perilya

Perilya Broken Hill Limited

ABN: 46 099 761 289

Broken Hill North Mine

2020 Annual Review

September 2021

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Table 1 - Annual Review Title Block

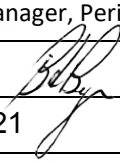
Name of operation	Broken Hill North Mine
Name of operator	Perilya Broken Hill Limited
Development consent / project approval #	Development Consent SDD7583
Name of holder of development consent / project approval	Perilya Broken Hill Limited
Mining lease #	Consolidated Mining Leases 4 and 5
Name of holder of mining lease	Perilya Broken Hill Limited
Water licence #	Water Access Licence WAL40959 Water Supply Approval 60WA583325
Name of holder of water licence	Perilya Broken Hill Limited
MOP start date	1st March 2018
MOP end date	28th February 2021 (extended to 30th June 2021)
Annual Review start date	1st January 2020
Annual Review end date	31st December 2020

I, Bruce Byrne, certify that this audit report is a true and accurate record of the compliance status of Broken Hill North Mine for the period 1st August 2019 to 31st July 2020 and that I am authorised to make this statement on behalf of Perilya Broken Hill Limited.

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 ina 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	Bruce Byrne
Title of authorised reporting officer	General Manager, Perilya Broken Hill Ltd.
Signature of authorised reporting officer	
Date	29/09/2021

Revision	Comments	Date
0	Submitted for approval	30 September 2020

1 STATEMENT OF COMPLIANCE

A statement of compliance with project approvals and mining leases for Broken Hill North Mine is presented in Table 2. 8, non-compliances were indentified during the reporting period.

Table 2 - Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes/No
SSD 7538	No
EPL2683	No
CML4	No
CML5	No

Non-compliances during the reporting period are discussed in Table 4 and ranked according to the compliance status key in Table 3.

Table 3 - Compliance Status Key

Risk level	Colour code	Description
High	Non-compliant (H)	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant (M)	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 (L)	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 (A)	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 4 - Non-Compliances during the period

Relevant approval	Condition	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
SSD 7538	Sch 2 – Cond 9	Unless the Secretary agrees otherwise, the Applicant must comply with the operating hours in Table 1	Non-compliant (Low Risk)	A production blast registering above 0.75 mm/s at closest residential receiver (North 3 blast monitor) was outside operating hours of Table 1.	Section 6.5
SSD 7538 CML4/5	Sch 3 – Cond 3 Cond 18	Apply a chemical dust suppressant (in accordance with an approved program) to all 'free areas' identified in the figure in Appendix 2 to achieve an emission control factor of 99.3% or better;	Non-compliant (Low Risk)	Fugitive dust emissions after the application of dust suppressant product were determined using the portable dust monitor referred to in EPL 2683	Section 6.1 and Section 10.1 Action Plan
SSD 7538	Sch 3 – Cond 24	The Applicant must ensure that ore laden trucks use the designated haulage route	Non-compliant (Low Risk)	One event during reporting period where driver entered North Mine via front gate.	Section 6.6
SSD 7538	Sch 3 – Cond 44	The Applicant must rehabilitate the site progressively	Non-compliant (Low Risk)	State and site-based biosecurity restrictions have postponed completion of progressive rehabilitation targets	Section 8.1
SSD 7538	Sch 4 – Cond 6	Within 3 months – the applicant must review and if necessary revise, the strategies, plans and programs required under this consent	Non-compliant (Low Risk)	Key plans were reviewed and revised however not all plans were reviewed per Condition 6	Section 11
EPL 2683	L4.5	The air blast overpressure level from blasting must not exceed 95 dB (Lin Peak) for the period 19:15 pm to 6:45 am.	Non-compliant (Low Risk)	On multiple occasions monitoring location, 56 North, exceeded this condition. Exceedances were the result of elevated wind speeds during the time of the blast event.	Section 6.5
EPL 2683	M2.2	Each monitoring point must be sampled at the required frequency.	Non-compliant (Low Risk)	Due to site power loss and manufacturer software error HVAS sampling events did not occur as required. Due to access issues and scheduling error dust deposition sample occurred outside the standard exposure days	Section 6.1

2 INTRODUCTION

Broken Hill North Mine (North Mine) Operation is located on the eastern edge of Broken Hill in the Far West region of New South Wales (Figure 1) and lies within a 162 ha area covered by Consolidated Mining Lease (CML) 4 and CML 5 (Figure 2). The current Development Consent (SSD 7538) Modification 2 authorises the operation until 18th August 2043. The Mining Operation Plan (MOP 2018), amendment 1 November 2018, was issued for a 3 year period from 1st March 2018 to 28th February 2021, MOP 2018 period was extended by four months to 30th June 2021. A transition to MOP/Rehabilitation Management Plan (RMP) submitted to Resources Regulator (Regulator) 19 May 2021, was approved to 30 June 2022. Figure 3 includes the approved mine layout for SDD 7538 and Figure 4 shows the approved limit of mining areas.

This Annual Review covers the period 1st January 2020 to 31st December 2020.

Following the approval of the North Mine MOP/RMP and the commencement of Mining Rehabilitation Reforms on the 2 July 2021, PBHL has sort to align reporting to a calendar year basis starting with this current submission for calendar year 2020. A request to align the Annual Review (AR) for SSD 7583 with the above changes was submitted on 24th August 2021. This change will result in the AR reporting period being for the 12 months to 31 December each year and with the AR document being submitted prior to 1 March each year.

This document has been prepared in accordance with the *Integrated Mining Policy - Annual Review Guidelines issued in October 2015.*

Contact details for key personnel responsible for the environmental management of the North Mine operation are provided in Table 5.

Table 5 - North Mine management contact details

Name	Position	Contact
Bruce Byrne	General Manager	(08) 8088 8582
Geoff Hender	Deputy General Manager – Broken Hill Operations	(08) 8088 8649
Chris Chindanya	Mining Manager – Northern Operations	(08) 8088 6577
Adam Forster	Health Safety Environment and Training Manager	(08) 8088 8616
Brett Bussell	Environmental Superintendent	(08) 8088 8920

Figure 1 - Project Locality

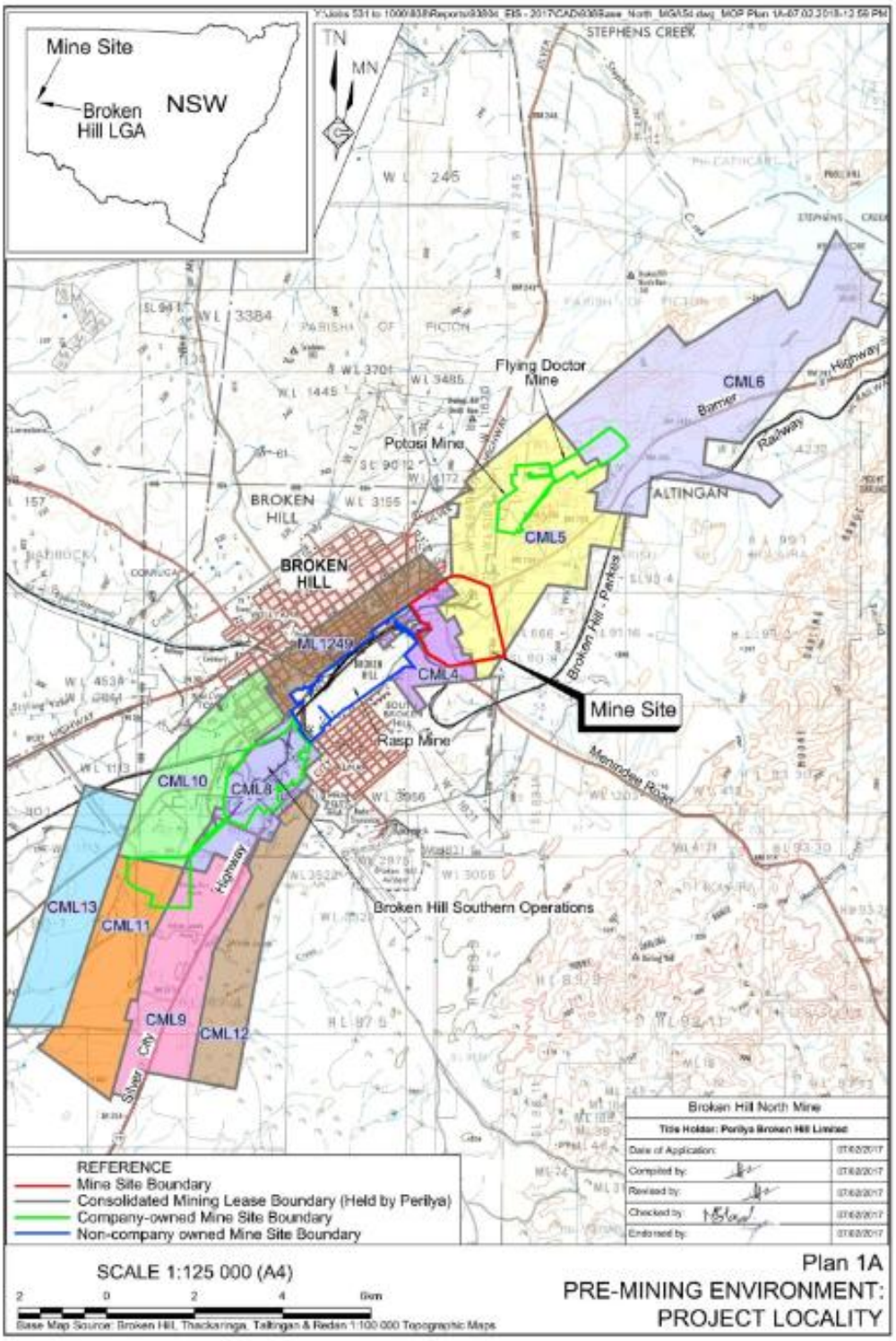


Figure 2 - Perilya North Mine Boundary

Figure 3 - SDD 7538 Approved North Mine Layout

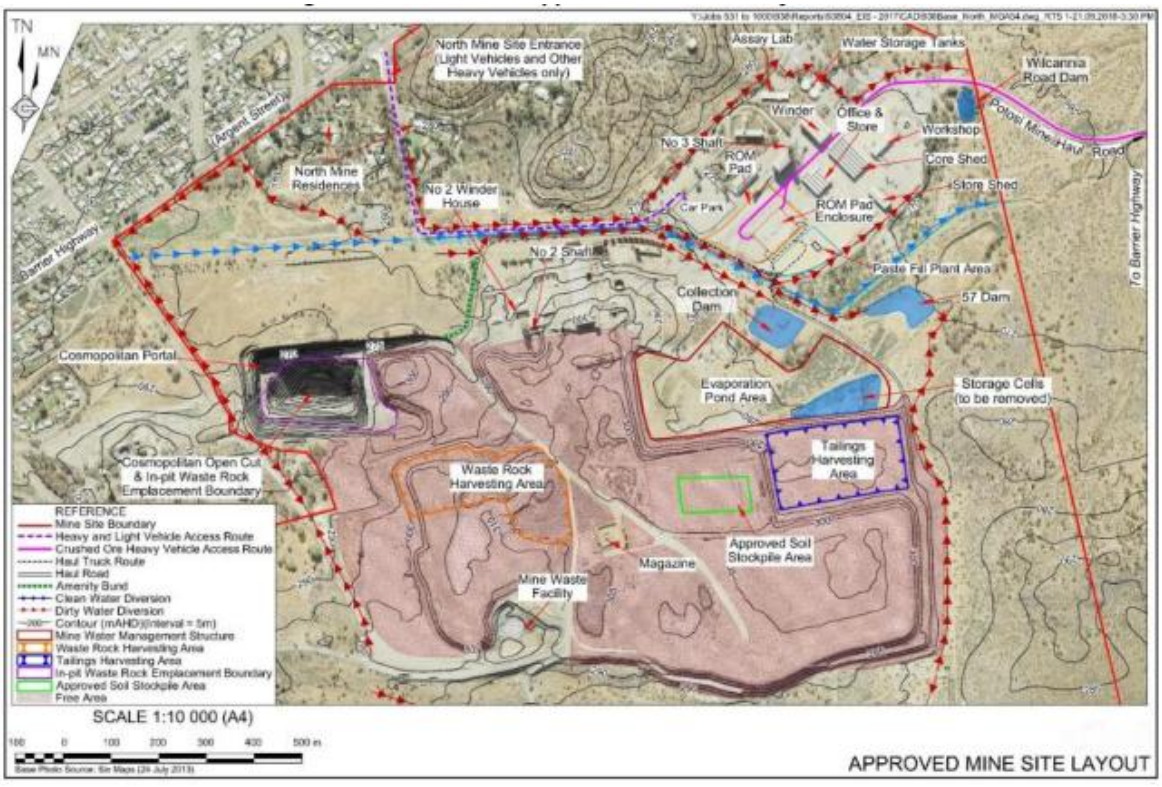
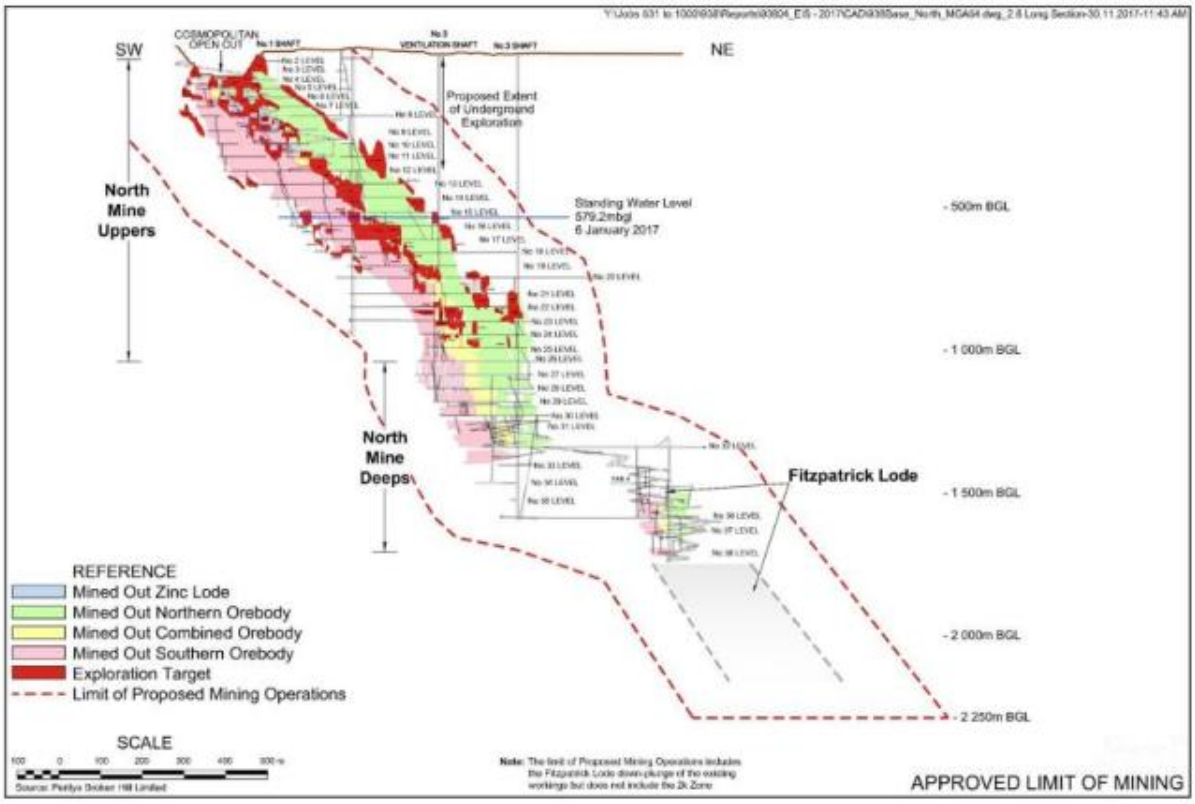


Figure 4 - Approved North Mine Limit of Mining



3 APPROVALS

North Mine has a number of statutory approvals, leases and licenses that regulate activities on site. During the reporting period, the following approval modifications occurred:

- EPL 2683 was varied on 11th March 2020 to reflect the updated blast monitoring unit locations
- EPL 2683 was varied on 11th June 2020 to amend overpressure limit times for conditions L4.3 and L4.4

Table 6 provides North Mine's existing approvals as at 31st December 2020.

Table 6 - North Mine's existing statutory approvals

Authority	Approval	Number	Expiry date
Department of Planning Industry and Environment (DPIE)	Development Consent	SDD 7538	25 years from date of construction (18th August 2018)
	Mining Operations Plan	-	28 February 2021
	Consolidated Mining Lease	CML 4	23 June 2024
	Consolidated Mining Lease	CML 5	17 June 2021
Environment Protection Authority	Environment Protection Licence	EPL 2683	Current
SafeWork NSW	Licence to Store Explosives	XSTR100008	11 March 2023
NSW Office of Water	Water Access Licence	WAL40959	Current
	Water Supply Works Approval	60WA583325	Current

4 OPERATIONS SUMMARY

4.1 MINING OPERATIONS

During the period mining activities at North Mine continued per approved operations under SSD7538 as defined in Section 2 of MOP 2018.

- Underground diamond drilling rigs targeting the upper section of mine area for exploration and blasting activities.
- Transportation of ore and mullock to the surface using portal and decline via underground haul trucks,
- Mullock placement occurred within existing Cosmopolitan open cut
- Extracted ore transported on sealed haulage route to surface ROM pad enclosure, a sealed, negative pressure building equipped with dust collection system.

Production figures during the reporting period are provided in Table 7.

Table 7 - Production Summary

Material	Unit	Approved limit (Max)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (estimate)
Waste Rock	Tonnes	-	218,661	218,393	231,925
Ore [a]	Tonnes	300,000	291,875	297,206	300,000

a- Ore extracted, crushed and transported by road to South Mine

4.2 OTHER OPERATIONS

4.2.1 ORE EXTRACTION AND TRANSPORT

Ore crushed within the ROM pad enclosure using mobile crusher and crushed ore loaded onto A-double road trains for transport to Southern Operations via the approved transport route, namely the Potosi Mine Haul Road, Barrier Highway, Iodide Street, Crystal Street and Gypsum Street.

Per Schedule 2, Conditions 6-8 of the Development Consent ore transport movements were conducted between the hours of 8 am and 6 pm with a maximum of 4 loaded movements an hour and 32 loaded movements per day. (http://www.perilya.com.au/our-business/operations/broken-hill-north-mine/ore-movement)

4.2.2 HOURS OF OPERATION

Mining operations activities are permitted 24 hours a day, 7 days a week, except for:

- Construction
  - 7 am to 6 pm, Monday to Friday
  - 8 am to 1 pm, Saturday
  - No activities on Sundays or public holidays
- Crushing, tailings harvesting , waste rock harvesting, ore transport (ROM pad to South Mine)
  - 8 am to 6 pm, 7 days a week
- Ore Transportation (mine portal to ROM pad)

- 7 am to 6 pm and 7 pm to 6 am, 7 days a week
- Production blasting, rehabilitation
  - 6:45 am to 7:15 pm, 7 days a week

4.3 NEXT REPORTING PERIOD

4.3.1 EXPLORATION

Underground exploration drilling will be undertaken to further define remnant ore and identify additional ore lenses and lodes. No surface drilling has been planned, however may be undertaken if required.

4.3.2 CONSTRUCTION

Construction of the paste fill plant and paste fill stockpile area is planned to progress during the next reporting period.

4.3.3 MINING OPERATIONS

Mine production is planned to continue at similar levels as the current reporting period and within the maximum approved limit. The actual production during the next reporting period will remain subject to ongoing operational parameters and performance.

4.3.4 DECOMMISIONING AND DEMOLITION ACTIVITIES

No infrastructure will be decommissioned or demolished during the next reporting period.

4.3.5 PROGRESSIVE REHABILITATION AND COMPLETION

Per MOP 2018 performance indicators and completion criteria progression towards rehabilitation targets as per Table 26 will continue and hydro-seeding trials describe in Section 8.2 shall be undertaken as soon as State border restrictions that are in place due to COVID-19 pandemic are lifted.

The MOP 2018 will be replaced during the next reporting period and future reporting will be aligned with outcomes of the replacement 2021 RMP/MOP.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The Department of Planning, Industry and Environment (Department) reviewed the Annual Review submitted for the period 1 August 2019 to 31 July 2020 and considered it to have satisfied the reporting requirement.

Regulator feedback of the 2019/2020 Annual Review per letter provided on 22nd September 2020 requested the document be updated to include Official Caution issued to Perilya Broken Hill on 8th April 2020 for the failure to obtain an Occupation Certificate for the ROM shed.

The updated Annual Review included Section 11.2 (Regulatory Actions) which detailed the Official Caution.

6 ENVIRONMENTAL PERFORMANCE

6.1 AIR QUAILTY

Environmental Management

Air quality management at North Mine is managed in accordance with:

- H02S02PLN0011 North Mine Air Quality Management Plan. Revision I.2 dated April 2020 approved by Department Planning Industry & Environment (DPIE) on 7th April 2020.

The document describes the management of air quality associated with the operational phase of the North Mine and addresses the requirements of Condition 5 of Schedule 3 of SSD7538 and Environmental Protection Licence (EPL) 2683.

The air quality monitoring plan comprises eight components:

- Real-time meteorological monitoring program capable of detecting adverse meteorological conditions;
- Real-time PM_{10} monitoring program capable of facilitating adaptive management of particulate emissions within the Mine Site;
- Total suspended particles (TSP) monitoring program;
- Deposited dust monitoring program;
- Stack monitoring program
- Paved road silt loading monitoring program;
- Free areas control level monitoring program; and
- Targeted monitoring programs to determine efficacy of mitigation measures.

North mine operates an air quality monitoring network consisting of:

- Five dust deposition gauges
- Two high volume air samplers (HVAS)
- Fixed real- time BAM (PM_{10}, $PM_{2.5}$ and wind)
- Real-time meteorological station
- Portable nephelometer (PM_{10})

Air quality monitoring locations are shown in Figure 7.

Environmental Performance

Pacific Environment (PEL) consultants prepared an Air Quality and Greenhouse Gas Assessment Update (PE 2017b) for the North Mine Environmental Impact Statement (EIS 2017). PEL modelling presented in the assessment has been used to evaluate monitoring results for the reporting period.

Depositional Dust Gauges

Depositional dust monitoring results are summarised in Table 8. Modelled annual average dust deposition at privately -owned receptors were not predicted to exceed the annual average dust deposition incremental criteria of 2 g/m^2/month as a result of the proposal alone or the cumulative criteria of 4 g/m^2/month. Modelling predicted the highest cumulative annual average as 2.71 g/m^2/month.

Table 8 - Comparison of annual average deposited dust results

Monitoring Point	Annual Criteria	Annual Criteria	Annual average depositional dust (g/m^2/month)			
	Increment g/m^2/month	Cumulative g/m^2/month	2017	2018	2019	2020
MP17 Caravan Park	<2	<4	1.8	2.1	1.6	2.4
MP22 Argent Street	<2	<4	2.3	2.9	1.5	1.5
MP23 Common Dam	<2	<4	1.7	0.9	6.1	1.9
MP24 Proprietary Sq	<2	<4	1.9	2.5	2.2	2.9
MP25 Rasp Ridge	<2	<4	1.9	1.6	1.5	2.6

Depositional dust monitoring lead results are summarised in Table 9.

Table 9 - Comparison of annual average deposited dust (lead) results

Monitoring Point	Annual average lead (2010 - 2016) g/m^2/month	Annual average lead (g/m^2/month)			
		2017	2018	2019	2020
MP17 Caravan Park	0.004	0.014	0.005	0.010	0.006
MP22 Argent Street	0.005	0.010	0.006	0.011	0.004
MP23 Common Dam	0.003	0.012	0.003	0.004	0.002
MP24 Proprietary Sq	0.011	0.037	0.014	0.031	0.021
MP25 Rasp Ridge	0.003	0.011	0.005	0.009	0.005

No depositional dust gauges exceeded the incremental criteria or the cumulative annual average for depositional dust for the reporting period. All sites within the boundary of the North Mine operation are consistent with modelled predictions.

Regional weather events due to drought conditions continue to influence results period which has been a trend observed over the prior two years.

Dust depositional sampling for the month of January occurred outside the standard exposure period of 30 days +/- 2 days. In this instance collection occurred after 33 days and was the result of a staff scheduling error. An annual schedule for sampling was developed to ensure compliance with the relevant Australian Standard and the process was communicated to relevant staff.

High Volume Air Samplers (HVAS)

HVAS-TSP results for the reporting period are summarised in Table 10. Modelled annual average TSP concentrations at privately-owned receptors were not predicted to exceed the annual average criteria of 90 µg/m^3 ,as a result of the proposal alone, or cumulatively. Modelling predicted a maximum increase of 0.42 µg/m^3, at privately-owned receptors on existing background concentrations.

HVAS TSP-Lead results for the reporting period are summarised in Table 11. The maximum predicted annual average lead concentration due to the proposed mine site compared with the contribution from the existing Mine site is less than 0.005 µg/m^3 (1% of the annual criteria). The model predicted an annual average lead concentration maximum at the Mine boundary of 0.224 µg/m^3.

Annual average TSP results did not exceed the annual average criteria for TSP or total lead for the reporting period. Due to extraordinary weather events no trends have been concluded.

Table 10 - Summary of HVAS TSP results

Monitoring Point	TSP Annual Criteria	Total suspended particulate matter (µg/m^3)					
		2018		2019		2020	
		Max 24 hr result	Annual Average	Max 24 hr result	Annual Average	Max 24 hr result	Annual Average
MP26 North Mine	90 µg/m^3	608.3	72.2	372.5	68.9	427.4	63.4
MP30 Argent Street		391.4	61.6	260.2	64.1	408.6	55.4

Table 11 - Summary of HVAS TSP-Lead results

Monitoring Point	TSP-Lead Annual Criteria	Annual Average lead (µg/m^3)					
		2018		2019		2020	
		Max 24 hr result	Annual Average	Max 24 hr result	Annual Average	Max 24 hr result	Annual Average
MP26 North Mine	<0.5 µg/m^3	2.211	0.208	0.390	0.120	0.538	0.122
MP30 Argent Street		0.267	0.092	0.360	0.102	0.500	0.086

HVAS sampling did not occur at the required frequency on several occasions during the reporting period and these were due to software and power loss during 24 hour sampling events. HVAS vendor communications on a systemic software fault were not provided to the company until after the missed event (2nd January 2020), temporary correction of the fault has been completed and chip replacement to repair the issue will be planned when travel restrictions allow.

Also an upgrade to high voltage infrastructure caused a temporary power failure during sampling event on 21st March 2020; samples were voided as HVAS did not operate for required number of hours. HVAS sampling over two dates (16/11/2020 and 22/11/2020) did not occur as required and this was attributed to a communication failure between HVAS technicians. The failure resulted in the glass fibre filter papers that are required to be changed out in between the 6-day sampling events, did not occur as scheduled. This resulted in a single filter being used over 2 sampling events for all HVAS units.

Real-Time PM_{10} Monitoring

Modelled maximum 24-hour average concentrations of particulate matter <10µm (PM_{10}) at privately-owned receptors were not predicted to exceed the daily average of 50 µg/m^3. Annual average concentrations of PM_{10} were not predicted to exceed criteria of 25 µg/m^3.

Exclusion of extreme regional events (both sites exceeding 24 hr averages by 300 µg/m^3) indicates an annual average of 23.4 µg/m^3 at Argent Street and 21.9 µg/m^3 at Menindee Road. During the reporting period regional weather events due to drought conditions resulted in exceedances which has been a trend observed over the past two years as summarised in Table 12.

Table 12 - Annual PM_{10} Results

Annual	Argent Street PM_{10} µg/m³		Menindee Road PM_{10} µg/m³	
	2019	2020	2019	2020
*Exceedances**	45	32	51	29
Minimum	3.6	1.0	4.3	2.2
Maximum	275.6	1015.5	274.9	1077.2
Average	28.2	31.2	31.5	29.4
Num	352	349	356	360
Data[%]	96	95	97	98
STD	37	75	41	74
** Includes any event where the 24 hour average dust concentration is >50 µg/m^3 for PM_{10}. No events were attributable to North Mine operations.*				

Continuous PM_{10} results for the reporting period at MP29 Argent Street and MP31 Menindee Road including running annual average for the reporting period are provide in Figure 5 and Figure 6.

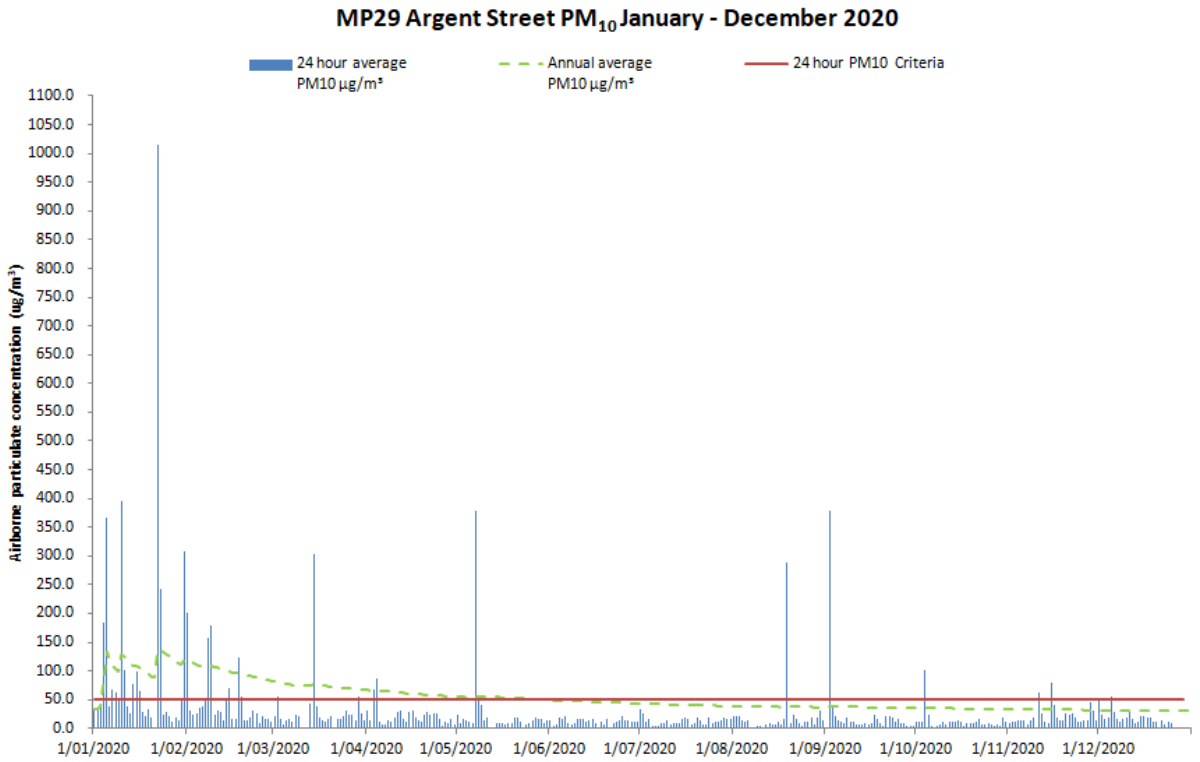


Figure 5 - Argent Street (MP29) PM_{10} summary for August 2019 - July 2020

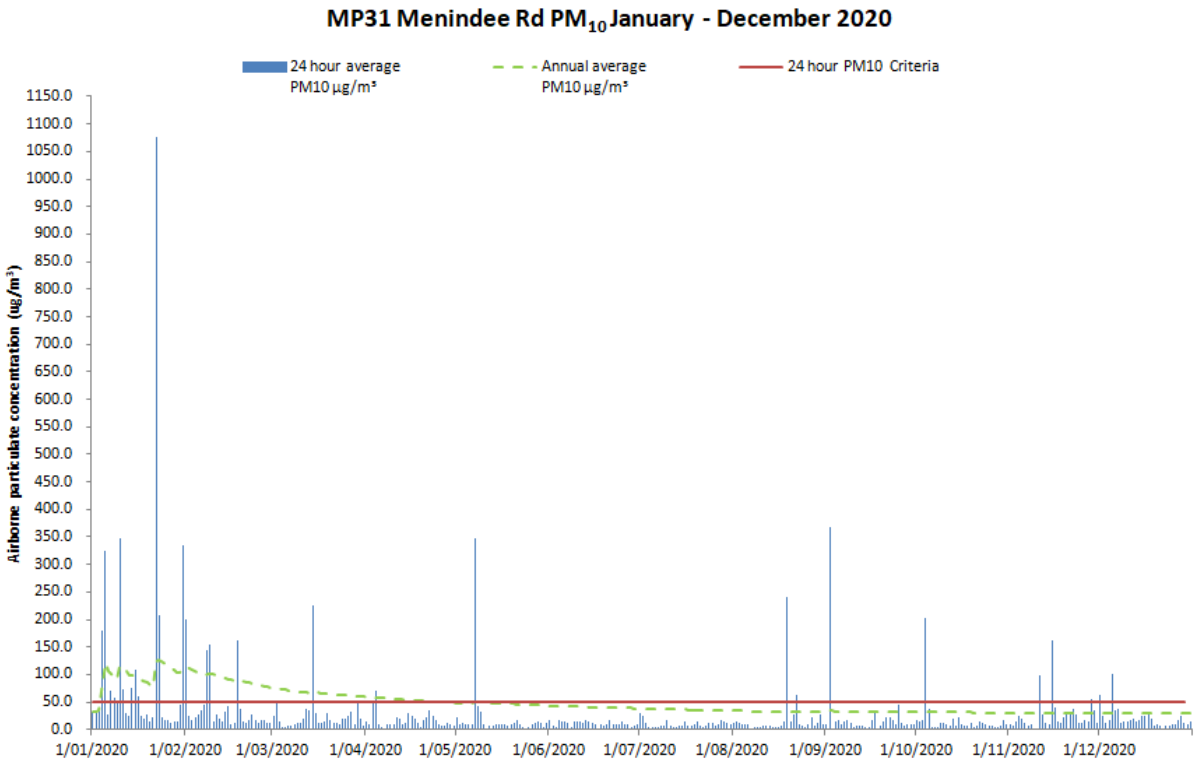


Figure 6 - Menindee Road (MP31) PM_{10} summary for August 2019 - July 2020

Figure 7 - Air Quality Monitoring Locations

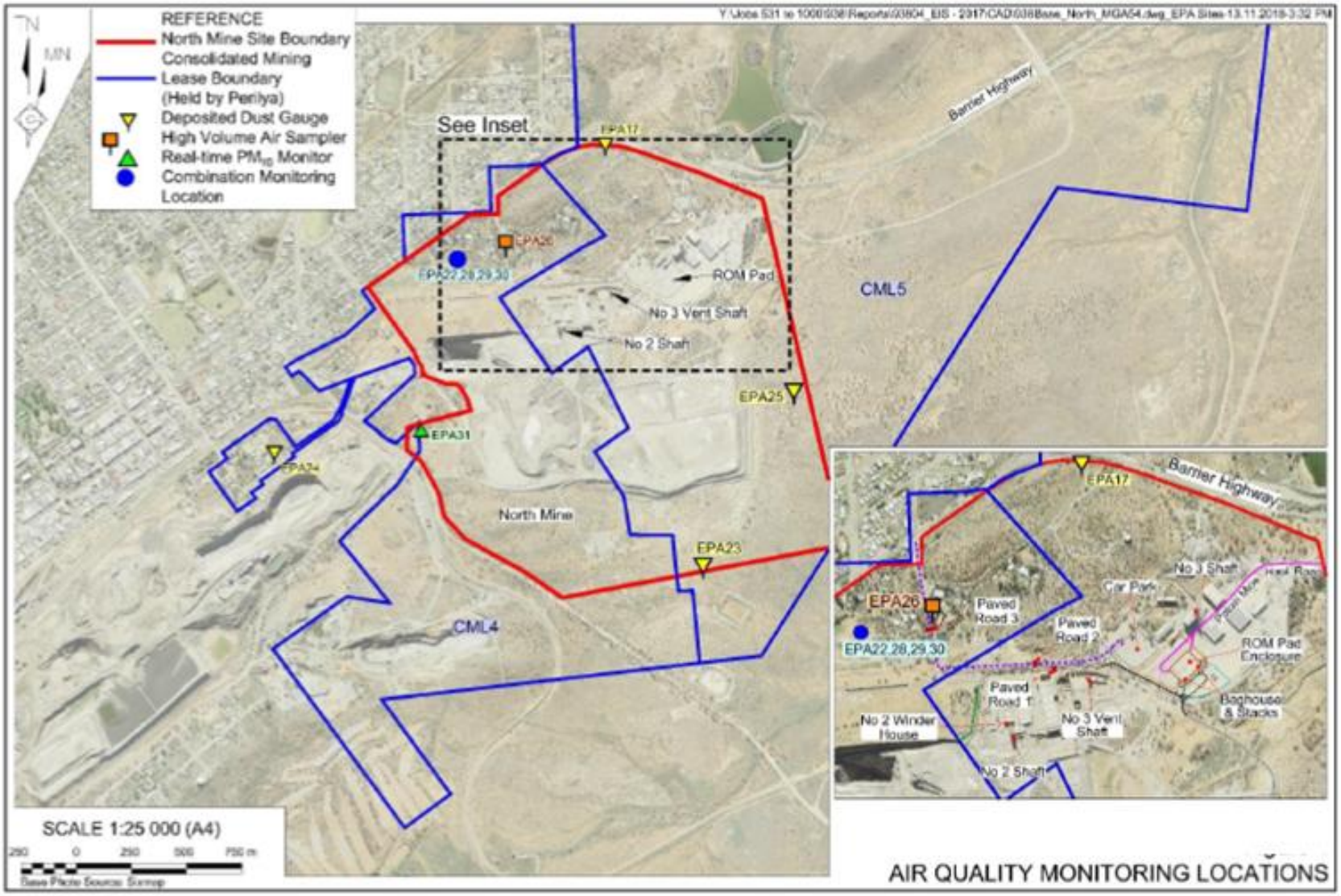
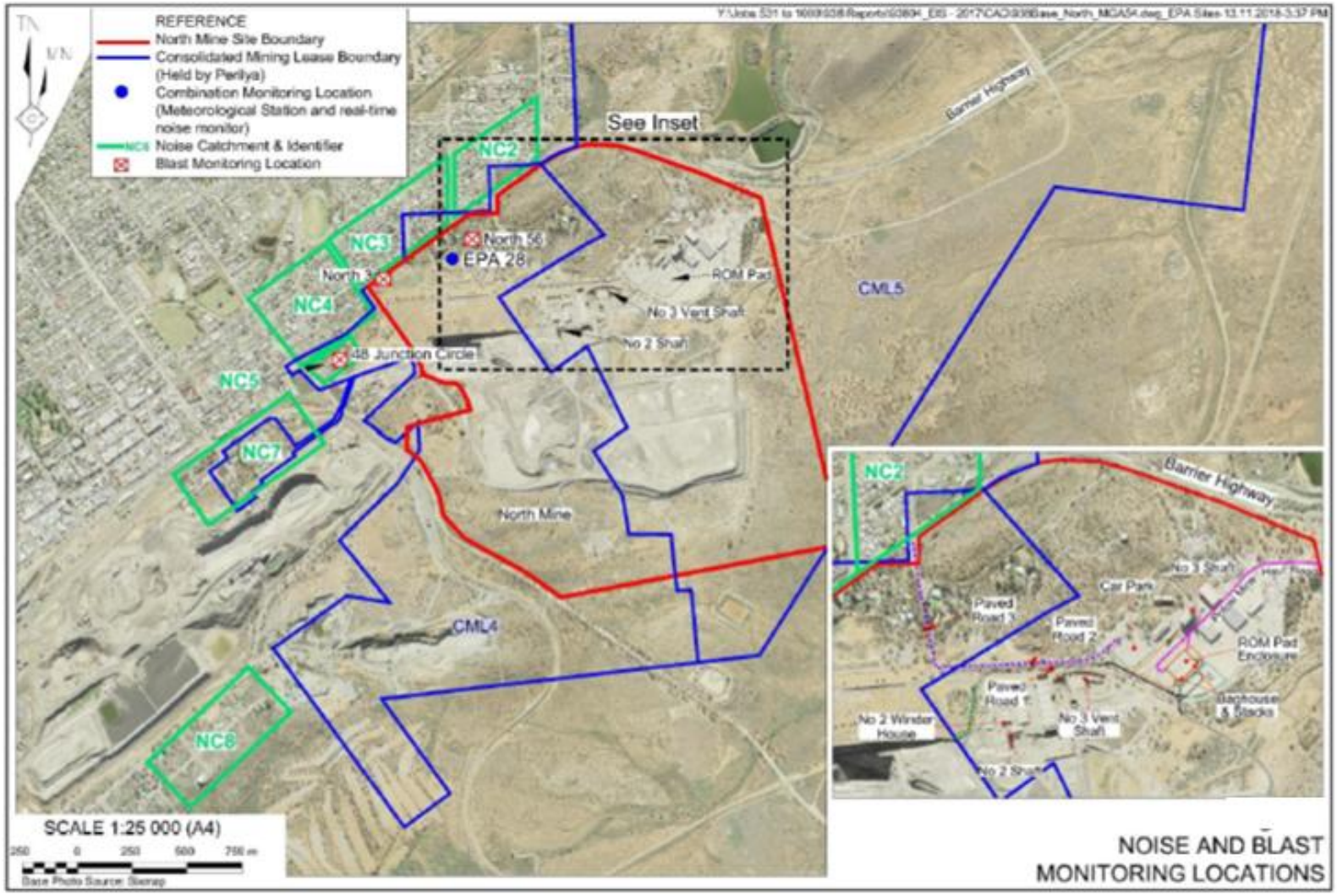


Figure 8 - Noise and Blast Monitoring Locations



Stack Monitoring Program

In addition to the diffuse emissions monitoring program, point source emissions are also monitored from the upcast vent shaft (#3 Vent) and dust collection system stacks installed on the negative pressure ROM building. Modelling for the North Mine EIS of parameters for stack emissions were premised upon upcast vent data from Perilya's South Mine and extraction stacks from Rasp Mine air quality assessment.

Vent shaft testing results for the reporting period are summarised in Table 13. Developed modelling criteria incorporated in to the EIS are significantly higher than the actual observed emissions.

Table 13 - Vent shaft sampling summary

Parameter	Units	Assumed Air Quality Modelling Criteria	*Actual No. 3 Vent Shaft*
Stack Monitoring (Vent Rise)			
Flow Rate	m^3/s	350	330
TSP	g/min	126	37
TSP - Lead	g/min	0.066	0.035
PM_{10}	g/min	63	33
$PM_{2.5}$	g/min	42 (@350 m^3/s)	24
		28.2 (@235 m^3/s)	
Type 1 substances [1]	g/min	N/A	≤0.069
Type 2 substances [2]	g/min	N/A	≤0.24
Note 1: Type 1 substances include antimony, arsenic, cadmium, lead and mercury or any compound containing one or more of those elements			
Note 2: Type 2 substances include beryllium, chromium, cobalt, manganese, nickel, selenium, tin and vanadium or any compound containing one or more of those elements			

Dust extraction stack testing results for the reporting period are summarised in Table 14. The assumptions used in the development of the model are not consistent with the final installed dust extraction systems and direct comparison is not possible.

During the next review of the air quality model use of actual rather than assumed criteria should provide greater certain on site emissions from the vent and stacks, sampling from this reporting period would suggest it may be a factor lower than current predictions. The next iteration of the air quality model will be included in the 2021 AR.

Table 14 - Extraction stack sampling summary

Parameter	Units	Assumed Air Quality Modelling Criteria	*Actual Dust Extraction Stack 1*	*Actual Dust Extraction Stack 2*
Stack Monitoring (Dust Extraction Stacks)				
Flow Rate	m^3/s	19.7	41	42
TSP	g/min	0.24	3.3	3
TSP - Lead	%	8.5	0.2	0.2
PM_{10}	g/min	0.24	<6	<6
$PM_{2.5}$	g/min	0.06	<4	<4
Type 1 substances [1]	g/min	N/A	≤0.012	≤0.012
Type 2 substances [2]	g/min	N/A	≤0.018	≤0.012
Note 1: Type 1 substances include antimony, arsenic, cadmium, lead and mercury or any compound containing one or more of those elements				
Note 2: Type 2 substances include beryllium, chromium, cobalt, manganese, nickel, selenium, tin and vanadium or any compound containing one or more of those elements				

Targeted monitoring (Free areas, paved roads)

- Free areas – Due to site COVID-19 related biosecurity restrictions during the reporting period annual surveying of free areas has been postponed and will be completed when site access restrictions are lifted.

- Paved roads – Silt loading survey for the haul road was undertaken subsequent to the Independent North Mine Audit. Three locations along the length of the haul road were sampled with all sampling locations having less than 1 g/m2 and compliant with the stated criteria <2 g/m2. However significant safety concerns were raised by operators and management during the execution of this sampling directly as a result of the proximity and frequency of heavy vehicles along the single lane haul road.

  A safer method with the same intent was incorporated into the latest version of the North Mine AQMP and approved by DPIE (07 April 2020). It incorporates the use of the portable air quality unit referred to in the North Mine EPL2683. This unit is placed as near as practicable to the haul road for a 24 hour period. If the 24 hour average PM_{10} value is greater than one half of the current NEPM value of 50 µg/m^3 (i.e. 25 µg/m^3) then the event is recorded via the site incident management system and TARP AQ8 is triggered.

  The portable air quality unit was placed adjacent to the haul road during the period for 36 days and recorded an average 24 hour value of 13.7 µg/m^3. Two 24 hour periods exceeded 25 µg/m^3 and investigations determined one related to a regional dust event and the second event was influenced by elevated wind speeds from wind sectors not related to the haul road.

6.2 COMMUNITY HEALTH

Environmental Health Management

Community Health management at North Mine is managed in accordance with:

- North Mine Lead Monitoring and Education Program. Revision E dated November 2019 approved by Department Planning Industry & Environment (DPIE) on 5th November 2019.

This document describes the management of blood lead monitoring and education to be implemented at the request of a resident of District 5A. This document specifically addresses the requirements of Condition 8 of Schedule 3 of SSD7538.

Environmental Health Performance

A *Human Health Risk Assessment* was prepared by ToxConsult (ToxConsult, 2017) to support the application for Development Consent. That assessment determined that the risk associated with emissions of lead from the Mine Site would be negligible. That assessment was based upon particulate emissions determined by the *Air Quality Assessment* (PEL 2017b). The results and conclusions of the Human Health Risk Assessment, therefore, are predicated on the assumption that the particulate matter concentrations and lead deposition levels determined by Pacific Environment (PEL 2017b) are complied with (refer to section 6.1 Air Quality).

In December 2020, the Health Protection Public Health Unit released the ***Lead Report 2019: Broken Hill children less than 5 years old****, WNSW LDH Public Health Unit, Health Protection December 2020.* The document presents the results of blood lead levels monitoring 681 children aged under the age of 5 residing in Broken Hill. The results may be summarised as follows.

- The geometric lead mean level (age-sex standardised) for all children under 5 years increased slightly by 0.4 µg/dL (from 4.7 µg/dL in 2018 to 5.1 µg/dL in 2019).

Lead Education Program

Following approval of North Mine Lead Monitoring and Education Program Revision E on 5th November 2019, Newsletter information packages were arranged for delivered by 22nd December to District 5a residence. The lead awareness packages included a copy of program and living with lead pamphlets from LeadSmart Broken Hill as per Figure 9.

Figure 9 - Lead awareness package mail out

Monitoring and Assistance Program

During the reporting period no residences from District 5a have approached PBHL requesting assistance.

6.3 NOISE

Environmental Management

Noise management at North Mine is managed in accordance with:

- H02S02PLN0012 North Mine Noise Management Plan. Revision D

This document describes the management of noise associated with the operational phase of the North Mine.

The Noise Monitoring Plan comprises three components:

• Predictive meteorological monitoring program capable of forecasting adverse meteorological conditions;

• Real-time noise monitoring program capable of facilitating adaptive management of noise within the Mine Site; and

• Attended monitoring program capable of demonstrating compliance with the criteria.

Noise monitoring locations are shown in Figure 8

Noise compliance criteria for the North Mine are set out in Condition 15 of Schedule 3 of SSD7538. Table 15 reproduces the identified criteria. Figure 8 presents the location of Noise Catchments (NC) NC1 to NC9.

Table 15 - Noise compliance criteria

Location	Day	Evening	Night	
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
NC1, NC2	38	38	35	45
NC3, NC4, NC5	36	36	35	45
All other residential receivers	35	35	35	45

Environmental Performance

As part of the development consent a *Noise Impact Assessment (MAC 2017)* was prepared. Background noise conditions are summarised in Table 16 at three locations surrounding the Mine Site.

Table 16 - Background monitoring noise levels

Location	Measured Rating Background Level (dBA)			Measured Equivalent Continuous Level (dBA)		
	Day[1]	Evening[1]	Night[1]	Day[1]	Evening[1]	Night[1]
L1	30 (29)[2]	31	30 (22)[2]	43	43	38
L2	33	35	30 (26)[2]	50	50	46
L3	31	31	30 (25)[2]	48	47	45
Note 1: Day period is from 7:00am to 6:00pm. Evening period is from 6:00pm to 10:00pm. Night period is from 10:00pm to 7:00am						
Note 2: Where the measured rating background level is lower than 30dBA a level of 30dBA is applied and the measured level is shown in brackets						
Source: MAC (2017) after Table 5						

Real-time Noise Monitoring (NMT1)

Table 17 presents the Noise Monitoring Trigger Levels, the trigger levels have been determined via modelling to calculate the All Pass and Low Pass levels at NMT1 equivalent to the noise criteria identified in Table 15 at the closest residential receiver NC3 (Figure 8). Hence, for a noise event from the North Mine to cause an alert from the noise monitoring terminal, both the All Pass and Low Pass triggers must be exceeded simultaneously at NMT1.

Table 17 - Real-time noise monitoring trigger levels

Period	Units	Noise Criteria at NC3	All Pass Trigger Level dB LAeq(15min)[1,2]	Low Pass Trigger at dB LAeq(15min)[1,2]
Day	LAeq(15min)	36	44	41
Evening	LAeq(15min)	36	44	41
Night	LAeq(15min)	35	43	40
	LA1(1min)	45	53	50
Note 1: To be updated progressively throughout the life of the North Mine				
Note 2: Adopts a 5dB adjustment to account for the distance between NMT1 and NC3.				

Noise monitoring triggers for the reporting period are summarised in Table 18. Mine operational noise contributions did not require TARP response.

Table 18 - Noise trigger summary

Extraneous and non-mining noise sources		North Mine generated noise sources		Contributions above Criteria
Weather (Wind, Rain)	37	Mine Vehicles	3	No
Wildlife (Birds, Insects)	6	Alarms	5	No
External Roads	12	Air quality equipment	13	No

Attended Monitoring Program

Four attended monitoring events occurred in the reporting period against noise criteria defined in Table 19.

- Q1, ending January 2020
- Q2, ending April 2020
- Q3, ending July 2020
- Q4, ending October 2020

Table 19 - Quarterly attended noise monitoring results in comparison to previous years

Monitoring Site	Period	Criteria	Prediction (Neutral)	Prediction (Temperature inversion)	2019		2020	
					min	max	min	max
$L_{Aeq(15min)}$ dB								
NC1	Day	38	37	-	NI	NI	NI	<38
	Evening	38	37	-	NI	<32	NI	<35
	Night	35	<30	34	NI	<32	NI	<35
NC2	Day	38	36	-	NI	NI	NI	<38
	Evening	38	36	-	NI	<32	NI	<35
	Night	35	<30	34	NI	<32	NI	<35
NC3	Day	36	30	-	NI	<33	NI	NI
	Evening	36	30	-	NI	<30	NI	<35
	Night	35	<30	30	NI	<30	<30	<35
NC4	Day	36	31	-	NI	<33	NI	NI
	Evening	36	31	-	NI	<30	NI	<35
	Night	35	<30	33	NI	<30	<30	<35
NC5	Day	36	<30	-	NI	<30	NI	NI
	Evening	36	<30	-	NI	NI	NI	NI
	Night	35	<30	<30	NI	<30	NI	32
NC6	Day	35	<30	-	NI	<28	NI	NI
	Evening	35	<30	-	NI	NI	NI	NI
	Night	35	<30	<30	NI	NI	NI	NI
NC7	Day	35	<30	-	NI	<30	NI	NI
	Evening	35	<30	-	NI	NI	NI	NI
	Night	35	<30	<30	NI	<30	NI	32
NC8	Day	35	<30	-	NI	NI	NI	NI
	Evening	35	<30	-	NI	NI	NI	NI
	Night	35	<30	<30	NI	NI	NI	NI
NC9	Day	35	<30	-	NI	NI	NI	NI
	Evening	35	<30	-	NI	NI	NI	NI
	Night	35	<30	<30	NI	NI	NI	NI

NI – North Mine noise inaudible during measurement periods

There were no exceedances of noise criteria during the monitoring events resulting from North Mine activities, which is consistent with predicted noise modelling. Further details of the results obtained are included on PBHL publically available monthly environment reports (http://www.perilya.com.au/health--safety--environment/environment/reports)

6.4 METEOROLOGICAL DATA

Environmental Management

Meteorological data monitoring at North Mine is managed in accordance with:

- H02S02PLN0012 North Mine Noise Management Plan. Revision D

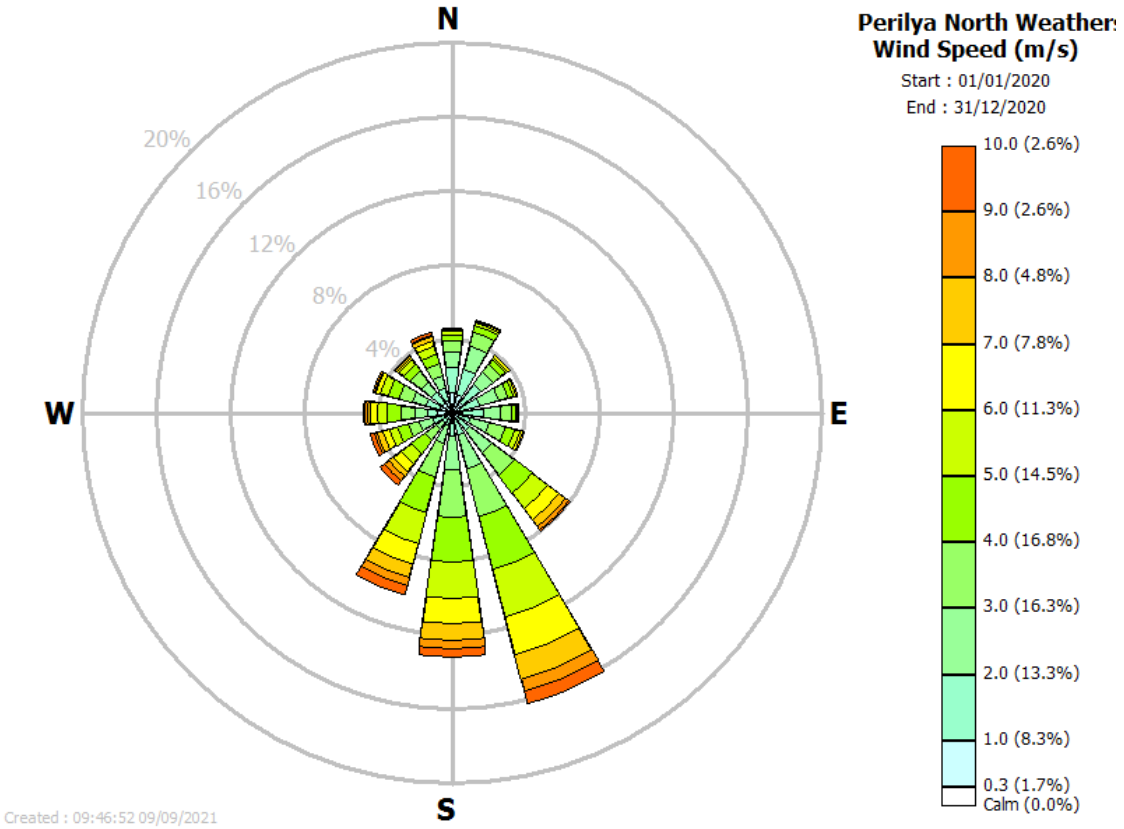
The North Mine meteorological station located at EPA28 per Figure 8 provides real-time adverse meteorological conditions for the implementation of noise and air quality adaptive management of on-site activities, the station records temperature at 2m and 10m, rainfall, wind speed and direction.

Environmental Performance

Meteorological data capture for the reporting period was 97.8%.

Wind direction during the period was predominantly from the south-southeast and wind speeds were greater than 3 m/s for 60% of the period. An annual wind rose for the period is provided in Figure 10

Figure 10 – Annual Wind Rose



6.5 BLASTING AND VIBRATION

Environmental Management

Blast management at North Mine is managed in accordance with:

- H02S02PLN0013 North Mine Blast Management Plan. Revision E

This document describes the management of blasting and blasting-related impacts associated with the operational phase of the North Mine. This document specifically addresses the requirements of Condition 22 of Schedule 3 of SSD7538.

North mine EPL 2683 requires monitoring of all blasts as summarised in Table 20 at two locations as per Figure 8:

- 56 North
- Junction Circle

Table 20 - Summary of EPL 2683 conditions for blasting (excluding Potosi)

Blasting EPL 2683 Conditions	
Condition	**Licence Requirement**
Licence Points	56 North Mine, Junction Circle
Pollutant/s	Ground Vibration
	Overpressure
Unit of measure	Millimetres per second (mm/s), Decibels (dB)
Sampling method	AS 2187.2-2006
Monitoring frequency	All blasts
Data Reporting	All blasts
Date results received	Immediately following each blast
Limits	
Ground Vibration – 95% of blasts	Five (5) millimetres per second (mm/s)
Ground Vibration – Upper limit	Ten (10) millimetres per second (mm/s)
Overpressure – 95% of blasts between 0645 h -1915 h	115 decibels (dB)
Overpressure – upper limit between 0645 h -1915 h	120 decibels (dB)
Overpressure – upper limit between 1915 h - 0645 h	95 decibels (dB)

In addition a third fixed monitoring location adjacent to the closest residence to blasting operations has been established. Per Condition 19 and 20 of Schedule 3 of SSD7538 “North 3” indicates levels at the closest privately owned residence. Table 21 summarises the blasting compliance criteria defined in development consent SSD7538.

Table 21 - Blasting compliance criteria

Blasting Impacts			
Location	Airblast Overpressure1 (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance2
Residence on privately owned land	115	5	5% of the total number of blasts over a 12-month period
	120	10	0%
Blasting Frequency			
Production blasts	1 per day or 6 per week (averaged over a calendar month)		
Other blasts[3]	No limit		

Note 1: The monitoring of airblast overpressure is only required until such time that the EPA is satisfied that it is no longer required

Note 2: The allowable exceedance must be calculated separately for production blasts, development blasts and cut and fill blasts.

Note 3: “Other blasts” are defined as production blasts that generate ground vibration of 0.75mm/s or less at any residence on privately-owned land, blast misfires or blasts required to ensure the safety of the mine or its workers.

Environmental Performance

Blast monitoring results are summarised in Table 22. During the reporting period a total of 1417 blasts were undertaken, 77 production blasts and 1340 development blasts. During the period, 3 blasts were not captured by all 3 units. This was due to software setup errors (twice failed at Junction Circle and once at North 56). On all these occasions the remaining monitors captured the blast event. One production blast on 26/01/2020 that

generated a ground vibration above 0.75 mm/s, at North 3, occurred outside of the operating hours defined in Schedule 2 Condition 9. The record triggered at 6:44:55 am, 5 seconds early.

No blasting ground vibrations results above the maximum 10 mm/s or 5/mms were recorded at any blast monitor during the reporting period. A maximum of 3.00 mm/s was recorded at 56 North. No overpressure results exceeded the 0645 to 1915 maximum of 120 dB or 115 dB limits during the reporting period with the maximum overpressure recorded 104.4 dB.

Monitoring location 56 North recorded 7 overpressure results above 95 dB for the 1915 to 0645 limit; these events were caused by elevated wind speeds during the time of the blast event, inversion conditions and inappropriate (historical) siting of the monitoring unit influencing results.

During the period a relocation (triggered by the historical siting) of 56 North monitor occurred and adjustment of EPL 2683 limit time periods was made. Both changes were made in consultation with the NSW Environmental Protection Authority, two exceedances have occurred since the above changes were implemented when production blasts were fired outside the time period (0645 - 1915) for safety reasons.

Table 22 - Blast monitoring results

	No. Blasts	No. times measured	Min. Value	Mean Value	Median Value	Max. Value
Overpressure (dB)						
56 North Mine	1417	181	88.0	90.9	88.0	101.9
Junction Circle		32	80.0	91.0	88.9	104.4
North 3		104	80.0	91.0	88.0	98.0
Peak Vector Sum (mm/s)						
56 North Mine	1417	182	0.31	0.64	0.45	3.00
Junction Circle		32	0.30	0.41	0.37	0.61
North 3		104	0.30	0.60	0.45	1.97
Production Blasts 77		Development Blasts	1340	Total Blasts	1417	
Blasts >95 dB 45		Blasts >115 dB	0	Blasts >120 dB	0	
Blasts >0.75 mm/s 37		Blast >5 mm/s	0	Blast >10mm/s	0	
Calculations are based on blasts registering above 0.3 mm/s PVS						

6.6 TRANSPORT

Environmental Management

Transport management at North Mine is managed in accordance with:

- H02S02PLN0014 North Mine Transport Management Plan. Revision D

This document describes the management of transportation-related impacts associated with the North Mine. This document specifically addresses the requirements of Condition 27 of Schedule 3 of SSD7538. For the purposed of this document “ore haulage” relates to transportation of ore in road-registered vehicles.

Transportation levels – the following maximum transportation rates are permissible.

- Up to 300 000 tpa of ore.
- Up to 32 ore laden truck movements per day.
- Up to 4 ore laden truck movements per hour.

Up to 16 ore laden truck movements per day when averaged over a calendar year.

Environmental Performance

Loaded vehicle movements during the reporting period did not exceed the maximum 32 loads per day, truck movements averaged over the calendar year was 14.9. Transport related incidents reported during the period are summarised below

- 29th May 2020 two wheels came off CMC haulage truck on Argent Street, making contact with North Mine residence fence and a private vehicle.
- 22nd July 2020 CMC Road Train entered North Mine through front gates and not by back/rear gate as per drivers Code of Conduct. Immediate action taken included: Contact CMC Supervisor.

6.7 HERITAGE

6.7.1 ABORIGINAL CULTURAL HERITAGE

Environmental Management

Aboriginal cultural heritage management at North Mine is managed in accordance with:

- H02S02PLN0016 North Mine Aboriginal Cultural Heritage Protocol. Revision 0

The protocol is implemented in the event that a suspected Aboriginal artefact is identified within the North Mine site. If an object is identified then the area is barricaded and made safe and immediate communication with the relative authorities, as defined in the protocol, will occur.

Environmental Performance

During the reporting period no chance finds have occurred and the Aboriginal Cultural Heritage Protocol has not been activated.

6.7.2 HISTRORIC HERITAGE MANAGEMENT

Environmental Management

Historic heritage management at North Mine is managed in accordance with:

- H02S02PLN0017 North Mine Historic Heritage Management Plan. Revision D

This document describes the management of Historic Heritage associated with the operational phase of the North Mine. The *Broken Hill Local Environment Plan (2013)* identifies 32 items of local heritage significance within the Mine Site.

Environmental Performance

An assessment of the condition of the heritage sites at the North Mine was undertaken in March 2019 by OzArk consultants. The prepared report (*Historic Heritage Condition Assessment: Broken Hill North Mine*) lists the assessed condition (as of 2019) alongside previous assessments (Table 23).

Table 23 - Condition of all heritage items at the North Mine

Name of Item	Item no.	Assessed Condition 2006	Assessed condition 2019	Comment
No. 1 Mill Foundations	PN-61	Not assessed	Structural ruin	Highly damaged exposed foundations. No recognisable sections of original building remain, and structure may be at risk of subsiding.
No. 1 Mill Tunnel	PN-62	Not assessed	Structural ruin	All timber components have rotted away, and many metal chute fixtures are missing. Concrete failing.
Ambulance Station	PN-63	Fair	Fair	External structure largely intact but interior roofing collapsed and in poor condition.
No. 2 Shaft Headframe and Crushers	PN-64	Fair	Fair	Headframe structure in good condition with little rust. Timber decking missing but crusher still in good condition, primary crusher machinery in poor condition. Windows broken throughout.
No. 2 Shaft Winderhouse	PN-65	Poor	Fair	Intact frame, peeling paint with some rust present on corrugated galvanised iron sheets. Some windows still intact.
No. 2 Changehouse	PN-66	Average	Fair	Intact, some rust on corrugated galvanised iron sheets. Stairs at entrance in poor condition.
No. 2 Mill	PN-67	Average	Fair	Missing some corrugated galvanised iron sheets and has a large amount of surface rust. Windows mostly intact, both concrete bins and building structure are in good condition at rear of building.
No. 2 Residue Pumphouse, No.12 Conveyer and Hopper	PN-68	Very poor	Very poor	Sheeting intact but all windows broken. Both hopper and conveyer in very poor condition.
No. 2 Reagent Shed	PN-69	Poor	Poor	Roof sheets missing, broken and missing windows, corrugated galvanised iron sheets very rusted.
No. 2 Thickener Vats	PN-70	Very poor	Very poor	All metal rusted, concrete failing and many pipes missing. Pumphouse in good condition, with concrete intact and minimal rust to corrugated galvanised iron panels.
No. 2 Lead Bin	PN-71	Very poor	Poor	Bin concrete failing and all metal surfaces rusted. Concrete base and rails leading from bin intact.
No. 2 Filterhouse and loading station	PN-72	Average	Poor	High level of rust on corrugated galvanised iron sheets with some panels missing. Windows broken.
No. 3 Vent fan	PN-74	Average	Fair	Some surface rust to horizontal section, but generally good condition. Vertical fan structure in poor condition with high levels of rust.
Weighbridge station	PN-75	Average	Poor	Structurally intact, but corrugated galvanised iron sheets rusty and windows broken. Interior in poor condition.
Water Tank (Lords Hill)	PN-96	Not assessed	Good	
Archaeological Potential - Amalgamated Zinc	PN-99	Not assessed	Not applicable	Area demolished, cleared and levelled. Archaeological potential limited to concrete slabs, no archaeological significance.
Loading Station	PN-76	Average	Good	Structural trusses intact, rusted but sound corrugated galvanised iron sheeting. Some timber fencing missing but generally good condition.
No. 3 Crusher house	PN-77	Fair	Fair	Some broken windows and rust to corrugated galvanised iron sheeting but intact and in fair condition.
No. 3 Shaft headframe	PN-78	Fair	Good	Structure intact with no missing trusses and minimal surface rust.
No. 3 Winderhouse	PN-79	Average	Fair	All windows intact, some rust present. Some shade panelling broken but machinery remains intact.

Name of Item	Item no.	Assessed Condition 2006	Assessed condition 2019	Comment
No. 3 Changehouse and subsurface platform	PN-80	Average	Fair	The areas of the building still in use are in good condition, but large amount of rust on roof and gutters. Many broken windows and concrete cancer are visible in places.
North Mine General Offices	PN-81	Fair	Poor	Roof and veranda in poor condition. Windows largely intact but window seals lifting and deteriorating.
North Mine Assay Office	PN-82	Fair	Fair	Steel frame rusted, some broken windows and failing window seals. Exterior roofing sheets lifting off.
No. 3 Tanks and shed	PN-83	Good	Good	Tank still functioning with some evidence of surface deterioration including salt scale at base and rust. Shed demolished.
No. 3 Transformers and cooling tower	PN-84	Very poor	Very poor	Evaporation tower in very poor condition with many blades rusted through and concrete flaking. Transformers have surface rust, vegetation around structures.
No. 3 Shed (former saw mill)	PN-85	Average	Structural ruin	Building demolished prior to 2016, slab concrete remains and evidence of timber offcuts.
Houses 17, 18, 19, 19B and 20	PN-86	Good	Very Good	Some minor works required: repainting, some roofing lifting, gutters full.
12 houses at Junction Circle	PN-89	Good	Good	All paintwork on timber lifting including facias.
North Mine Residences	PN-87	Good	Good	Exterior paint lifting in places.
North Broken Hill Entrance Gates	PN-88	Fair	Fair	Structurally sound brickwork but roof facia and gutters in poor condition.
Drainage Channel I314	PN-73	Not assessed	Good	"Possible originally stone lined in entirety. Some sections now concrete lined to replace missing or damaged stonework. Concrete base has cracked and beginning to fail in places where stonework missing. Eastern section concrete changes to stone at the weighbridge. Western end buried and contains a pipe. An integrity assessment completed by Perilya in 2018.
Standard Gauge Railway Siding	PN-97	Not assessed	Poor	35 metres remaining at far-eastern end of line. Several railcars remaining on line.
Compressed Air and Power Line	PN-98	Not assessed	Poor	Many sections missing, line is incomplete.

6.8 WASTE MANAGEMENT

Environmental Management

Perilya Broken Hill Ltd engages a licensed waste management provider for the offsite management of both recycled and non-recycled waste including (subject to logistical constraints from the current pandemic):

- Hydrocarbons on a monthly basis
- Hazardous waste including sewerage

Onsite waste disposal includes, overburden waste is disposed within the Cosmopolitan pit and benign wastes (as approved via EPL 2683) are disposed within the onsite landfill and covered with overburden material.

Environmental Performance

During the reporting period North Mine had reduced disposal due to logistical constraints 6,000 Litres of waste oil. Collection of hydrocarbon products during this reporting period approximately 1 tonnes of IBC-size containers sent off site for appropriate disposal.

Waste management has decreased in this reporting period, a result of logistical constraints from the current pandemic. Significant waste streams requiring licensed contractors include; hydraulic hoses, oil filters, oily rags, empty IBC's from concrete services, obsolete chemicals and recyclables have been delayed

6.9 CONTAMINATED LAND AND HYDROCARBON CONTAMINATION

Areas of contamination arising as a result of historical mining are scheduled to be addressed during site rehabilitation and prior to the mine closure phase.

Hydrocarbon waste management requirements (AS 1940) are in place and hydrocarbon waste is disposed of by a licensed waste contractor.

6.10 LAND MANAGEMENT

The Mine is located in a historically disturbed area (since 1883). An ecological assessment undertaken as part of the EIS for the re-start of North Mine determined that the mine would not result in disturbance to native vegetation.

An ecological assessment undertaken in 2017 determined that the mine re-start would not result in impact to any threatened species (OzArk 2017.)

Weeds and pests are controlled on a campaign basis with no activities undertaken during the period. Woody weeds on the CML's include sporadic Tamarisk. Feral animals include goats and rabbits. There were no required programs associated with weed or feral animal control during the period.

6.11 VISUAL AMENITY

The Mine site is operational. The only areas with night (surface) lighting are the maintenance workshops and administration / crib areas. Outdoor lighting fixtures constructed in accordance with *AS4282 (INT) – Control of Obtrusive Effects of Outdoor Lighting.*

6.12 BUSHFIRE

Bushfire risk at North Mine is considered to be low due to:

- Vegetation surrounding North Mine is open arid shrubland sparsely vegetated and has as a result inherently low fuel loads

The Mine site contains perimeter and internal fire breaks.

6.13 PUBLIC SAFETY

North Mine is considered to present low risk to public safety due to:

- Site possessing full-perimeter security fencing;
- Mine site is patrolled on a regular basis by Security;

Video surveillance is used at all Perilya mines in Broken Hill.

Security related incidents reported during the period are summarised below

- 10th February 2020 - Unauthorised vehicle on site. Security notified.

7 WATER MANAGEMENT

7.1 WATER ACCESS LICENCE

PBHL holds a water supply works approval (60WA583325) for the underground workings of the North Mine as well as a water access licence (WAL40959) that allows for the extraction of up 1.466 Gl of groundwater per annum from the North Mine workings, as well as:

• Southern Operations (WA60582773, WA60582777 and WA60582779); and

• Potosi Mine (85WA753477).

Table 24 - North Mine extraction from January to December 2020

Water access licence #	Annual extraction limit (GL)	No. 3 Shaft Annual extraction (GL)
WAL40959	1.466	0.380

North mine extracted approximately one third of the total allocation across the third mine sites during the reporting period per Table 24.

7.2 SURFACE WATER

Environmental Management

Surface management at North Mine is managed in accordance with:

- H02S02PLN0017 North Mine Water Management Plan. Revision F

This document describes the management of water associated with the operational phase of the North Mine.

External Catchments Zone

Runoff generated in the External Catchments Zone enters the Mine Site catchments and is directed either around or through the Mine Site via clean water diversion drainage infrastructure (open drain or pipe) without mixing with other (site generated) classes of water.

Internal (Mine-Site) Catchments Zones

All surface water runoff is contained via a series of lined and unlined dams with pump and pipe connectivity.

Sediment and Erosion Control

Inspections of sediment and erosion control structures following 25 mm of rain in 24-hours, in the event that evidence of erosion or sedimentation is observed, a defined set of management and mitigation measures are implemented in accordance with the above plan.

Environmental Performance

For the reporting period Broken Hill recorded 174 mm of rainfall with 49 days registering greater 0.1 mm, the highest 24 hour rainfall event recorded was 32.6 mm which occurred in September 2020.

An inspection of water management structures following 25mm of rainfall in 24 hours occurred in September and areas of erosion identified. Actions to repair and increase controls where implemented. Water sampling did not occur as no flow was present and inadequate volumes available for sampling.

7.3 GROUNDWATER

Environmental Management

Groundwater management at North Mine is managed in accordance with:

- H02S02PLN0017 North Mine Water Management Plan. Revision F

Groundwater recharge occurs via direct rainfall in sub-crop areas or via leakage from the overlying regolith or alluvial deposits associated with ephemeral water courses.

There are no known groundwater dependant ecosystems in the vicinity of the North Mine (OzArk 2017). In the vicinity of North Mine, the aquifer has been the subject of extensive dewatering since the commencement of mining operations in 1883. PBHL installed a submersible pump in the No. 3 Shaft on 2 March 2018 to recommence dewatering operations.

Extracted water is stored in lined evaporation ponds or piped to South Mine for use in the mineral processing circuit. Three piezometers were established downstream of the Evaporation Ponds to measure presence of leakage with a Trigger Action Response Plan (TARP) to be implemented should water of similar quality to the No. 3 shaft be intersected.

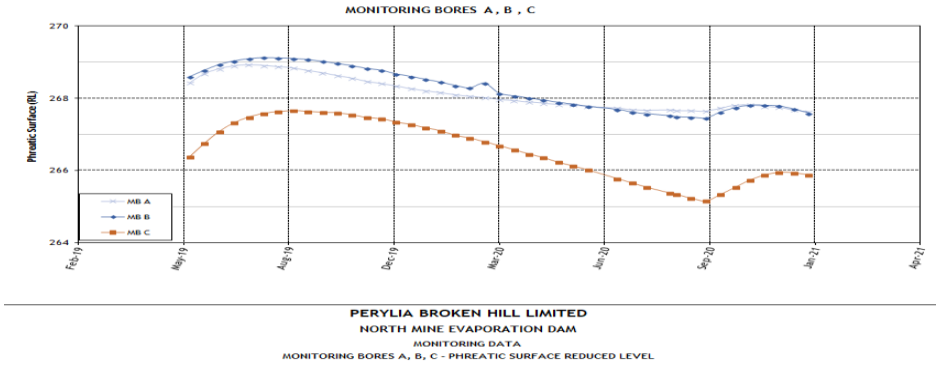
Environmental Performance

The standing water level within the No. 3 Shaft in August 2018 was 584.5 (m BGL) and the standing water level recorded during reporting period 965.1 (m BGL).

Monitoring of the three downstream piezometers commenced in May 2019, the first monitoring event indicated the presence of water and the frequency of monitoring was increased to fortnightly to observe trends. Due to the low volumes of water present an in-situ water probe was used to determine water quality parameters of the monitoring bores. Monitoring recorded increasing conductivity from monitoring bore A (MB A) to monitoring bore C (MB C) indicating the source entered the system at MB A before flowing to MB C.

Figure 11 provides the fortnightly monitoring of downstream monitoring bores, observed water levels have declined since August 2019 to September 2020 before increasing following high rainfall. Evaporation dams had 38.4 ML pumped into structures from underground and held water during the reporting period. Adjacent dam 57 remained dry from January 2020 to August 2020, for September to November the dam held water.

Figure 11 - Monitoring Bores A, B, C Pheratic surface level



8 REHABILITATION

The rehabilitation planning and management of North Mine is located in sections 5 to 8 of the MOP (2018). In accordance with Schedule 3, Condition 45 within one year of commencing mining operations a draft Rehabilitation Strategy was prepared and provided to members of the Broken Hill Rehabilitation Steering Committee for consultation. Outcomes of consultation with the committee are still pending and are linked to the Historic Heritage management plan consultation. Approval of the rehabilitation strategy will initiate the development of the North Mine Rehabilitation Plan.

The post mining land use goals identified in the North Mine strategy are to create a landform that:

1. is safe, stable, secure and non-polluting;
2. provides for a range of beneficial land uses that will support the post-mining economy of Broken Hill;
3. retains and preserves key heritage items in a manner that allows subsequent custodians to manage those items into the future, while allowing for the archival recording and removal or ruination of other items;
4. provides for a visual landscape that is in keeping with Broken Hill's unique visual character;
5. preserves relevant surface infrastructure for future beneficial land use;
6. does not exacerbate existing lead levels in soils surrounding the Mine Site;
7. does not result in discharge of sediment, salt or chemical-laden water, including leachate, from the Mine Site; and
8. is designed and managed in manner that is consistent with reasonable community and government agency expectations and desires.

8.1 REHABILITATION DURING REPORTING PERIOD

Table 25 presents a summary of the disturbance areas for the previous reporting period, the current reporting period and a forecast of the next reporting period. Table 25 indicates site disturbance at the end of the annual review reporting period.

Table 25 - Rehabilitation Status

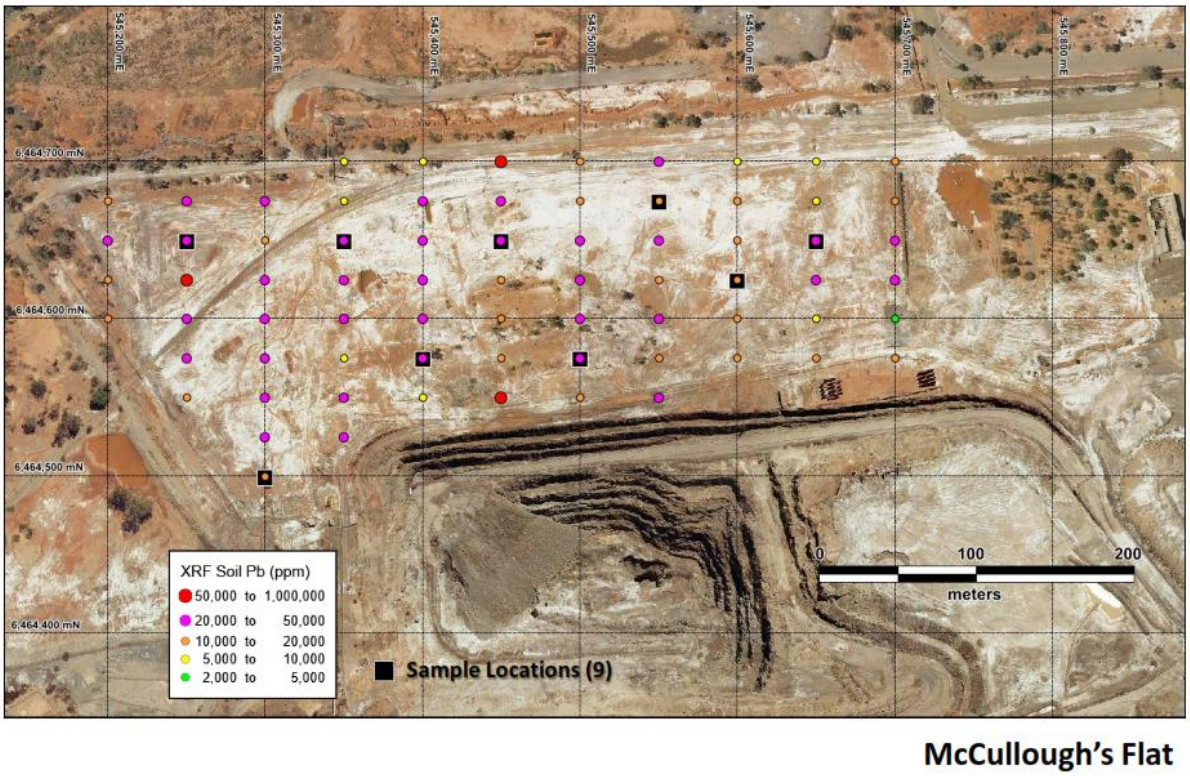
Mine Area Type	Previous reporting period	This reporting period	Next reporting period
	2019 (ha)	2020 (ha)	2021 (ha)
A. Total mine footprint	162.1	162.1	162.1
B. Total active disturbance	153.8	147.1	137.2
C. Land being prepared for rehabilitation	0	6.7	13.2
D. Land under active rehabilitation	0	0	0
E. Completed rehabilitation	0	0	0

Rehabilitation activities during the reporting period have been influenced by COVID related State border and Site Health & Safety restrictions, which resulted in postponement of planned rehabilitation and trials (Section 8.2).

Collection and storage of 37 kg of seed mix for rehabilitation of Domain 4 area were undertaken during the reporting period; however the aforementioned delays have postponed the preparation of the landform area. Table 26 provides a summary of the status of rehabilitation at the end of the reporting period.

Due to limitations which prevented planned words per Table 26, alternative data collection using on-site personnel were completed in September 2020 including XRF grid assessment and sampling of McCullogh's Flat. The data including previous assessments will be used to develop a comprehensive sampling plan for the contamination assessment, which is expected to be completed June 2021.

Figure 12 - XRF grid results of McCullough's Flat assessment (Pb)



A non-operational area of Domain 4 known as slime dam 1 was ripped and contoured in late December 2020 as shown in Figure 13, additional areas of Domain 4 will be ripped and contoured in early 2021.

Figure 13 - Photographs of ripping and contouring activities on slime dam 1

Table 26 - Rehabilitation Progression (Year 2/Year 3)

Objective	Performance Indicator	Completion Criteria	Progress at start of MOP	Expected Completion	TARP	Current Status
Phase 1 – Decommissioning						
Domain 5 – Mining Disturbance Area						
All infrastructure not suitable for lawful final land use will be removed.	Infrastructure not required for final land use to be removed.	All relevant infrastructure removed.	Not Commenced	End Year 1		Complete. Not required mine infrastructure has been removed. Historical Heritage and Rehabilitation Management plans requiring sanction from the Broken Hill Rehabilitation Steering Committee (pending) have not been finalised, thus lawful final land use has not been confirmed.
Domain is free from hazardous materials and contaminants.	Contaminated land identified and remediated.	Preliminary contaminated land assessment, including recommendations for remediation complete.	Not Commenced	End Year 1		Existing contaminated land assessment data compiled in preparation for assessment, XRF grid and sampling completed by site personnel during reporting period (Figure 12).Perilya COVID-19 policies limited options for suitable qualified person to attend site to complete contamination report.
		Final contaminated land assessment indicates any contamination has been remediated and landform is acceptable for final land use.	Not Commenced	End Year 2	1 – trigger relates to not meeting remediation – this assessment has been COVID delayed	Site access due to Perilya COVID-19 policies during reporting period has limited options for contaminated land assessment of remediation options.
Phase 2 – Landform Establishment						
Domain 5 – Mining Disturbance Area						
Free draining, stable and non-polluting landform established.	Landform suitable for growth medium development.	No pooling of water observed within landform. Landform established to integrate with the surrounding topography.	Not commenced	In progress (4ha/year from Year 2)		Yet to commence as contaminated land assessment and final landform have not be confirmed to progress to phase 2
Phase 3 – Growth Medium Development						
Domain K – Rehabilitation Area – Open Shrubland *Domain M – Heritage Conservation Area (sections not required to support heritage/commercial final land use)*						
Growth medium suitable for establishment of vegetation communities present.	Compacted surfaces deep ripped along contour.	Photographs of ripped areas.	Not Commenced	In progress (4ha/year from Year 2)		Domain 4 of Domain K only area non operational with per established (prior to MOP 2018) phase 1 and 2 areas available. Rip and contour development postponed in Year 2 due to COVID-19

Objective	Performance Indicator	Completion Criteria	Progress at start of MOP	Expected Completion	TARP	Current Status
						State boarder closures. Works started Year 3 December 2020 to Rip and contour the surface of Slime Dam 1 (Figure 13) No work in Domain M per previously discussed delays in Historical and Rehabilitation strategy approvals
	Minimum growth medium depth determined during rehabilitation trials (see Section 8.2) spread over domain.		Not Commenced	In progress (4ha/year from Year 2)	5, 6 & 7 Not triggered - work delayed	Growth medium spreading of Domain 4 linked to above delay. No work in Domain M per previously discussed delays in Historical and Rehabilitation strategy approvals
Phase 4 – Ecosystem and Land Use Establishment						
Domain K – Rehabilitation Area – Open Shrubland *Domain M – Heritage Conservation Area (sections not required to support heritage/commercial final land use)*						
Establish vegetation communities with a similar species composition to the surrounding native vegetation communities and consistent with the proposed final land use.	Species determined through rehabilitation trials planted using methodology and timing determined based in rehabilitation trials (see Section 8.2).		Not Commenced	In progress (4ha/year from Year 2)	9 Not triggered – work delayed	Vegetation establishment of Domain 4 linked to above delay. No work in Domain M per previously discussed delays in Historical and Rehabilitation strategy approvals
Phase 5 – Ecosystem and Land Use Sustainability						
No ecosystem and land use sustainability activities apply to domains during current MOP period.						

8.2 REHABILTATION TRIALS

During the reporting period two rehabilitation trials employing hydro-seeding were planned:

1. 1000 m^2 area on the haul road noise bund slope per Figure 14 and
2. 5000 m^2 area on the McCullough St Flat.

Plant species were selected based on general soil, angle of soil surface slope and observed particle size distribution conditions, salinity, portions of topsoil and metals probability of occurrence. Additionally plant species (chenopods) that are not highly palatable to feral animals have been selected.

Prior to the postponement the hydro seeding mix was collected per Table 27, the seed has been individually bagged, labelled and is currently being stored under controlled conditions in Adelaide.

Figure 14 - Proposed noise bund trial area

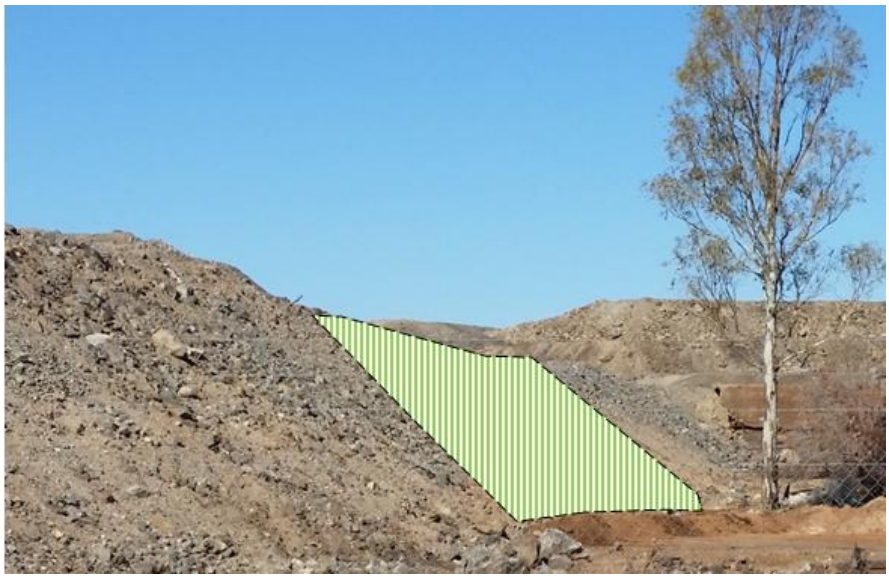


Table 27 - Hydroseeding trial seed mix

Hydroseeding mix	Quantity in Kg	Hydroseeding mix	Quantity in Kg
Atriplex nummularia	2.55	Maireana aphylla	1.00
Atriplex semibaccata	2.00	Maireana sedifolia	0.75
Atriplex holocarpa	2.00	Myoporum montanum	0.50
Atriplex lindleyi	2.00	Senna artemisioides ssp artemisioides	1.00
Atriplex vesicaria	1.00	Tecticornia sp	5.00
Enchylaena tomentosa	2.00	Nitraria billardierei	2.00
Maireana aphylla	1.00	Cymbopogon ambigus	0.55
Maireana appressa	1.95	Dactyloctenium radulans	0.50
Maireana brevifolia	2.00	Enneapogon nigricans or sp	0.20

In preparation of a replacement MOP/RMP document for North Mine PBHL completed a Landscape Function Analysis (LFA) monitoring program in December, which included establishment of comparable analogue sites with proposed rehabilitation (Figure 15 and Figure 17). The monitoring program assess flora diversity, structure, cover, soil stability, water infiltration and nutrient cycling which will help in the development of rehabilitation completion criteria.

The controls established at North Mine are characterised as:

- Ridge – two survey sites in remnant vegetation along a rocky ridge line
- Flats – two survey sites in remnant vegetation on gravelly flats

Figure 15 - North mine analogue sites

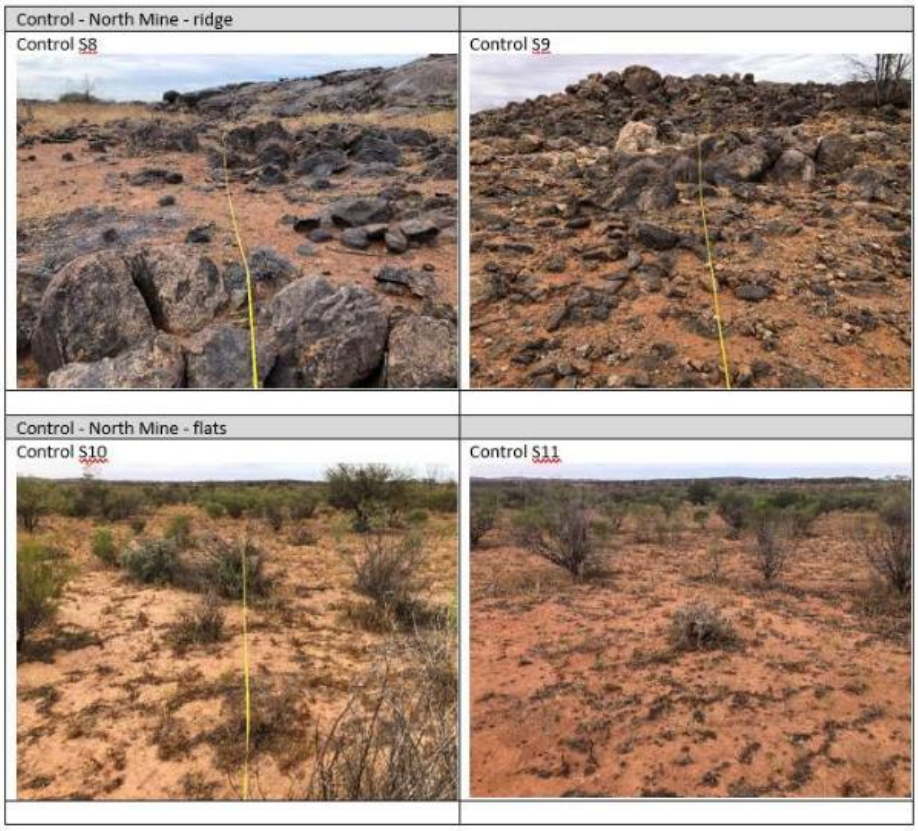


Table 28 - Summary of North mine LFA data

Mine	Area	Site	Landscape Organisation Index	Stability	Infiltration	Nutrients
North Mine	North Mine - ridge	Control S8	0.6	50.9	29.2	14.4
North Mine	North Mine - ridge	Control S9	0.68	60.1	35.3	15.2
North Mine	North Mine - flats	Control S10	0.4	53.9	28.8	20.1
North Mine	North Mine - flats	Control S11	0.4	54.4	28.9	21.1

In December PBHL started development on a topsoil trial area 30m x 90m:

- Topsoil + Subsoil + Waste Rock – treatment bare waste rock with 150mm subsoil and 150mm topsoil
- Subsoil + Waste Rock – treatment bare waste rock with 150mm subsoil
- Waste Rock – treatment bare waste rock that has ripped

Half the treatment areas will be seeded with the remaining area to act as a control providing natural germination rates, works are anticipate to be completed by June 2021.

Figure 16 - Topsoil trial area

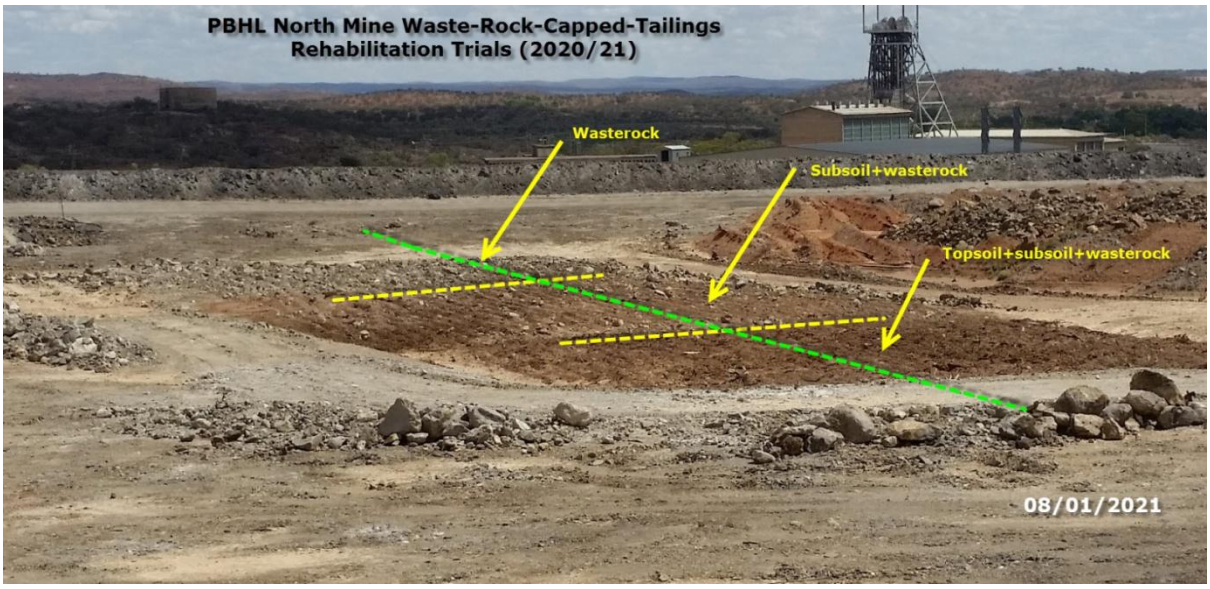
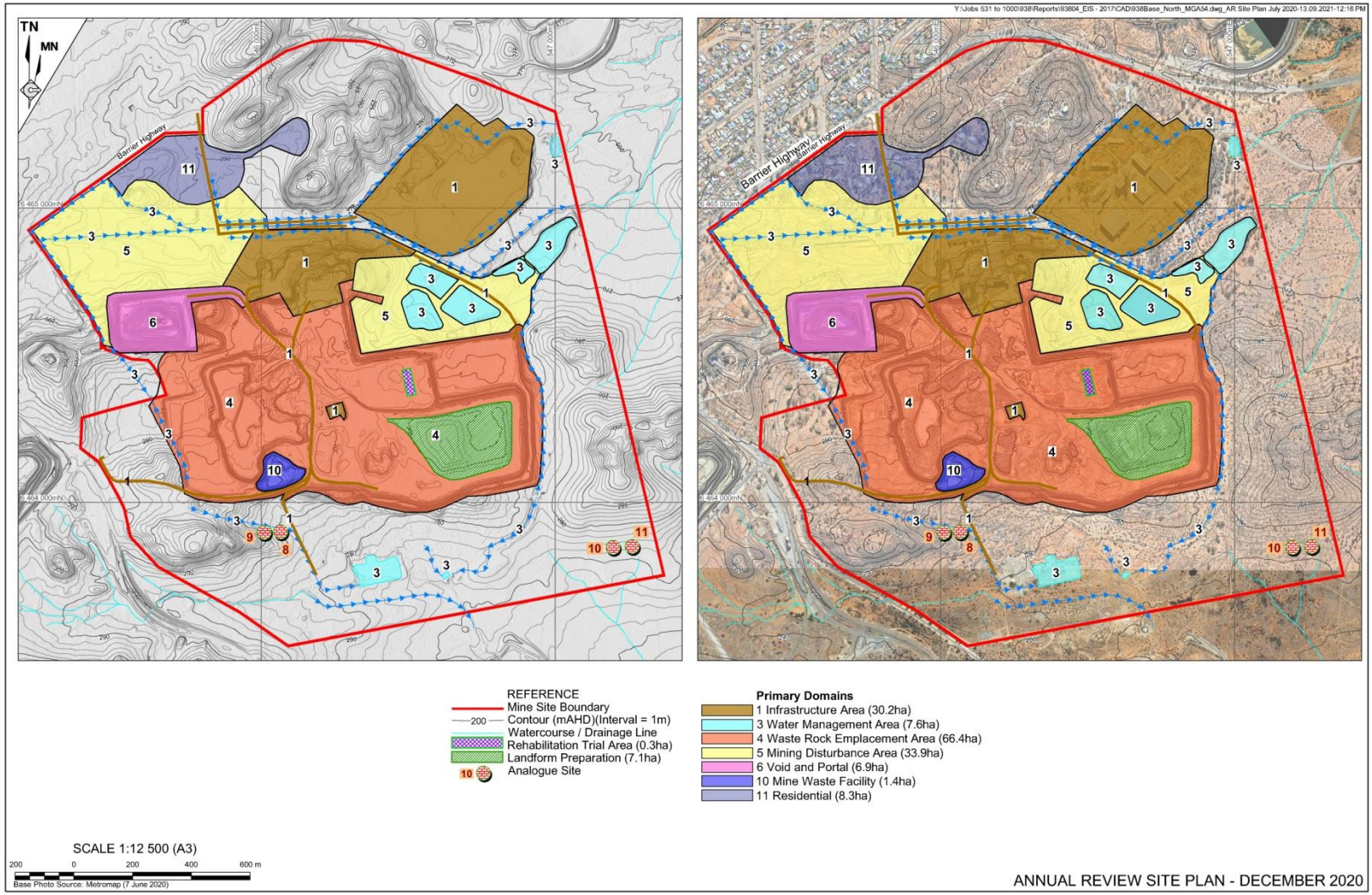


Figure 17 - Annual Review Site Plan - December 2020



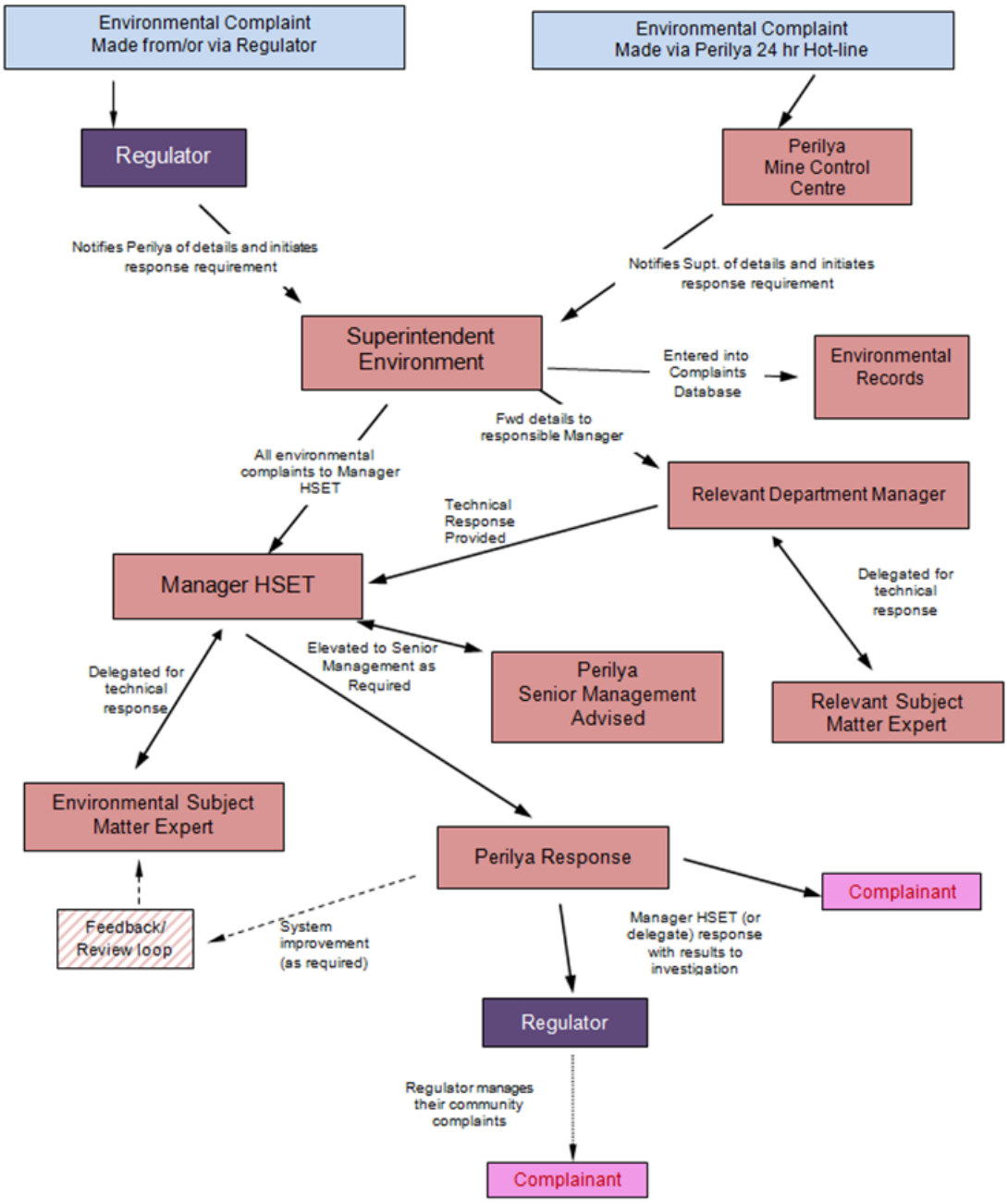
9 COMMUNITY

Environmental Complaints Management

Environmental Complaints management at North Mine is managed in accordance with:

- H05S14SOP0001: Management of Environmental Complaints
- Record of Environmental Complaints Form

Response to environmental complaints follows the chart below.



Community Complaints

During the reporting period there were no complaints registered for North Mine. Table 29 summaries the issues registered over the last three reporting periods.

Table 29 - Registered North Mine Complaints

Issue	2018	2019	2020
Noise	2	0	0
Blasting and vibration	1	1	0

Community Consultative Committee

As the re-commissioning of the North Mine is designated a State Significant Project, establishing a Community Consultative Committee (CCC) for the project is one of the conditions of the Development Consent.

The Broken Hill North Mine Community Consultative Committee is an advisory committee chaired by an independent chairperson. The CCC provides a forum for discussion between Perilya and representatives of the Broken Hill community, stakeholder groups and the Broken Hill City Council on issues relating the state significant project, North Mine.

The CCC seeks to:

- Promote good working relationships and information sharing between committee members.
- Allow Perilya to keep the community informed about projects, seek community views on the North Mine, and respond to matters raised by the community.
- Allow community members and the local council to seek information from Perilya on the development and implementation of the North Mine project, and facilitate the delivery of balanced social, environmental and economic outcomes.

Minutes of Meetings held between the CCC and Perilya can be found at http://www.perilya.com.au/health--safety--environment/community/bhnmccc

10 INDEPENDENT ADUIT

10.1 INDEPENDENT ENVIRONMETAL AUDIT

An independent environmental audit was undertaken at North Mine in August 2019, the period covered by the audit was from 18 August 2018 to 16 August 2019. The audit was conducted by Environmental Engineering & Energy (3E) with lead auditor John Hanrahan, The Secretary of the DPE endorsed the appointment of the audit team by letter on 3 May 2019.

The scope of the independent environmental audit included all relevant conditions specified below:

- State Significant Development Consent Number 7538 (MOD 1) as approved on 7 September 2018 by the delegate of the NSW Minister for Planning ('SSD Consent');
- Environment Protection Licence Number 2683 as at 6 July 2018, issued by the NSW Environment Protection Authority ('EPL');
- Consolidated Mining Lease Number 4 as renewed on 8 July 1987 ('CML4');
- Consolidated Mining Lease Number 5 as renewed on 8 July 1987 ('CML5'); and
- The sighting of environmental and operational documentation, records, monitoring data, operating and field conditions relating to the operation of the Broken Hill North Mine and related activities and conducting a number of interviews with relevant Perilya environmental and operational personnel.

Following is a summary of the audit report which is available on the company website including PBHL response to audit conditions resulting in non-compliance.

- *A total of 213 conditions across the SSD Consent, EPL, CML4 and CML5 were audited. The audit identified 135 'compliant' findings, 9 'not verified' findings, 25 'non-compliant' findings (consisting of 25 'low' risk level, 0 'medium' risk level,' 0 high' risk level), 14 'administrative non-compliance' findings, 16 'not triggered' findings, and 14 'notes'.*
- *Perilya was compliant with 135 of the 197 applicable conditions (i.e. all conditions except those which were 'not triggered').*
- *Perilya's level of compliance with the applicable conditions (i.e. all conditions except those which were 'not triggered') in each instrument was as follows:*
  - *Perilya was compliant with 43 of the 69 applicable SSD Consent conditions;*
  - *Perilya was compliant with 47 of the 70 applicable EPL conditions;*
  - *Perilya was compliant with 22 of the 28 applicable CML4 conditions;*
  - *Perilya was compliant with 23 of the 30 applicable CML5 conditions.*

Table 30 details the remaining action to be completed.

Table 30 - Ongoing 2019 Independent Audit Actions

Condition	Audit Findings		Additional Work Required
SSD 7538 Sch 3 – Cond 3	In relation to paragraph (e) of this condition, chemical dust suppressant had been applied on the North Mine site on several dates starting on 10 November 2018 and ending on 18 December 2019. Consolidated Mining & Civil (CMC) provided an email to Perilya on 14 January 2019 to confirm details of dates of application "as per diagrams supplied", showing the roads and areas which were treated. However, during this August 2019 audit Perilya was unable to provide evidence that the application of chemical dust suppressant achieved an emission control factor of 99.3% or better. Refer to table entry "Ref 55" in the Northstar "Independent Audit of Air Quality and Health Management" report of 19 March 2019.	Non-compliant (Low Risk)	Fugitive dust emissions, after the application of dust suppressant product were determined using the portable dust monitor referred to in EPL 2683. Ongoing performance via above method to be discussed in annual review reporting.
SSD 7538 Sch 3 – Cond 26	During the audit period Perilya did not fully comply with the second dot point in paragraph (a) of this condition as follows: · On 27/28 June 2019 Perilya's North Mine Manager issued a Manager's Specific Instruction (Doc No: H02S04MSI0099) in response to the following:	Non-compliant (Low Risk)	PBHL will include review of incident in future reviews of Traffic Management Plan
SSD 7538 Sch 3 – Cond 34	During this August 2019 audit there was evidence of inadequate implementation of several aspects of the Water Management Plan in relation to the following: · Section 9.1 of the Water Management Plan – There was evidence that dirty water is possibly mixing with diverted clean water in the southern zone of the North Mine site catchments. Refer to supporting evidence/comments in SSD Consent Schedule 3 condition 32. · Section 9.3.2 of the Water Management Plan – This section states that the Wilcannia Road Dam and 57 Dam will be maintained such that each storage will be empty within 5 days of a rainfall event greater than 25mm in a 24-hour period. However, at the time of this August 2019 audit, these dams were not empty and infrastructure was not in place to transfer water to the Evaporation Pond as per Figure 5 of the WMP. · Section 11.3 of the Water Management Plan (Level 3 TARP) – There is a risk that Perilya cannot implement responses to every high rainfall event in a timely manner because there is no automated recording of freeboard levels in the water storage facilities.	Non-compliant (Low Risk)	PBHL to undertake a review of the extent of potential contamination to the diversion drain system, noting that Line 2 of Table 6 in the Development Consent requires PBHL to "maximize" the diversion of clean water around disturbed areas on site. Wilcannia Dam and 57 Dam had not received 25 mm of rainfall in a 24 hr period. Observed waters were generated by the truck wheel wash facility which drains to Wilcannia Dam and is then pumped to 57 Dam or the evaporation ponds. Wilcannia Dam operates on a float valve system to trigger pumping of waters to 57 Dam in order to prevent over topping. 57 Dam has pump and pipe connectivity to the evaporation ponds. Visual markers are installed to indicate freeboard levels in the evaporation ponds.

Condition	Audit Findings		Additional Work Required
CML 4/5 18	During this August 2019 audit the following examples of unauthorised air pollution and water pollution were identified: · Perilya was unable to provide evidence that the application of chemical dust suppressant achieved an emission control factor of 99.3% or better (refer to SSD Consent Schedule 3 condition 3); .	Non-compliant (Low Risk)	Fugitive dust emissions, after the application of dust suppressant product were determined using the portable dust monitor referred to in EPL 2683. Ongoing performance via above method to be discussed in annual review reporting

10.2 INDEPENDENT AUDIT OF AIR QUAILTY AND HEALTH MANAGEMENT

In accordance with Consent SSS 7538 Schedule 3 Conditions 12 and 13, one month following commencement of mining operations an audit of the air quality and health management systems was undertaken. The audit was performed on 22nd January 2019 by Gary Graham of Northstar Air Quality, Table 31 provides a summary of compliance.

In April 2019 PBHL submitted the audit report including company responses (available on Perilya website) and action plan to address identified non-compliant issues to the Department. A response to the submissions from the Department received on 31st October 2019 requested an update to the implementation of actions, an updated Air Quality Management Plan and confirmation on the distribution of newsletter per Schedule 3, Condition 8 (addressed in Section 6.2). The implementation status as of 9th November 2019 submitted to the department noted the 10 of the 13 identified non-compliance would be completed following approval of updated Air Quality Management Plan submitted on the 13th November 2019. At the end of the reporting period one ongoing action requires further work per Table 32.

Table 31 - Summary of Air Quality and Health Audit

Compliance Status	Number
Compliant	54
Non-compliant	13
Not triggered	21
Blank	0
Total	**88**

Table 32 - Ongoing Actions for Air Quality and Health Audit

Requirement	Audit Findings	Recommendations / Actions	Perilya Actions Status
Free areas are non-operational areas identified on Figure 1. A testing program is required to determine the level of fugitive dust control achieved and to identify any areas that are not meeting the 99.3% control criteria identified in Section 8.1 [AQMP]. All free areas will be surveyed annually using the Confined Air Burst Chamber (CABC) method.	ERM (Aug 2018) PBHL, North Mine Wind Erosion Field Testing provides a report on the control efficiency of 'free areas' by CABC. The conclusion of that report states: "The results of the above field analysis indicate that natural crusting of unsealed surfaces observed within the uncontrolled free areas provides a reduction of more than 80% in wind erosion potential relative to freshly disturbed material at the majority of the sample locations. In terms of the results for the controlled exposed surface areas indicate that covering the exposed areas with waste rock (rock armouring) provides an effective reduction in wind erosion potential relative to uncontrolled, disturbed materials within the area. The results for this location / control technique presented the highest control efficiency during the testing exercise. Nevertheless, none of the results obtained during the testing campaign were observed to exceed the 99.3% control efficiency stated in the Construction Air Quality Management Plan (CAQMP). On that basis, further surface treatment is recommended to demonstrate compliance." TARP AQ7 states: "Apply Lignosulfonate dust suppression at the rates identified by the manufacturer and retest until all free areas achieve 99.3% control. If required, reapply Lignosulfonate dust suppression until required control level achieved. File results and report as described in Section 12.3". The site visit witnessed the application of lignosulphonate, but evidence of achieving the 99.3% control has yet to be provided.	Additional CABC testing is required to demonstrate a 99.3% control efficiency. If the test results do not demonstrate compliance additional actions will be required.	Initial works from the “Free Areas” CABC requires a follow up survey to determine if the criteria have been met by the application of Lignosulphonate product after the CABC survey (see Ref 30). However we have been advised by our AirQ specialist to await feedback on the approved use of the method via regulators.

11 INCIDENTS AND NON-COMPLIANCES DURING REPORTING PERIOD

11.1 NON-COMPLIANCES

The compliance status of North Mine with relevant approvals and conditions for the current reporting period was assessed in Section 1. Details of non-compliance have been addressed in relative sections of the report as indicated in Table 4.

11.2 REGULATORY ACTIONS

The Independent Environmental Audit submitted to the Department on 1 November 2019 identified an "administrative non-compliance" with Condition 11 of Schedule 2 of the Development Consent SSD7538.

The Department of Planning, Industry and Environment issued a Show Cause Letter dated 17 February 2020 relating to an alleged failure to obtain construction and / or occupation certificates for the "*Run of Mine (ROM) shed and other relevant buildings and structures associated with the project*".

Consequently, the Department determined that Perilya breached Section 109M of the *Environmental Planning and Assessment Act 1979* by occupying the ROM shed without and occupation certificate or an interim occupation certificate and Perilya were issued an Official Caution notice on 8 April 2020.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Activities to be completed in the next reporting period to improve the environmental and community performance of the North Mine are summarised in Table 34.

Table 33 - Proposed activities to be completed in the next reporting period

Activity	Timeframe
Completion of review and, if necessary, revision of Environmental Management Plans	In accordance with SSD7538 Schedule 4 Condition 6
Progression of remaining actions from Independent Environmental Audit	Ongoing
Progression of remaining action from Independent Air Quality and Health Audit	Ongoing
Independent Air Quality and Health Audit	January 2021
Continued engagement with local stakeholders	Ongoing