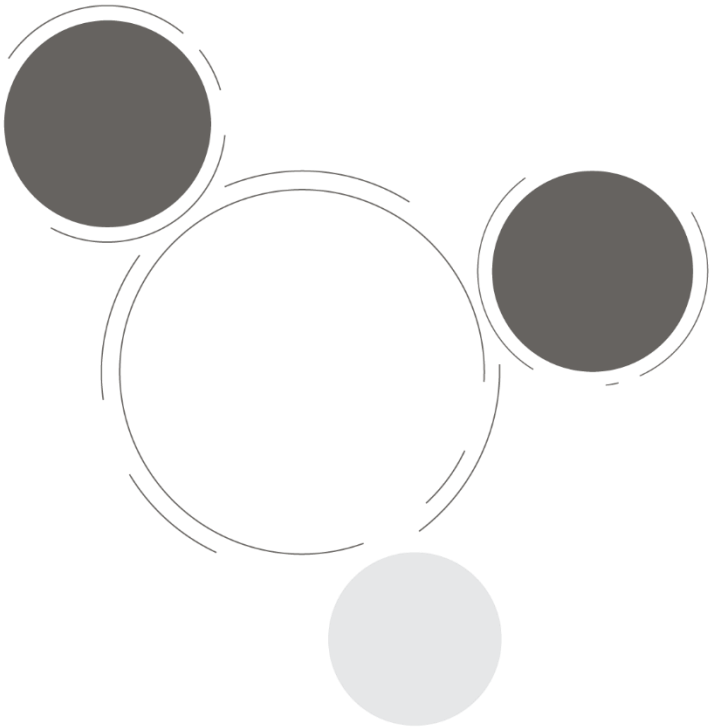
BAAL BONE UNDERGROUND

GLENCORE



Annual Review

2021

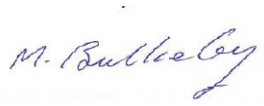
Name of Operation	Baal Bone Colliery
Name of Operator	Baal Bone Colliery
Project Approval Number	09_0178
Name of Holder of Project Approval	The Wallerawang Collieries Ltd
Mining Lease Number/s	CCL749, MPL261, CL391, ML1302, ML1389, ML1607
Name of Holder of Mining Lease/s	The Wallerawang Collieries Ltd
Water Licence Number/s	WAL27887, WAL34952, 80WA706034, 80WA706035
Name of Holder of Water Licence/s	The Wallerawang Collieries Ltd
MOP Start Date	20th December 2019
MOP End Date	31st December 2025
Annual Review Start Date	1st January 2021
Annual Review End Date	31st December 2021

I, Elizabeth Fishpool, certify that this audit report is a true and accurate record of the compliance status of Baal Bone Colliery for the period 1st January 2020 to 31st December 2020 and that I am authorised to make this statement on behalf of Baal Bone Colliery.

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	Mark Bulkeley
Title of Authorised Reporting Officer	Operations Manager
Signature of Authorised Reporting Officer	
Date	24 March 2022

Abbreviations:

ACMA – Australian Communications and Media Authority
BOD –Biochemical Oxygen Demand
CCL – Consolidated Coal Lease
CL – Coal Lease
CMRA – Coal Mines Regulation Act 1982
DPIE – Department of Planning, Industry & Environment
DPI – Department of Primary Industry
DRE - Department of Industry, Division of Resources & Energy
DRG –Department of Planning, Industry & Environment – Division of Resources and Geoscience
EC – Electrical Conductivity
EPA – Environmental Protection Authority
EPL – Environment Protection Licence
MBAS – Methylene Blue Active Substances
ML – Mining Lease
MOP – Mining Operations Plan
MPL – Mining Purposes Lease
OEH – Office of Environment and Heritage
REA - Reject Emplacement Area
TSS – Total Suspended Solids

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This report is available electronically online via the website: *Reporting documents - Baal Bone Colliery (glencore.com.au)*.

1 Statement of Compliance

Table 1.1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes/No*
PA 09_0178	No
EPL 765	No
Mining Leases	Yes
Water Licences	Yes

Table 1.2 Details of non-compliances in 2021.

Relevant Approval	Condition #	Condition description	Risk	Comment	Reference
PA 09-0178	Schedule 3, Condition 21	Groundwater Monitoring Plan	Low	Ongoing exceedance of Water Quality Trigger Level for dissolved zinc (0.175mg/L) at BBPB3.	**Section 7.2.4** and **Section 11**
PA 09-0178	Schedule 3, Condition 21	Groundwater Monitoring Plan	Administrative non-compliance	Groundwater quality analysis not carried out in accordance with schedule specified in Section 4.1.3 of the GWMP.	**Section 7.2.4** and **Section 11**
EPL 765	L2.4	Water and/or Land Concentration Limits	Low	Results received showed exceedances of dissolved iron at EPL Monitoring Point 16 during monthly sampling events in February, March and May 2021, compared to a EPL concentration limit of 1.0mg/L.	**Section 7.1.2** and **Section 11**
EPL 765	L2.4	Water and/or Land Concentration Limits	Low	Sampling conducted on the 16 March 2021 at LDP16 returned a pH result of 6.2, below the EPL minimum limit of 6.5 for pH.	**Section 7.1.2** and **Section 11**

Compliance status key for Table 1.2

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

2 Introduction

2.1 Overview

An Annual Review is prepared annually by Baal Bone Colliery (Baal Bone), to fulfil the reporting requirements of various regulatory departments. Baal Bone is operated by The Wallerawang Collieries Ltd (TWCL). The reporting period for this Annual Review is 1 January 2021 to 31 December 2021.

On 14 January 2011, Baal Bone received Project Approval (PA 09_0178) for the continuation of mining activities at Baal Bone via Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project Approval granted approval for the continuation of mining operations at Baal Bone until 14 December 2014, and included:

- continuation of underground mining of Longwalls (LW) 29-31 in accordance with the approved Subsidence Management Plan (SMP) and Mining Operations Plan (MOP);
- continued operation of associated surface infrastructure;
- saleable coal production of 2.0 Mtpa (equating to 2.8 Mtpa run of mine (ROM) coal);
- continued transport of prepared saleable coal to markets by rail, and up to 900,000 tonnes per annum (tpa) by road; and
- mining of other isolated Remnant Areas within existing workings.

Underground mining at Baal Bone ceased on 3 September 2011, with the site entering into care and maintenance.

In February 2015, then DP&E approved amendment to the Project Approval to extend the life of mine for an additional three years until 31 December 2019 to allow the Remnant Areas to be mined.

In December 2015, DP&E approved a second modification to the Project Approval to allow Ben Bullen Creek to remain in its current alignment.

On 20 December 2019, the Resources Regulator approved the Mine Closure MOP until 31 December 2025.

In January 2020 demolition of infrastructure on the Baal Bone site commenced, which included the demolition of the Coal Handling Preparation Plant (CHPP), bathhouse and workshop, as well as all coal conveyors, reclaim tunnels, transfer towers, bins, sheds and other associated ancillary infrastructure. The rail loop linking the site to the Main Western Railway line was also decommissioned and all rail lines, ballast and sleepers were removed from the corridor.

The civil works and rehabilitation component of the closure activities commenced in September 2020. The remediation of the CHPP and Run of Mine (ROM) areas and the former rail corridor was undertaken over the remaining period of 2020. Activities included the addition of topsoil, fertiliser, lime and gypsum followed by the areas being ripped. The CHPP ROM area was then seeded with a pasture seed mix and the rail loop was seeded with a woodland seed mix.

During this period, filling of voids including the Leachate Dam, REA 6 Tailings Dam, Central Void and the Southern Void was also undertaken. The filling of the REA 6 Tailings Dam was completed in December. The remaining voids will continue to be filled throughout the 2021 reporting

period. Once filled the voids will be topsoiled and then ameliorated in a similar fashion to the rail loop prior to being seeded with a woodland seed mix.

During 2021, the filing of the Southern Void and Leachate Dam were completed. The administration and workshop buildings were demolished in October 2021. Over 42 ha of land was shaped to final landform, ameliorated and seeded – including areas of the Northern rehabilitation domain and the Southern void domain.

During 2021 rehabilitation works were completed on sections of Ben Bullen Creek where it passes through the site. Remediation works included large amounts of rock revetment along the banks of the creek (Reach 2), the installation of high and low flow channels, and highwall safety and stabilisation work. Over 10,000 tubestock plants, including the threatened Capertee Stringybark were planted along the remediated sections of Ben Bullen Creek.

2.2 Scope of this Annual Review

The layout of this Annual Review has been aligned to the DP&E Post- approval requirement for state significant mining developments - Annual Review Guideline (October 2015).

This Annual Review has also been prepared to address the requirements of Schedule 5, Condition 3 of Baal Bone's Project Approval (PA 09_0178), which requires a report to be submitted to the Secretary reviewing the annual environmental performance of the project. The requirements of Schedule 5, Condition 3 of the Project Approval and where these are addressed in the Annual Review are listed in **Table 2.1.**

Table 2.1: Requirements of Schedule 5, Condition 3 of Project Approval 09_0178

Schedule 5, Condition 3 requirement	Annual Review Section
a) describe the works that were carried out in the previous calendar year, and the works that are proposed to be carried out over the current calendar year.	**Section 4** and **Section 12**
b) include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against: • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in the EA.	**Sections 6, 7, 8 and 9**
c) identify any non-compliance over the previous calendar year, and describe what actions were (or are being) taken to ensure compliance;	**Sections 1** and **11**
d) identify any trends in the monitoring data over the life of the project;	**Sections 6, 7** and **8**
e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	**Sections 6, 7** and **8**
f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the project.	**Section 12**

It should be noted that this Annual Review does not necessarily provide a comprehensive description of each individual operation or environmental control that is currently employed at Baal Bone. Rather, this Annual Review focuses on providing a succinct review of the significant operational and environmental activities undertaken throughout the year. It also examines the performance of key site operations and environmental controls throughout the 2021 reporting period.

Included is a summary of monitoring data (as applicable), a discussion regarding the level of compliance achieved, together with an overview of initiatives proposed and actions planned for the 2022 reporting period.

2.3 Mine Contacts

Baal Bone Colliery can be contacted via telephone on (02) 6350 6900 and fax (02) 6359 0530. The postal and street addresses are as follows:

Postal: Baal Bone Colliery
PO Box 13
Lithgow NSW 2790

Street: Baal Bone Colliery
Castlereagh Highway
Cullen Bullen NSW 2790

Personnel responsible for environmental management at Baal Bone Colliery are shown below:

Table 1.2: Mine Personnel Contact Details

Contact Person	Position	Contact Details
Mark Bulkeley	Operations Manager	Ph: (02) 6350 6943 Email: *Mark.Bulkeley@Glencore.com.au*
Elizabeth Fishpool	Environment and Community Coordinator	Ph: (02) 6350 6920 Email: *Elizabeth.Fishpool@Glencore.com.au*

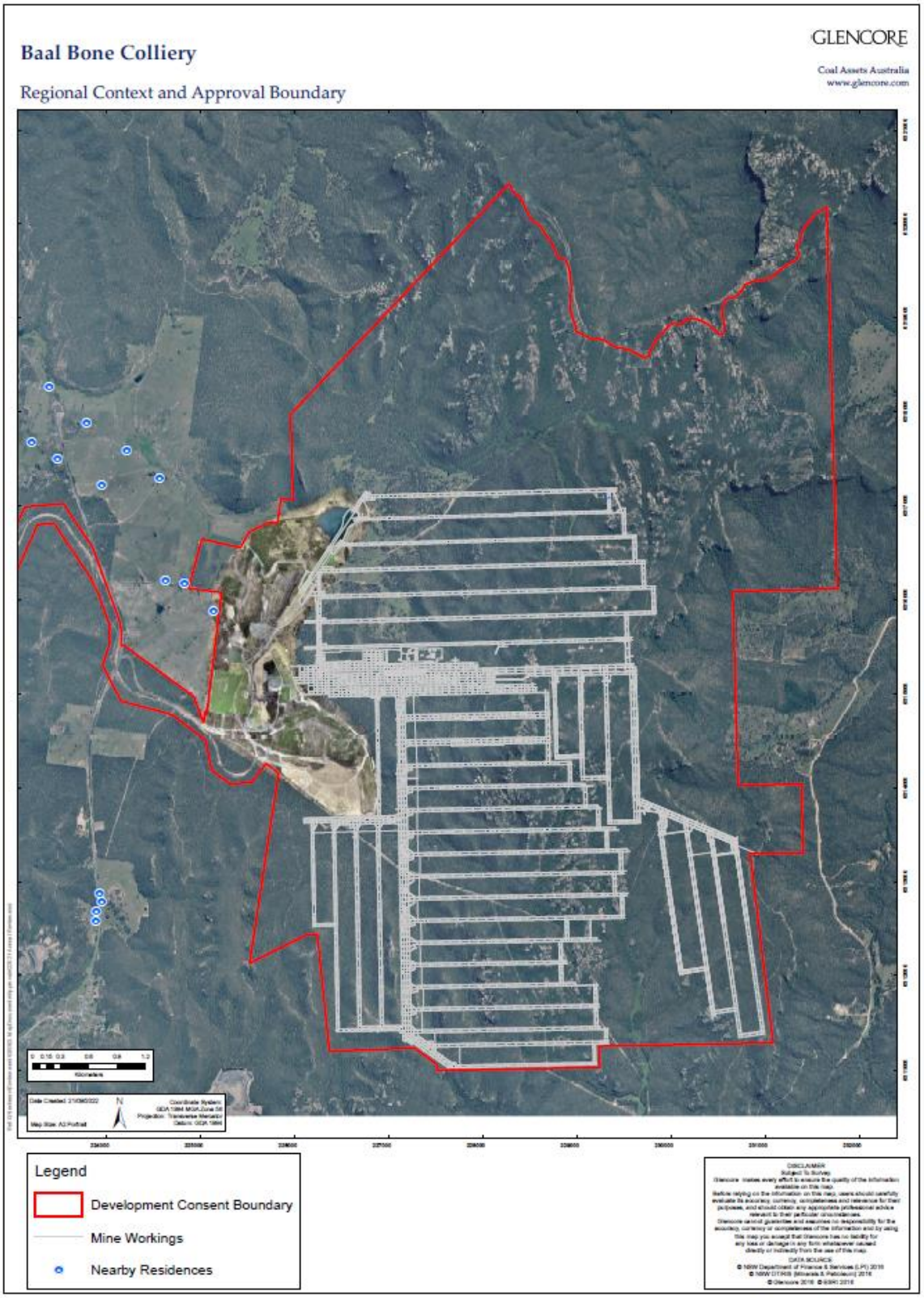


Figure 1.1: Locality plan showing approval boundary.

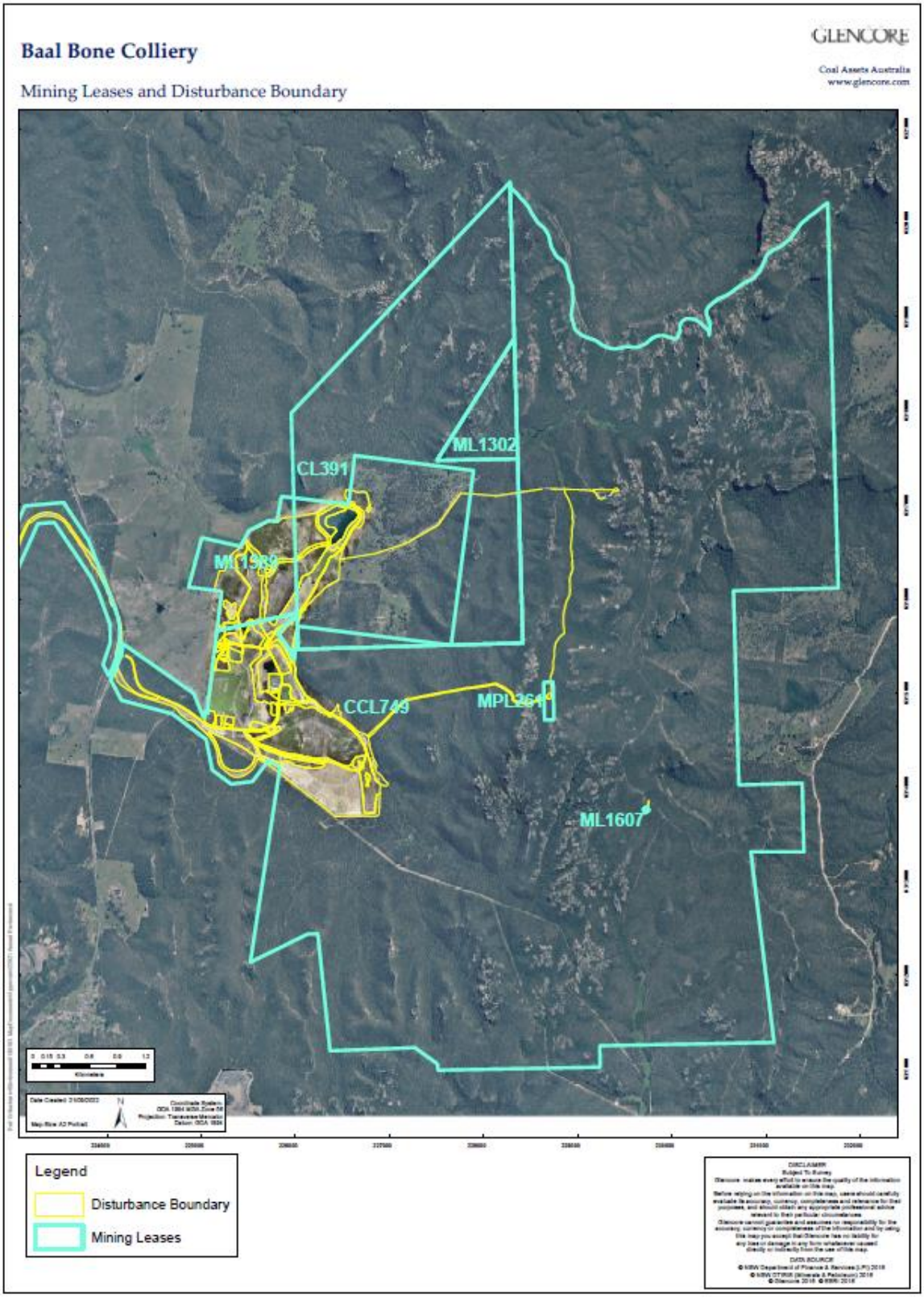


Figure 1.2: Mining lease boundaries and disturbance area.

3 Approvals

A list of all current consents, leases, licences and approvals are included below in **Table 3.1** along with their compliance status for the 2020 calendar year.

Table 3.1: Consents, Leases, Licences and Approvals.

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/ Review Date	Scope	Were all Approval Conditions Complied With?
Project Approval	DPIE	07_0035	The Wallerawang Collieries Ltd	24/10/2007	Perpetuity	Part 3A Project Approval for the Ventilation Shaft and Power Line Project.	Yes
	DPIE	09_0178	The Wallerawang Collieries Ltd	14/01/2011	31/12/2014 (Mining operations)	Part 3A Project Approval for continued operations at Baal Bone Colliery.	Yes
	DPIE	09_0178 (MOD 1)	The Wallerawang Collieries Ltd	14/01/2011 Mod 1 Feb 2015	31/12/2019 (Mining operations)	Part 3A Project Approval for continued operations at Baal Bone Colliery until 31 December 2019.	Yes
	DPIE	09_0178 (MOD 2)	The Wallerawang Collieries Ltd	01/12/2015 Mod 2 Dec 2015	31/12/2019 (Mining operations)[1]	s75W modification to maintain alignment of Ben Bullen Creek.	No – refer to Table 1.2 and Section 11.
Environment Protection Licence	EPA	765	The Wallerawang Collieries Pty Ltd	21/02/2020	Until surrendered, suspended or revoked.	Premises and Scheduled Activity (Coal Mining/ Washery) Licence	No – refer to Table 1.2 and Section 11.
Mining Operations Plan	Resources Regulator	09/2520	The Wallerawang Collieries Pty Ltd	20/12/2019	31/12/2025	Mine Closure MOP for Baal Bone Colliery	Yes
Mining Leases	Resources Regulator	CCL 749	The Wallerawang Collieries Pty Ltd	05/04/1990	11/03/2030	Mining Entitlement (Consolidates CL 209, CL 246, CL 329, CL 330, CL331 and CL332) Various depths	Yes
	Resources Regulator	MPL 261 (Act 1973)	The Wallerawang Collieries Pty Ltd	22/08/1990	22/08/2032	Mining Entitlement (Southern mine dewatering bores) Parish: Ben Bullen, Depth: Surface - 10m	Yes

1 Expiry date relates only to mining operations. As per PA 09_0178: *"Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings to the satisfaction of the Secretary and DRE. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been properly rehabilitated".*

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/ Review Date	Scope	Were all Approval Conditions Complied With?
	Resources Regulator	CL 391 (Act 1973)	The Wallerawang Collieries Pty Ltd	24/02/1992	11/03/2030	Mining Entitlement Parish: Ben Bullen Depth: > 20m	Yes
	Resources Regulator	ML 1302 (Act 1992)	The Wallerawang Collieries Pty Ltd	29/09/1992	11/03/2030	Mining Entitlement Parish: Ben Bullen Depth: >20m	Yes
	Resources Regulator	ML 1389 (Act 1992)	The Wallerawang Collieries Pty Ltd	09/05/1996	11/03/2030	Mining Entitlement Parish: Ben Bullen Depth: Surface – unlimited Surface - 20m	Yes
	Resources Regulator	ML1607	The Wallerawang Collieries Pty Ltd	08/01/2008	11/03/2030	Mining Lease (Purposes) Parish: Cox Depth: Surface – 10m	Yes
Occupation Permit	Forestry Corporation of NSW	MIN100038 (Previously PB03800 & PB03805)	Baal Bone Colliery	07/03/2022	07/03/2027	Occupation permit for Nth/Sth dewatering bore areas, and monitoring bores and stress cells near Cox's Swamp.	Yes
Water Access Licence	DPI Water	WAL27887 *80WA706118* - 750 units	The Wallerawang Collieries Pty Ltd	17/7/2007	Perpetuity *15/01/2025*	Water Access Licence (under Water Management Act 2000) replaces bore licences: 80BL135509 (near rail loop) and 80BL136703 (near UC1). Both bores have been decommissioned and sealed.	Yes
	DPI Water	WAL34952 *80WA716836* – 25 units	The Wallerawang Collieries Pty Ltd	27/07/2013	Perpetuity *16/07/2027*	Water Management Act 2000 licence – replaces bore licence 80SL046064. 80WA716836 licences the Overshot Dam.	Yes
Bore Licences	DPI Water	80WA706034	The Wallerawang Collieries Pty Ltd	18/01/1995	15/01/2022	Section 115 of the Water Act 1912. Bore – Mine dewatering LW 1 (South Bore 1). Converted to monitoring bore in 2020.	Yes
	DPI Water	80WA706035	The Wallerawang	18/01/1995	Surrendered in 2022	Section 115 of the Water Act 1912. Bore – Mine dewatering LW 1 (South	Yes

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/ Review Date	Scope	Were all Approval Conditions Complied With?
			Collieries Pty Ltd			Bore 2). Decommissioned in 2020.	
	DPI Water	80BL239077	The Wallerawang Collieries Pty Ltd	19/06/2006	18/06/2016[2]	Section 115 of the Water Act 1912. Bore – Mine dewatering LW 19 (North Bore). Converted to monitoring bore in 2020.	Yes
Acknowledgement of Notification of Hazardous Chemicals on Premises	SafeWork NSW	NDG023231	The Wallerawang Collieries Pty Ltd	13/02/2015	Perpetuity	Dangerous Goods Licence – UG diesel tank and 3 LPG tanks.	Yes

Refer to **Section 10** for details of findings from 2019 Independent Environmental Audit.

3.1 Amendments during the Reporting Period

Mining Operations Plan

On 21 December 2020, Baal Bone Colliery submitted MOP Amendment B to the Resources Regulator for approval. The revised MOP Amendment B:

- Retained the Northern Void as a permanent sink.

On 1 March 2021, approval for MOP Amendment B was granted by the Resources Regulator.

Environment Protection Licence

On 22 June 2021, EPL 765 was varied to remove EPA Identification Point 2 and all corresponding monitoring requirements due to the removal of the sewerage treatment plant, and the rehabilitation of the transpiration bed.

Environmental Management Strategy

A draft consolidated Environmental Management Strategy was sent to various Regulators in July 2021 for comment. In December 2021 it was forwarded to DPIE for approval. On 24 February 2022, DPIE approved the consolidated Environmental Management Strategy.

2 In correspondence dated 19/12/2017 DPI Water confirmed that licence 80BL239077 is still valid, despite it being expired. This is due to an administrative issue being addressed by DPI Water. In correspondence dated 2/7/20 DPI Water reconfirmed that the licence is still valid. Note: dewatering from this bore ceased on 17/12/2019 in accordance with EPL 765.

4 Operations Summary

4.1 Exploration

There was no exploration activity conducted during the reporting period.

4.2 Land preparation, Mining and Mineral Processing

Mining operations at Baal Bone ceased in September 2011 and the site entered care and maintenance. Coal washing operations were completed in December 2011. Transportation of coal product ceased in April 2012.

On 20 December 2019 the Baal Bone Colliery Mine Closure Mining Operations Plan (MOP) was approved and the site entered into a mine closure execution phase.

4.3 Demolition

During 2019, eleven entries into the underground mine, and the Longwall 19 ventilation shaft were filled and sealed in accordance with *MDG6001 Guidelines for Permanent Filling and Capping of Surface Entries to Coal Seams.* Adits 1-5 and 8-11 required the demolition of concrete collars. Adit 1 (Main Fan) and Longwall 19 also required the dismantlement of ventilation fans. In 2020 a further eight buried adits were drilled from the surface, grouted and sealed.

Civil contractors were engaged in January 2020 to conduct the demolition and removal of mine infrastructure. The first stage of activities were completed by July 2020 and included the demolition of the Coal Handling Preparation Plant (CHPP), bathhouse and workshop, as well as all coal conveyors, reclaim tunnels, transfer towers, bins, sheds and other associated ancillary infrastructure. The rail loop linking the site to the Main Western Railway line was also decommissioned and all rail lines, ballast and sleepers were removed from the corridor.

During 2021 the majority of the remaining infrastructure onsite was demolished including the administration building, workshop and other ancillary infrastructure in the Central Pit Top area.

5 Actions Required from Previous Annual Review

The 2020 Baal Bone Annual Review was submitted on 23 March 2021. In correspondence dated 29 March 2021, the Department of Planning, Industry & Environment advised:

"The Department has reviewed the Annual Review and considers it to satisfy the reporting requirements of the approval. Please note that the Department's acceptance of this Annual Review is not endorsement of the compliance status of the project.

Non-compliances with Schedule 3 Condition 21 identified in the Annual Review have been noted by the Department, with no further action at this stage.

In accordance with Schedule 5 Condition 9, it is requested that a copy of the 2020 Annual Review is made publicly available on the company website within 1 month from the date of this letter."

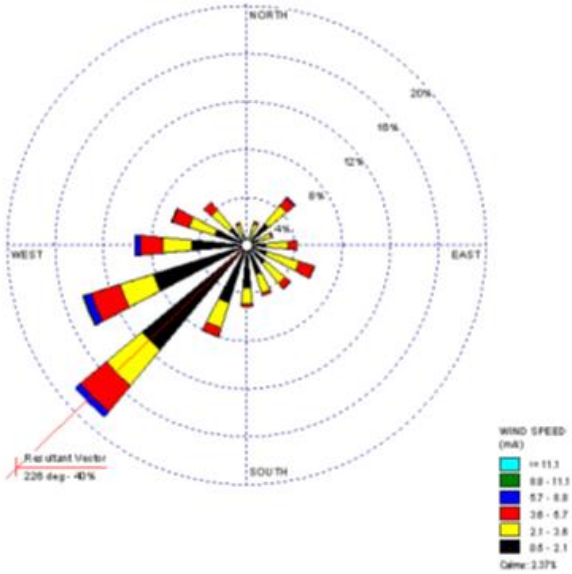
A copy of the 2020 Annual Review, and previous Annual Reviews can be found on the Baal Bone webpages at: *Reporting documents - Baal Bone Colliery (glencore.com.au)*.

6 Environmental Performance

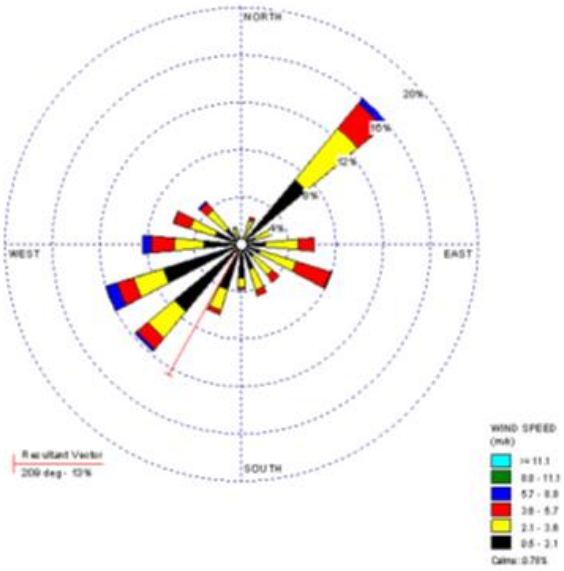
6.1 Air Pollution

6.1.1 Wind speed and direction

As discussed in the **Air Quality Monitoring Program**, local meteorological data for the area was sourced from the Mt Piper Power Station monitoring station to ensure consistency with previous air quality reports. The data shows a predominant northeast / southwest wind axis, although the northeast portion is predominant in the summer months. The annual and summer wind roses are shown in **Figure 5.1**.



Annual Wind Rose



Summer Wind Rose

Figure 6.1: Wind Roses (Mt Piper Power Station Meteorological Station)

6.1.2 Dust Monitoring and Sample Locations

Monthly dust deposition monitoring is carried out in accordance with Australian Standard AS3580.10.1 and EPL requirements.

Baal Bone maintains a network of four dust deposition gauges to monitor dust levels around site and in the vicinity of the nearest neighbour, these are:

- Sample location DM1 (EPL monitoring point No. 7);
- Sample location DM2 (EPL monitoring point No. 13);
- Sample location DM3 (EPL monitoring point No. 14); and
- Sample location DM4 (EPL monitoring point No. 15);

Sample location DM5 (EPL monitoring point No. 16) was removed from the EPL in February 2014 following consultation with the EPA regarding site dust monitoring and risks.
Locations of all air quality monitoring gauges are shown in **Plan 2.**

6.1.3 Review and interpretation of dust monitoring results

Schedule 3, Condition 10 of PA 09_0178 includes air quality impact assessment criteria for the project which are summarised in below. The pollutants to be monitored include deposited dust, TSP and PM_{10}.

Table 6.1: Baal Bone air quality impact assessment criteria

Pollutant	Averaging period	Criterion	
Deposited dust	**Annual**	**Maximum increase**	**Maximum total**
		2 g/m^2/month	4 g/m^2/month
		Maximum Total	
TSP	Annual (suspended)	90 $\mu g/m^3$	
PM_{10}	24 hour (suspended)	50 $\mu g/m^3$	
	Annual (suspended)	30 $\mu g/m^3$	

Levels of deposited dust were monitored in accordance with the air quality impact assessment criteria. Results of deposited dust monitoring conducted during the 2021 reporting period provided below.

Table 5.2: Deposited dust monitoring results for 2021 (g/m^2/month)

Collection Date	EPL Point 7 DM1	EPL Point 13 DM2	EPL Point 14 DM3	EPL Point 15 DM4
5-Jan-21	0.8	0.5	0.5	0.3
4-Feb-21	0.6	0.4	0.5	0.4
8-Mar-21	0.4	0.8	0.3	0.1
8-Apr-21	0.6	0.3	0.8	0.5
10-May-21	0.1	0.4	0.4	0.3
8-Jun-21	0.5	0.5	0.6	0.5
7-Jul-21	0.3	0.2	0.2	0.3
5-Aug-21	0.4	0.3	0.3	0.3
6-Sep-21	0.8	0.3	0.3	0.3
7-Oct-21	1.7	1.1	1.2	1.0
8-Nov-21	0.6	0.2	0.5	0.4
8-Dec-21	16.5	0.7	0.4	0.3

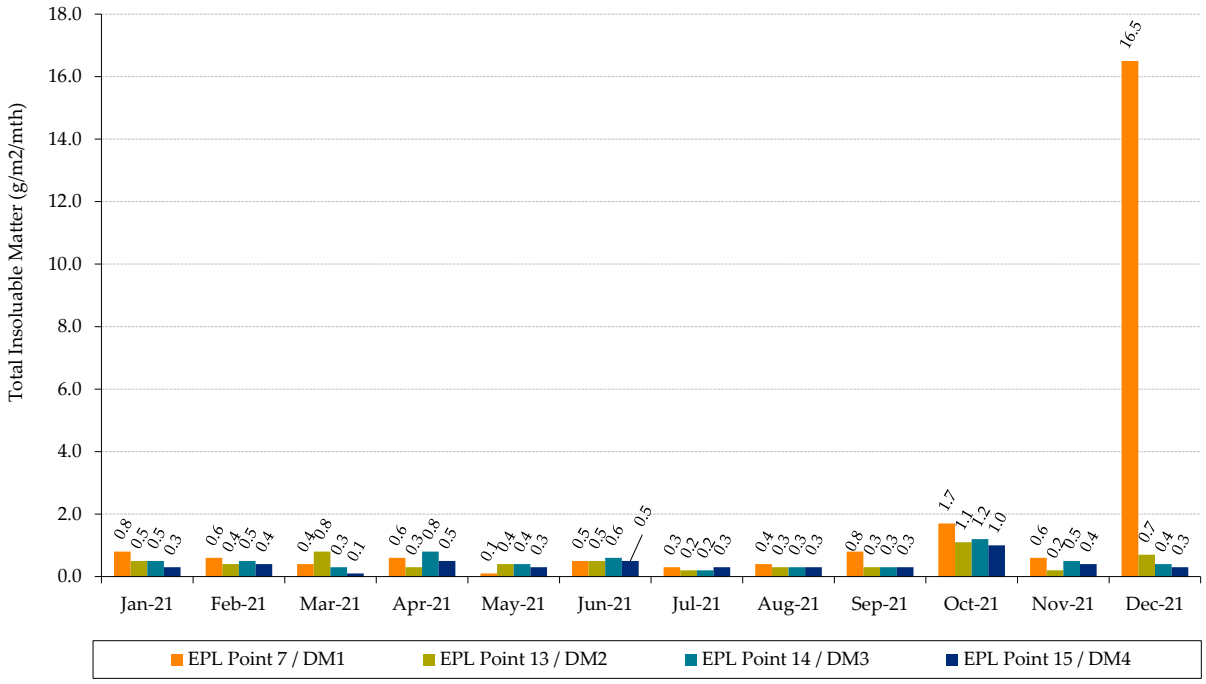


Figure 6.2: 2021 Deposited Dust Monthly Monitoring Results

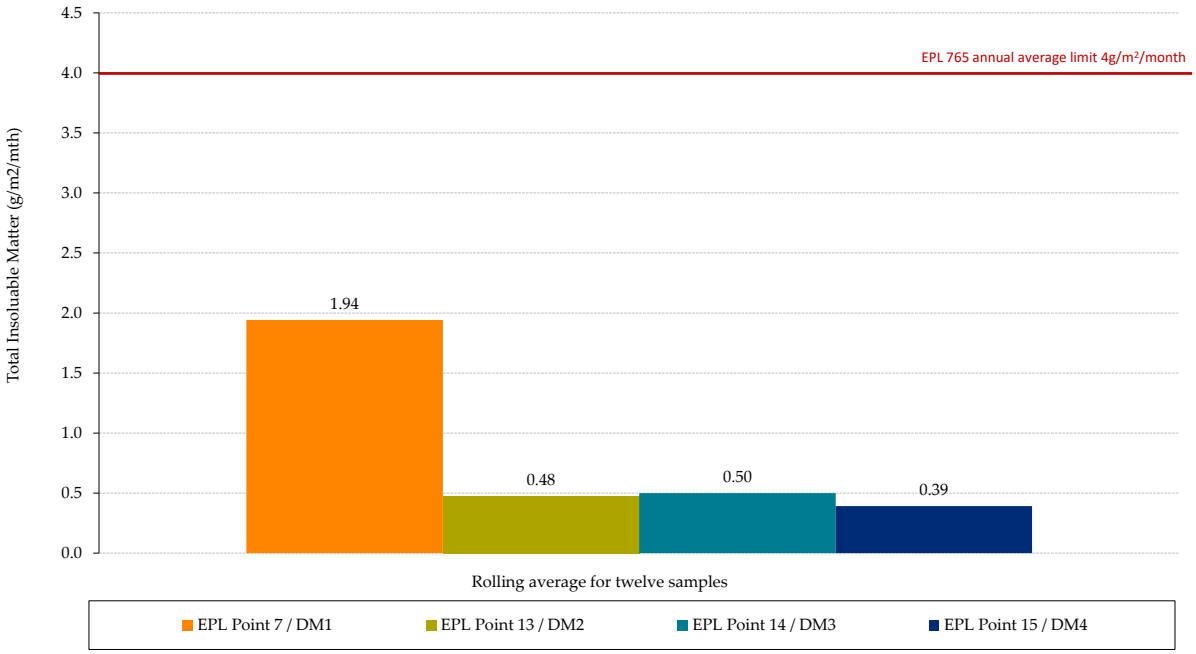


Figure 6.3: 2021 Annual Average Deposited Dust Results

Dust monitoring results for 2021 are below the maximum allowable annual average dust level of 4 g/m^2/month, in accordance with Schedule 3, Condition 10 of Project Approval 09_0178.
Note: while a high deposited dust result was recorded in DM1 dust gauge in December 2021, when the annual average is applied all results are well within Project Approval limits –refer to **Figure 6.3**.

6.1.4 Comparison against previous Annual Reviews

Historically, deposited dust results have remained below the maximum allowable annual average dust level of 4 g/m^2/month in accordance with Schedule 3, Condition 10 of Project Approval 09_0178. **Figure 6.4** shows the annual averages for DM1 – DM5 for the period 2012 to 2021.

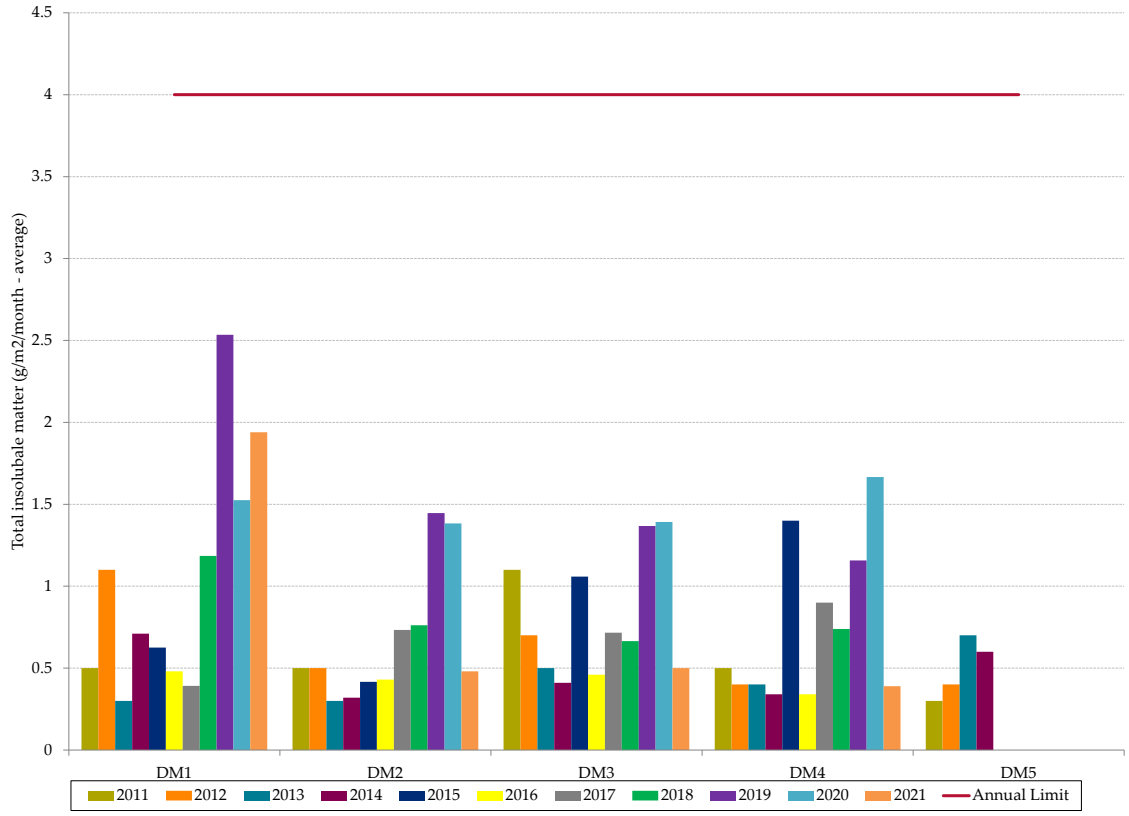


Figure 6.4: 2012 to 2021 Deposited Dust Monitoring Results

6.1.5 Comparison against EA

Levels of air quality pollutants as predicted under the EA are presented in below. **Table 6.3** shows the predicted cumulative pollutant concentration (which includes the predicted concentration from Baal Bone plus the background concentration). Deposited dust criteria are expressed as deposition rates and not concentrations. The predicted levels were all below the specified criteria.

Table 6.3: Maximum predicted pollutant results at the discrete sensitive receptors (AECOM, 2010).

No.	Deposited Dust (g/m²/month)	
	Annual	Annual cumulative*
1	0.76	3.3
2	0.4	3.0
4	0.2	2.8
5	0.2	2.8
6	0.2	2.8
7	0.2	2.8
8	0.2	2.8
9	0.4	3.0
10	0.4	3.0
11	0.2	2.8

No.	Deposited Dust (g/m^2/month)	
	Annual	Annual cumulative*
12	0.2	2.8
13	0.2	2.8
Criteria	4 g/m^2/month	

* Includes the predicted concentration from Baal Bone plus ambient background concentrations

The monitoring results at DM2 for deposited dust are likely to be representative of predicted deposited dust results at receptor number 2 listed in Table 6.3. The monthly deposited dust monitoring results at DM2 during the reporting period, presented in Section 6.1.3, are frequently at or below than the maximum predicted pollutant levels within the EA, as well as below the relevant criteria.
Therefore, the air quality impacts associated with Baal Bone's operations are consistent with the predicted impacts in the EA.

6.2 Blasting

No blasting was conducted at Baal Bone during the reporting period.

6.3 Operational Noise

For the purpose of assessing the compliance status of site with licence noise limits, a site attended audit and noise measurements were conducted on 18 August 2021, during the day, evening and night periods by Global Acoustics.

The audit report concluded that:
"Attended environmental noise monitoring described in this report was undertaken during the day, evening, and night periods of 18 August 2021. The purpose of the survey is to quantify and describe the acoustic environment around the site and compare with specified limits.

There were no exceedances, complaints or noise related incidents recorded by BBC since the previous monitoring was carried out (July 2020).

Noise levels from BBC complied with the relevant noise limits during the August 2021 survey. Criteria may not always be applicable due to meteorological conditions at the time of monitoring."

Full noise audit reports can be accessed from the Baal Bone publications webpage at: *https://www.glencore.com.au/operations-and-projects/coal/past-operations/baal-bone-colliery/reporting-documents.*

There were no complaints regarding operational noise received during the reporting period.

6.3.1 Comparison against EA and previous Annual Reviews

The EA predicted $L_{Aeq\ 15\ minute}$ dB(A) noise levels at residences R1 and R2/R3, both with and without the dozer operating on the ROM stockpile. The EA also predicted $L_{A1,\ 1min}$ dB(A) intermittent noise

levels at R1 and R2/R3 at night. The results of the attended noise audits confirm that Baal Bone Colliery noise levels are consistent with the EA predicted noise levels.

6.4 Aboriginal and European Heritage

6.4.1 Aboriginal Heritage

An Aboriginal Cultural Heritage Management Plan (ACHMP) for the potential rock shelter site BBC-RS1 was developed by OzArk Environmental & Heritage Management Pty Ltd in 2008, based on the findings of the Indigenous Heritage Assessment.

6.4.2 European Heritage

No European Heritage Sites have been identified within the Baal Bone mining lease.

6.4.3 Comparison against EA

The EA predicted that, while subsidence may occur, it is unlikely to impact currently undetected Aboriginal sites such as open sites. Potential impacts to Aboriginal heritage associated with the mining of LW29-31 have been assessed in previous surveys (OzArk 2007a; 2010). No significant impacts were predicted in this area, however, subsidence monitoring was to be undertaken during extraction. The rock shelter site BBC-RS1 was also required to be managed in accordance with an ACHMP.
Extraction of LW30 beneath BBC-RS1 occurred in July 2010. During this time, Baal Bone inspected the site twice weekly. Following extraction beneath BBC-RS1, the area was resurveyed and movement vectors were calculated. Subsidence monitoring during the reporting period has confirmed the predictions in the EA. The data showed that the rock which forms the main shelter (overhang) moved 536 mm in a westerly direction and subsided approximately 717 mm (10 mm accuracy). However, there was no visible damage caused to BBC-RS1 as a result of the extraction of LW30.

On 7 December 2020 BBC-RS1 was inspected again by Baal Bone personnel with no issues found.

6.5 Natural Heritage

No natural heritage sites have been identified within the Baal Bone mining lease.

6.6 Mine Subsidence

The SMP for development and extraction of LW 29-31 expired on 1 December 2014 with mining operations in the LW 29-31 area completed on 3 September 2011.

Historic subsidence results can be found in Subsidence Status Reports published on the Baal Bone website in the following location: *https://www.glencore.com.au/operations-and-projects/coal/past-operations/baal-bone-colliery/reporting-documents*.

6.7 Hydrocarbon Contamination

Baal Bone Colliery conducts six-monthly testing of groundwater monitoring wells in the vicinity of the underground diesel storage tank (UST). Refer to **Plan 3** and **Plan 4** for locations.

Six-monthly testing of the groundwater monitoring wells has occurred since 2013. The results of this monitoring program acknowledge that previous activities at the site have resulted in contamination of shallow groundwater. The contamination is localised and associated with the known point source, the fuel storage area.

2021 results for TRH at MW01 were consistent with historical levels until October 2021 when levels increased again. Subsequent use of the underground diesel tank was discontinued, and the tank was purged in December 2021.

Results for TRH at MW01 are presented in **Figure 5.6** below.

In February 2022 the UST was removed and contaminated material excavated from the area surrounding the UST. The contaminated material was removed to an adjacent designated area onsite (Pip top grit trap) which has been configured as a land farm for bioremediation. A number of soil samples from the excavated pit were taken and analysed to confirm that all hydrocarbon contaminated material had been removed.

Validated materials from the bioremediation areas onsite (1) Pit top grit trap, and (2) STP ponds will be re-used onsite once sampling confirms hydrocarbon levels have reached acceptable levels.

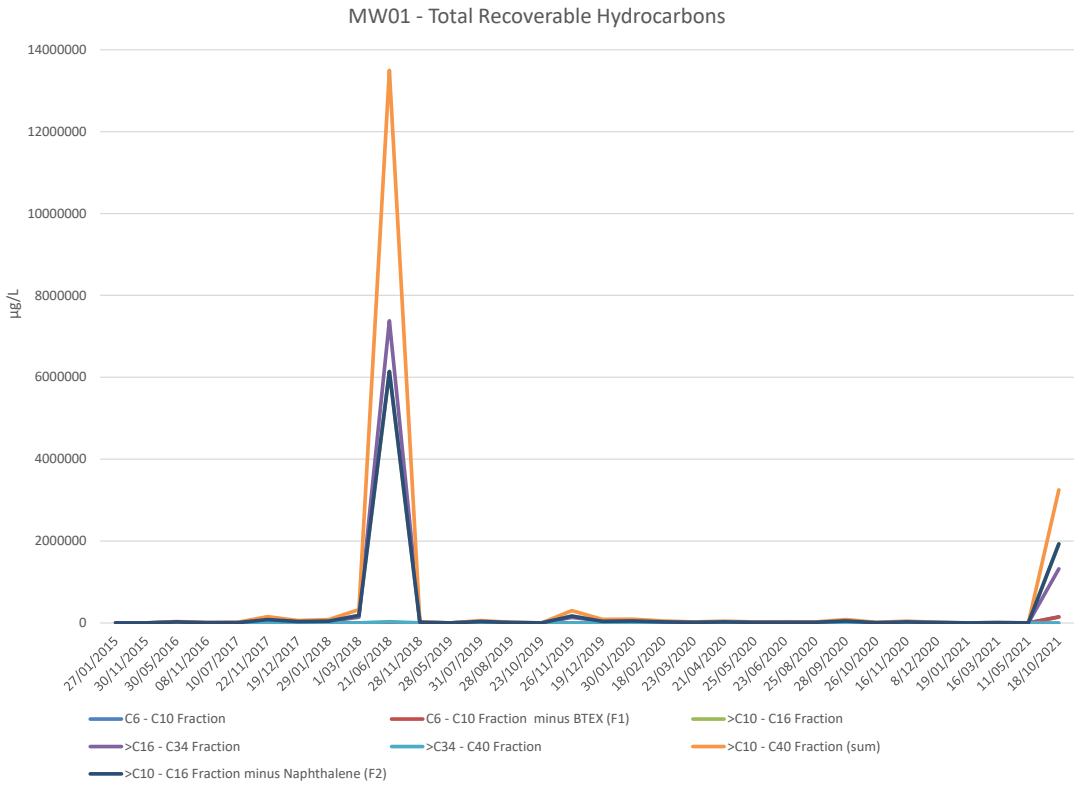


Figure 6.6: TRH results for MW01 (2015 to 2021)

Plate 1: Removal of UST

Underground diesel tank following removal	Remediation site with bioremediation area in background.
	

6.8 Methane Drainage and Ventilation

During 2019, longwall 19 ventilation shaft and adits 1-11 were filled and sealed. No drainage activities were conducted in 2021.

6.9 Public Safety

Fences are in place around the mining lease area, with all other boundary gates locked and maintained in correct working order. All access points onto the mine area are signposted to warn the public of Baal Bone Colliery's mining operations and of the risks involved. Warning signs have also been erected along public tracks in the Ben Bullen State Forest warning of mine subsidence and prohibiting entry to unauthorised persons.

6.10 Visual Amenity and Lighting

During 2020 and 2021 the majority of structures onsite were demolished as part of mine closure activities. As at end 2021, the electrical substation is the main piece of infrastructure not yet demolished.

6.11 Weed and Pest Management

During 2021 Baal Bone Colliery carried out a weed spraying program predominantly targeting Blackberry.

7 Water Management

7.1 Surface Water

EPL 765 licensed monitoring points are provided in the **Table 7.1** below. The location of monitoring points can be seen **in Plan 2.**

Note: In February 2020, EPL Monitoring Point 11 was replaced by EPL Monitoring Point 16 (BBLDP1), and EPL Monitoring Point 12 (WMP1) was removed. In June 2021 EPL 765 was varied to remove EPL Monitoring Point 2/BBLD2.

Table 7.1: EPL Licenced Monitoring Points

EPA Identification No.	Type of Monitoring Point	Description of Location
2	Discharge water quality monitoring	Sewage Transpiration Bed labelled as 'BBLD2' *(Removed from EPL 765 in June 2021)*
16	Discharge to waters	Ben Bullen Creek downstream of active surface mining area, labelled as 'BBLDP1'

A copy of EPL 765 can be accessed here: *www.epa.nsw.gov.au/prpoeoapp*

A description of discharge and monitoring sites, analyses conducted, frequency of sampling and concentration limits (where applicable) are shown below. EPL Monitoring Points are shaded in yellow.

Table 7.2: Baal Bone Colliery water monitoring locations and monthly analysis during 2020

Sample Name	Sample Location	Frequency	Pollutants Analysed	EPL Limits Apply
BBLD2 *(removed in June 2021)*	EPL Monitoring Pt No.2. In sump at discharge from STP maturation pond to transpiration bed area	Monthly during discharge	Oil & grease, TSS, pH, BOD, faecal coliforms, nitrogen, phosphorus	Not specified
BBLDP16 (BBLDP1)	EPL Monitoring Pt No.16. Immediately below the pipe outlet or in stilling pool below spillway of overshoot dam (Previously BBLDP1/EPL Monitoring Pt No. 11)	Monthly during discharge	EC, oil & grease, sulphate, iron, TSS, pH, flow rate, hardness, MBAS, nitrogen, phosphorus	Oil & grease, pH, dissolved iron, TSS
BBPOT	Potable water from main kitchen in Administration	Monthly	pH, EC, Hardness, heterotrophic standard plate count, total coliforms, E coli, Pseudomonas	N/A
BBDW	Dirty water dam	Monthly	EC, Iron, oil & grease, pH, Sulphate, TSS	N/A
BBPRW	Process water dam	Monthly	EC, Iron, oil & grease, pH, Sulphate, TSS	N/A
BBBC	Box cut sump	Monthly	pH, EC, iron, sulphates	N/A

Sample Name	Sample Location	Frequency	Pollutants Analysed	EPL Limits Apply
BBBBC Mid	Ben Bullen Creek mid-way through site	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, oil & grease, nitrogen, phosphorus	N/A
BBJC2	Jews Creek upstream of mining operations, but below dewatering bore discharges	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, oil & grease, nitrogen, phosphorus	N/A
BBJCH	Jews Creek headwaters upstream of all mining operations and mine dewatering discharges	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	N/A
BBJCB	Jews Creek downstream at bridge on Castlereagh Highway.	Monthly (during flow)	EC, oil & grease, sulphate, iron, TSS, pH, flow rate, hardness, MBAS, nitrogen, phosphorus	N/A
BBCR	Cox's River	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, oil & grease, nitrogen, phosphorus, Hardness	N/A

7.1.1 Interpretation and Review of Monitoring Results

Condition L2 of EPL 765 outlines water concentration limits for oil and grease, pH, total suspended solids and dissolved iron. These limits are presented below:

Table 7.3: EPL concentration limits

Pollutant	BBLDP16/BBLDP1 (EPL Monitoring Point 16)
Oil and grease (mg/L)	10
pH	6.5-8.5
Total Suspended Solids (mg/L)	50
Iron (dissolved) (mg/L)	1.0

Monitoring results for Baal Bone's three monitoring points as required by EPL 765 are discussed in **Table 7.4**, and **Figures 7.1 to 7.4**. Samples were taken monthly during discharge in accordance with the EPL.

Table 7.4: 2021 concentrations as required by EPL 765.

EPL Point	Month	Pollutant									
		EC	O&G	SO_4^{2-}	Fe	TSS	pH	BOD	Faecal Coliform	N	P
		uS/cm	mg/L	mg/L	mg/L	mg/L	-	mg/L	cos/ 100ml	mg/L	mg/L
BB LD2	Jan	Sample not required	*Dry*	Sample not required		*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	Feb		*Dry*			*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	Mar		*Dry*			*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	Apr		*Dry*			*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	May		*Dry*			*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	June		*Dry*			*Dry*	*Dry*	*Dry*	*Dry*	*Dry*	*Dry*
	July	Sample not required. Monitoring point removed from EPL 765									
	Aug										
	Sep										
	Oct										
	Nov										
	Dec										
BB LDP16 (LDP1)	Jan	630	<5	297	<0.05	9.0	6.7	Sample not specified on licence.			
	Feb	720	<5	320	1.65	11.0	6.7				
	Mar	992	<5	462	3.21	22.0	6.2				
	Apr	601	<5	345	0.86	<5	7.0				
	May	794	<5	316	1.32	<5	6.6				
	June	No flow									
	July										
	Aug										
	Sep										
	Oct										
	Nov										
	Dec	460	<5	197	0.08	13	6.7				

Legend

BOD = Biological oxygen demand
EC = Electrical conductivity
Fe = Iron (dissolved)
N = Nitrogen
O & G = Oil and Grease
P = Phosphorus
SO_4^{2-} = Sulphate
TSS = Total suspended solids

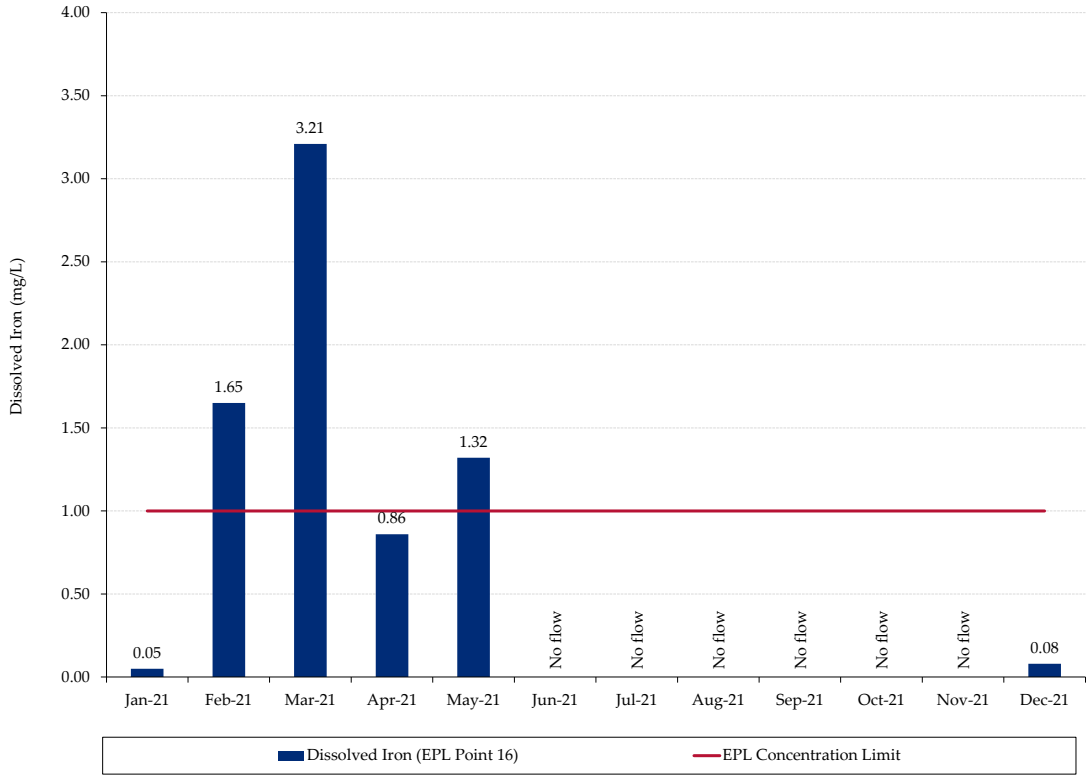


Figure 7.1: Dissolved Iron

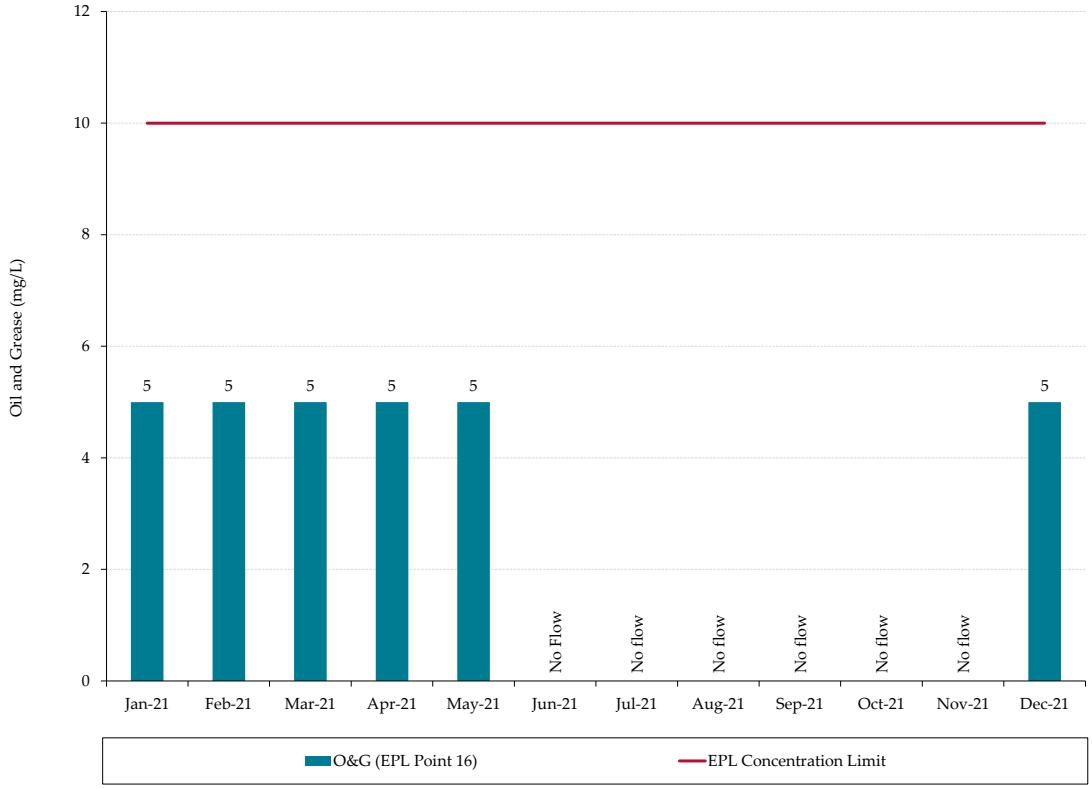


Figure 7.2: Oil & Grease

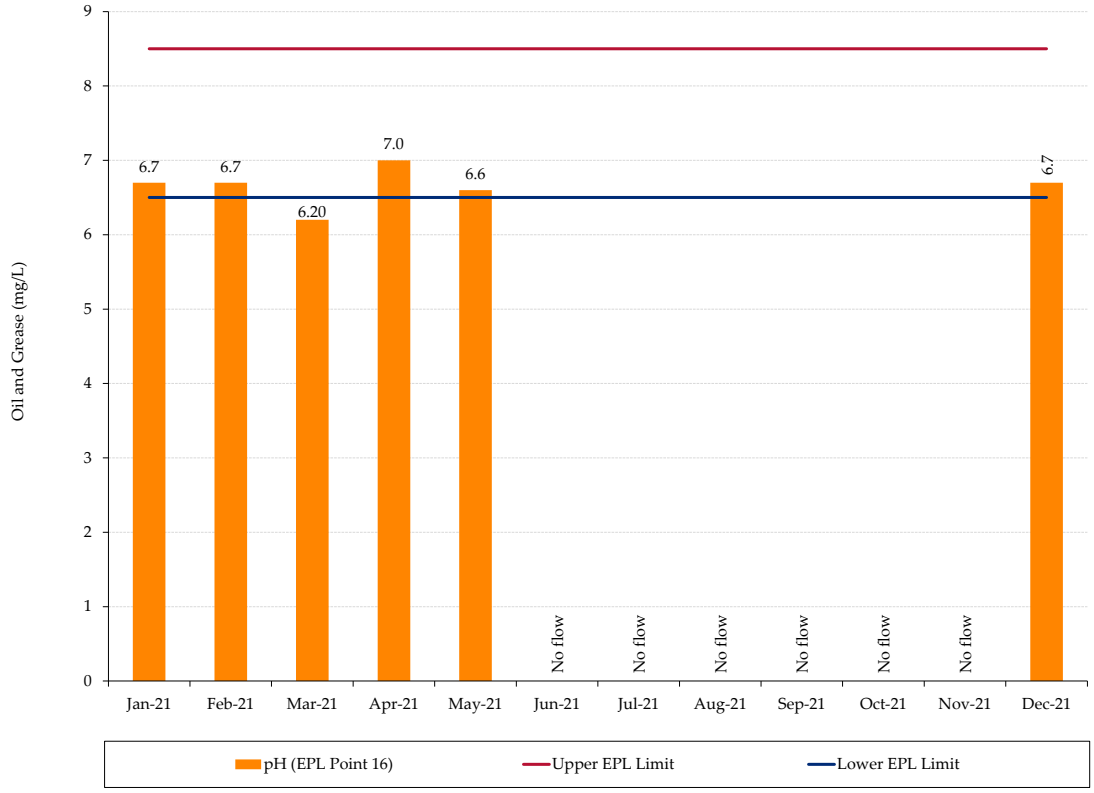


Figure 7.3: pH

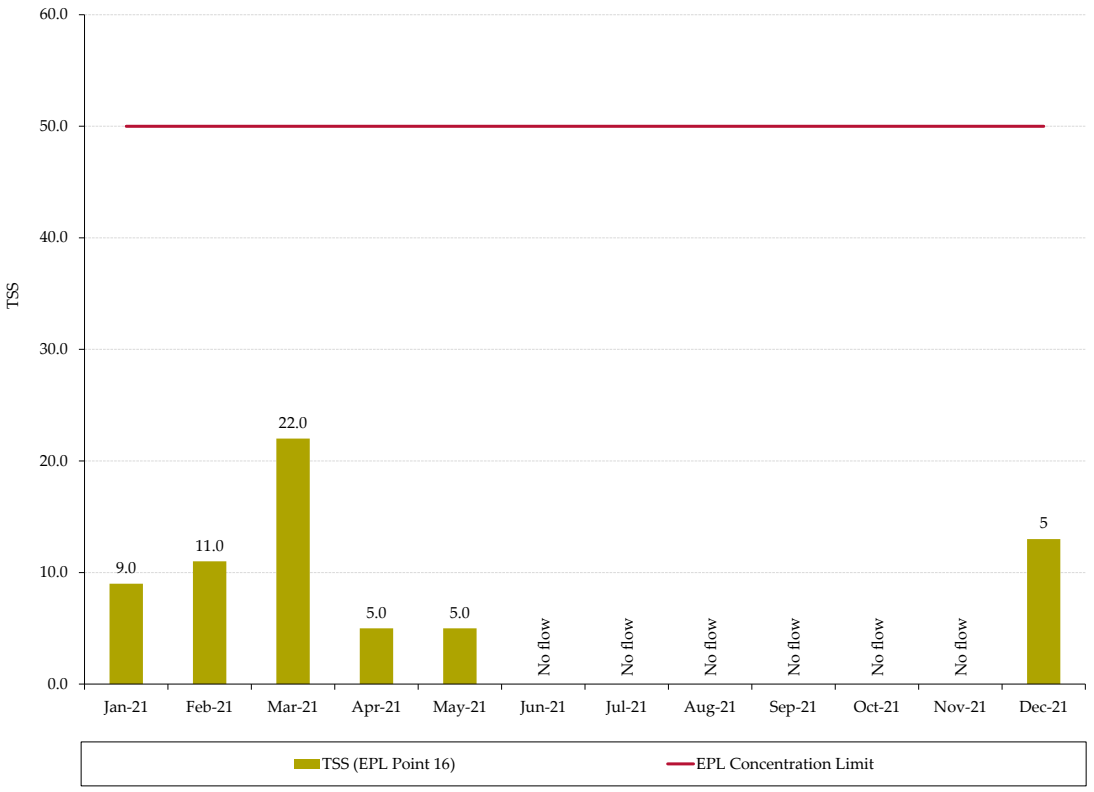


Figure 7.4: Total Suspended Solids

A summary of monitoring results for EPL discharge and monitoring points (those with specified concentration limits) can be found below for the 2021 reporting period:

- All monthly TSS results were below the EPL concentration limit of 50 mg/L; and
- All Oil and grease levels were below the EPL concentration limit of 10 mg/L.
- February, March and May 2021 results for dissolved iron exceeded the EPL limit of 1mg/L with readings of 1.65 mg/L, 3.21 mg/L and 1.32 mg/L respectively.
- March 2021 sample returned a pH reading of 6.2 which is outside of the pH concentration limits.
- From June to September 2021, there was no flow at EPL Point 16 (LDP1) during monthly sampling events – as such no samples were able to be taken.

Management actions in response to pH and dissolved iron readings outside of EPL concentration limits:

- An external consultant: Gauge Scientific was commissioned and has provided a report to Baal Bone Colliery investigating the iron exceedances, and providing monitoring and management recommendations;
- Gauge Scientific has advised that the increased iron concentrations have not caused material harm to the environment;
- Water sampling frequency at LDP16 was increased to weekly (when flowing) for a period of time;
- Additional monitoring points were implemented around the suspected source of increased iron concentrations and sampled for a period of time; and
- Written notifications were provided to the EPA on 26 April 2021 and 16 June 2021.
- Sampling identified that elevated iron levels were not being detected upstream of the Overshot Dam. During 2021 the Overshot Dam emptied allowing the identification of a spring located within the Overshot Dam, with visible iron staining around it. Sampling confirmed high concentrations of dissolved iron from the spring. It is suspected that the spring contributed to elevated dissolved iron levels.
- December 2021 and January 2022 monitoring showed that iron concentrations at BBLDP16 had returned to within EPL limits, and sampling frequency at BBLDP16 returned to monthly during 2022.

Monthly EPL reporting can be accessed here: *https://www.glencore.com.au/operations-and-projects/coal/past-operations/baal-bone-colliery/reporting-documents*.

7.1.2 Comparison against previous Annual Reviews

A summary of water quality results from previous Annual Reviews is provided below.

Table 7.5: Water quality results 2006 - 2021

Annual Review Year	Iron	Oil and Grease	pH	TSS
2006	One minor exceedance at BBLDP16.	Compliant	Compliant	Compliant
2007	One erroneous exceedance at BBLDP16 of 5.4mg/L in August 2007 – retesting showed compliant level of 0.9mg/L	Compliant	Compliant	One erroneous exceedance at BBLDP1 of 266mg/L in August 2007 – retesting

Annual Review Year	Iron	Oil and Grease	pH	TSS
				showed compliant level of 25mg/L
2008	Compliant	Compliant	Compliant	Compliant
2009	Compliant	Compliant	Compliant	Compliant
2010	1 exceedance at BBLDP16 of 2mg/L in February 2010.	Compliant	Compliant	Compliant
2011	2 exceedances at BBLD6 in April and October and 1 exceedance at BBLDP16 in June 2011 of 1.2, 1.2 and 3mg/L respectively.	Compliant	Compliant	Compliant
2012	1 exceedance at BBLD6 of 2mg/L in September 2012.	Compliant	Compliant	Compliant
2013	Compliant	Compliant	Compliant	Two Total Suspended Solids (TSS) exceedances at BBLDP3 (60mg/L) and BBLDP6 (85mg/L) in February
2014	Total iron recorded in Jan 2014 at BBLDP16 was 1.11mg/L. However note that EPL limit is for *dissolved iron.* Sampling routine changed to include dissolved iron.	Compliant	Compliant	Compliant
2015	Compliant	Compliant	Compliant	Compliant
2016	Compliant	Compliant	Compliant	Compliant
2017	Compliant	Compliant	Compliant	Compliant
2018	Compliant	Compliant	Compliant	Compliant
2019	Compliant	Compliant	Compliant	Compliant
2020	Dissolved iron level exceedance of 1.68mg/L in August at BBLDP16.	1 exceedance at BBLDP16 in January.	Compliant	Compliant
2021	February, March and May 2021 results at BBLDP16 for dissolved iron exceeded the EPL limit with readings of 1.65 mg/L, 3.21 mg/L and 1.32 mg/L respectively.	Compliant	1 exceedance at BBLDP16 of 6.2 in March 2021	Compliant

Occasional exceedances of iron have been recorded in 2006, 2010, 2011, 2012, 2014, 2020 and 2021. Note: the EPL limit of 1 mg/L is for Dissolved Iron, and the exceedances reported in previous years were Total Iron results. Monitoring was amended during 2014 to include dissolved iron at EPL monitoring points.

Figures 7.5 – 7.8 illustrate the long term trends for dissolved iron, oil and grease, pH and total suspended solids at current EPL monitoring points. Note that there has been no flow recorded at

BBWMP1 and BBLD2 during the reporting period. Furthermore EPL monitoring points BBLD3 and BBLD6 were removed in 2013.

Figure 7.5 shows the iron level recorded at BBLDP16 from 2014 to 2021. From 1 August 2013 EPL 765 specified a *dissolved* iron concentration limit of 1 mg/L at BBLDP16. Prior to this time, the iron concentration limit at BBLDP16 was 1 mg/L of *total* iron. Between 2014 and 2020 there has been one exceedance of the EPL dissolved iron concentration limit, in August 2020, with a reading of 1.68 mg/L. An investigation which included follow up testing of BBLDP16 and examination of water transfers could find no definitive reason for the isolated spike in iron levels.

During 2021 there were three exceedances of the dissolved iron EPL limit of 1mg/L. Refer to **Section 7.1.2** for further detail on 2021 exceedances and management actions.

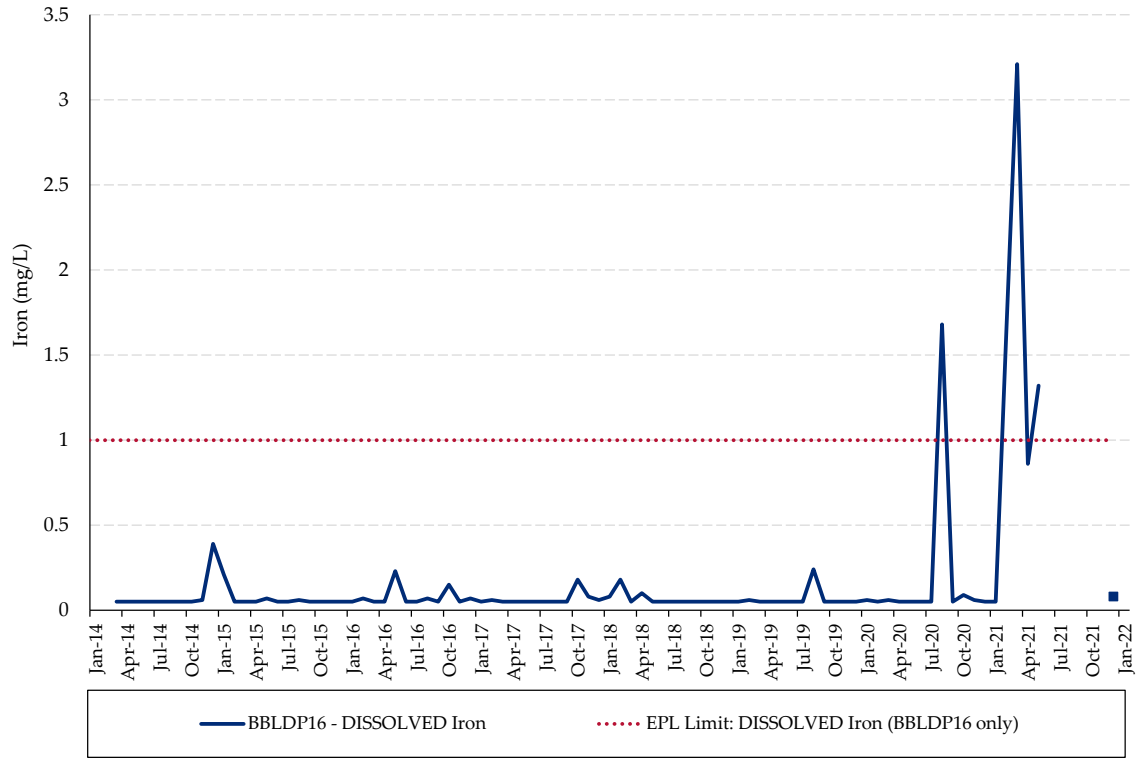


Figure 7.5: Iron Dissolved (2014 – 2021)

Oil and grease levels in the sample taken on 22 January 2020 exceeded the EPL concentration limit of 10mg/L, with a result of 11 mg/L. An investigation was undertaken into this exceedance which found that potential contributors may have been the extended dry spell and recent rainfall, the bushfires moving through the area as well as vehicles and machinery on site. Refer to **Section 7.1.2** for further information.

Prior to January 2014, the limit of reporting for oil and grease was < 2 mg/L. From January 2014, limit of reporting value became < 1 mg/L before increasing back to <2 mg/L in March 2016. From October 2017 the limit of reporting increased to <5 mg/L due to changing to ALS Group Environmental Division Lithgow to undertake the monthly monitoring and analysis.
These changes in the limit of reporting account for the step change in reported oil and grease levels.

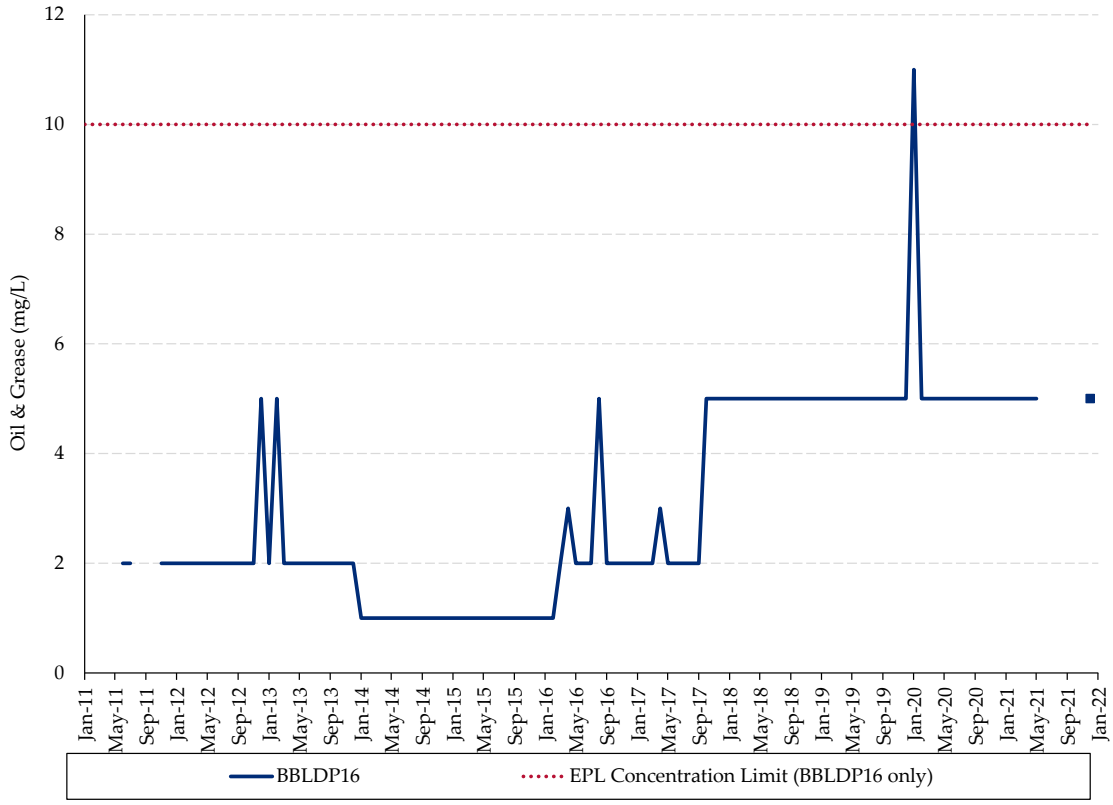


Figure 7.6: Oil and grease levels from 2011 to 2021

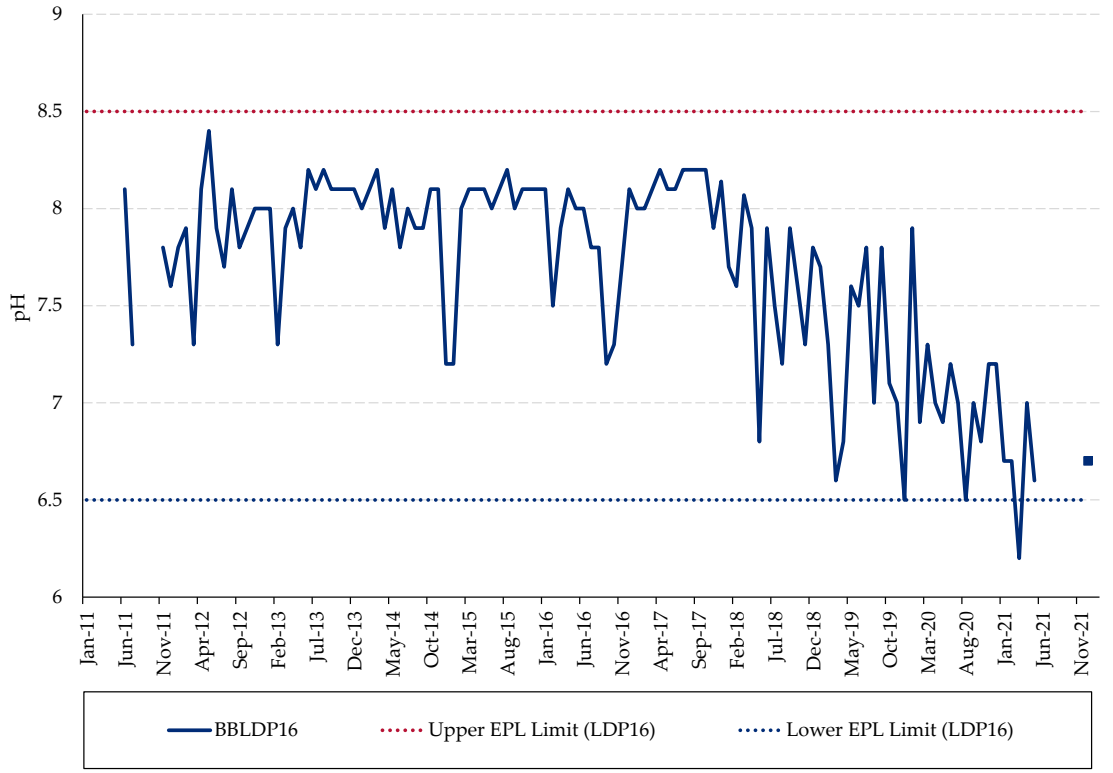


Figure 7.7: pH levels from 2011 to 2021

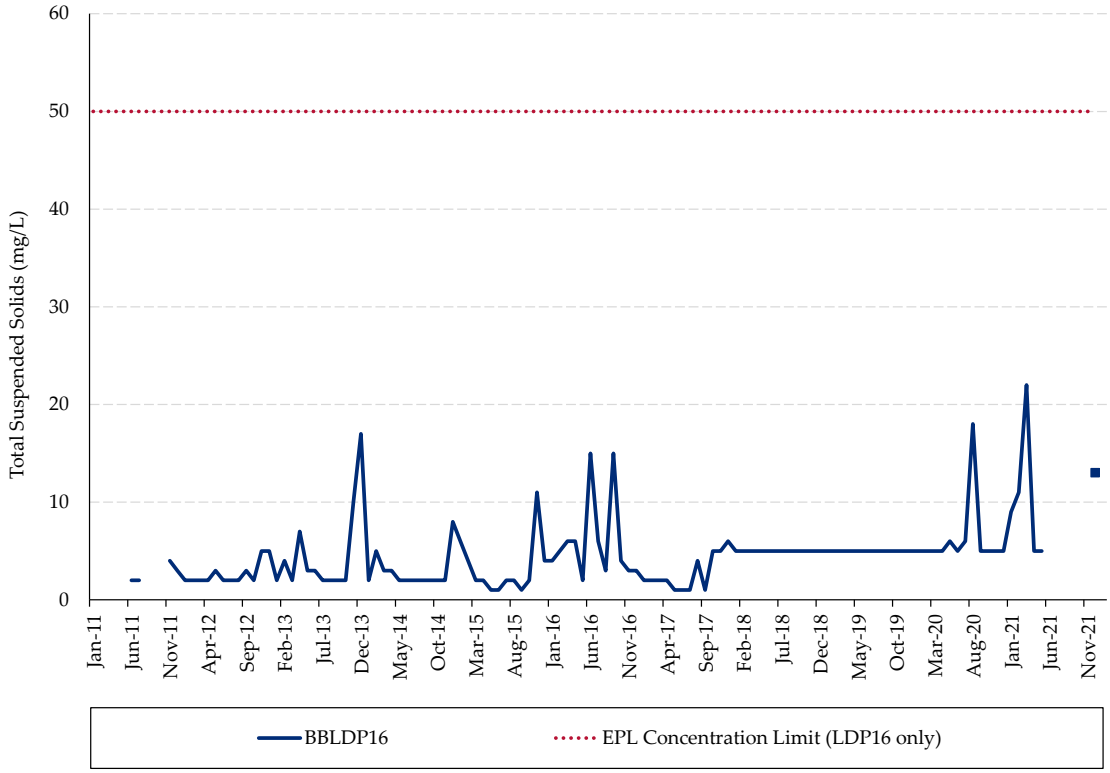


Figure 7.8: Total suspended solids levels from 2011 to 2021

7.1.3 Comparison against EA

The EA reported that, based on past monitoring results for EPL discharge and monitoring points, water quality was expected to continue to be within the EPL limits during extraction of LW29-31. This prediction is supported by the results presented in the current and past Annual Reviews.

7.2 Groundwater

Section 3 outlines the water bore and piezometer licences held by Baal Bone Colliery.

7.2.1 Groundwater Extraction

Mine water discharge from EPA Licenced Discharge Point LDP11 (now BBLDP16) ceased on 17 December 2019 in accordance with EPL Licence No. 765, Special Condition E2 which required this to occur prior to 31 December 2019.

Historical groundwater extraction is reported in previous Annual Reviews available here: *https://www.glencore.com.au/operations-and-projects/coal/past-operations/baal-bone-colliery/reporting-documents*.

Table 7.6 Groundwater Extraction

Water Licence	Water sharing plan, source and management zone	Entitlement (Unit Shares)	Water Approval Number/ Water Supply Works	TOTAL Water Pumped
WAL 27887	NSW Murray Darling Basin Porous Rock Groundwater Sources	750 units	80WA706118	Nil*
WAL 34952	Macquarie Bogan Unregulated and Alluvial Water Sources	25 units	80WA716836	Nil

*Passive take of groundwater is occurring into the Northern Void.

7.2.2 Groundwater Monitoring

Baal Bone Colliery monitors groundwater levels and groundwater chemistry in six piezometers in and around Cox's River Swamp (**Appendix A -Plan 5)**.

Monitoring data in the six piezometers (four aquifer and two swamp/alluvial) are presented in **Figure 6.9 to Figure 7.5**. Piezometers BBPB1-BBPB4 monitor groundwater levels and chemistry in the deeper sandstone aquifer, while piezometers BBPB5 and BBPB6 monitor groundwater levels and chemistry in the shallower Coxs River Swamp.

Baal Bone's Surface and Groundwater Response Plan includes Trigger, Action, and Response Plans (TARP), which include triggers for assessing changes to groundwater levels and groundwater chemistry. Additionally, there are water quality trigger values for a number of water chemistry parameters contained in Baal Bone's approved Groundwater Monitoring Plan. The TARP and trigger levels are used as a measure of impacts to groundwater levels and quality in both the deep sandstone and shallower swamp groundwater aquifers. The groundwater level and quality trigger levels are presented below. Response and rehabilitation methodologies have also been included where appropriate.

Table 7.7: Groundwater Model TARP

Trigger	Action	Response	Plan	Timeframe
• Groundwater monitoring results deviate from predictions made in the EA; • Increased groundwater make in the underground workings compared to predictions made in the EA (AECOM, 2010); • Consecutive pressure monitoring data from the regional monitoring network, over a period of 6 months, shows an adverse impact from	• Notify the Baal Bone Colliery Environment and Community Manager (ECM), or delegate; • Review all groundwater pumping data; • Identify if the installation of additional piezometers is required; • Investigate any external influence which may be affecting the results including climatic data; and • Review operations and investigate for links to operational activities.	• Review the frequency of groundwater monitoring in the affected area; and • Notify and consult with relevant government agencies on investigation and outcomes (e.g. DPI Water, DPIE, and EPA).	• Amend the groundwater model if required; and • Amend the Groundwater Monitoring Plan if required.	Notification to Secretary and any other relevant agencies (e.g. EPA, DPI Water) as soon as practicable (Schedule 5, Condition 5 of PA 07_0178).

Trigger	Action	Response	Plan	Timeframe
the previous data or groundwater model predictions; or • Annual review of the depressurisation of the coal measures shows an adverse impact from the previous data or groundwater model predictions.				

Table 7.8: Loss of Water Quality TARP

Trigger	Action	Response	Plan	Timeframe
Monitoring results outside the relevant trigger levels in the SWMP or GWMP: ECM determines that the deviation from background trends and adopted impact assessment criteria could result in environmental harm; three (3) consecutive values are outside the adopted impact assessment criteria; or the measurement varies significantly from background water quality trends.	• Notify the Baal Bone Colliery ECM, or delegate; • Review monitoring results against historical monitoring data; • Review recent monitoring results for adjacent monitoring sites; • Review any relevant operational data (i.e. clearing activities, UG mining activities, meteorological data etc.); • Determine if an incident has potentially occurred; • Complete investigation IF Investigation reveals actual or potential material harm to the environment, the EO (together with the Ops Mgr) will initiate the PIRMP[3] immediately. • Inform regulatory agencies as required.	• A remedial action plan is developed and implemented to address the investigation findings. • Remedial action plan could include: o Increase monitoring frequency where relevant; o Undertake additional monitoring (stream health monitoring, etc.) if necessary. o Corrective/preventative actions based on the outcomes of the investigation and/or additional monitoring;	• Follow up information is provided to regulatory agencies as requested; and • A summary of monitoring results, investigations and remedial actions plans are provided within the Annual Review. • Monitor the completion of actions to ensure they have been effective. IF • Material Harm Incident occurred- Internal and External Reporting requirements are completed in accordance with Section 5 of Baal Bone's PIRMP, and reporting obligations detailed in EPL No. 765 and the Project Approval.	Notification to Secretary and any other relevant agencies (e.g. EPA, DPI Water) as soon as practicable (Schedule 5, Condition 5 of PA 07_0178). ***Immediate*** reporting of material harm incident required by POEO Act.

Table 7.9: Groundwater Quality Trigger Levels

[3] PIRMP- Pollution Incident Response Management Plan

Element	Short Term Minor Change Criteria^	Short Term Major Change Criteria^	All Bore 80th Percentile	BBP4 80th Percentile
pH	4.6	4.2	5.0*	5.5*
Electrical Conductivity (µS/cm)	300	300	90	90
Copper (mg/L)	0.041	0.043	0.011	0.007
Iron (mg/L)	15.25	24.28	11	11
Zinc (mg/L)	0.143	0.175	0.098	0.074

Source: ^Aurecon (2012)

*Note: * 20th Percentile*

Note: 300 µS/cm is ANZECC (2000) guideline

Note: Minor change criteria apply for periods of 1 or 2 consecutive months while Major Change Criteria apply for periods of more than 2 months.

7.2.3 Groundwater Levels

Rainfall deficit and groundwater levels in the six groundwater monitoring piezometers are presented in **Figure 7.9**. Long term trends of groundwater levels and daily rainfall are shown in **Figure 7.10.**

Rainfall deficit is plotted on **Figure 7.9.** The rainfall deficit uses data from the Lithgow BOM weather stations, and is calculated by accumulating monthly differences between observed and average rainfall. A negative value indicates that the month is drier than average, and a positive value indicates a wetter month. Falling legs on the deficit plot indicate a move towards drought conditions; rising legs indicate a retreat from drought.

Since January 2021, the rainfall deficit has seen a general reduction trend. Five months during 2021 saw monthly rainfall totals above long term averages. In January 2021 the deficit was -1000 mm, compared to -824 mm by end 2021. The total rainfall received in Lithgow during 2021 was 1002 mm, which is 143 mm more than the long term average annual rainfall in Lithgow of 859 mm, or 117% of the long term average rainfall.

The water levels in all the bores (BBPB1 – BBPB5) have remained relatively stable during 2021, which is interpreted to be due to wetter conditions compared to previous years.

BBPB6 was recorded as dry from February 2018 until groundwater levels dropped throughout 2017 in response to the dry conditions, and in February 2018 the piezometer has been recorded as dry. BBPB6 has remained dry from February 2018 until July 2020. From August 2020 until Oct 2020 water levels in BBPB6 have increased. Throughout 2021 the water levels in BBPB5 and BBPB6 were stable, with water at ground level for the entire year at these bores within the swamp.

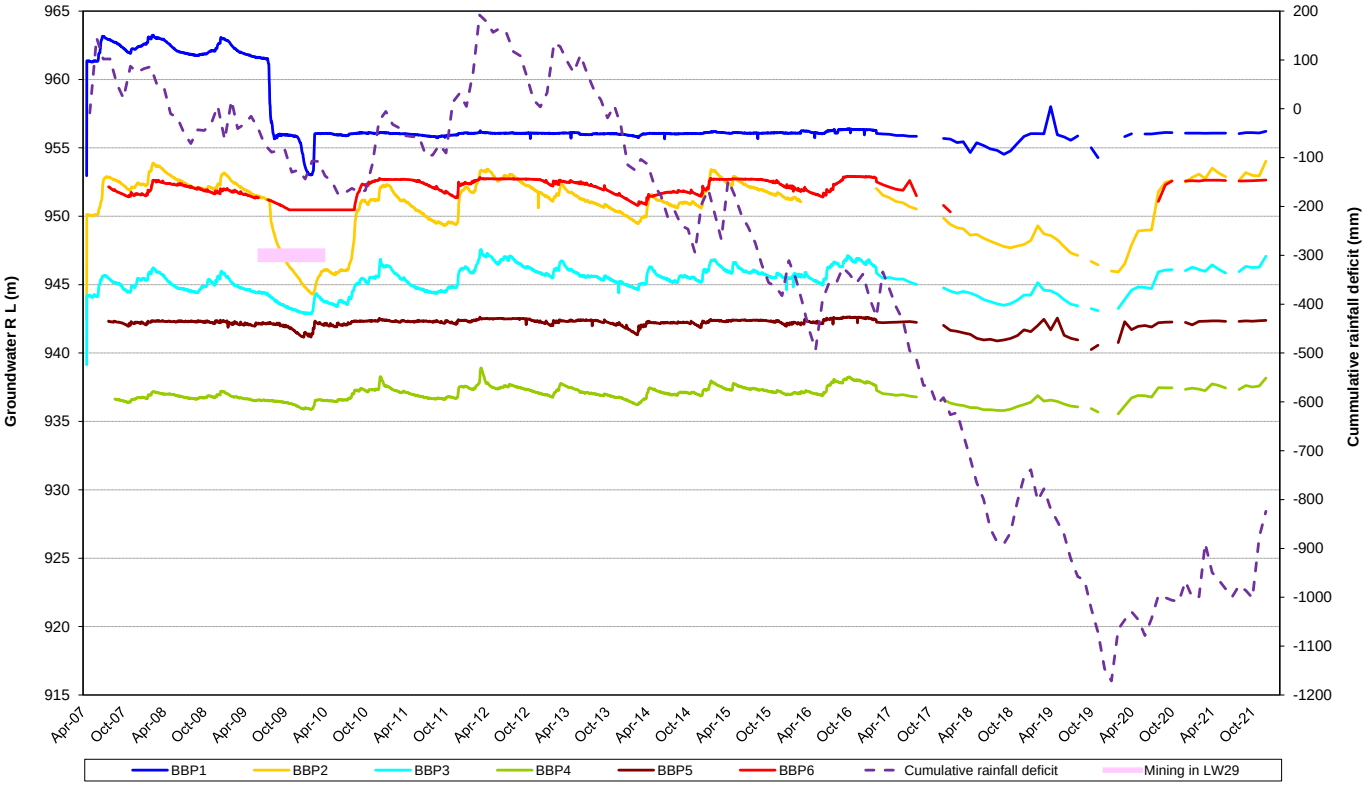


Figure 7.9: Coxs River Swamp groundwater levels and rainfall deficit

7.2.3.1 Comparison against Previous Annual Reviews

Groundwater data are plotted on **Figure 7.9** and **Figure 7.10**. The north – to – south downstream groundwater gradient has been broadly maintained (highest level observed in BBPB1 and lowest level observed in BBPB4), indicating that overall flow has been maintained down through the swamp.

All groundwater levels appear to be approximately at pre-mining levels, with the only exception being at piezometer BBP1, where a groundwater level has re-stabilised at RL 956 m (approximately 5 m below pre-mining level).

All bores saw a decrease in groundwater RL corresponding to the prolonged drought period and rainfall deficit from early 2017 until end 2019. During 2020 the higher volume of rainfall received comparative to previous years, corresponded with an increase in groundwater RLs in all bores. Water levels in all bores have remained relatively stable during 2021.

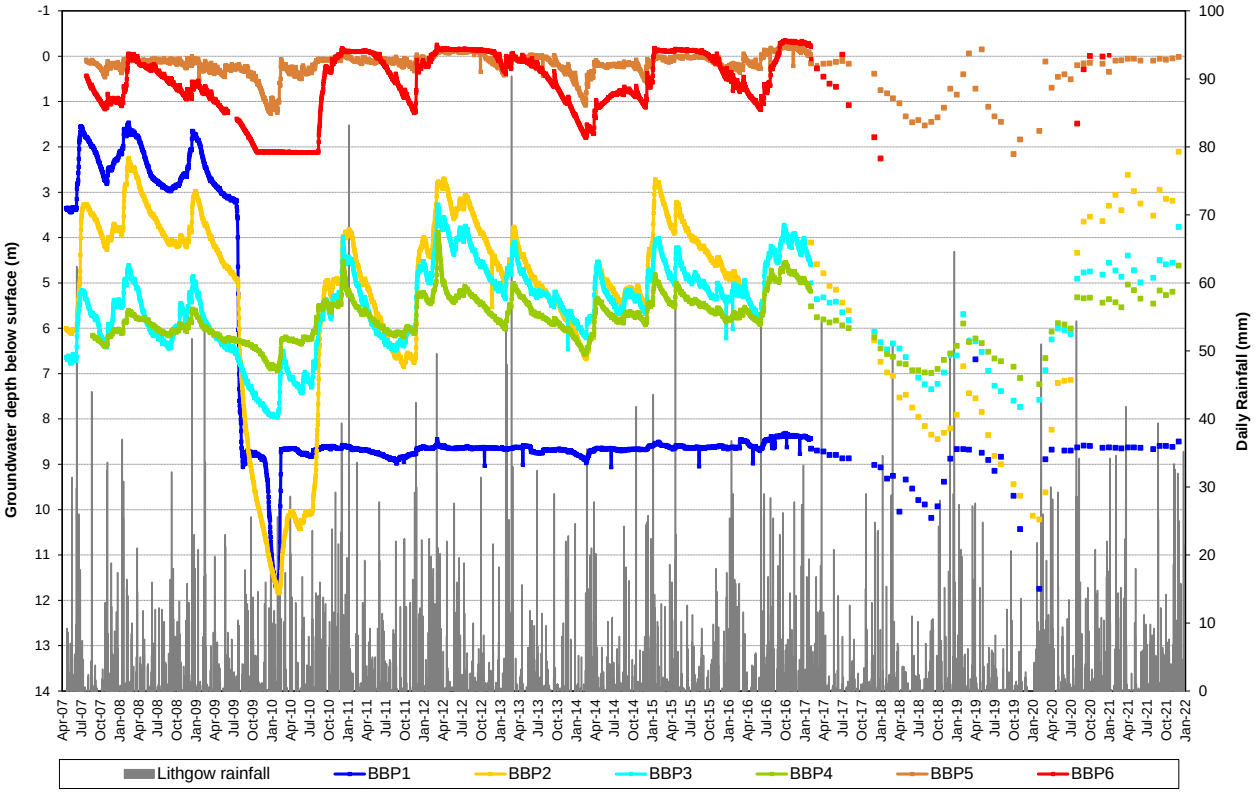


Figure 7.10: Longterm groundwater trends

7.2.3.2 Comparison against EA

The EA concluded that the likelihood of extraction of LW29-31 resulting in a significant impact on the Coxs River Swamp was considered extremely low.

All groundwater levels appear to be approximately at pre-mining levels, with the only exception being BBPB1, where groundwater has re-stabilised at RL956 (approximately 5 metres below pre-mining level).

Over the long-term, an emerging trend shows that groundwater levels in BBPB2, BBPB3 and BBPB4 all appear to correlate well with the overall cumulative rainfall deficit (difference between the monthly rainfall and the long-term average). The other remaining piezometers (BBPB5 and BBPB6), all appear resistant to short-term weather variances, due to the location of BBPB5 and BBPB6 in the centre of the swamp, which generally remains saturated. The prolonged drought period, as evidenced by the steady rainfall deficit from early 2017 until early 2020, saw all bores respond with decreasing water levels, and BBPB6 was recorded as dry from February 2018 until July 2020.

7.2.4 Groundwater Chemistry

Groundwater chemistry monitoring results for the reporting period are provided below in **Figures 7.11 to 7.15**.

Section 4.1.3 of the Groundwater Monitoring Plan requires the Cox's Swamp bores (BBPB1 – BBPB6) to be sampled according to schedule outlined below.

Piezometer ID	Water Level	pH	Electrical Conductivity (µS/cm)	Copper	Zinc	Iron	Speciation
BBPB1 - 6	Two Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Quarterly

Water samples were unable to be collected from BBPB2 in December 2020 and January 2021 due to damage to the bore. The bore was repaired, and samples taken in February 2021.

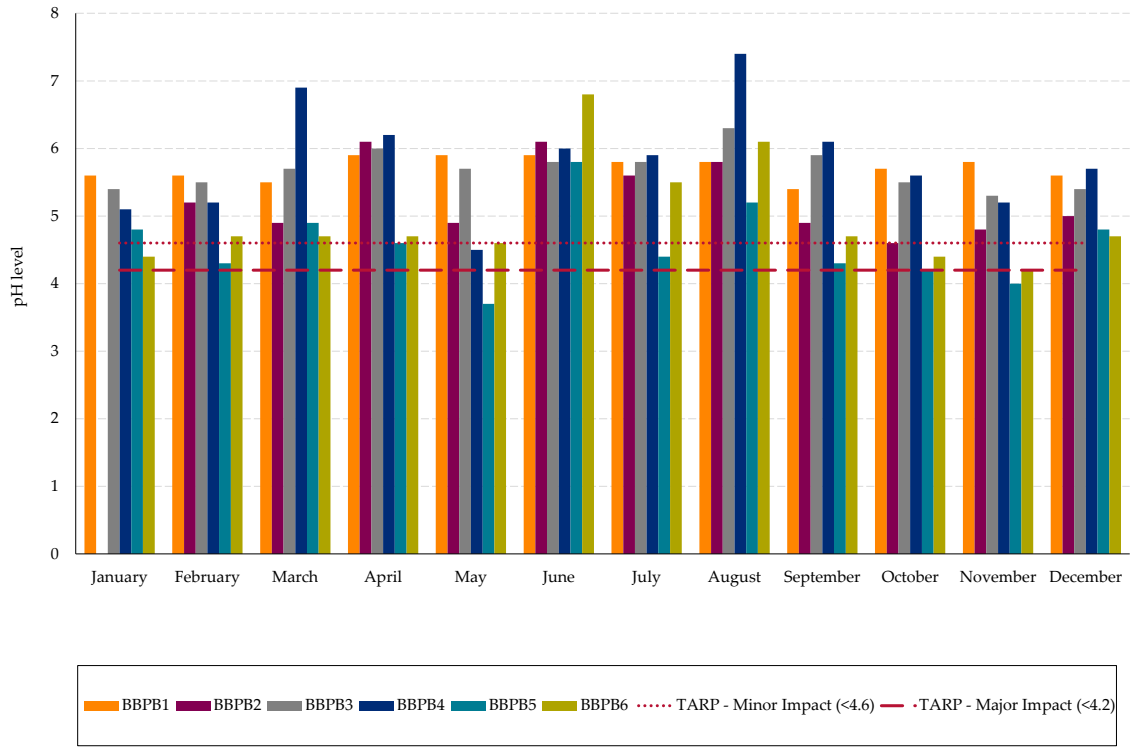


Figure 7.11: 2021 Groundwater pH levels.

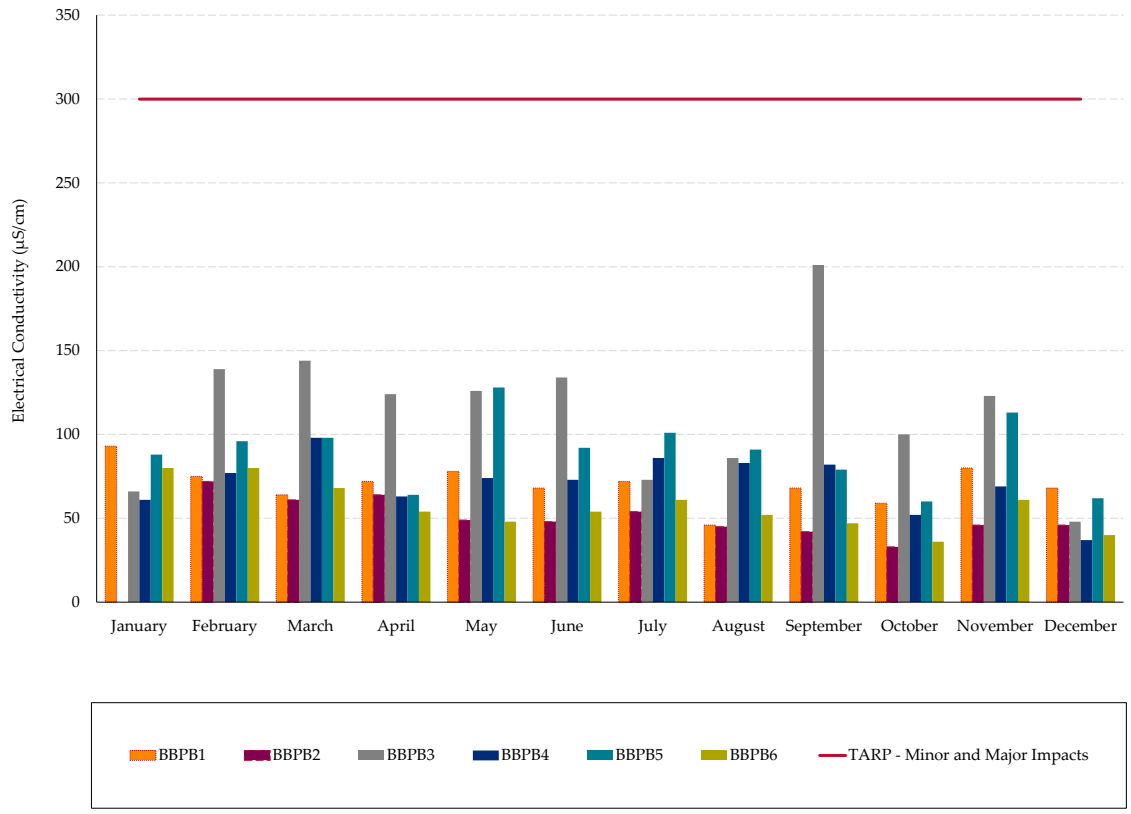


Figure 7.12: 2021 Groundwater Electrical Conductivity.

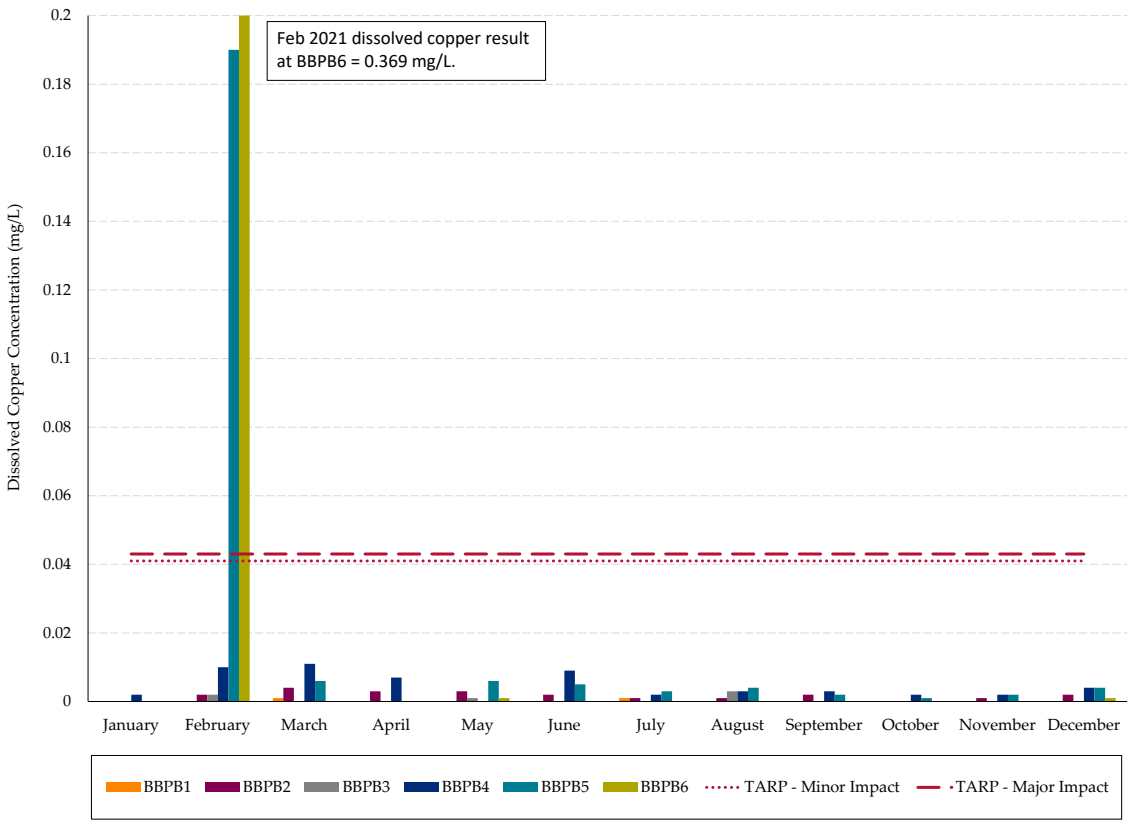


Figure 7.13: 2021 Groundwater Copper levels.

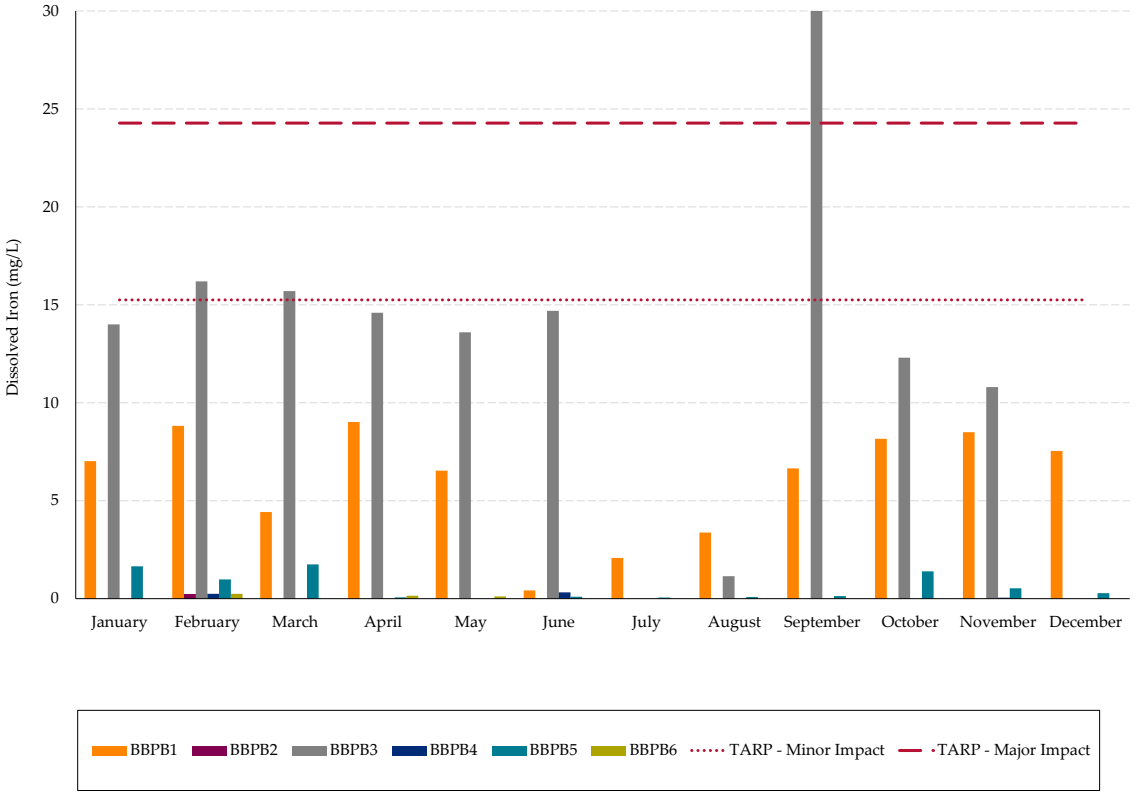


Figure 7.14: 2021 Groundwater Iron (dissolved) levels.

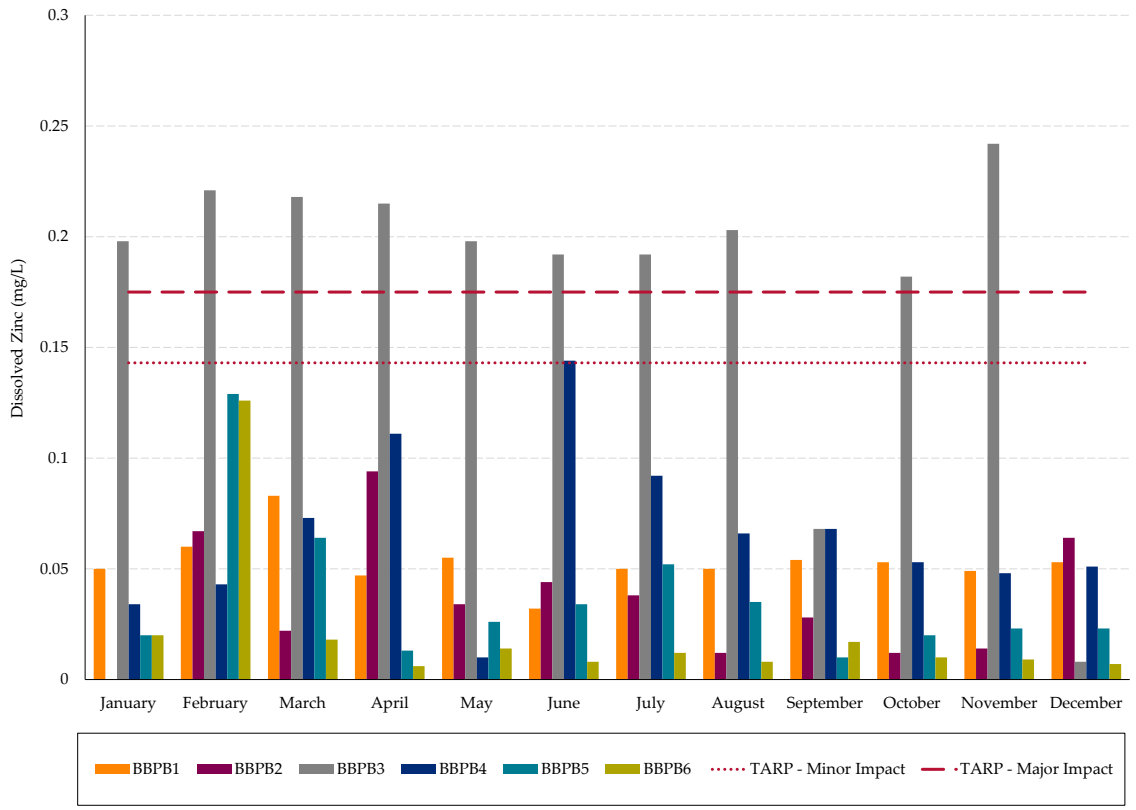


Figure 7.15: 2021 Groundwater Zinc Levels.

As shown in **Figure 7.11** above, all pH levels for bores BBPB1 through 3 were within both the minor and major impact criteria during 2021. BBPB4 was below the minor trigger level for one month in May 2021. BBPB5 was outside either the major and/or minor impact trigger levels for 6 months within 2021, including a three-month consecutive period from September until November. BBPB6 also dropped below the minor impact trigger levels for January, October and November 2021.
The pH levels outside of TARP criteria at BBPB5 from September until November 2021 were investigated. When *Section 3.3.3 Background Data Correction* of the Groundwater Monitoring Plan is applied, the corrected pH levels in BBPB5 are within trigger levels due to corresponding drops in pH at the background bore (BBPB4). Hence no notification to Regulatory agencies was required.

As shown in **Figure 7.12** above: electrical conductivity (EC) levels were within both the minor and major impact criteria for all groundwater monitoring bores during 2021.

As shown in **Figure 7.13**, copper levels were also within impact criteria for all groundwater monitoring bores during 2021, except at BBPB5 and BBPB6 in February 2021. The spike in copper levels was isolated to BBPB5 and BBPB6 for February 2021. Copper results returned to historical levels for the remainder of 2021, and no obvious cause for the spike was determined.

As shown above in **Figure 7.14**, 2021 iron levels were below the minor and major impact trigger levels for all bores except BBPB3. Dissolved iron levels at BBPB3 exceeded the minor impact trigger level in February and March 2021, and exceeded the major trigger level in September 2021. Due to the short duration of these exceedances no further action was undertaken.

As shown above in **Figure 7.15**, 2021 zinc levels were below the minor impact trigger level for all groundwater monitoring wells with the exception of BBPB3 and BBPB4. BBPB3 exceeded the major impact trigger levels from January to August 2021, and from October to November 2021. BBPB4 exceeded the minor impact trigger level for the month of June 2021.

This major impact TARP event has continued since August 2012. Note that mining in LW29-31 ceased in September 2011.

In 2012, Baal Bone Colliery commissioned a report by Aurecon which investigated groundwater quality and the TARP trigger levels. The Aurecon report (March 2012) investigated the increases in zinc at BBPB3 however was unable to find obvious reasons for these increases. The Aurecon investigation suggested that variable rainfall and corresponding changes in groundwater levels could be contributing to changes in zinc levels.

The 2019 Independent Environmental Audit (IEA) carried out by Hansen Bailey determined that the ongoing exceedance of Water Quality Trigger Levels for dissolved zinc at BBPB3 was a low risk non-compliance. The audit recommended that Baal Bone Colliery, “revisit the zinc trigger levels for BBP3 in consultation with DPIE for the closure stage”.

In the 2019 IEA Action Plan, Baal Bone Colliery committed that by 30 March 2021 a consultant will be engaged to further investigate the exceedance with consideration to be given to calibrating the groundwater triggers to site specific conditions if appropriate.

In 2020, Umwelt were engaged in part to determine the potential causes of elevated zinc concentrations at BBP3 and identify whether the existing groundwater minor and major change criteria (trigger values) should be updated. In relation to zinc Umwelt found that “t*he peak*

concentrations during many of these events was recorded shortly after increased rainfall following a prolonged dry period. This suggests that rainfall-runoff infiltration has mobilised zinc from dry strata within the BBP3 catchment and that a wetting and drying process could be a significant contributor to groundwater zinc concentrations." Also that *"Elevated zinc concentrations were observed to occur pre-mining, during mining and post-mining. Elevated zinc concentrations at times followed a rise in groundwater level in BBP3".*

Baal Bone Colliery provided a copy of the 2020 groundwater investigation report to DPIE in correspondence dated 17 November 2020. Formal notifications regarding the 2021 zinc exceedances were made to DPIE on 1 March 2021, 16 June 2021 and 25 August 2021.

7.2.4.1 Comparison against previous Annual Reviews

Table 7.10 summarises previous Annual Review results and any exceedances of TARP trigger levels (minor and major) in BBPB1 – BBPB6 during the period 2011 – 2021.

Table 7.10: Summary of TARP exceedances and previous Annual Review results

	BBPB1	BBPB2	BBPB3	BBPB4	BBPB5	BBPB6
2011	No TARP exceedance	No TARP exceedance	**Dissolved Iron**: Feb to Dec **Dissolved Zinc**: Jan, Feb, Aug, Nov, Dec	**Dissolved Copper**: Aug – Dec	No TARP exceedance	No TARP exceedance
2012	No TARP exceedance	No TARP exceedance	**Dissolved Iron**: Jan **Dissolved Zinc**: Jan, Jun, Aug to Dec	**Dissolved Copper:** Jan, Jul to Oct **Dissolved Zinc:** Oct	No TARP exceedance	No TARP exceedance
2013	No TARP exceedance	No TARP exceedance	**Dissolved Iron:** Jan, May, Oct to Dec **Dissolved Zinc:** Jan to Dec	**Dissolved Copper:** Sep to Dec **Dissolved Zinc:** Dec	No TARP exceedance	No TARP exceedance
2014	No TARP exceedance	No TARP exceedance	**Dissolved Iron:** Jan to Mar, Jul **Dissolved Zinc:** Jan to Dec	**Dissolved Copper:** Jan, Sep	No TARP exceedance	No TARP exceedance
2015	No TARP exceedance	No TARP exceedance	**Dissolved Iron:** Jan, Feb, Apr, Jun, Dec **Dissolved Zinc**: Jan to Dec	No TARP exceedance	No TARP exceedance	No TARP exceedance
2016	**Dissolved Copper:** Feb	No TARP exceedance	**Dissolved Iron:** Feb, Mar **Dissolved Zinc**: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Dec	No TARP exceedance	No TARP exceedance	No TARP exceedance
2017	No TARP exceedance	**Dissolved Iron**: Oct **Dissolved Zinc:** Oct	**Dissolved Iron**: Oct **Dissolved Zinc:** Jan, Feb, Mar, May, June, July, Aug, Sept, Nov, Dec	No TARP exceedance	No TARP exceedance	**Dissolved Copper**: Nov and Dec **Dissolved Iron**: Oct
2018	**Dissolved Iron**: July	**pH:** Nov	**Dissolved Iron:** Jan, Mar, Jun, Jul **Dissolved Zinc:** Jan to Jul, Sept to Dec	No TARP exceedance	**Dissolved Iron:** Mar, Jul **Dissolved Copper:** Mar, Jun, Jul	No TARP exceedance **(**BBPB6 dry during 2018)
2019	**EC:** July	No TARP exceedance	**Dissolved Iron:** Jun, July, Nov **Dissolved Zinc:** Jan to Nov	No TARP exceedance	No TARP exceedance	No TARP exceedance

2020	**Dissolved Iron:** April	No TARP exceedance	**Dissolved Zinc:** Apr to Jul, Sept to Dec **Dissolved Iron:** Mar, Apr, Jun, Jul, Dec	No TARP exceedance	**pH:** Apr to Dec **EC:** May	**Dissolved Zinc:** Aug **pH:** Aug to Dec **EC:** Aug
2021	No TARP exceedance	No TARP exceedance	**Dissolved Iron:** Feb, Mar, Sep **Dissolved Zinc:** Jan to Aug, Oct, Nov	**pH:** May **Dissolved Zinc:** Jun	**Dissolved copper:** Feb **pH:** Feb, May, Jul, Sep to Nov	**Dissolved copper:** Feb **pH:** Jan, Oct, Nov

7.2.4.2 Comparison against EA

The EA concluded that the likelihood of extraction of LW29-31 resulting in a significant impact on the Coxs River Swamp water quality and quantity (levels) is considered extremely low.

In terms of groundwater quality, minor and major changes have been noted for pH and trace metals at some bores however electrical conductivity has generally remained below its trigger level of 300 µS/cm. This indicates that the local groundwater has a very low salinity and is consistent with the local background of only 100µS/cm.

As noted in **Section 7.2.4**, there were a number of minor and major trigger level events during 2021 – particularly for zinc and pH. Both the 2012 Aurecon report and the 2020 Umwelt report on groundwater quality conclude that minor changes to groundwater quality can occur by chance in the variable conditions of rainfall and the resulting groundwater level changes. The 2021 reporting period saw higher rainfall in comparison to previous reporting periods.

In terms of both groundwater levels and quality, monitoring confirms that there has been no measurable impact from mining on the swamp.

7.2.5 Groundwater Model

As part of the mine closure planning process, a groundwater model was developed to estimate the long-term recovery of the regional groundwater table post mining (GHD, 2017). The predictions of the groundwater model informed a numerical water balance model that was used to estimate the flooding of the underground workings and the water level and quality of the Northern Void.

The Groundwater Monitoring Plan requires the validation of the groundwater model predictions of groundwater inflow into the mine workings every three years.

In 2020 GHD was commissioned to validate and compare monitoring data to MODFLOW model predictions. The validation concluded that the model provides a reasonable representation of the current rate of recovery of the underground water level (GHD 2020).

In early 2022 GHD validated the groundwater model again, comparing the latest water level recovery monitoring data for the underground workings against model predictions. Water levels collected for the north and southern dewatering bores and the Northern Void were compared against the model predictions.

Figure 7.16 shows observed standing water levels compared to the water levels predicted by the hydrogeological model and the underground recovery water balance model.

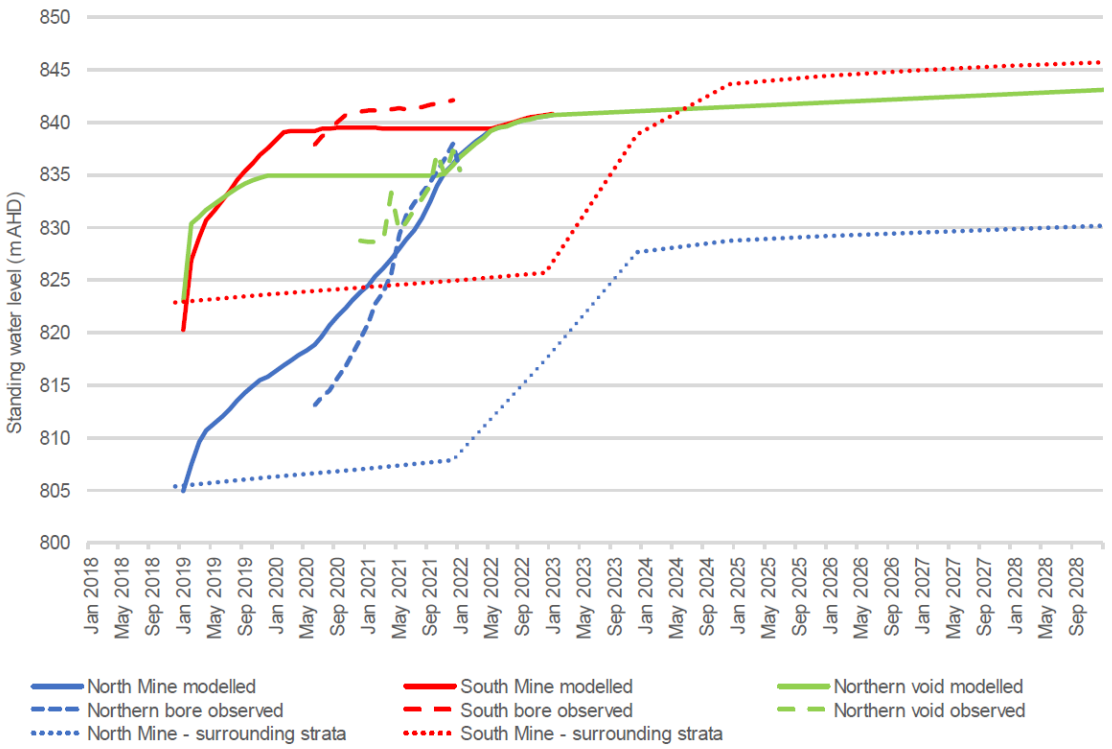


Figure 7.16 Observed and modelled post-closure groundwater level

The 2022 GHD Groundwater Model validation report found that:
" Review of seam floor contours indicates that the southern area of the workings is likely spilling into the northern area of the workings and the northern void. This is causing the water level at the south dewatering bore to remain relatively constant while the water level at the north dewatering bore and northern void continues to rise. The hydrogeological model assumed that the water level in the workings and the goaf would rise relatively uniformly throughout the workings.

The underground recovery water balance model was intended to provide a more realistic representation of water levels during the early part of the recovery, before the water level in the workings, goaf and surrounding strata equilibrated. Comparison of the observed and modelled water levels in Figure 7.16 shows that observed water levels are generally within 3 m of the predictions, although some uncertainty remains due to the partially dewatered initial conditions when dewatering ceased."

7.3 Channel Stability Monitoring

The Surface Water Monitoring Plan requires that Channel Stability Monitoring be undertaken annually for Coxs River, Ben Bullen Creek, Baal Bone Creek and Jews Creek to assess the condition of the watercourse.

Channel Stability Monitoring was first undertaken in 2014 (mining ceased in 2011). Following the initial monitoring in 2014, the scope of the monitoring program was limited to only areas of active erosion as identified in the 2014 monitoring program (Stream Health Monitoring Recommendations – Umwelt, dated 30 November 2015).

Therefore, as mining will not recommence, only monitoring locations Co-2, Co-3 and Co-4 on Cox's Creek, Be-2, Be-3, Be-4, Be-5 and Be-6 on Ben Bullen Creek, and Ba-2 and Ba-3 on Baal Bone Creek need to be inspected as part of the annual monitoring program.

Channel Stability Monitoring was undertaken on 15 and 16 November 2021 by Umwelt.

The 2021 Channel Stability Monitoring Report concluded that:

"During the 2021 channel stability assessment, it was observed that some assessment points show differences in condition when compared to those observed in previous years. These changes are likely due to a combination of bush fire activity at the beginning of 2020 and recent substantial rainfall. Generally, the calculated activity ratings are similar to those reported from 2020 and therefore the conclusions regarding the cause of erosion remain consistent with those detailed in the 2020 monitoring report (Umwelt 2020b)."

7.4 Stream Health Monitoring

The Surface Water Monitoring Plan required that Stream Health Monitoring be undertaken for Coxs River, Ben Bullen Creek, Baal Bone Creek and Jews Creek to determine the overall health and condition of each of the four watercourses

Stream Health Monitoring was in 2014. Following the results of the 2014 monitoring and due to the care and maintenance status of Baal Bone Colliery, annual Stream Health Monitoring was suspended.

As per advice from Umwelt (Stream Health Monitoring Recommendations – Umwelt, dated 30 November 2015) and the **Surface Water Monitoring Plan**:

Prior to the commencement of Ben Bullen Creek Rehabilitation works, aquatic fauna monitoring sites will be identified in Jew's Creek and in analogue sites in order to establish baseline completion criteria. Following the completion of physical Ben Bullen Creek rehabilitation works, the monitoring will be extended to sites in the rehabilitated creek line with rehabilitation success being assessed against the analogue site(s).

Accordingly in June 2020 an aquatic fauna monitoring event was completed by Umwelt to establish analogue sites and collect baseline aquatic fauna data prior to rehabilitation works commencing in Ben Bullen Creek. Three analogue aquatic fauna monitoring sites were established in Ben Bullen Creek, Wangcol Creek and Coxs River, as these are considered permanent creeks during drought conditions.

In November 2021 aquatic fauna monitoring was carried out in the three analogue sites established in 2020, as well as two new monitoring sites within the rehabilitated sections of Ben Bullen Creek.

The methodology involved collecting macro-invertebrate samples at each site near edge habitats and macrophytes. Macro-invertebrates were sorted to a family or subfamily level (depending on requirements of the AUSRIVAS model). These macro-invertebrates were then used to assign a Stream Invertebrate Grade Number – Average Level version 2 (SIGNAL2) score for water quality (based upon pollution tolerance).

Table 7.11 provides the outcome of the 2020 and 2021 Aquatic Fauna Monitoring.

Table 7.11: Outcomes of 2020 and 2021 aquatic fauna monitoring

	2020		2021	
Site	Signal2 Grade	No. of Macro-Invertebrate Families	Signal2 Grade	No. of Macro-Invertebrate Families
Analogue Sites				
BBC-AQ1	4.17	11	4.167	4
WC-AQ1	3.48	17	3.556	5
CR-AQ1	4.79	17	4.473	11
Rehabilitated Sites				
BBC-R1	-	-	2.259	9
BBC-R3	-	-	3.375	4

The aquatic fauna monitoring found that the SIGNAL2 grades for the two sites on the newly rehabilitated Ben Bullen Creek were lower than the analogue sites. Site BBC-R3 was only slightly lower than the analogue site with the lowest SIGNAL2 grade. It is likely that sites BBC-R1 and BBC-R3 will continue to improve during subsequent monitoring events.

Furthermore, the analogue site BBC-AQ1 is downstream of the rehabilitated sites, however the Signal2-Grade for this site remained consistent. This suggests that the work involved with the rehabilitation of Ben Bullen Creek has not had a detrimental effect on downstream macro-invertebrate communities.

Umwelt (2021) concluded that:
"The SIGNAL2 grades for the newly established sites within the rehabilitated creek line of Ben Bullen Creek were lower than those of the analogue sites. As this is the first year of monitoring of the rehabilitated creek line, it is not expected that aquatic fauna assemblages should match those of analogue sites. It is expected that the aquatic fauna assemblages and respective SIGNAL2 grades of the sites within the rehabilitated creek line of Ben Bullen Creek will improve in similarity to the analogue sites over time".

Given that the rehabilitation of Ben Bullen Creek was only recently completed, Umwelt (2021) did not provide any recommendations for improving current management actions, other than the continuation of aquatic fauna monitoring.

8 Rehabilitation

8.1 Status of Rehabilitation

Rehabilitation activities are carried out in accordance with the approved Baal Bone Colliery Mine Closure MOP 2019 -2025. The primary objective of rehabilitation is to create a safe, stable final landform with self-sustaining native vegetation communities.

A summary of rehabilitation works for the previous, current and next reporting periods are detailed in **Table 8.1**.

Table 8.1: Summary of Rehabilitation Performance[4]

Mine Area Type	Previous Reporting Period (Actual) (ha)	This Reporting Period (Actual) (ha)	Next Reporting Period (Forecast) (ha)
	2020	2021	2022
A. Total Mine Footprint[5]	475	475	475
B. Total active disturbance	152.8	110	91.2
C. Land being prepared for rehabilitation	45.7[6]	42.8	18.8
D. Land under active rehabilitation	217.4	260.2	279
E. Completed rehabilitation	0	0	0

In 2007 and 2008 110ha in the Northern and Southern open cut areas were shaped to final landform, covered with clay loam free-dig material and treated with a range of structural soil conservation and stormwater management works. Soils were ameliorated with agricultural lime and gypsum and seeded with a range of native and improved pasture seed mixes.

During 2019, eleven entries into the underground mine, and the Longwall 19 ventilation shaft were filled and sealed in accordance with MDG6001 Guidelines for Permanent Filling and Capping of Surface Entries to Coal Seams. In 2020 a further eight buried adits were drilled, grouted and sealed.

In January 2020 demolition of infrastructure on the Baal Bone site commenced, which included the demolition of the Coal Handling Preparation Plant (CHPP), bathhouse and workshop, as well as all coal conveyors, reclaim tunnels, transfer towers, bins, sheds and other associated ancillary infrastructure. The rail loop linking the site to the Main Western Railway line was also decommissioned and all rail lines, ballast and sleepers were removed from the corridor. The

[4] Values at A and B are given as at the end of the reporting period whilst values at C and D reflect areas rehabilitated during the period

5 This figure excludes the Subsidence Domain as per Annual Review Guideline (2015).

[6] Total rehabilitation area includes 0.6 ha in previously rehabilitated areas.

remaining infrastructure: the administration building, workshop and other ancillary infrastructure were demolished during 2021.

The civil works and rehabilitation component of the closure activities commenced in September 2020. The remediation of the CHPP and Run of Mine (ROM) areas and the former rail corridor was undertaken over the remaining period of 2020. Activities included the addition of topsoil, fertiliser, lime and gypsum followed by the areas being ripped. The CHPP ROM area was then seeded with a pasture seed mix and the rail loop was seeded with a woodland seed mix – completing approximately 45 ha of rehabilitation during 2020.

During 2020 and 2021 filling of voids including the Leachate Dam, REA 6 Tailings Dam, Central Void and the Southern Void was also undertaken. In total over 1,000,000m3 was introduced into these areas.

In 2021 rehabilitation works commenced on sections of Ben Bullen Creek where it passes through the site. Remediation works included large amounts of rock revetment along the banks of the creek, the installation of high and low flow channels, and highwall safety and stabilisation work. Over 10,000 tubestock plants, including the threatened Captertee Stringybark were planted along the remediated sections of Ben Bullen Creek.

During 2021, approximately 42 ha was rehabilitated and seeded including areas surrounding the Northern and Central Voids, the Southern Void and the banks of Ben Bullen Creek.

In 2022, shaping, ripping and seeding of unrehabilitated areas of the site with pasture and woodland seed mixes will continue. These areas include the former pit top area, haul roads and Central Void. Once all areas of the Colliery are rehabilitated, the site will enter a monitoring and maintenance phase.

During 2022 work will commence to develop certification applications with DPIE – Resources Regulator for older rehabilitation areas that have achieved completion criteria.

Plate 2 provides photos demonstrating rehabilitation progress.

Pit top – July 2019	Pit Top – March 2022
	
CHPP ROM – July 2019	CHPP ROM – March 2022
	
Southern REA – January 2021	Southern REA - February 2021
	
BB Creek Reach 2 – January 2021	BB Creek Reach 2 – March 2022
	

8.1.1 Subsidence Remediation

In March 2021 subsidence repairs were carried out on a number of cracks above LW29-31. During 2021 subsidence inspections were carried out in March and July 2021.

The assessment and remediation criteria set out the **Mine Closure MOP 2019-2025 (Section 3.2.5)** will be used as a guide for future remediation activities. Remediation activities will be undertaken in response to regular monitoring until rehabilitation has been achieved.

Each site once rehabilitated will have an inspection and photograph taken to provide evidence that the work has been completed to the required scope of work determined for the closure criteria stage. This information will be recorded and maintained within the subsidence database until tenure relinquishment.

8.2 Performance Indicators and Completion Criteria

The Baal Bone Colliery MOP divides the lease area into seven different domains. **Section 6 of the Baal Bone Colliery Mine Closure MOP 2019 - 2025** outlines the rehabilitation performance indicators and closure criteria that must be met to demonstrate that the rehabilitation objectives for each domain have been achieved over the six different rehabilitation phases (i.e. (1) Decommissioning, (2) Landform Establishment, (3) Growth Medium Development, (4) Ecosystem and Land Use Establishment, (5) Ecosystem and Land Use Sustainability, and (6) Relinquished Lands).

A range of different environmental monitoring and inspections are used to measure progress towards the rehabilitation completion criteria for each phase, including; landform surveys and inspections, water monitoring, soil tests, flora and fauna monitoring. In particular the completion criteria outlined in the Ecosystem and Land Use Establishment phase, and Ecosystem and Land Use Sustainability phase are tracked via the Annual Ecological Rehabilitation Monitoring outlined below at **Section 8.3.2.**

8.3 Rehabilitation Inspections and Monitoring

Three types of rehabilitation monitoring/inspections are undertaken at Baal Bone. These include;

- Regular inspections by site personnel,
- An annual environmental rehabilitation walk around inspection and
- Annual Ecological Rehabilitation Monitoring which was implemented in 2009.

8.3.1 Annual Environmental Rehabilitation Inspection

The 2021 Annual Environmental Rehabilitation Inspection was conducted by DnA Environmental from 23rd November 2021.

The inspection noted some isolated areas needing additional work to remediate weeds; erosion and rilling; and other minor issues. Recommended actions have been entered into CMO - Baal Bone's compliance tracking system.

8.3.2 Annual Ecological Rehabilitation Monitoring

An Annual Ecological Rehabilitation Monitoring program is undertaken at Baal Bone Colliery to evaluate the success of rehabilitation and Baal Bone Colliery's progress towards fulfilling long term land use objectives. The monitoring program will continue within rehabilitation areas until all rehabilitation closure criteria are satisfied, and mining leases are relinquished.

Sixteen monitoring sites and six reference sites have been established to monitor flora, fauna, landscape function and habitat values aimed at assessing ecosystem function in remnant vegetation and rehabilitation areas (**Appendix A – Plan 6).**

Monitoring of these sites is undertaken annually until rehabilitation areas reach acceptable levels of establishment, and then monitoring will be undertaken periodically. Monitoring of these sites assesses:

- Plant community structural attributes;
- Cover, species density, height and structural diversity;
- Species richness (the number of plant species present in each structural layer of each vegetation community);
- The presence and abundance of any weed species; and
- Assessment of natural regeneration/recruitment of new species.

The findings of this monitoring program are used to assist in management recommendations for appropriate rehabilitation works within Baal Bone Colliery holdings. Where necessary, rehabilitation procedures are amended accordingly to continually improve rehabilitation standards.

The findings of the Annual Ecological Rehabilitation Monitoring program are also used to assess progress towards rehabilitation commitments in the Baal Bone Colliery Mine Closure MOP 2019-2025. **Section 6** in the **Mine Closure MOP 2019-2025** sets out performance indicators and completion criteria. Baal Bone Colliery will demonstrate achievement of all completion criteria prior to seeking relinquishment of the site.

2021 Annual Ecological Rehabilitation Monitoring Results

The results of the 2021 monitoring, undertaken by DnA Environmental from the 15th – 19th November 2021 are summarised in **Table 8.2** below. The table indicates the performance of the mixed eucalypt woodland and exotic pasture rehabilitation monitoring sites against 70% primary completion performance indicators in 2020. The selection of criteria has been presented in order of rehabilitation phases according to the ESG3 MOP guidelines. The range values of the ecological performance targets are amended annually. Rehabilitation sites meeting or exceeding the range values of their representative target community type have been identified with a coloured box and have therefore been deemed to meet these primary completion performance targets this year. Hashed coloured boxes associated with soil condition indicate they may be outside of the reference target ranges, but within acceptable agricultural limits.

Table 8.2: Performance of the rehabilitation sites against completion criteria and primary performance indicators in 2021

Rehabilitation Phase	Aspect or ecosystem component	Completion criteria	Performance Indicators	Unit of measure (*desirable)	NOC3 Pasture	NOC5 Pasture	ROM01 Pasture	ROM02 Pasture	Box Cut 2021	NOC1 2021	NOC2 2021	SOC1 2021	SOC2 2021	SOC3 2021	SOC4 2021	SOC5 2021	REA5 2021	RLP01 2021	RLP02 2021	VentRehab
Performance indicators are quantified by the range of values obtained from representative reference sites in 2021					**70% meet criteria**															**100% meet criteria**
Phase 2: Landform establishment and stability	**Landform slope, gradient**	Landform suitable for final land use and generally compatible with surrounding topography	Slope	< Degrees (°)	**7**	**1**	**1**	**2**	**14**	**5**	**5**	**8**	**6**	**6**	**1**	**15**	**2**	**0**	**1**	**5**
	Active erosion	Areas of active erosion are limited	Cross-sectional area of rills	m2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Phase 3: Growth medium development	**Soil chemical, physical properties and amelioration**	Soil properties are suitable for the establishment and maintenance of selected vegetation species	pH	pH (5.6-7.3)	**6.4**	**8.1**	**8.0**	**7.6**	**6.4**	**5.2**	**4.7**	**5.3**	**5.7**	**5.2**	**5.5**	**5.8**	**6.4**	**6.9**	**6.9**	**5.6**
			EC	< dS/m (<0.150)	**0.025**	**0.083**	**0.262**	**0.652**	**0.064**	**0.028**	**0.082**	**0.041**	**0.026**	**0.030**	**0.033**	**0.045**	**0.125**	**0.056**	**0.150**	**0.028**
			Phosphorous	mg/Kg (50)	**3.3**	**3.9**	**32.8**	**56.4**	**3.9**	**3.3**	**2.3**	**3.9**	**3.3**	**4.3**	**4.9**	**5.2**	**12.1**	**12.8**	**14.4**	**5.6**
			Nitrate	mg/Kg (>13)	**1.2**	**1.2**	**1.2**	**1.2**	**1.5**	**1.2**	**1.2**	**1.4**	**1.2**	**2.1**	**1.9**	**4.4**	**1.2**	**1.2**	**1.2**	**2.0**
			ESP	% (<5)	**1.5**	**1.8**	**1.0**	**0.9**	**2.6**	**0.9**	**0.7**	**3.3**	**1.6**	**2.1**	**3.4**	**0.8**	**3.5**	**1.5**	**2.2**	**1.6**

Rehabilitation Phase	Aspect or ecosystem component	Completion criteria	Performance Indicators	Unit of measure (*desirable)	NOC3 Pasture	NOC5 Pasture	ROM01 Pasture	ROM02 Pasture	Box Cut 2021	NOC1 2021	NOC2 2021	SOC1 2021	SOC2 2021	SOC3 2021	SOC4 2021	SOC5 2021	REA5 2021	RLP01 2021	RLP02 2021	VentRehab
Phase 4: Ecosystem& Land Use Establishment	**Landscape Function Analysis (LFA): Landform stability and organisation**	Landform is stable and performing as it was designed to do	LFA Stability	%	65.5	69.6	68.5	57.4	68.0	73.5	72.5	72.0	72.6	73.8	75.0	68.9	72.0	55.6	50.1	63.4
			LFA Landscape organisation	%	100	88	91	28	97	100	100	100	98	100	100	93	100	56	28	55.0
	Herbage Biomass	Pasture productivity is comparable to analogue sites.	Green Dry Matter Biomass	kg/ha	40	20	2400	1350	na	na	na	na	na	na	na	na	na	na	na	na
	Vegetation diversity	Vegetation contains a diversity of species comparable to that of the local remnant vegetation	Diversity of shrubs and juvenile trees	species/area	na	na	na	na	11	12	11	12	7	20	19	6	12	14	8	19
				% endemic	na	na	na	na	93	100	99.7	100	100	99	99.9	93	97	100	100	100
			Total species richness	No./area	na	na	na	na	39	30	34	39	35	54	55	47	46	66	50	58
			Native species richness	>No./area	na	na	na	na	28	29	26	32	33	44	45	24	23	54	32	51
			Exotic species richness	<No./area	na	na	na	na	11	1	8	7	2	10	10	23	23	12	18	7

Rehabilitation Phase	Aspect or ecosystem component	Completion criteria	Performance Indicators	Unit of measure (*desirable)	NOC3 Pasture	NOC5 Pasture	ROM01 Pasture	ROM02 Pasture	Box Cut 2021	NOC1 2021	NOC2 2021	SOC1 2021	SOC2 2021	SOC3 2021	SOC4 2021	SOC5 2021	REA5 2021	RLP01 2021	RLP02 2021	VentRehab
	Vegetation density	Vegetation contains a density of species comparable to that of the local remnant vegetation	Density of shrubs and juvenile trees	No./area	na	na	na	na	896	552	341	712	2260	1020	1038	496	162	554	372	426
	Ecosystem composition	The vegetation is comprised by a range of growth forms comparable to that of the local remnant vegetation	Tree species	No./area	na	na	na	na	9	7	6	7	3	11	9	0	7	3	2	5
			Shrub species	No./area	na	na	na	na	9	12	10	8	9	13	11	8	5	15	9	23
			Herb species	No./area	na	na	na	na	12	5	11	20	14	22	25	30	24	35	28	16
Phase 5: Ecosystem & Land Use Sustainability	**Landscape Function Analysis (LFA): Landform function and ecological performance**	Landscape Function Analysis (LFA): Landform function and ecological performance	LFA Infiltration	%	52.4	30.2	35.8	22.7	48.2	44.0	49.4	47.7	41.2	52.5	53.2	48.4	40.3	29.5	18.5	30.2
			LFA Nutrient recycling	%	52.4	34.5	35.7	19.2	49.1	49.7	52.7	52.0	47.4	58.0	54.8	50.2	43.6	24.8	14.6	29.6
	Protective ground cover	Ground layer contains protective ground cover	Perennial plant cover (< 0.5m)	%	37.5	5.0	77.0	44.5	34.5	27.1	51.0	22.0	20.5	49.0	47.5	23.0	8.5	3.0	11.5	24.5

Rehabilitation Phase	Aspect or ecosystem component	Completion criteria	Performance Indicators	Unit of measure (*desirable)	NOC3 Pasture	NOC5 Pasture	ROM01 Pasture	ROM02 Pasture	Box Cut 2021	NOC1 2021	NOC2 2021	SOC1 2021	SOC2 2021	SOC3 2021	SOC4 2021	SOC5 2021	REA5 2021	RLP01 2021	RLP02 2021	VentRehab
		and habitat structure comparable with the local remnant vegetation	Total Ground Cover	%	95.0	79.0	93.5	67.0	84.5	97.8	100.0	100.0	76.5	99.5	97.5	100.0	95.5	19.6	17.1	67.5
	Ground cover diversity	Vegetation contains a diversity of species per square meter comparable to that of the local remnant vegetation	Native understorey abundance/m2	> species/m^2	1.8	3.0	0.6	0	5.6	4.8	3.8	4.6	6.6	6.0	7.4	3.8	3.0	3.8	4.2	4.4
			Exotic understorey abundance/m2	< species/m^2	4.6	7.6	3.4	3.8	2.6	0.2	2.0	0.6	0.2	0.6	1.6	5.2	9.2	2.2	2.8	2.0
		Native ground cover abundance is comparable to that of the local remnant vegetation	Percent ground cover provided by native vegetation <0.5m tall	%	22.4	24.4	6	0	71.6	97.7	74.1	91.9	98.3	95.0	88.0	41	22.7	65.6	48	75
	Ecosystem growth and natural recruitment	The vegetation is maturing and/or natural recruitment is occurring at rates similar to those of the local remnant vegetation	shrubs and juvenile trees 0 - 0.5m in height	No./area	na	na	na	na	568	232	85	452	1940	754	741	280	20	506	372	220
			shrubs and juvenile trees 1.5 - 2m in height	No./area	na	na	na	na	8	44	64	20	16	5	8	24	7	4	0	14
	Ecosystem structure	The vegetation is developing in structure and complexity	Foliage cover 0.5 - 2 m	% cover	17	0	0	0	9	19	10	18	10	6	0	10	5	0	0	0

Rehabilitation Phase	Aspect or ecosystem component	Completion criteria	Performance Indicators	Unit of measure (*desirable)	NOC3 Pasture	NOC5 Pasture	ROM01 Pasture	ROM02 Pasture	Box Cut 2021	NOC1 2021	NOC2 2021	SOC1 2021	SOC2 2021	SOC3 2021	SOC4 2021	SOC5 2021	REA5 2021	RLP01 2021	RLP02 2021	VentRehab
		comparable to that of the local remnant vegetation	Foliage cover 2 - 4m	% cover	9	0	0	0	10	5	11	27	11	4	0	6	0	0	0	0
			Foliage cover >6m	% cover	0	0	0	0	0	0	0	1	0	12	18	12	0	0	0	0
	Tree diversity	Vegetation contains a diversity of maturing tree and shrubs species comparable to that of the local remnant vegetation	Endemic Species	% endemic	na	na	na	na	100	100	100	100	100	40	76	100	0	100	0	0
	Tree density	Vegetation contains a density of maturing tree and shrubs species comparable to that of the local remnant vegetation	Tree density	No./area	na	na	na	na	38	34	44	50	22	58	40	68	0	2	0	0
	Ecosystem health	The vegetation is in a condition comparable to that of the local remnant vegetation.	Healthy trees	% population	na	na	na	na	26	47	0	14	41	26	10	7	0	50	0	0
			Flowers/fruit: Trees	% population	na	na	na	na	8	9	9	16	27	5	18	6	0	0	0	0

The 2021 Annual Ecological Rehabilitation Monitoring Report concludes that the older NOC and SOC woodland rehabilitation areas have met almost all of the 70% completion criteria targets, demonstrating that diverse and self sustaining mixed eucalypt woodlands have established on these older areas.

During 2022 work will commence to develop certification applications with DPIE – Resources Regulator for older rehabilitation areas that have achieved completion criteria.

Rehabilitation monitoring and maintenance work will continue during 2022.

8.4 Ben Bullen Creek Rehabilitation Project

From 2007 to 2009 stabilisation and restoration works were completed along two sections (Reach 1 and 3) of the Ben Bullen Creek including riparian vegetation (tube stock) planting in upper and lower reaches.

Under Project Approval 09_0178, Baal Bone was required to review its water management systems which included a review of the Ben Bullen Creek Natural Channel Design and Restoration Plan, originally prepared in 2007.

A review of the Ben Bullen Creek Natural Channel Design and Restoration Plan during 2012/2013 indicated that remediation of the current Ben Bullen Creek diversion through the pit top area may be optimal to the reinstatement of the creek to its pre-disturbance pathway (approximately pathway post Ben Bullen Mine 1952).

URS were commissioned in 2013 to carry out a Phase 1 assessment of Ben Bullen Creek.Findings from the assessment recommended that the existing diversion be maintained for Ben Bullen Creek.

Following discussions held with DP&E in 2014, a modification was sought by Baal Bone to modify the approved final landform plan and associated conditions for the Baal Bone Coal Project under Project Approval 09_0178. The modification was sought under Section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act), and will facilitate the changes to final alignment and rehabilitation of Ben Bullen Creek. In December 2015, DP&E approved the modification to allow Ben Bullen Creek to remain in its current alignment.

On the 13 December 2016, the Ben Bullen Creek Rehabilitation Plan was submitted to DP&E for review and approval. It was also sent to OEH, Fisheries NSW, DRE and DPI Water for consultation purposes as required by PA 09_0178. The Ben Bullen Creek Rehabilitation Plan was approved by the DP&E on 13 December 2017.

In 2021 rehabilitation works commenced on Reach 2 of Ben Bullen Creek. works included large amounts of rock revetment along the banks of the creek, the installation of high and low flow channels, and highwall safety and stabilisation work. Over 10,000 tubestock plants, including the threatened Captertee Stringybark were planted along the remediated sections of Ben Bullen Creek.

8.5 Other Infrastructure

During 2021, a number of buildings and other infrastructure onsite have been demolished as outlined in **Section 4.3.**

9 Community

9.1 Community Consultative Committee

The Baal Bone Colliery Community Consultative Committee (CCC) has been established to provide a formal conduit for exchange of information and views between the local community and Baal Bone's Management Team.

One CCC meeting was held during the reporting period on 7 December 2021. No further CCC meetings are planned given mine closure works are scheduled to be completed in early 2022.

9.2 Community Complaints

There were no community complaints received during the 2021 reporting period.
A community complaint summary is available from the Baal Bone website: *https://www.glencore.com.au/operations-and-projects/coal/past-operations/baal-bone-colliery/community-documents*.

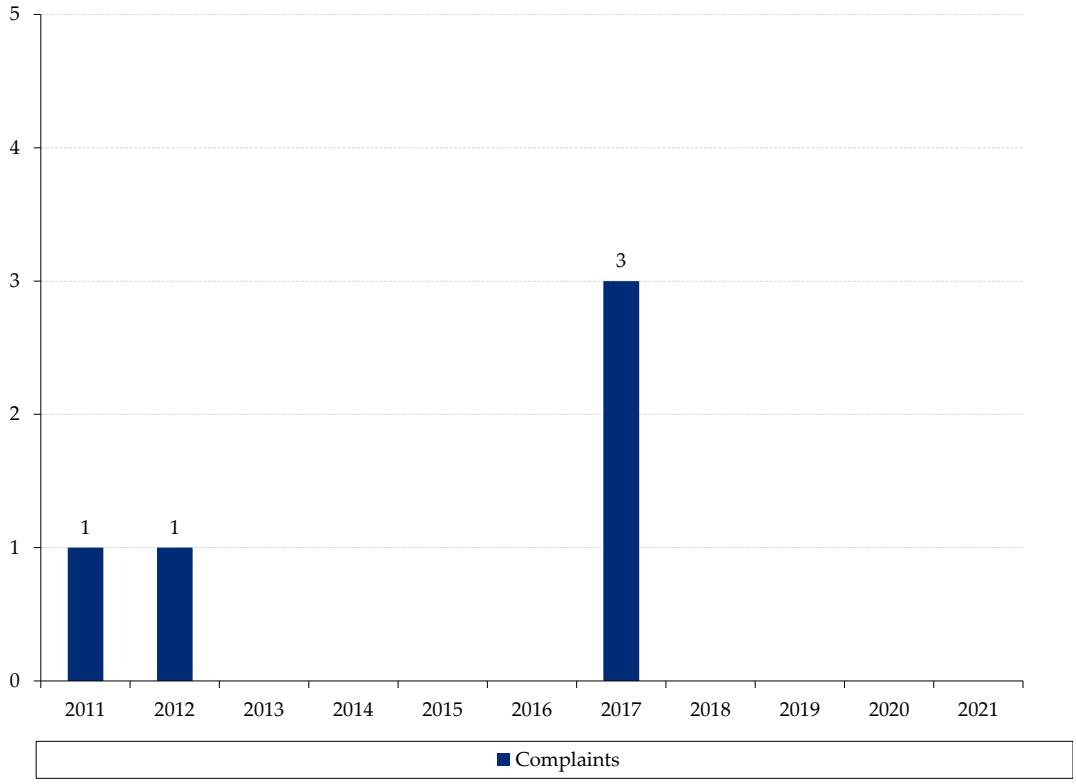


Figure 9.1: Community complaints by year

9.3 Community Sponsorship

Glencore invests in Health, Arts and Culture, Education and Enterprise, Environment and the Community, including, as an example, education grants to NSW Government Schools.

10 Independent Audit

Baal Bone Colliery underwent an Independent Environmental Audit (IEA), as per Schedule 5, Condition 7 of PA 09_0178 in December 2019. The site component of the audit was conducted on 17 and 18 December 2019 by Hansen Bailey. Baal Bone Colliery received the final audit report from Hansen Bailey on 27 February 2020. The IEA Report Executive Summary concludes that "*Baal Bone Colliery is being managed at a high level of compliance on environmental matters*".

A copy of the most recent as well as previous audit reports, and responses to audit recommendations can be found on the Baal Bone Colliery website. Audit actions have been entered into CMO - Baal Bone's compliance tracking system.

The next Independent Environmental Audit of Baal Bone Colliery will occur in 2022.

Tables 10.1 and **10.2** outline the **ongoing** actions arising from the 2019 Audit. Actions completed in 2020 are outlined in the 2020 Annual Review.

Table 10.1: Status of ongoing actions arising from non-compliances identified during 2019 Independent Environmental Audit

Sch and Cond Number	Audit Recommendation	Response/Action Plan	Status In 2021
Project Approval 09_0178			
Schedule 2, Condition 11	Include reference to AS 2601-2001 Standard and summary of requirements for demolition in relevant documentation for Mine Closure phase.	Reference to AS 2601-2001 to be included in relevant documentation for Mine Closure phase.	Complete. Demolition complete, with admin building demolished in mid 2021.
Consolidated Coal Lease (CCL749)			
Condition 33	DSCL is consulted six-monthly for site-wide rehabilitation or written exemption sought from DRG if it can be justified.	An action is in place. Consultation recommenced in December 2019 prior to this audit occurring.	Ongoing

Table 10.2: Status of ongoing continual improvement actions from IEA.

Sch and Cond Number	Audit Recommendation	Response/Action Plan	Status
Project Approval 09_0178			
Schedule 3, Condition 16 (c)	Although the Water Management Plan was approved, recommend that for future updates where consultation with other regulators is required, that regulators are offered an opportunity to comment for a duration of at least 30 days prior to submission to DPIE for approval.	Future Management Plan updates to allow for thirty day response period by regulators.	Complete. *Consolidated EMS submitted to regulators for comment on 14/7/21, requesting response by 16/08/21.*
Schedule 3, Condition 24 (c)	Weeds were evident onsite including blackberry. It is understood weed maintenance occurs regularly onsite and should continue, an	Weed management will continue to occur.	Ongoing.

	especially high risk period will be following decent rain.		A weed spraying program is carried out annually.
Schedule 3, Condition 24 (d)	REA5 showed two areas of complete failure. Minesoils recommends soil tests for Electrical Conductivity (EC), pH, Cation Exchange Capacity (CEC) and Exchangeable Sodium Percentage. It appears these two areas have received and pooled saline water from irrigation which has resulted in an area too salty for most vegetation. Some simple soil tests will indicate if this is true. In the event salinity is the limiting factor it is recommended to either leach the salts through the primary root zone via natural rainfall (slow) or irrigate with non-saline water. Alternatively, bring in additional material suitable for growth medium, subject to relevant approvals.	Consideration to be given to soil testing being undertaken. This area will be subject to rehabilitation efforts as part of the closure phase of the operation.	Ongoing. Monitoring of REA5 rehabilitation progress to continue.
Schedule 3, Condition 24 (e)	REA5: The remainder of REA5 showed no acacia species established (Plate 6). This is believed to have occurred due to the tree seed not being treated prior to sowing. Most acacia species require a mechanism to break the seedcoat such as boiling, scarifying or low heat fire. It is recommended that low depth (<300mm surface ripping be strategically undertaken to avoid areas already establishing with Eucalypts. Additional seed mix (especially Acacia species) should then be treated, brought in and sown in the newly ripped areas. Recommended REA 5 repair mix includes Capertee Stringybark (as per SoC 31)	This area will be subject to rehabilitation efforts as part of the closure phase of the operation. Capertree Stringybark is listed in the Project Closure Plan Revegetation Species List.	Ongoing. 1300 Capertree Stringybark tubestocks have been planted across the site. Monitoring of REA5 rehabilitation progress to continue.
Schedule 3, Condition 24 (f)	Overall the rehabilitation is establishing adequately in most areas (Plate 5,7), however recommend additional intervention is required to meet target species composition (especially the lower storey species) within a timeframe suitable for lease relinquishment.	Additional intervention will occur throughout the closure phase of the operation to ensure compliance with completion criteria associated with species composition.	Ongoing. Annual Rehabilitation Inspection identifies areas requiring additional intervention and suggests actions.
Schedule 5, Condition 2 (a)	Recommend for closure, re-approve specialists where required.	To be considered at next management plan review.	Complete. *Minimal changes made to consolidated management plan. Reapproval of specialists not deemed necessary given the closure status of BBC.*
Schedule 5, Condition 2 (b)	Consideration of combining all relevant management plans from this consent into single, reduced Closure Management Plan relevant to closure (Noise, Air Quality, Aboriginal Cultural Heritage, Biodiversity and Land Management, Rehabilitation, Erosion and Sediment Control, Groundwater Monitoring, Surface Water Monitoring, Waste and Water, Road Haulage) (with approval from DPIE) and/or include single	To be considered at next management plan review.	Complete. Consolidated EMS approved on 24/02/2022.

	document as appendix to draft Mine Closure MOP.		
Schedule 5, Condition 2 (c)	In management plan update: • Tabulate condition showing where each point is addressed; • Ensure that all agencies are consulted with during preparation of management plan; and • All technical specialists, where required by conditions of consent to be approved by the Secretary.	To be considered at next management plan review.	Complete. Consolidated EMS approved on 24/02/2022.
Consolidated Coal Lease (CCL749)			
Condition 32	Warragamba Outer Catchment Area be shown on a draft Closure MOP figure to ensure that work in relation to rehabilitation is completed before termination of the authority.	Consideration to be given to having a figure reflect information that is currently available in relation to the Warragamba Outer Catchment Area at the next review of the current MOP.	Ongoing
Previous IEA (2016) Recommendations			
21	6.7a) Recommend at next review, that all management plans should include a table cross referencing the requirements in Schedule 5 Condition 2 of the Project Approval, with the relevant sections of management plans, consistent with previous audit recommendation.	To be completed at next management plan review.	Complete. Consolidated EMS approved on 24/02/2022.
23	6.7c) The copy of the Biodiversity Management Plan should be provided to OEH for consultation.	To be completed at next management plan review.	Complete. Draft Consolidated EMS sent to OEH on 14/07/2021.

11 Incidents and Non-Compliances during the Reporting Period

Incidents are notified to the EPA, DPI&E and other relevant agencies immediately on becoming aware of a notifiable incident.[7]

11.1 Reportable Incidents

There were no reportable incidents during the 2021 reporting period.

11.2 Non-Compliances

There were four non-compliances during the 2021 reporting period, as summarised in **Table 11.1** below.

Table 11.1: Non-Compliances

Relevant Approval	Date(s)	Details of non-compliance	Cause of Non-compliance	Action to address Non-compliance
PA 09-0178 **Schedule 3, Condition 21**	Ongoing during 2021	Ongoing exceedance of Water Quality Trigger Level for dissolved zinc (0.175mg/L) at BBPB3	A 2020 Umwelt investigation found that the zinc exceedances were likely the result of increased rainfall, and rises in groundwater levels.	Ongoing monitoring.
PA 09-0178 **Schedule 3, Condition 21**	January 2021	Groundwater quality analysis not carried out in accordance with schedule specified in Section 4.1.3 of the GWMP.	Damage to monitoring bore BBPB2 resulted in samples unable to be extracted from bore in January 2021.	BBPB2 repaired and able to be sampled for 11 months of 2021 (Feb to Dec).
EPL 765 **L2.4**	09/02/2021, 16/03/2021 and 11/05/2021	Results received showed exceedances of dissolved iron at EPL Monitoring Point 16 during monthly sampling events in February, March and May 2021, compared to a EPL concentration limit of 1.0mg/L.	Sampling identified that elevated iron levels were not being detected upstream of the Overshot Dam. During 2021 the Overshot Dam emptied allowing the identification of a spring located within the Overshot Dam, with visible iron staining around it. Sampling confirmed high concentrations of dissolved iron from the spring. It is suspected that the spring contributed to elevated dissolved iron levels.	Additional water sampling was conducted, regular inspections are conducted of the area, with an increased focus on water quality and appearance; and lime is applied to the Overshot Dam (as required) to raise the pH. A external consultant was engaged to investigate the issue.

[7] PA09_0178 Schedule 5, Condition 5 and Condition 6 and Protection of the Environment Operations Act 1997, Section 153 - Pollution Incident Response Management Plan (PIRMP, BBNUG-882012935-2894).

Relevant Approval	Date(s)	Details of non-compliance	Cause of Non-compliance	Action to address Non-compliance
EPL 765 **L2.4**	16/03/2021	Sampling conducted on the 16 March 2021 at LDP16 returned a pH result of 6.2, below the EPL minimum limit of 6.5 for pH.	Investigation determined that potential contributors may have been: * Increased rainfall following a prolonged drought period; * Changes to hydrogeology including the cessation of pumping from the underground workings at end 2019, resulting in decreased water levels in the Overshot Dam and the subsequent recharge of groundwaters.	Additional water sampling was conducted, regular inspections are conducted of the area, with an increased focus on water quality and appearance; and lime is applied to the Overshot Dam (as required) to raise the pH. A external consultant was engaged to investigate the issue.

12 Activities to be completed in the Next Reporting Period

Activities to be completed during the 2022 reporting period include:

Demolition

- None scheduled for 2022

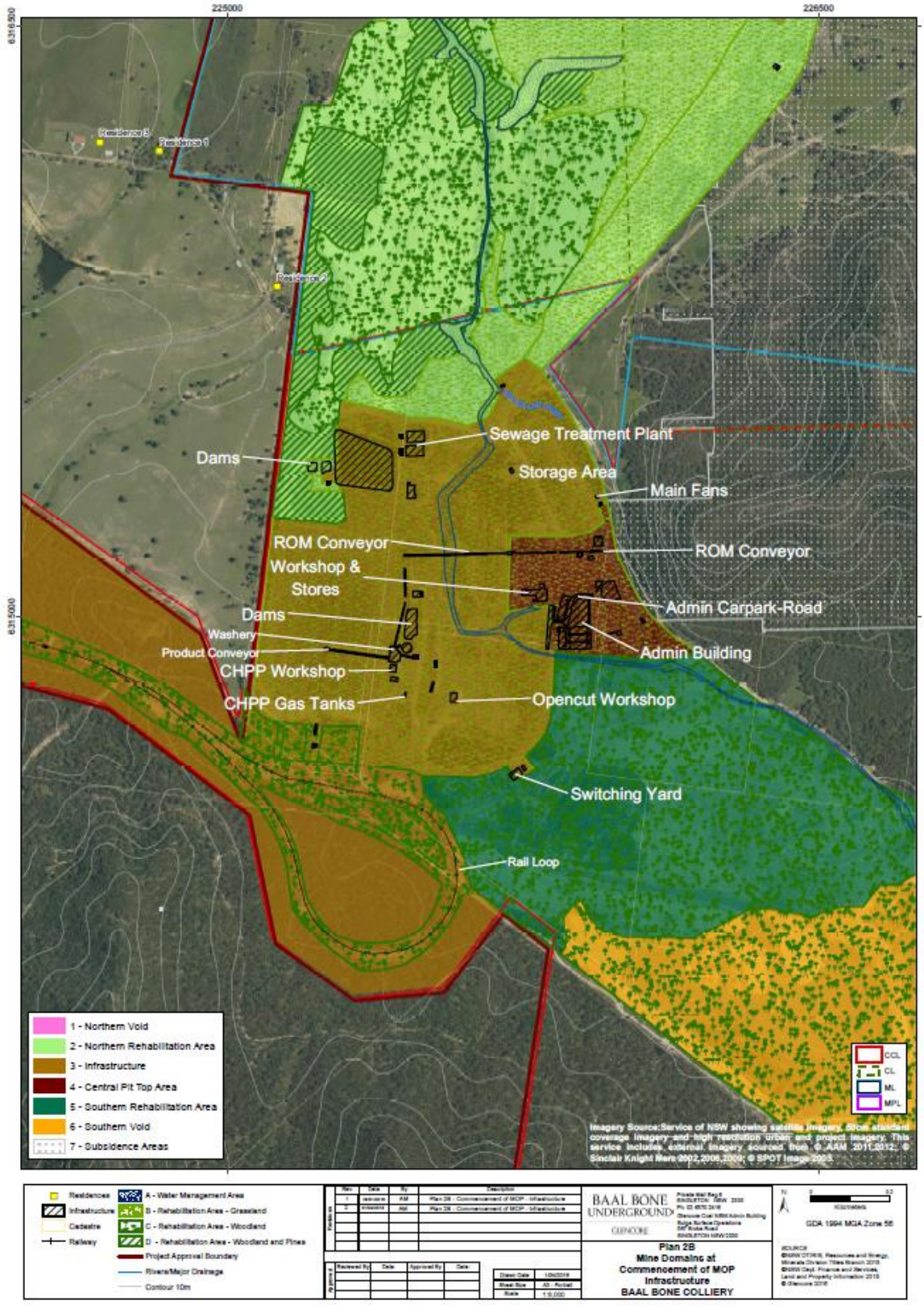
Rehabilitation

- Continued rehabilitation in the following areas in accordance with the approved Mine Closure MOP 2019 – 2025:
    - Domain 1- Northern Void: maintenance of previously rehabilitated areas.
    - Domain 2 – Northern Rehabilitation Area: application of mulch and ameliorants; and seeding of roads and Central Void.
    - Domain 3 – Infrastructure: ripping of haul road, seeding of roads and four ways area.
    - Domain 4 – Central Pit Top Area: reshaping, ripping and seeding of remaining administration area.
    - Domain 5 – Southern Rehabilitation Area: maintenance of previously rehabilitated areas.
    - Domain 6 – Southern Reject Emplacement Area: seeding of haul roads.
    - Domain 7 – Subsidence Area: continued rehabilitation of any subsidence cracks.
    - Domain 8 – Ben Bullen Creek: reshaping of Reach 1B.
- Commencement of certification process for any rehabilitation areas meeting completion criteria.

Management Systems

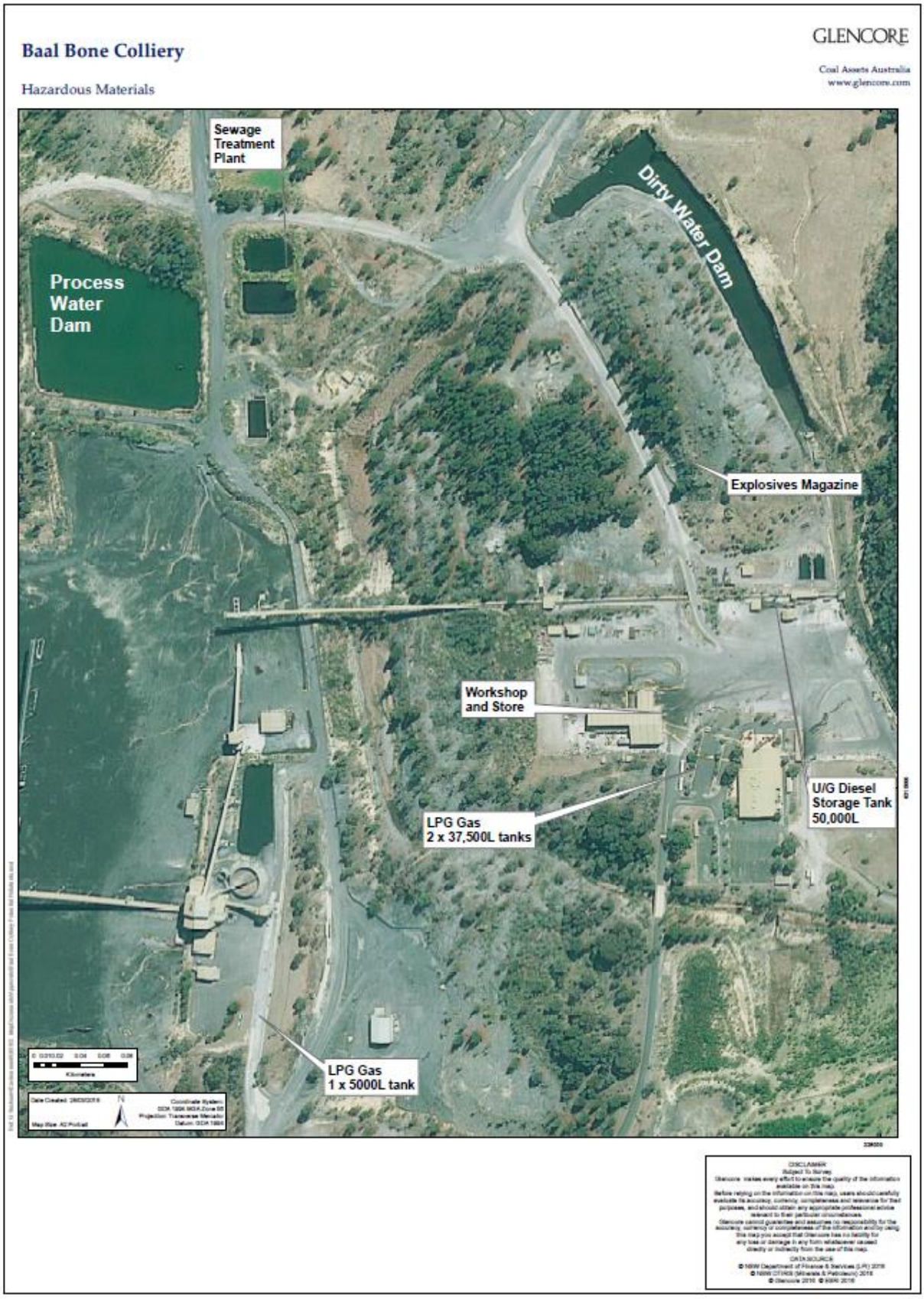
- Rationalisation of monitoring programs as mine closure works complete (in accordance with approved Consolidated Management Plan).

A.1 Appendix A - Plans

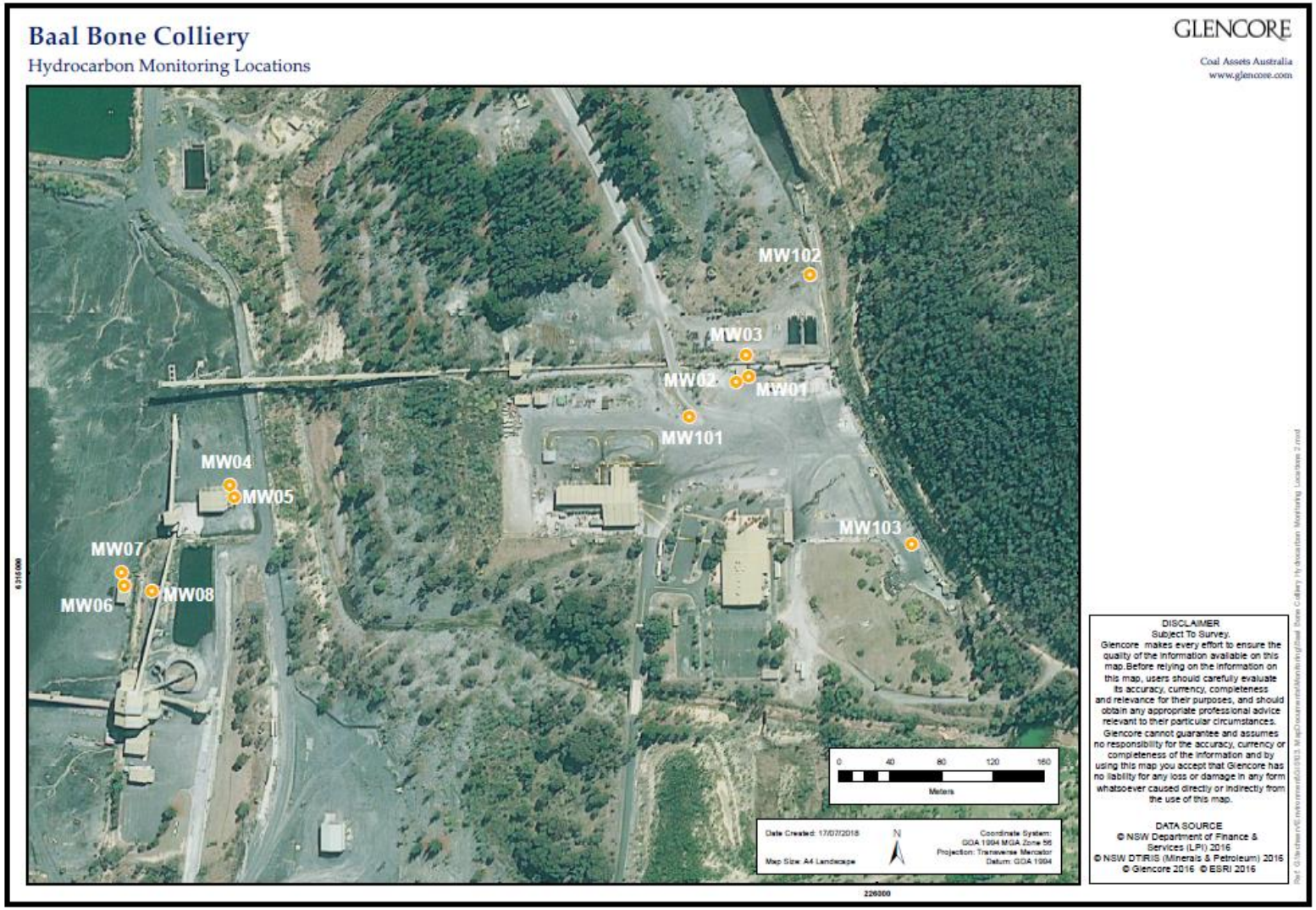


Plan 1 – Site Infrastructure (Prior to demolition and closure activities)

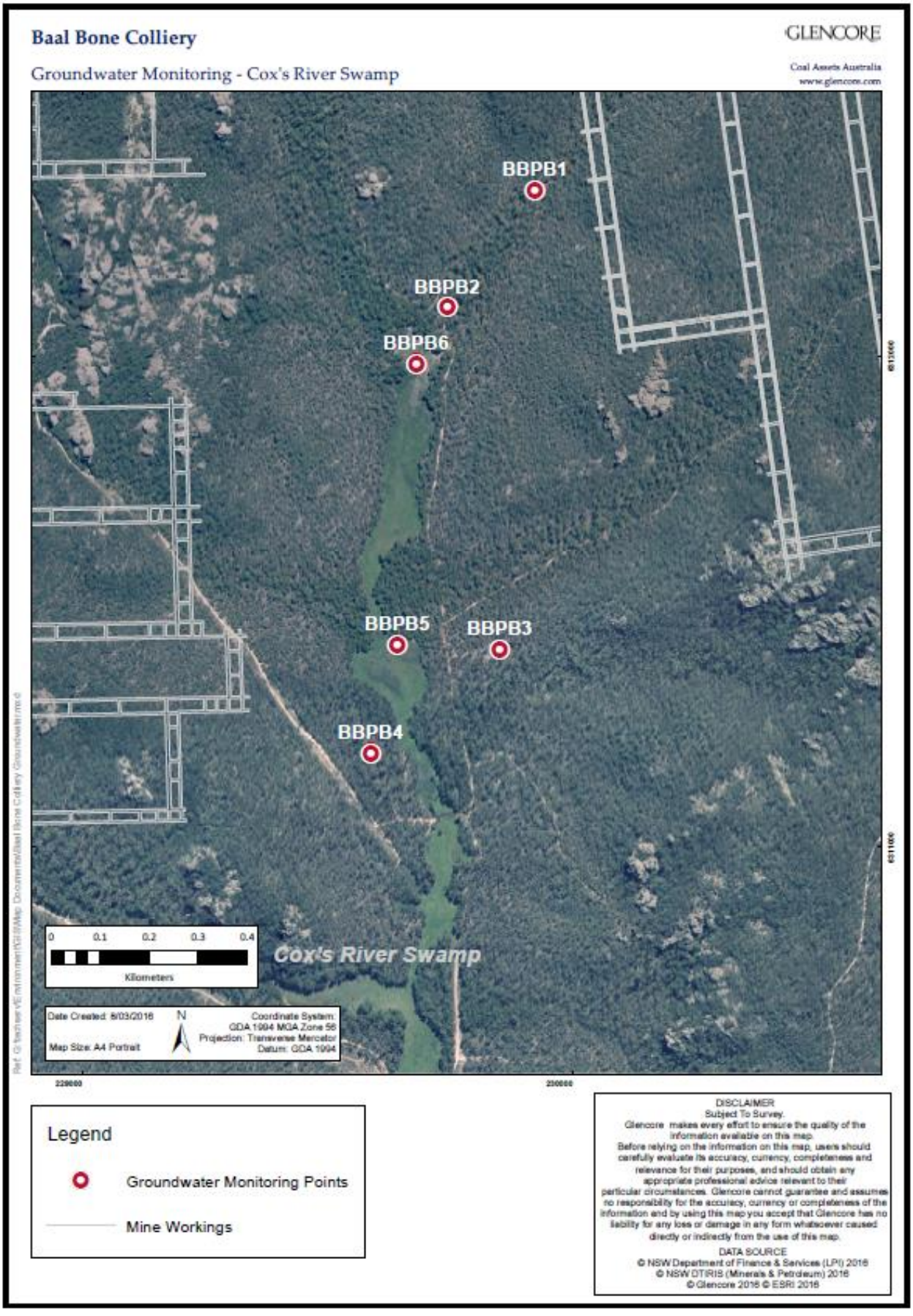
Plan 2 – Licensed Monitoring Locations



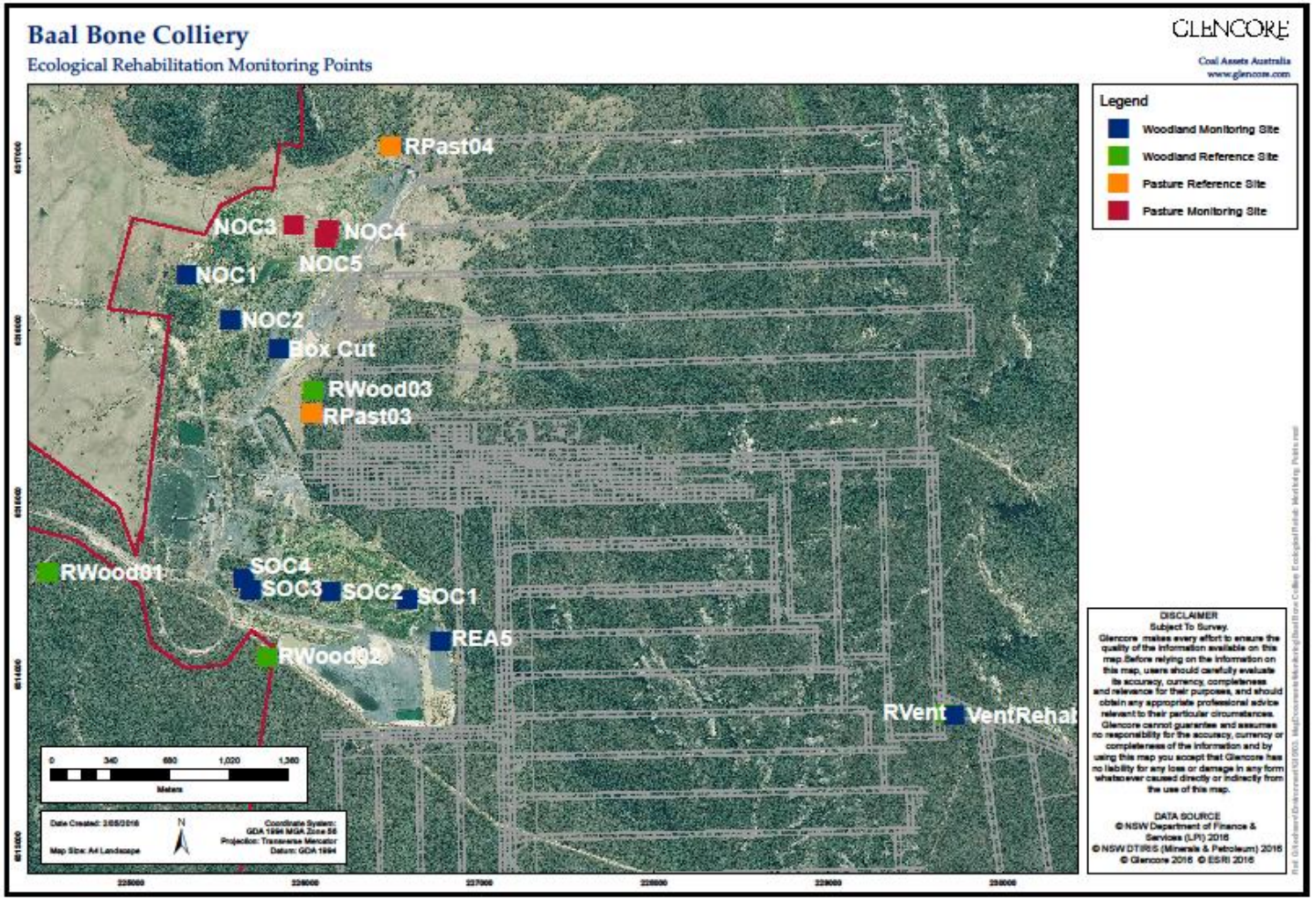
Plan 3 – Hazardous Materials (prior to demolition and closure activities)



Plan 4 – Hydrocarbon Monitoring Locations



Plan 5 – Groundwater Monitoring Cox's River Swamp



Plan 6 – Ecological Rehabilitation Monitoring Points

A.2 Appendix B – Approval

Department of Planning and Environment

Ms Elizabeth Fishpool
Environment and Community Coordinator
THE WALLERAWANG COLLIERIES LIMITED
Castlereagh Highway
Cullen Bullen NSW 2790

04/05/2022

Baal Bone Coal - (MP09_0178)
2021 Annual Review

Dear Ms Fishpool

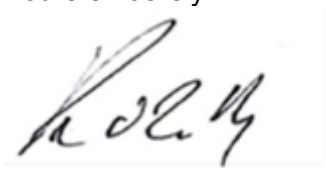
Reference is made to the Annual Review (MP09_0178-PA-18) for the period 1 January 2021 to 31 December 2021, submitted to the Department of Planning and Environment (the department) on 24 March 2022 as required under Schedule 5 Condition 3 of MP09_0178 (the approval, as modified).

The Department has reviewed the Annual Review and considers it to generally satisfy the reporting requirements of the approval and the Department's *Annual Review Guideline* (October 2015). Prior to uploading a copy of the 2021 Annual Review on the company website please amend the Annual Review to update the figures in Section 2 with recent aerial photos showing development consent boundary, current operational disturbance footprint and offset areas.

Please note that the Department's acceptance of this Annual Review is not an endorsement of the compliance status of the project.

Should you wish to discuss the matter further, please contact me on 0429400261 or compliance@planning.nsw.gov.au

Yours sincerely



Katrina O'Reilly
Team Leader - Compliance
Compliance
As nominee of the Planning Secretary