Standpipe 1 (Donaldson Seam)
Site 3 - VW 136m (Rathluba Seam)


GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD4
SURFACE RL: +26.5 mAHD
Water Level/Pressure (mAHD)
40
30
20
10
0
-10
-20
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23
Site 4 - Standpipe 2 (Alluvium)
Site 4 - Standpipe 1 (Rathluba Seam)


GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD5
SURFACE RL: +60.7 mAHD
Site 5 - VW 62m (Whites Creek Seam)
Site 5 - VW 71m (Donaldson Seam)
Site 5 - VW 89.5m (Big Ben Seam)
Water Level/Pressure (mAHD)
60
50
40
30
20
10
0
-10
-20
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23


GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD6
SURFACE RL: +53.6 mAHD
Site 6 - VW 96m (Whites Creek Seam)
Site 6 - VW 114m (Donaldson Seam)
Site 6 - VW 128m (Big Ben Seam)
Water Level/Pressure (mAHD)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23


GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD7
SURFACE RL: +26.8 mAHD
Water Level/Pressure (mAHD)
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23
Site 7 - Standpipe 1 (Alluvium)
Site 7 - VW 70m (Whites Creek Seam)
Site 7 - VW 95m (Donaldson Seam)
Site 7 - VW 107m (Big Ben Seam)


GROUNDWATER LEVEL HYDROGRAPH - BLOOMFIELD Site PD8
SURFACE RL: +24 mAHD
Water Level/Pressure (mAHD)
30
20
10
0
-10
-20
-30
-40
-50
01-Jan-07
01-Jan-08
31-Dec-08
31-Dec-09
01-Jan-11
01-Jan-12
31-Dec-12
31-Dec-13
01-Jan-15
01-Jan-16
31-Dec-16
31-Dec-17
01-Jan-19
01-Jan-20
31-Dec-20
31-Dec-21
01-Jan-23
Site 8 - Standpipe 1 (Alluvium)
Site 8 - VW 83m (Donaldson Seam)
Site 8 - VW 97m (Big Ben Seam)
Site 8 - VW 238m (Rathluba Seam)

APPENDIX E

COMPLAINTS REGISTER

BLOOMFIELD COLLIERY

COMPLAINTS REGISTER

2021

No.	About *	Time/Date	Location	Details	Action Taken / Findings
21_01	N	9/2/21 11:11pm	Ashtonfield	Complaint via 'Hotline'. Complaint about noise at CHPP on night shift 9/2/21.	Mine Manager attempted to ring complainant on four occasions on 10/2/21 to discuss noise complaint. No message bank available.
21_02	N	9/2/21 11:24pm	Ashtonfield	Complaint via 'Hotline'. Complaint about noise at CHPP on night shift 9/2/21.	Mine Manager rang complainant on morning of 10/2/21 to discuss noise complaint. Night shift scheduled for the 10/2/21 cancelled due to unfavourable meteorological conditions.
21_03	N	11/5/21 1:43pm	Louth Park	Complaint via EPA received on 11/5/21. Complaint from Louth Park resident about noise from mining operations on night shift 5/5/21.	Environmental Advisor rang complainant on 11/5/21 and emailed the EPA on 13/5/21. Explained that noise model used to determine potential impacts and noise monitoring will be conducted at night if considered necessary. The noise model on 5/5/21 showed some minor enhancement in Louth Park but was low risk.
21_04	N	21/5/21 1:31pm	Ashtonfield	Complaint via email to Environmental Advisor. Complained about noise at CHPP during night shift on 18, 19 and 20/5/21.	Maine Manager rang complainant on 24/5/21. Explained that the noise model is used to determine potential impacts and noise monitoring is also conducted at night if considered necessary. The CHPP does not work of a night in southerly winds and uses predictive noise model when winds are favourable. As long as monitoring indicates operations within noise limits then operations will continue as scheduled.

21_05	N	29/10/21 6:51pm	Ashtonfield	Complaint via 'Hotline'. Complaint about noise from CHPP at end of night shift at 6 am on 29/10/21.	Environmental Advisor rang complainant at 8:15am on 29/10/21. Complainant said they have been there 3 years and noise is not normally an issue, however this morning seemed louder than normal. Environmental Advisor explained that the CHPP only operates one week a month on average, and only works overnight depending on the weather. Next week is scheduled to operate from Monday to Friday from 6 am to 6 pm.

*** D = Dust, N = Noise, B = Blasting, V = Visual, L = Lighting, W = Weeds, O = Other**

APPENDIX F

INCIDENT REPORTS

THE Bloomfield GROUP
WE CARE. WE DELIVER.

PO Box 4
East Maitland NSW 2323

Four Mile Creek Road
Ashtonfield NSW 2323
AUSTRALIA

TEL + 61 2 4930 2600
FAX + 61 2 4933 8940

ABN 76 000 106 972

02 March 2021

REF: 1204_EGOVB:CK
CC: NSW EPA, NSW Resources Regulator, Maitland Council.
Submitted via email and NSW Major Project Portal.

Department of Planning, Industry and Environment
4 Parramatta Square,
12 Darcy Street
PARRAMATTA NSW 2124
Attn.: Ann Hagerthy- Senior Compliance Officer.

RE: Incident Report: Train Loader Dam Bloomfield Colliery. Bloomfield Site MP 05_0136
EPA incident No.: C02606-2021

Dear Ann,

In accordance with Sch.6 Condition 7 of PA 05_0136- "Bloomfield Site", please receive this report, provided to the best of our knowledge, in relation to the alleged incident which occurred on 23 February 2021 and which was subsequently notified to the Department, NSW EPA, Resources Regulator and Maitland Council.

Background.

On Tuesday 23 February a site inspection was undertaken at Bloomfield Colliery by NSW Department of Planning Industry and Environment (DPIE), compliance officers Heidi Watters and Ann Hagerthy. Chris Knight and Greg Lamb from Bloomfield Collieries accompanied the DPIE officers.

Following the inspection it was noted via email by Officer Ann Hagerthy that:

"…. the small dams to the east and west of the road near the rail loadout facility (RLF), that were excavated on the low point to discharge to Four Mile Creek. They appeared to be receiving coal contact water from the RLF and conveyor area. The eastern dam was observed to be slowly overflowing at the time of the inspection, and both showed evidence of having overflowed in the past." (source email dated 26/2/2021).

Request for information:

The following sections are in response to the request for information received on Friday 26/2/2021 which comprise the incident report.

1. ***"Cause, Time and Duration of Event;"***

   The incident was observed at about 11:40am on Tuesday 23 February 2021.

   The cause of the event, being a small overflow of the eastern dam, was due to water entering the dam from the rail loadout area due to recent rainfall. It was raining at the time of inspection.

   The overflow of the eastern dam was blocked to prevent the opportunity for future overflows at 13:30pm on 23 February 2021. No further release of water occurred from this time.

A pump was installed on 23 February 2021 to remove the water from the eastern and western dams. This water was pumped into the sites mine dirty water system.

2. ***"Type, volume and concentration of every pollutant discharged as a result of the event;"***

Sampling of the eastern dam was undertaken at 13:20 on 23 February 2021, with the results provided in Table 1 below. As noted below no water from the eastern dam was observed flowing into Four Mile Creek at the time of inspection of the lower area which occurred on 24/02/2024.

Table 1: Eastern dam analytical results from sample obtained on 23/2/2021

Physicals	**Method**	**Units**	**East Dam 23/02/2021**
Temperature	Temp	°C	22.8
pH	APHA 4500-H B	pH Units	7.1
Electrical Conductivity	APHA 2510 B	µS/cm	1,230
Total Suspended Solids	AS3550.4	mg/L	8

Anions and Cations	**Method**	**Units**	East Dam **23/02/2021**
Chloride, Cl	EXT	mg/L	14
Sulphate, SO4	EXT	mg/L	570
Total Alkalinity#	VGT-WI/53	mg CaCO3/L	150
Sodium-Dissolved	EXT	mg/L	61
Potassium-Dissolved	EXT	mg/L	3.9
Calcium-Dissolved	EXT	mg/L	92
Magnesium-Dissolved	EXT	mg/L	56

TRH/BTEX	**Method**	**Units**	**East Dam 23/02/2021**
Benzene	EXT	µg/L	<1
Toluene	EXT	µg/L	<1
Ethylbenzene	EXT	µg/L	<1
m+p-xylene	EXT	µg/L	<2
o-xylene	EXT	µg/L	<1
Total Xylenes	EXT	µg/L	<2
Sum of BTEX	EXT	µg/L	<2
Naphthalene	EXT	µg/L	<1.0
TRH C6 - C9	EXT	µg/L	<10
TRH C6 - C10	EXT	µg/L	<10
TRH C6 - C10 less BTEX (F1)	EXT	µg/L	<10
TRH C10 - C14	EXT	µg/L	<50
TRH C15 - C28	EXT	µg/L	<100
TRH C29 - C36	EXT	µg/L	<100
TRH C10 - C36 (sum)	EXT	µg/L	<100
TRH >C10 - C16	EXT	µg/L	<50
TRH >C16 - C34	EXT	µg/L	<100
TRH >C34 - C40	EXT	µg/L	<100
TRH >C10 - C40 (sum)	EXT	µg/L	<100

Field Tests	Method	Units	East Dam 23/02/2021
Dissolved Oxygen	APHA 4500-O G	mg/L	8.8

Total Dissolved Solids	Method	Units	East Dam 23/02/2021
Total Dissolved Solids	AS3550.4	mg/L	1,010

Metals - Dissolved	Method	Units	East Dam 23/02/2021
Iron	EXT	mg/L	<0.01

Upstream and downstream sampling from the potential point of confluence below the train loader dams was undertaken on 24 February 2021. Site WM11 (or EPA ID 2) further downstream was also sampled. Locations of all sampling points are shown on Figure 1. Please note that no water from the eastern dam was observed flowing into Four Mile Creek at the time of inspection.

Table 2: Upstream, downstream and location WM11 analytical results from sample obtained on 23/2/2021

Physicals	Method	Units	Upstream 24/02/2021	Downstream 24/02/2021	WM11 24/02/2021
Temperature	Temp	°C	22.7	22.4	22.3
pH	APHA 4500-H B	pH Units	7.4	7.5	7.6
Electrical Conductivity	APHA 2510 B	µS/cm	627	1,270	2,730
Total Suspended Solids	AS3550.4	mg/L	2	3	10

Anions and Cations	Method	Units	Upstream 24/02/2021	Downstream 24/02/2021	WM11 24/02/2021
Chloride, Cl	EXT	mg/L	49	82	160
Sulphate, SO4	EXT	mg/L	140	400	1,100
Total Alkalinity#	VGT-WI/53	mg CaCO3/L	120	170	200
Sodium-Dissolved	EXT	mg/L	61	150	380
Potassium-Dissolved	EXT	mg/L	4.1	5.6	9.4
Calcium-Dissolved	EXT	mg/L	15	34	83
Magnesium-Dissolved	EXT	mg/L	18	45	110

TRH/BTEX	Method	Units	Upstream 24/02/2021	Downstream 24/02/2021	WM11 24/02/2021
Benzene	EXT	µg/L	<1	<1	<1
Toluene	EXT	µg/L	<1	<1	<1
Ethylbenzene	EXT	µg/L	<1	<1	<1
m+p-xylene	EXT	µg/L	<2	<2	<2
o-xylene	EXT	µg/L	<1	<1	<1
Total Xylenes	EXT	µg/L	<2	<2	<2
Sum of BTEX	EXT	µg/L	<2	<2	<2
Naphthalene	EXT	µg/L	<1.0	<1.0	<1.0
TRH C6 - C9	EXT	µg/L	<10	<10	<10
TRH C6 - C10	EXT	µg/L	<10	<10	<10
TRH C6 - C10 less BTEX (F1)	EXT	µg/L	<10	<10	<10
TRH C10 - C14	EXT	µg/L	<50	<50	<50
TRH C15 - C28	EXT	µg/L	<100	<100	<100
TRH C29 - C36	EXT	µg/L	<100	<100	<100
TRH C10 - C36 (sum)	EXT	µg/L	<100	<100	<100
TRH >C10 - C16	EXT	µg/L	<50	<50	<50

TRH >C16 - C34	EXT	µg/L	<100	<100	<100
TRH >C34 - C40	EXT	µg/L	<100	<100	<100
TRH >C10 - C40 (sum)	EXT	µg/L	<100	<100	<100

Total Dissolved Solids	Method	Units	Upstream 24/02/2021	Downstream 24/02/2021	WM11 24/02/2021
Total Dissolved Solids	AS3550.4	mg/L	393	888	2,220

Metals - Dissolved	Method	Units	Upstream 24/02/2021	Downstream 24/02/2021	WM11 24/02/2021
Iron	EXT	mg/L	0.49	0.31	0.1

Figure 1. Plan showing sediment dam, Licenced discharge point (EPA ID1) and sampling locations in relation to Project Approval, EPL and Mining Tenements.

LEGEND

0 — 1 km

- ML 1738
- AMA 1001
- EPL 396
- Abel Mine Project Area
- Water Sampling

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Bloomfield Colliery

Plan 1

Date: February 2021
Photo: January 2021

Drawing: A3

3. ***"Actions taken in relation to the event;"***

- ✓ Sampling of eastern and western rail loader dam by Greg Lamb for the following analytes; pH, Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids, cations and anions, Filterable Iron, Total recoverable Hydrocarbons and BTEX. Completed 13:20 pm on 23/02/2021.

- ✓ Infill of Eastern Dam spillway to prevent further flow from dam. Completed 13:30 pm on 23/02/2021.

- ✓ Installation of pumps at east and west dam. Completed 23/02/2021. Water pumped to mine water system. (Overland dam).

- ✓ Notification of incident to DPIE, NSW EPA, Resources Regulator and Maitland Council on 23 February 2021. Activation of the Pollution Incident Response Management Plan in accordance with EPL 396. (All completed prior to 16:30, 23 February 2021).

- ✓ Sampling upstream and downstream of potential confluence of eastern dam. A sample was also taken from WM11- behind the Four Mile Pty Limited workshop on Four Mile Creek. (note WM11 is the EPA monitoring point under licence 396). Completed 8am 24 February 2021. (This was also completed on 25 and 26 February 2021).

- ✓ Inspection below eastern dam to determine extent of flow. Completed 14:00 on 24 February 2021.

- ✓ Engaged GHD to review train loadout area to determine the rain event that would cause overtopping of each dam. (1 March 2021).

4. ***"How far did the 23 February overtopping event travel along the drainage lines. Did the flow reach Four Mile Creek. Did the flow travel offsite."***

An inspection was undertaken on the 24 February 2021 at around 14:00 by Mr Chris Knight of the drainage line below the eastern dam. There was no evidence of flow at the time of inspection. There was no evidence of any material harm to the environment. Immediately below the previous dam spillway the flow channel ceased and a thick sodden accumulation of leaf matter and plant debris was noted. (Figure 2). The extent of this sodden material was about 40 metres below the previous dam spillway which was about 40 metres away from the bank of Four Mile Creek. (Figure 3) No flow of water was observed to enter Four Mile Creek from the eastern dam at the time of inspection, and there was no evidence that water from the eastern dam had recently done so.

Figure 2: Extent of observable flow path below previous spillway. Note thick accumulation of leaf and plant material.

Figure 3: Panoramic photograph of the location of the extent of "sodden" leaf material below eastern dam.

5. ***"The capacity of each dam, the area draining to each dam, and the rain event that would cause overtopping of each dam."***

The catchment for each dam has been calculated as follows;

- Catchment East Dam: 9,000 m2 (0.9 Ha).
- Catchment West Dam: 20,100 m2 (2.1 Ha).

It should be noted that there are a number of small sediment dams above the eastern and western dams which all report to either the eastern or western dams as final. (ie the individual smaller dams do not discharge offsite).

- The Eastern Dam has a nominal capacity of 0.52 ML
- The Western dam has a nominal capacity of 0.41 ML

Bloomfield Collieries have engaged GHD to undertake an assessment to determine what rainfall event would cause passive release of water from the eastern and western dam. A copy of the report will be provided to the Department on Wednesday 10 March 2021.

6. ***"When (or estimate if unknown) each dam most recently overtopped."***

Bloomfield Collieries is not specifically aware of any previous "overtopping" of the dams. Visual evidence of previous water flow, ie erosion flow path is noted below the overflow points on both dams. It is also noted that recent works have been undertaken by personnel to clean out the eastern dam overflow. Bloomfield Collieries is committed to resolve the issue by stopping any further flow from the dams and will commission a water specialist to undertake a review of their design in accordance with *"Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries" (*Department of Environment and Climate Change 2008).

Rainfall information for the month of February 2021 up to the event is provided in Table 3. Please note that there were four (4) licenced discharge events which occurred prior to the 23 February 2021.

Table 3

Bloomfield Meteorological Station - Rainfall till 9am.

Date	Time	TOTAL Rain (mm)	*TOTAL Evaporation (mm)	**Licenced Discharge Event
1/02/2021	9:00:00	0.2	2.3	
2/02/2021	9:00:00	11.6	4.5	Discharge 10 ML
3/02/2021	9:00:00	0	3.3	
4/02/2021	9:00:00	0	3.5	
5/02/2021	9:00:00	0	4.9	
6/02/2021	9:00:00	0	5.5	
7/02/2021	9:00:00	8	1.1	
8/02/2021	9:00:00	0	4.7	
9/02/2021	9:00:00	0	4.2	
10/02/2021	9:00:00	2.4	4.4	
11/02/2021	9:00:00	0	2.4	
12/02/2021	9:00:00	0	5.0	
13/02/2021	9:00:00	4.6	4.1	
14/02/2021	9:00:00	19.6	1.0	
15/02/2021	9:00:00	0	4.2	
16/02/2021	9:00:00	15.2	2.9	
17/02/2021	9:00:00	16	3.2	Discharge 30 ML
18/02/2021	9:00:00	0.4	3.3	Discharge 20 ML
19/02/2021	9:00:00	19.6	2.7	Discharge 10 ML
20/02/2021	9:00:00	1.8	2.2	
21/02/2021	9:00:00	2.8	2.7	
22/02/2021	9:00:00	2.8	3.7	
23/02/2021	9:00:00	0	4.2	
24/02/2021	9:00:00	7.2	-	

*Total Evaporation data sourced from Bloomfield Meteorological station.

**Licenced discharge event under EPL 396 from EPA ID 1 Licenced discharge point.

7. ***"How far along the drainage lines from the dams would previous overtopping events have travelled. Would it have reached Four Mile Creek, and/or off site. Include photos of area of estimated full extent of flow."***

Bloomfield Collieries is not specifically aware of any previous "overtopping" of the dam. Visual evidence of previous water flow, ie erosion flow path is noted below the overflow points on both dams. The extent of the flow from previous overtopping events that may have occurred is also unknown.

Please see Figure 3 noting location of the extent of sodden ground below the eastern dam as observed on 24 February 2021. No detriment to the vegetation was noted at the time of inspection.

8. ***"Details (including dates) of any maintenance undertaken on each dam, including desilting, pumping down".***

The eastern dam was cleaned out during January 2021. These works included removal of silt from the dam and clean out of the dam overflow. Dams have been desilted as part of routine maintenance however specific dates are not recorded.

9. ***"The Date (or estimate if unknown) when each dam was constructed."***

The Eastern and Western dams were constructed at the same time as the Rail Loader during late 1991 / 1992. Please see below extract from air photo image from 1992 noting constructed dams.

Figure 4 : 1992 Aerial image showing newly constructed Eastern and Western Dams.

10. ***"Details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event."***

- ✓ Immediate prevention of passive release from Eastern and Western dam. Water from Rail Loadout Area is now captured and pumped into the current dirty mine water system.
- ✓ Medium term the dam will be bypassed with flow directed to the overland dam with bunding installed to prevent offsite release.
- ✓ Undertake a review of the catchment and dam sizing in accordance with *"Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries" (*Department of Environment and Climate Change 2008).
- ✓ The previous stockpile areas around the train loadout will be rehabilitated. All carbonaceous material will be removed and the area will be grassed. (Figure 5).

Figure 5 : Areas to be rehabilitated around train Loadout Area

- ***"A figure showing all surrounding drainage lines and the approval and EPL boundaries."***

Figure 6:

LEGEND

0 — 1 km

- ML 1738
- AMA 1001
- EPL 396
- Abel Mine Project Area
- Water Sampling

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Bloomfield Colliery

Plan 1

Date: February 2021
Photo: January 2021

Drawing: A3

For Consideration

At the time of inspection on 23 February the flow from the Eastern Dam was estimated to be around 10- 20 litres per minute. The extent of flow was not observed to enter Four Mile Creek. At the time of inspection the Western dam was not overflowing.

Both the Eastern and Western Dams were constructed as sediment dams in 1991 / 1992.

EPL 396 allows for discharge to surrounding waters at Four Mile Creek via EPA ID 1 Licenced discharge point to a limit of pH 6.5 – 8.5, EC limit 6000 µS/cm , TSS of 30 (mg/L) and Filterable Iron 1.0 milligrams per litre mg/L. The result from the eastern dam was significantly less than the EPL criteria. See table 4.

Table 4. East Dam sample result versus EPL discharge criteria..

Site	pH	Electrical Conductivity	Total Suspended Solids	Iron
	pH Units	µS/cm	mg/L	mg/L
EPA ID 1 Limit (EPL 656)	6.5-8.5	6,000	30	1.0
East Dam (23/02/2021)	7.1	1,230	8	<0.01

In consideration of the incident the discharge limits for EPL 396 were not exceeded and the incident occurred during active rainfall. No detriment to the surrounding environment including vegetation was noted. There is no evidence of any material harm to the environment.

Bloomfield Colliery commits to the following;

- Review of the Bloomfield Colliery water management plan to include the Rail loadout area and the Eastern and Western Dam into the mine water management system.
- Review and calculation of catchment requirements for the train loadout area in accordance with *"Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries" (*Department of Environment and Climate Change 2008). Any works required to ensure compliance will be undertaken.
- Rehabilitation of previous coal stockpile areas at the train loadout as shown in figure 5.

If you require any further information or have any questions please do not hesitate to give me a call.

Yours sincerely

Chris Knight
Environment Manager
The Bloomfield Group - ***Celebrating over 80 years in Business***
PO Box 4, EAST MAITLAND NSW 2323
Tele: 612 6578 8824 | Fax: 02 6571 1066 | Mob: 0403 058 777
Email: cknight@bloomcoll.com.au | Website: www.bloomcoll.com.au

CC: NSW EPA, NSW Resources Regulator, Maitland Council.

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26 March 2021

The Regional Manager
NSW Environment Protection Authority
PO Box 488G
NEWCASTLE NSW 2300

Dear Sir/Madam,

RE: EPA Pollution Line Reference No. C04253-2021 / EPA116704 - ref:_00D7F6iTix._5007F19rPGi:ref

This letter is submitted in compliance with EPL396 Condition R2.2 which requires that we provide written details of the notification referred to above.

Background

At 8:00 am on 20 March 2021, a Bloomfield operator was conducting a pipeline / pump inspection at the Bloomfield Colliery Coal Handling Preparation Plant (CHPP). During the inspection it was discovered that water was passively spilling to Four Mile Creek from the Overland Dam (a mine water dam) located below the Coal Stockpile area.

A diesel pump was operational at the time, however due to the rainfall intensity and runoff during the event the pump was unable to keep up with the inflow to the dam.

Mine personnel notified the Environmental Officer who notified the event to the Mine Manager.

Immediate actions undertaken by site personnel included increasing the flow rate and pump speed and ensuring that the pump fuel supply was adequate to ensure continued operations to dewater the overland dam.

The incident was reported to the EPA Pollution Line at 19:59 pm on 22/3/2021 March 2021. The verbal notification was logged and the initial Reference Number EPA 116704 issued. Subsequent notification was provided to the NSW Department of Planning, Industry and Environment-Compliance, the Resources Regulator and Maitland Council. Subsequent email advice on 23 March 2021, from NSW EPA provided incident number C04253-2021.

Passive Spill of Overland Dam

An investigation into the incident is summarised as follows:

- During the recent rainfall event of 18-24 March 2021 Bloomfield Colliery received a total of 258 mm of rain.
- Bloomfield Colliery received 153 mm of rain between 18 March and 8.00 am on 20 March 2021.
- A further 29 mm of rain was received between 8.00 am on 20 March and 8.00 am on 21 March 2021.
- A further 45 mm of rain was received between 8.00 am on 21 March and 8.00 am on 22 March 2021.
- A further 31 mm of rain was received between 8.00 am on 22 March and the end of the rain event.
- Run-off water from the CHPP is collected in the Overland Dam and is pumped back to site to be included in the raw water system and used in the Coal Handling Preparation Plant (CHPP) and for dust suppression.
- At 8:00 am on 21 March 2021 the Bloomfield operator was again conducting a pipeline / pump inspection at the CHPP. During this inspection it was observed that the water was no longer passively spilling from the dam and the pump was still in operation demonstrating that the pump had caught up with inflows and was drawing the dam down.
- On the morning of 22 March 2021 it was observed that water was again passively spilling from the overland dam. See Photo 1.

Photo 1 – Passive release from overland dam 22/3/2021 09:00

- Sampling of the Overland Dam, including samples from Four Mile Creek upstream and downstream of the Overland Dam, was conducted over several days. Sampling locations are shown on Figure 1. (WM6 - Upstream, Overland Dam and EPL ID 2 – Downstream)
- Sampling results indicate that there was no downstream deterioration in water quality. See Tables 1-3.
- On the morning of 24 March 2021 it was observed that the water was no longer passively spilling from the dam.
- The catchment area of the Overland Dam is 40 Ha.
- The dam had been pumped down prior to the rain event commencing and water level was estimated to be at 10% capacity.
- The pump had been running continuously throughout the event and has a capacity of approximately 7 ML per day. See Photo 2.
- Dam storage capacity is approximately 33 ML.
- From the time of the first spill observation it is estimated that 23.4 ML of water flowed from the Overland Dam to the environment.
- Over the same period it was estimated 1479 ML of non mine water flowed down Four Mile Creek below the Overland Dam.
- The spill volume represents approximately 1.6% of the total flow during the spill event.
- At the time of the spill a licensed water discharge to Four Mile Creek was being undertaken in accordance with EPL 396 water discharge conditions.

Photo 2 – Diesel pump installed at overland dam.

LEGEND

0 — 1 km

- ML 1738
- AMA 1001
- EPL 396
- Catchment Area
- Water Sampling

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Bloomfield Colliery

Figure 1

	Date: March 2021 Photo: January 2021	Drawing: A3

Sample Results

Water sampling was undertaken at the spill point of the Overland Dam which is representative of the water which discharged offsite. Sampling was also undertaken upstream and downstream of the dam along Four Mile Creek. The results for the water sampling is outlined in Table 1-3 and locations are shown on Figure 1.

Table 1 – 22/3/21 Sample Results

22/3/21	Upstream (WM6)	Overland Dam	Downstream (EPL ID. 2)
Total Suspended Solids (mg/L)	436	31	19
pH	6.5	4.5	6.8
EC (uS/cm)	168	1140	525
Iron (mg/L)	-	NYA	-

NYA – Not yet available

Table 2 – 23/3/21 Sample Results

23/3/21	Upstream (WM6)	Overland Dam	Downstream (EPL ID. 2)
Total Suspended Solids (mg/L)	79	41	24
pH	6.4	4.4	6.5
EC (uS/cm)	166	1400	546
Iron (mg/L)	-	NYA	-

NYA – Not yet available

Table 3 – 24/3/21 Sample Results

24/3/21	Upstream (WM6)	Downstream (EPL ID. 2)
Total Suspended Solids (mg/L)	24	34
pH	6.6	6.6
C (uS/cm)	203	497

Bloomfield Colliery holds a license in accordance with EPL 396 to discharge waters after rainfall events greater than 10mm into the Four Mile Creek watercourse from Lake Kennerson / Lake Forster Mine Water dams. The analytes in Table 1 & 2 are the pollutants listed in EPL 396 required to be tested during a licenced discharge event. It shows that the results are similar to qualities that are permitted to be discharged under EPL 396 with the exception of pH which exceeds the limit of 6.5-8.5. However, downstream results show no deterioration in pH levels.

Outcome / Follow Up

As an outcome of the investigation the following works will be implemented to reduce the risk for a repeat of the incident:

- Works have begun on rehabilitating areas within the catchment with the aim of minimising the mine water catchment of the Overland Dam.
- Bloomfield Mine will reduce the catchment size of the coal stockpile area by remediating areas no longer required for the storage of coal.
- Bloomfield Mine will immediately install an additional pipe at an upstream mine water dam that flows into the Overland Dam. During significant rainfall events an additional pump can be installed at this dam.

If you require any further information in regard to this matter please contact me at this office.

Yours faithfully
BLOOMFIELD COLLIERIES PTY LIMITED

Greg Lamb
Environmental Advisor

☎ **(02) 49302689**
✉ **glamb@bloomcoll.com.au**

Greg Lamb

From: Chris Knight
Sent: Tuesday, 23 March 2021 10:15 AM
To: 'info@epa.nsw.gov.au'; 'hunter.region@epa.nsw.gov.au'
Cc: Brad Donoghoe; Greg Lamb; Geoff Moore
Subject: RE: Bloomfield Colliery EPL 396- exceedance of TSS criteria

Dear NSW EPA,
Please receive written notification that an exceedance of discharge criteria (Total Suspended Solids) occurred during a licenced discharge event at Bloomfield Colliery – EPL 396 on 21/3/2021 and 22/3/2021.

On 21/3/2021 a decision was made to release water under a licenced discharge event however the TSS was noted at 78 mg/l above a licenced criteria of 30 mg/l. The decision to release water was made due to safety concerns of Lake Kennerson overtopping the spillway in an uncontrolled manner due to recent heavy rainfall and forecast for further heavy rain in the Hunter Region.

A decision to discharge was also made on 22/3/2021 for the same reason with TSS noted at 74 mg/l above a licenced criteria of 30 mg/l.

Upstream , EPL Point 1 and EPL Point 2 (Downstream) are presented below in Table 1.

Table 1.

21/3/21	Upstream	EPL Point 1	Downstream (EPL ID. 2)
Total Suspended Solids	436	**78**	24
pH	6.5	7.5	6.7
EC	168	1410	525

22/3/21	Upstream	EPL Point 1	Downstream (EPL ID. 2)
Total Suspended Solids	197	**74**	19
pH	6.6	7.5	6.8
EC	174	1370	525

Please advise if you require any further information on the above TSS criteria exceedances from the licenced discharge events.

Best Regards

THE Bloomfield GROUP
WE CARE. WE DELIVER.

Chris Knight
Environment Manager
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