



# 1 October 2022 – 31 December 2022 Environmental Monitoring Results Summary

<b>Name of Mine</b>	Northparkes Mines
<b>Name of Leaseholder and Mine Operator</b>	CMOC Mining Pty Ltd
<b>Mining Leases</b>	ML1247, ML1367, ML1641 AND ML1743
<b>Environment Protection Licence</b>	EPL 4784
<b>Development Consent</b>	DC11_0060 (as modified)

<b>Reviewed by</b>	Chris Higgins
<b>Title</b>	Superintendent – Environment & Farms
<b>Date</b>	
<b>Signature</b>	
<b>Approved by</b>	Stacey Kelly
<b>Title</b>	Manager – People, Safety & Environment
<b>Date</b>	
<b>Signature</b>	

## 1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 October to 31 December 2022. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at [www.northparkes.com.au](http://www.northparkes.com.au)). Details of air quality, noise, water and vibration monitoring locations are available in the Environmental Monitoring Program. Refer to appendix A for all monitoring location maps.

## 2. AIR QUALITY

In June 2022, Northparkes Project Approval (DC11\_0060) was updated to include the following:

- removal of TSP (high volume air samplers (HVAS)) and depositional dust gauges, and
- requirement of PM<sub>2.5</sub> assessment criteria to be included (may be a calculation as a ratio of PM<sub>10</sub>). Including,
  - Inclusion of Annual averaging period criteria for PM<sub>2.5</sub> of 8 µg/m<sup>3</sup>
  - Inclusion of 24 hour averaging period criteria for PM<sub>2.5</sub> of 25 µg/m<sup>3</sup>
- Annual averaging criteria for PM<sub>10</sub> exceedance reduced from 30 µg/m<sup>3</sup> to 25 µg/m<sup>3</sup>

Monitoring locations are strategically positioned around the mine lease and neighbouring properties. Monitoring of TSP and depositional dust continued through to end of October when the Air Quality Management Plan was updated and approved by the EPA.

### 2.1 PM<sub>10</sub>

PM<sub>10</sub> monitoring results for the Hubberstone, Milpose and Hillview monitoring locations, for the reporting period, are displayed in Figure 1, Figure 2 and Figure 3 respectively. The criteria for exceedances (as nominated in the Development Consent DC11\_0060, known as the Consent), are >25 µg/m<sup>3</sup> for the annual average and >50 µg/m<sup>3</sup> for a 24-hour monitoring period.

During the reporting period no exceedances of the Consent criteria were recorded.

From 5 – 11 December, the new MetOne BAM1020 units were installed at all three locations. No data was recorded during that time to ensure installation and calibration figures were correct. No data is available for the Hillview unit for the period 17 December to 13 January, as a result of commissioning issues.

#### **Annual Averages:**

Annual averages recorded at all monitoring locations are below the Consent criteria of 25 µg/m<sup>3</sup>, recording:

- 8.1 µg/m<sup>3</sup> at Hubberstone
- 9.1 µg/m<sup>3</sup> at Milpose, and
- 7.0 µg/m<sup>3</sup> at Hillview.

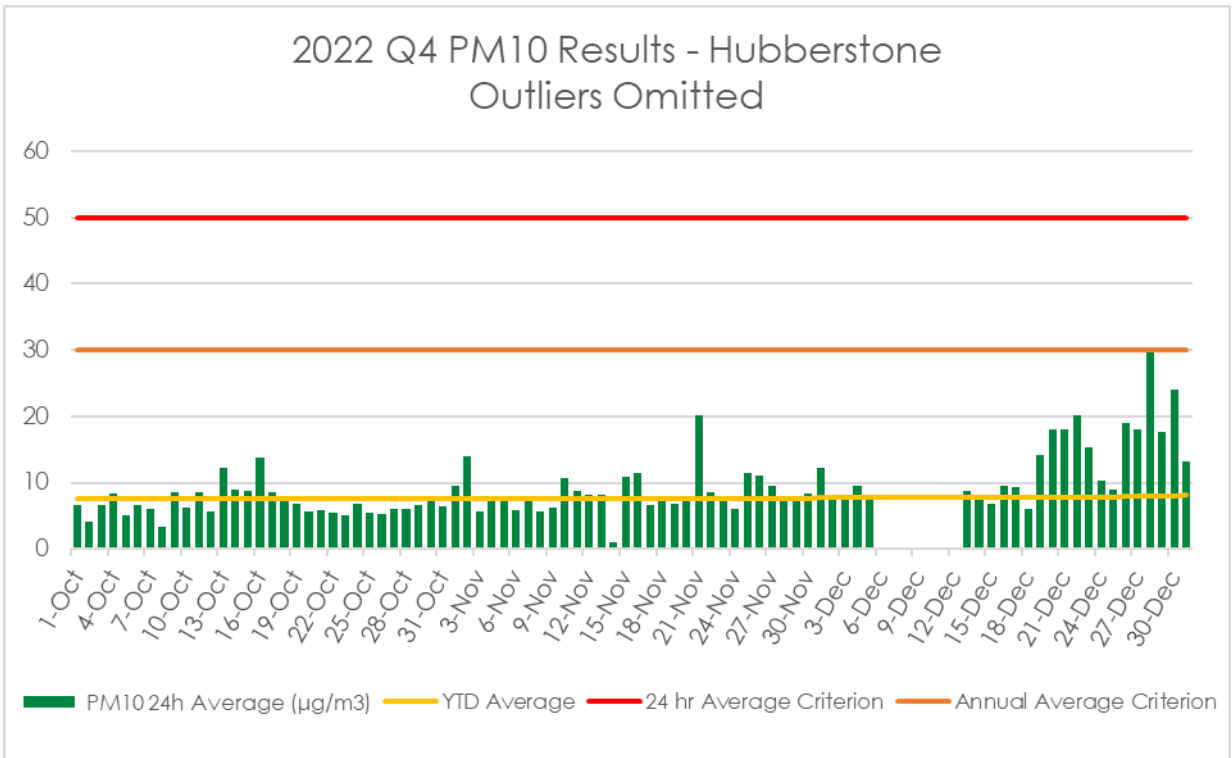


Figure 1: Hubberstone

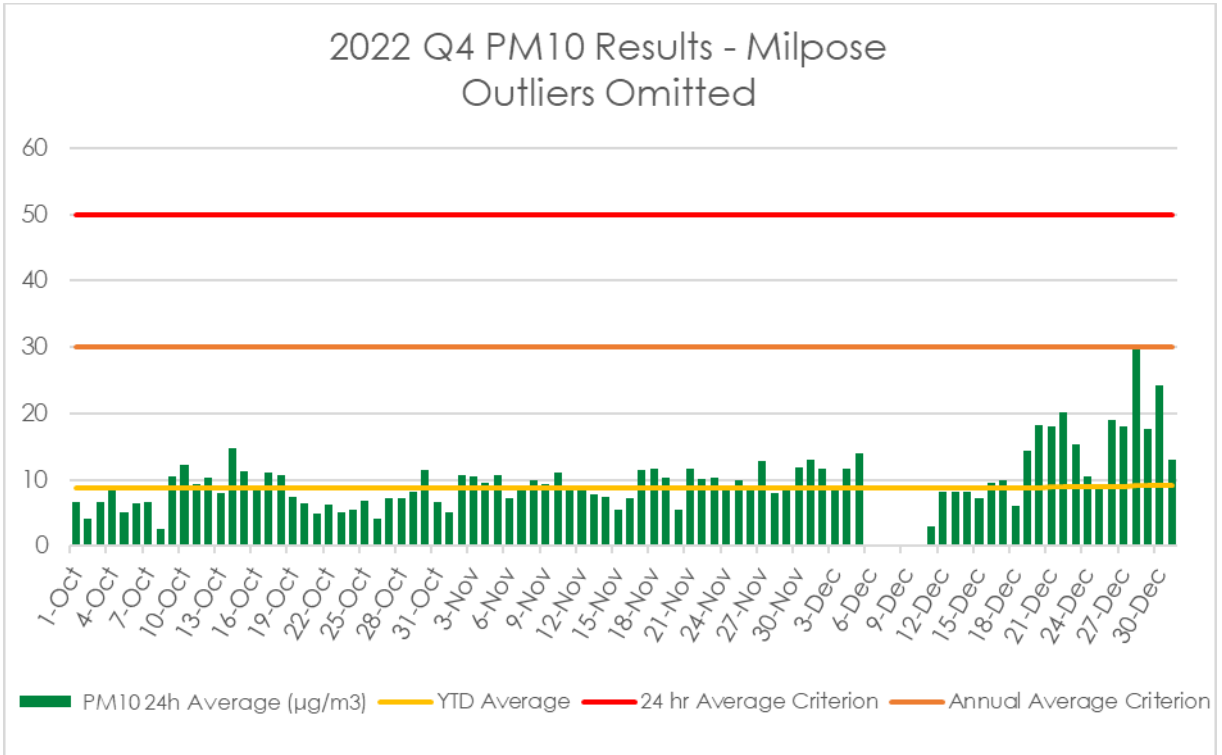


Figure 2: Milpose

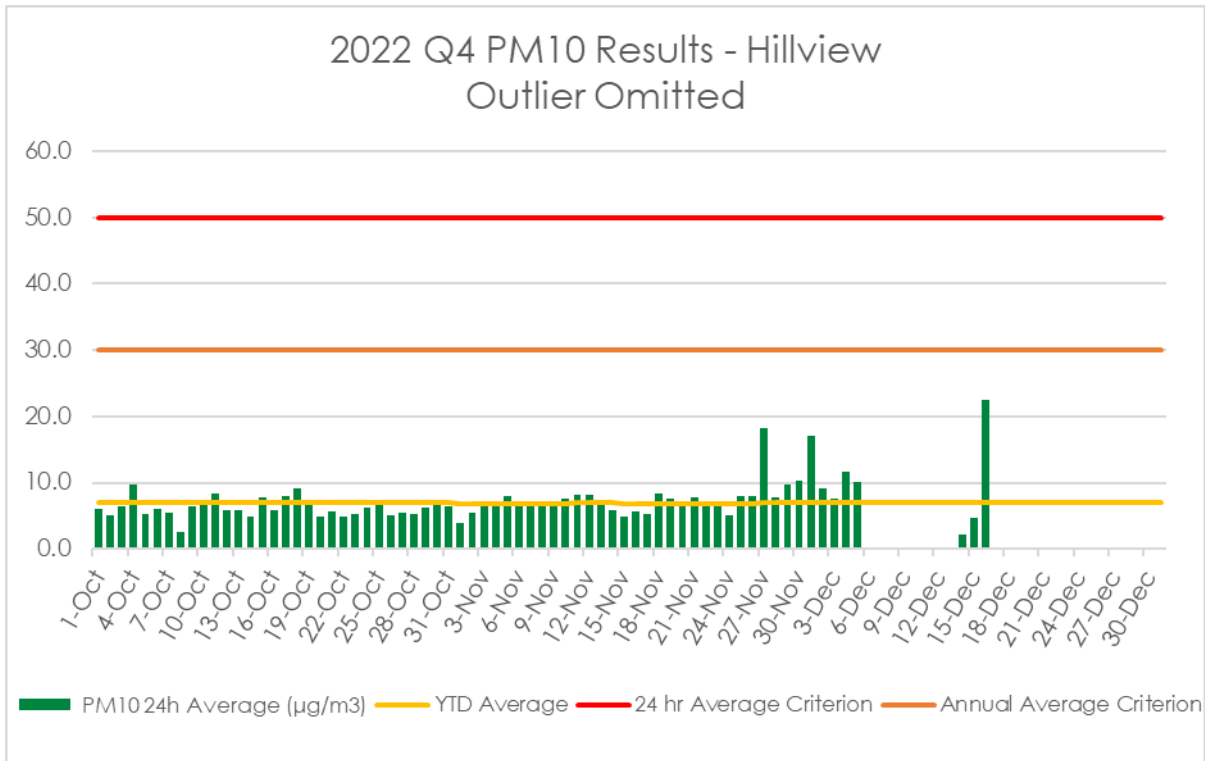


Figure 3: Hillview

## 2.2 TSP

Hubberstone, Milpose and Hillview all recorded dust levels at the TSP monitoring locations under the required average annual criteria set by the Consent (90 µg/m³) for the quarter for the reporting period.

From the end of October, TSP results were no longer required to be recorded due to the change of licence conditions.

### Annual Averages:

Annual averages recorded at all monitoring locations are significantly below the Consent criteria of 90 µg/m³, recording:

- 14.2 µg/m³ at Hubberstone
- 15.4 µg/m³ at Milpose, and
- 14.4 µg/m³ at Hillview.

During the reporting period no exceedances of the Consent criteria were recorded.

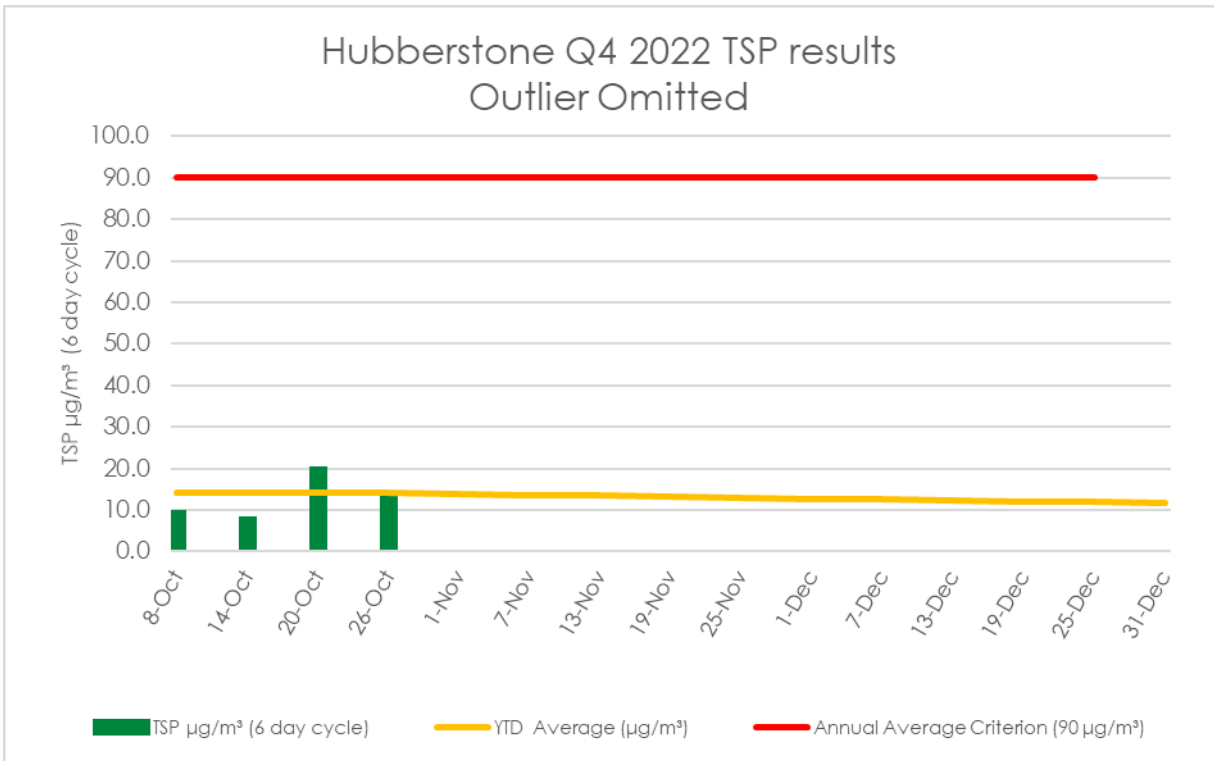


Figure 4: Hubberstone

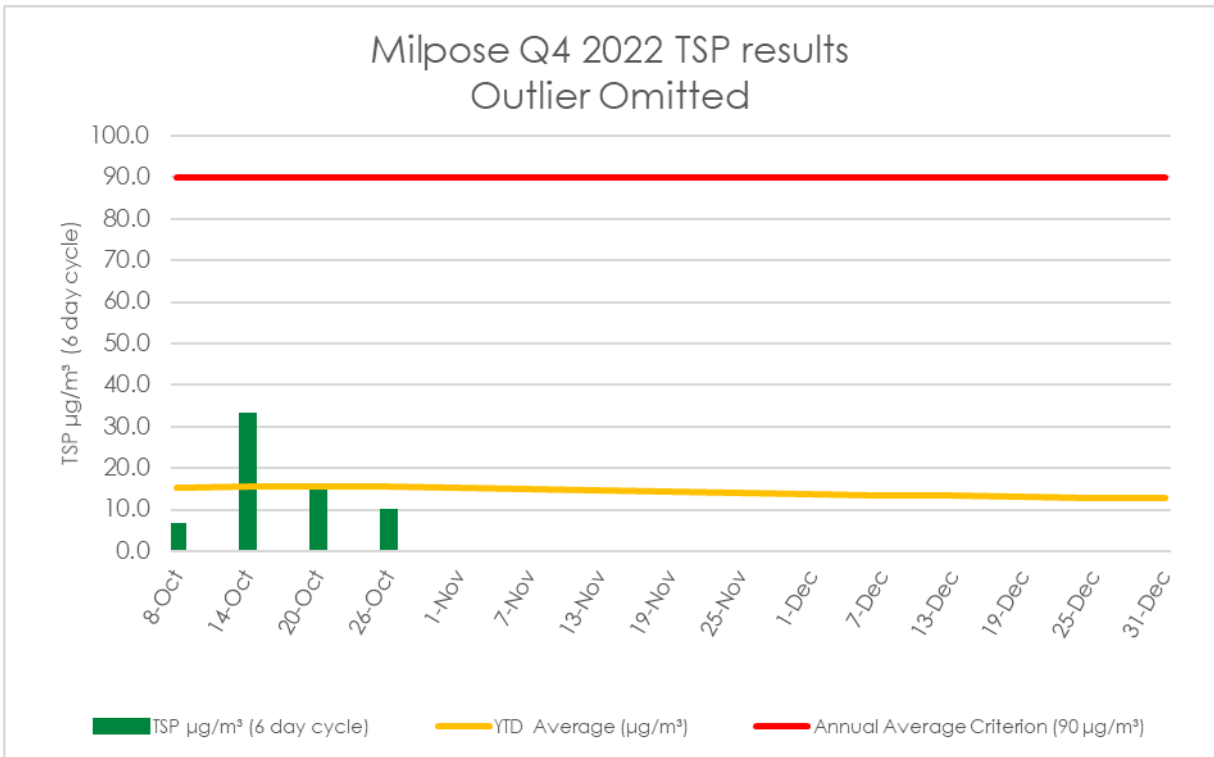


Figure 5: Milpose

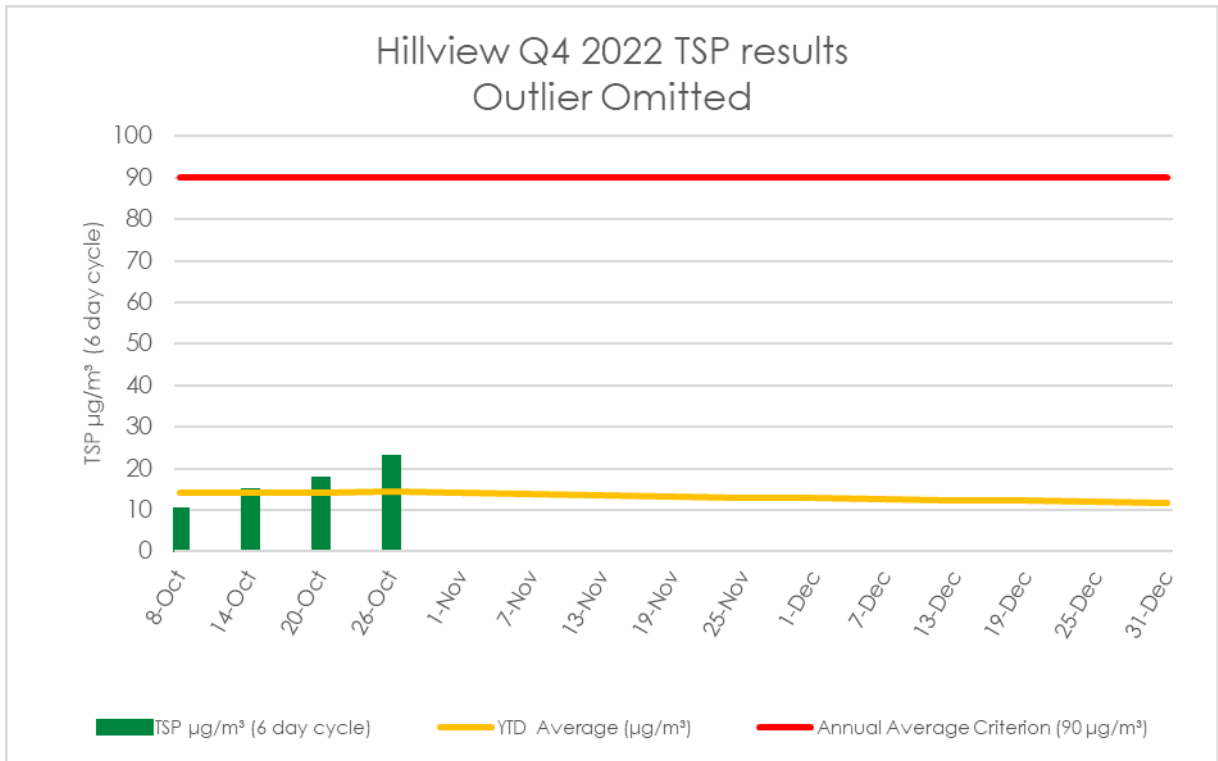


Figure 6: Hillview

### 2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month-long period and are a measure of broad scale changes to the local air quality.

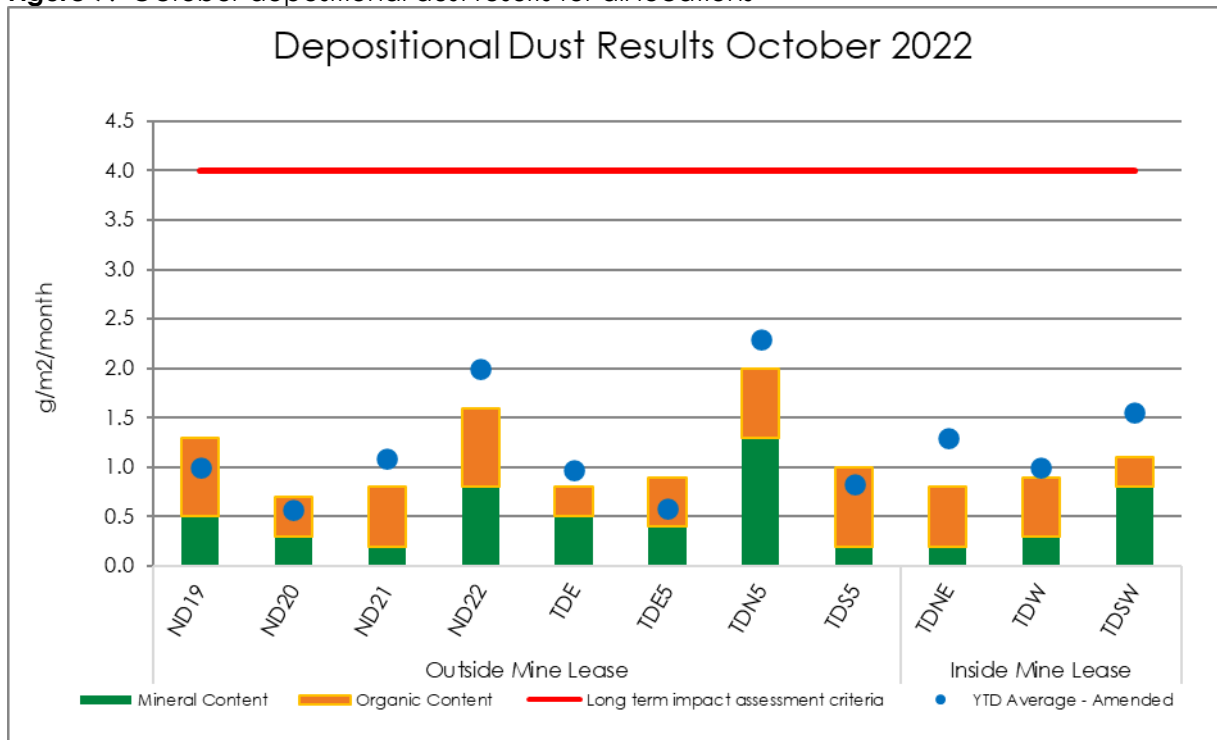
Eleven depositional dust gauges are located across the mining lease and neighbouring residential properties to monitor atmospheric dust. A summary of the monthly monitoring results at each monitoring location are presented the figures below. Please be advised that only monitoring locations ND19, ND20, ND21 & ND22 are regulated by the criteria stated in the Consent, as they are the only depositional dust gauges that are at a residence on privately-owned land. All other depositional dust gauges are used to inform operational activities.

The indicative annual average for all locations are below the long-term impact assessment criteria (4 g/m<sup>2</sup>/month), complying with the conditions of the Consent.

From the end of October, depositional dust results were no longer required to be recorded due to the change of licence conditions.

During the reporting period no exceedances of the Consent criteria were recorded.

**Figure 7:** October depositional dust results for all locations



### 3. WATER

#### 3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Consent. All water samples are analysed at an independent National Association of Testing Authorities (NATA) accredited laboratory.

Surface water quality monitoring is undertaken at Northparkes specifically within the three defined water management systems of;

- Clean water management system, which includes farm dams and watercourses;
- Dirty water management system, which includes settlement ponds; and
- Contaminated water management system, which includes all aspects of ore processing, and retention ponds.

The groundwater monitoring program at Northparkes aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Consent. It focuses on potential impacts to environmental assets and groundwater users in the area surrounding Northparkes.

Monitoring results are assessed and interpreted utilising historical trend analysis and internal water quality criteria and trigger levels to identify potential changes.



### 3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Consent, with no significant changes to the pH or EC for all locations. Copper concentrations increased at several locations, although results are still consistent with long term data. These locations will be closely monitored during the future reporting periods. A summary of the monitoring results at each location sampled are presented in Tables 1-7 below.

**Table 1:** Process Water System

Location	RP01	RP02	RP03	RP04	RP05	RP06	RP07	RP08	RP09	RP12	RP13	RP15	RP16	RP19	RP20
pH	8.24	8.32	8.39	7.97	7.67	7.93	7.38	7.39	7.48	7.80	7.73	7.64	8.44	7.56	7.226
EC (uS/cm)	284	890	1,285	987	517	510	522	2,039	1,131	233	1,270	4,429	2,419	3,196	2,035
Cu (mg/L)	0.132	0.053	0.056	0.315	0.065	0.079	0.012	0.033	0.032	0.035	0.087	0.017	0.006	0.012	0.022

**Table 1 continued:** Process Water System

Location	RP21	RP23	RP24	RP25	RP26	RP27	RP28	RP32	Caloola North	Caloola South	GT02	PWD
pH	9.21	8.27	8.26	7.74	7.83	7.35	7.34	7.96	7.89	7.60	7.38	9.52
EC (uS/cm)	2,220	648	419	401	485	2,065	1,717	389	2,144	3,473	1,580	4,322
Cu (mg/L)	0.022	0.024	0.048	0.021	0.035	0.029	0.012	0.131	0.01	0.013	0.034	0.034

**Table 2:** Sediment Ponds

Location	SP03	SP10	SP15	SP33
pH	7.16	7.84	8.71	7.95
EC (uS/cm)	1,352	132	536	190
Copper (mg/L)	0.01	0.058	0.016	0.035

**Table 3:** Farm Dams

Location	FD04	FD05	FD06	FD07	FD11	FD12	FD16	FD18	FD25	FD26	FD27
pH	7.18	8.09	7.91	7.87	8.44	7.24	6.82	7.85	7.57	8.27	8.75
EC (uS/cm)	1,005	88	77	80	343	142	105	2,256	70	528	98
Copper (mg/L)	0.012	0.013	0.012	0.01	0.015	0.016	0.014	0.016	0.004	0.014	0.014

**Table 4: TSF Bores**

Location	MB01	MB02	MB03	MB05	MB06B	W26	W27	W28	W29	W30	W31	W32
pH	7.07	7.67	5.08	6.5	7.57	7.46	11.84	10.61	12.16	7.29	8.46	12.03
EC (uS/cm)	6,261	9,797	25,734	24,476	18,346	12,908	21,137	14,489	19,747	2,439	578	3,395
Copper (mg/L)	0.009	0.01	0.043	0.01	0.01	0.007	0.01	0.01	0.018	0.008	0.021	0.007

**Table 5: Opencut Bores**

Location	MB10	MB13	MB14	W14	W19	W20	W21	W22	W23	W24	W25
pH	7.03	7.06	7.21	7.78	7.06	7.00	7.54	7.41	7.17	8.07	7.28
EC (uS/cm)	13,320	23,170	3,297	4,109	5,935	12,634	25,998	11,794	14,340	2,453	2,316
Copper (mg/L)	0.008	0.01	0.007	0.008	0.006	0.017	0.004	0.008	0.007	0.011	0.014

**Table 6: Underground Bores**

Location	MB17	MB18	MB19	MB20	P101	P102	P139	P145	P149
pH	7.47	9.45	7.49	7.00	7.18	7.28	6.18	6.72	6.40
EC (uS/cm)	889	5,134	13,489	12,466	10,455	28,746	29,529	132	27,248
Copper (mg/L)	0.01	0.025	0.009	0.030	0.002	0.001	0.01	0.006	0.01

**Table 7: Regional Bores**

Location	Far Hilliers	Long Paddock	Moss #1	Wright
pH	6.70	8.63	7.52	8.97
EC (uS/cm)	683	712	2,206	846
Copper (mg/L)	0.004	0.012	0.009	0.006

## 4. VIBRATION

### 4.1 Overview

The assessment criteria for blast impacts at Northparkes are based on the ANZECC Guideline, aimed to minimise annoyance to human comfort levels. Table 8 below shows the blast impact criteria as set out in the Schedule 3 Conditions 6-13 of the Consent.

**Table 8:** Vibration and overpressure criteria of DC11\_0060.

<i>Location</i>	<i>Airblast overpressure (dB(Lin Peak))</i>	<i>Ground vibration (mm/s)</i>	<i>Allowable exceedance</i>
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 <i>(or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)</i>	0%

The blast monitoring program uses blast units which measure ground vibration and air overpressure at the residences of the four closest privately owned properties, Adavale, Hillview, Hubberstone and Milpose. The program is designed to measure the effectiveness of control measures and ensure compliance with consent and licence conditions, relevant standards and corporate requirements. A summary of the monitoring results are provided below.

### 4.2 Quarterly Monitoring Analysis

During the reporting period, four surface blasts were undertaken during the monitoring period.

**Table 9: Overpressure**

Monitor Location	13-Oct-22 -	27-Oct-22 -	10 Nov 22 -	10 Nov 22 -	08 Dec 22 -	15 Dec 22 -
	Actual Overpressure (dB)	Actual Overpressure (dB)	Actual Overpressure (dB)	Actual Overpressure (dB)	Actual Overpressure (dB)	Actual Overpressure (dB)
Adavale	98.8	89.6	90.3	102.1	114.3	86.2
Hillview	98.8	97.6	102.5	93.2	103	97.3
Hubberstone	114	91.6	97	97.5	108.1	92.7
Milpose	111.9	95.2	102	92.9	92.1	94.5



## 5. NOISE

Operational noise is managed by CMOC in accordance with the approved Noise Management Plan (NMP). The NMP covers all operational activities with the potential to generate noise at Northparkes. It details specific noise management and mitigation measures, outlines monitoring and reporting requirements and provides clear definitions of the roles and responsibilities for noise management.

Property	Day	Evening	Night	
	<i>L<sub>Aeq</sub>(15min)</i>	<i>L<sub>Aeq</sub>(15min)</i>	<i>L<sub>Aeq</sub>(15min)</i>	<i>L<sub>A1</sub>(1min)</i>
All privately-owned land	35	35	35	45

### 5.1 Overview

CMOC undertakes a noise monitoring program that consists of both operator-attended and unattended surveys at the five nearest occupied residences Hubberstone, Milpose, Lone Pine, Hillview and Adavale.

Operator-attended noise measurements and recordings are undertaken outside the mining leases in order to quantify the intrusive noise emissions from construction and of general mine activity as well as the overall level of ambient noise. This noise monitoring was undertaken by an independent and suitably qualified noise professional.

### 5.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken between Tuesday 22 to Wednesday 23 November 2022.

The assessment was completed to quantify site noise emissions against relevant noise criteria pertaining to Northparkes operations in accordance with Conditions 1 to 5 of Schedule 3 of the NSW Development Consent Conditions (DC11\_110060), Northparkes Noise Management Plan (NMP, 2019) and Traffic Management Plan (TMP, 2019).

Road noise monitoring identified that vehicle movements associated with shift change generated levels below the relevant road noise criteria specified in the TMP and NMP.

Attended monitoring has identified that operational emissions generated by Northparkes comply with relevant noise criteria at all monitoring locations for all assessment periods. Furthermore, project related noise emissions are generally barely audible at monitoring locations. Extraneous non-mining sources such as traffic, insects, wind in trees, birds, aircraft, residential and agricultural noise were audible during the monitoring period. A summary of the monitoring results at each monitoring location are presented in Tables 9-14 below.

**Table 9:** Attended noise monitoring results for Hubberstone

Day					
13:46	60	44	33		Wind 30 – 58
23/11/2022					Birds 27-65
14:01	61	44	35	WD: SW	Traffic 30-48
23/11/2022				WS: 1.5m/s	Site - Water Pump 27-35
14:16	65	43	35	Stab Class: C	(barely to just audible throughout)
23/11/2022					
Site LA <sub>eq</sub> (15min) Contribution					32
Evening					
20:22	58	48	43		Insects 38-61
23/11/2022					Birds 37-58
20:37	59	52	43	WD: W	Traffic 35-45
23/11/2022				WS: 0.5m/s	Dogs Barking <35
20:52	61	49	41	Stab Class: F	Site - Water Pump <35
23/11/2022					(barely audible throughout)
Site LA <sub>eq</sub> (15min) Contribution					<35
Night					
00:14	44	36	32		Insects 25-45
23/11/2022					Birds 25-55
00:29	55	36	32	WD: SW	Site - Water Pump 27-38
23/11/2022				WS: 0.5m/s	(just to audible throughout)
00:44	45	36	32	Stab Class: E	Site Processing 25-33
23/11/2022					(barely to just audible 50% measurement)
Site LA <sub>eq</sub> (15min) Contribution					32
Site LA <sub>1</sub> (1min) Contribution					<45

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**Table 10:** Attended noise monitoring results for Lone Pine

Table 4 Operator-Attended Noise Survey Results – Location NM2, Lone Pine					
Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	Duration 15min	L <sub>Amax</sub>	L <sub>Aeq</sub>		
<b>Day</b>					
14:54 23/11/2022	77	49	34		Wind 29-55
15:09 23/11/2022	67	46	35	WD: W WS: 1.5m/s	Birds 26-66 Traffic 26-77
15:24 23/11/2022	65	43	33	Stab Class: B	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Evening</b>					
19:18 23/11/2022	69	44	38		Birds 35-69
19:33 23/11/2022	65	46	40	WD: W WS: 1.0m/s	Insects 36-50 Traffic 35-74
19:48 23/11/2022	74	49	40	Stab Class: E	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<35
<b>Night</b>					
23:02 22/11/2022	43	30	27		Insects 25-48
23:17 22/11/2022	41	29	27	WD: SW WS: 0.1m/s	Dogs Barking 25-38 Birds 25-33
23:32 22/11/2022	48	29	26	Stab Class: E	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
Site L <sub>A1</sub> (1min) Contribution					<40

Note: NPM denotes Northparkes Mines.

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**Table 11:** Attended noise monitoring results for Milpose

Table 5 Operator-Attended Noise Survey Results – Location NM3, Milpose					
Date/Time (hrs) Duration 15min	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
<b>Day</b>					
16:47 23/11/2022	61	36	26		Insects 20-30
17:02 23/11/2022	53	31	26	WD: NW WS: 1.0m/s	Wind 25-53 Aircraft 30-43
17:17 23/11/2022	47	29	25	Stab Class: C	MAC Operator 61 Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Evening</b>					
20:06 22/11/2022	52	40	29		Insects 25-52
20:21 22/11/2022	47	39	27	WD: SW WS: 0.5m/s	Dogs Barking 25-36 Aircraft 25-35
20:36 22/11/2022	49	39	27	Stab Class: E	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Night</b>					
1:24 23/11/2022	45	21	14		Insects 20-30
1:39 23/11/2022	45	20	13	WD: W WS: 0.1m/s	Birds 25-53
1:54 23/11/2022	53	22	13	Stab Class: E	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
Site L <sub>A1</sub> (1min) Contribution					<40

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.



**Table 12:** Attended noise monitoring results for Hillview

Table 6 Operator-Attended Noise Survey Results – Location NM4, Hillview					
Date/Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
12:30 23/11/2022	60	43	33	WD: NW WS: 1.0m/s Stab Class: B	Insects 28-49 Traffic 25-65
12:45 23/11/2022	65	46	32		Birds 25-48 Wind 25-36
13:00 23/11/2022	59	41	31		Site – Hum <25 (barely audible throughout)
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Evening</b>					
18:00 23/11/2022	61	46	34	WD: W WS: 1.5m/s Stab Class: D	Traffic 30-61 Insects 33-45
18:15 23/11/2022	93	63	40		Birds 30-54 Aircraft 35-61
18:30 23/11/2022	61	46	37		Wind 30-45 Residential Noise 30-93 Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Night</b>					
2:24 23/11/2022	48	30	23	WD: SW WS: 0.1m/s Stab Class: E	Insects 20-35 Dogs Barking 25-42
2:39 23/11/2022	59	29	24		MAC Operator 59 Site – Hum 20-25
2:54 23/11/2022	35	26	22		(barely to just audible throughout)
Site L <sub>Aeq</sub> (15min) Contribution					<30
Site L <sub>A1</sub> (1min) Contribution					<40

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**Table 13:** Attended noise monitoring results for Adavale

Table 7 Operator-Attended Noise Survey Results – Location NM5, Adavale					
Date/Time (hrs) Duration 15min	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
<b>Day</b>					
15:48 23/11/2022	56	38	31		
16:03 23/11/2022	58	37	30	WD: W WS: 2.5m/s	Wind 28-62 Birds 25-56
16:18 23/11/2022	62	42	34	Stab Class: C	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Evening</b>					
21:04 22/11/2022	42	30	28		
21:19 22/11/2022	38	28	26	WD: SW WS: 1.0m/s	Insects 26-45 Wind 25-35
21:34 22/11/2022	45	29	25	Stab Class: D	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
<b>Night</b>					
22:05 22/11/2022	40	27	24		
22:20 22/11/2022	42	29	24	WD: SW WS: 0.5m/s	Insects 23-40 Aircraft 25-42
22:35 22/11/2022	39	27	24	Stab Class: E	Site Inaudible
Site L <sub>Aeq</sub> (15min) Contribution					<30
Site L <sub>A1</sub> (1min) Contribution					<40

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**Table 14:** Attended road noise survey results

Table 8 Operator-Attended Road Noise Survey Results – Location NM4, Hillview				
Date/Time (hrs)	Measured Noise Level	Meteorology	Criteria	Description and SPL dBA
Duration 1 hour	dB LAeq(1hr)		dB LAeq(1hr)	
12:30	45	WD: NW	55	Insects 28-49
23/11/2022		WS: 1.0m/s		Traffic 25-60
(Day)		Stab Class: B		Birds 25-48
				Wind 25-36
				Site – Hum <25
				(barely audible throughout)
				(Approx. 10 vehicles Enter/Exit NPM Site)
18:00	47	WD: W	55	Traffic 30-61
23/11/2022		WS: 1.5m/s		Insects 33-45
(Evening)		Stab Class: D		Birds 30-54
				Aircraft 35-61
				Wind 30-45
				Residential Noise 30-93
				(Approx. 72 vehicles Enter/Exit NPM Site)

Note: NPM denotes Northparkes Mines.

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Results of the road noise survey identify that the LAeq(1hr) noise contribution at NM4 is <50dBA for both measurements and hence, satisfy the relevant road noise criteria as outlined in the NMP and the RNP. Observations from MAC operator identified no concentrate truck movements during all three measurements periods.