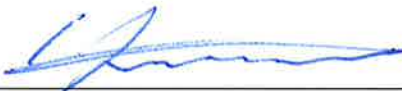





# 1 July to 30 September 2018 - Quarter 3 Environmental Monitoring Results Summary

<b>Name of Mine</b>	Northparkes Mines
<b>Name of Leaseholder and Mine Operator</b>	CMOC Mining Pty Ltd
<b>Mining Leases</b>	ML 1247, ML 1367, ML 1641 and 1743
<b>Environment Protection Licence</b>	EPL 4784
<b>Development Consent</b>	PA11-0060, (as modified)

<b>Reviewed by</b>	<b>Chase Dingle</b>
<b>Title</b>	Superintendent – Environment, Community and Farms
<b>Date</b>	30/11/2018
<b>Signature</b>	
<b>Approved by</b>	<b>Stacey Kelly</b>
<b>Title</b>	Manager – People, Safety and Environment
<b>Date</b>	30 NOVEMBER 2018
<b>Signature</b>	

# 1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 July 2018 to 30 September 2018. 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 and water monitoring locations are available in the Environmental Monitoring Program.

# 2. AIR QUALITY

The air quality monitoring program utilises PM<sub>10</sub> (beta attenuated monitors), TSP's (high volume air samplers (HVAS)) and depositional dust gauges. Monitoring locations are strategically positioned around the mine lease and neighbouring properties. TSP and PM<sub>10</sub> monitoring has been undertaken at three nearby farm residences Hubberstone, Milpose and Hillview. A summary of the monitoring results are provided below.

## 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 Approval), is >30 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 there were eighteen elevated 24hr criteria readings recorded across the three monitoring locations, with the Hubberstone property recording 11 of these. All recordings triggered the internal investigation process and were found to be caused by external factors and deemed non-mine related. The high readings at all locations on July 18 and August 3 were most likely attributed to the severe dust storms observed within the district. All other elevated readings, in particular Hubberstone, were found to be most likely caused by agricultural activities, including animal husbandry in surrounding drought affected paddocks, or minor localised dust events within the vicinity of the monitoring location. The missing data for Hubberstone (27/7/18 – 1/8/18) was due to a localised power outage.

The annual average PM<sub>10</sub> levels recorded at all PM<sub>10</sub> monitoring locations are below the predicted levels within the EA (30 µg/m<sup>3</sup>).

Hubberstone PM<sub>10</sub> Results for Q3 2018

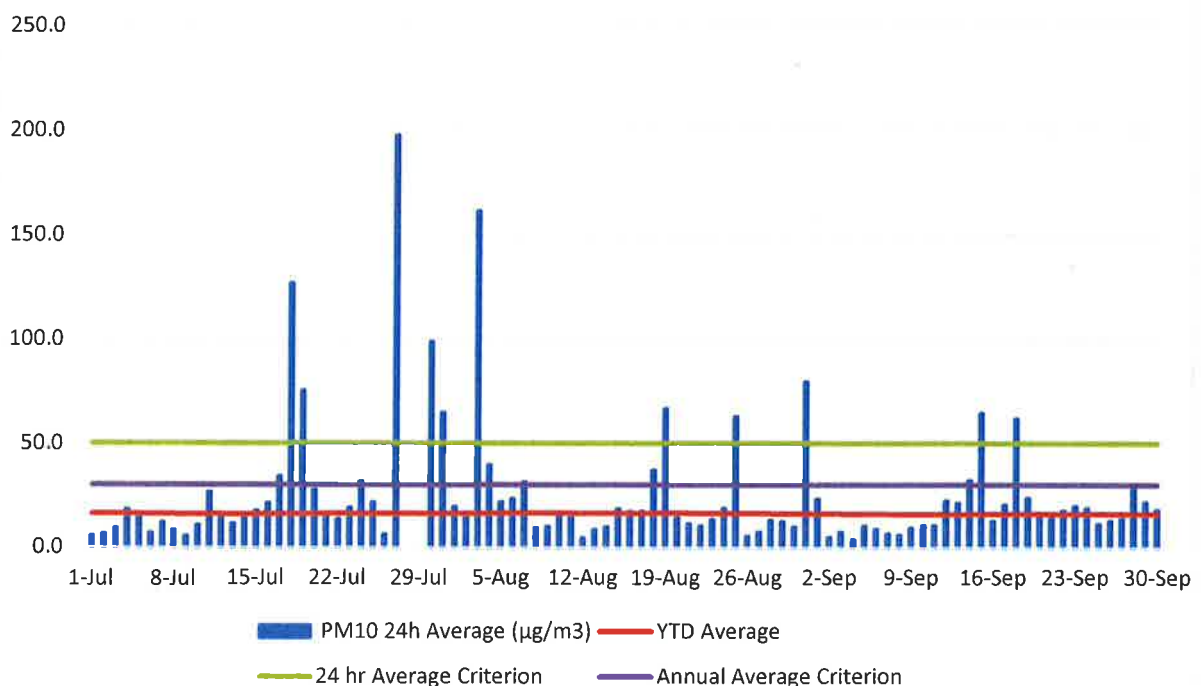


Figure 1: Hubberstone

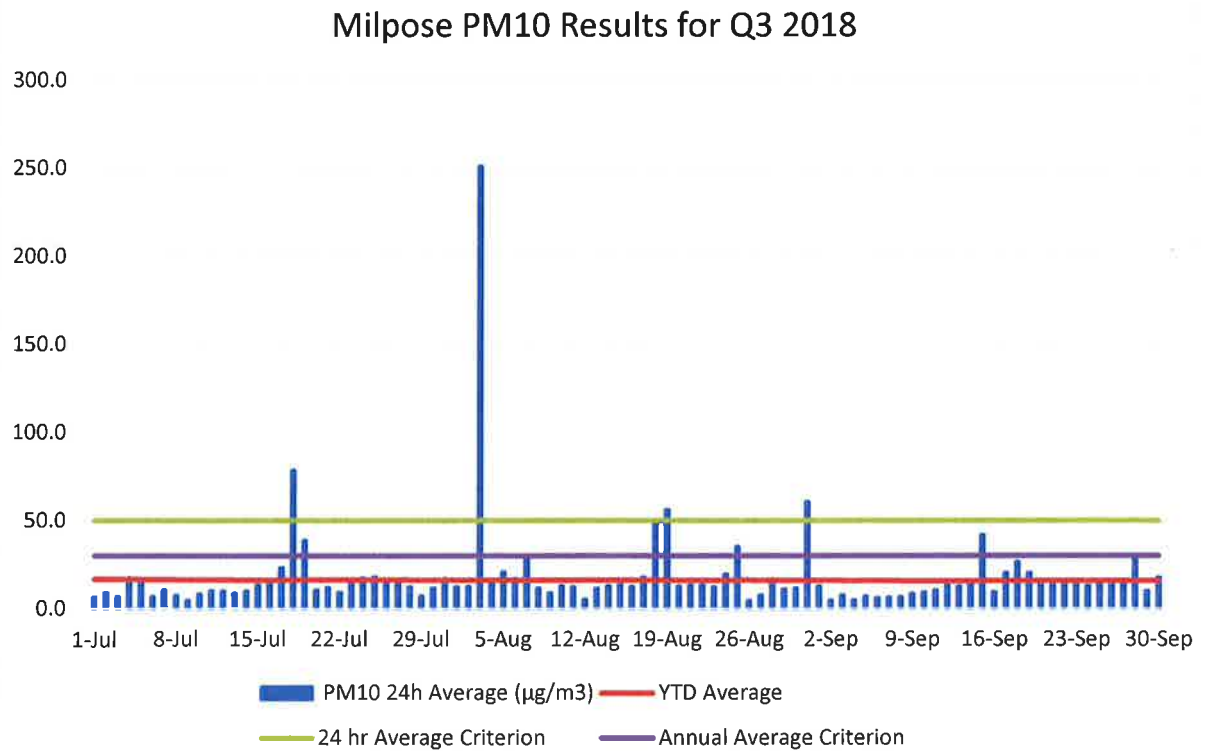


Figure 2: Milpose

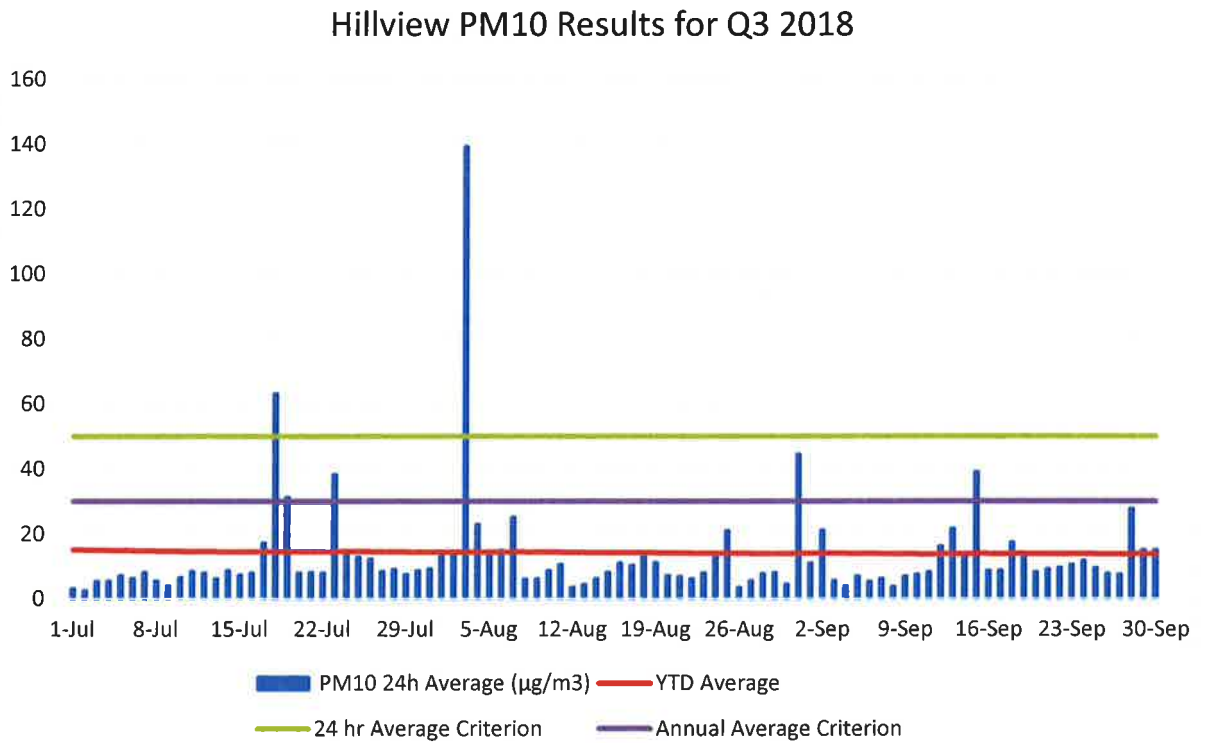


Figure 3: Hillview

## 2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required average annual criteria set by the Approval ( $90 \mu\text{g}/\text{m}^3$ ) for the Q3 2018 monitoring period. However, the elevated result for Hubberstone on the 19/7/18 was attributable to Bogan Road construction works and associated overnight heavy vehicle parking adjacent to the dust monitor. The other elevated result for Hubberstone (6/8/18) directly corresponded to a localised dust storm (evident from all three locations recording elevated readings for that day). The elevated result for Milpose (18/8/18) was also attributable to both a large localised dust storm and agricultural activities as wind directions for that particular day were generally from WSW and not from the direction of the mine sites (NW). Results are presented in Figure 4, Figure 5 and Figure 6 respectively.

### Hubberstone Q3 2018 TSP results

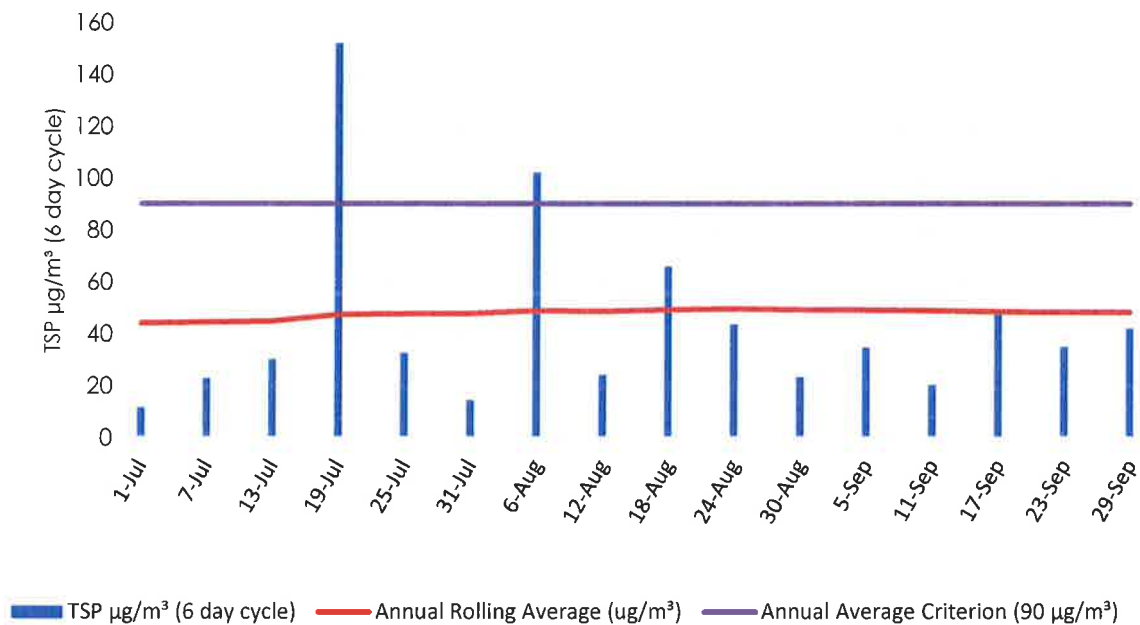


Figure 4: Hubberstone

### Milpose Q3 2018 TSP results

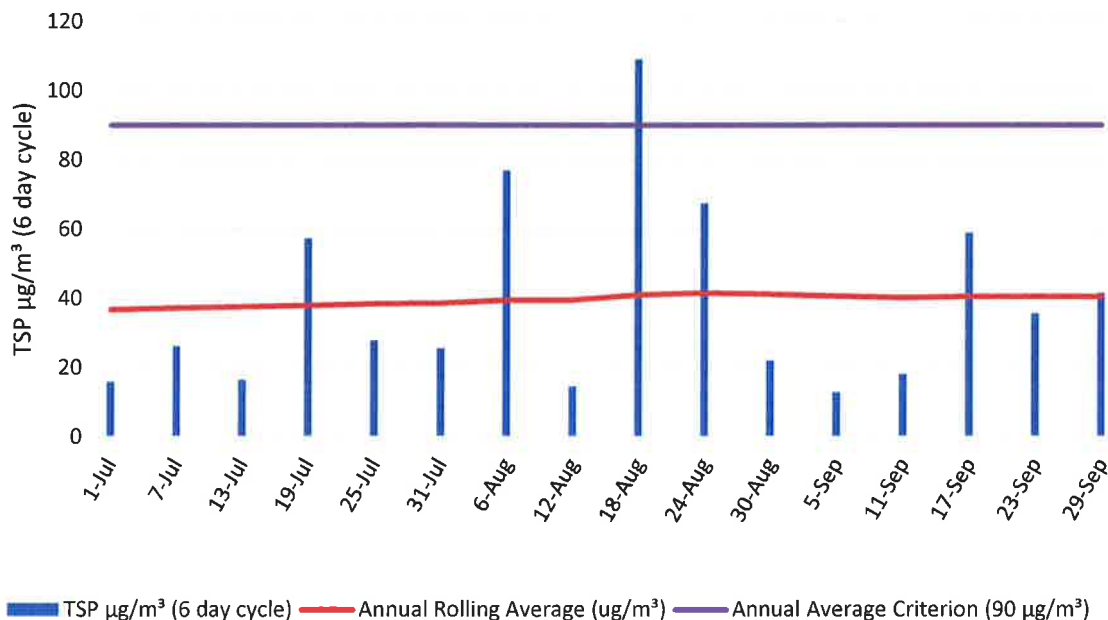


Figure 5: Milpose

### Hillview Q3 2018 TSP results

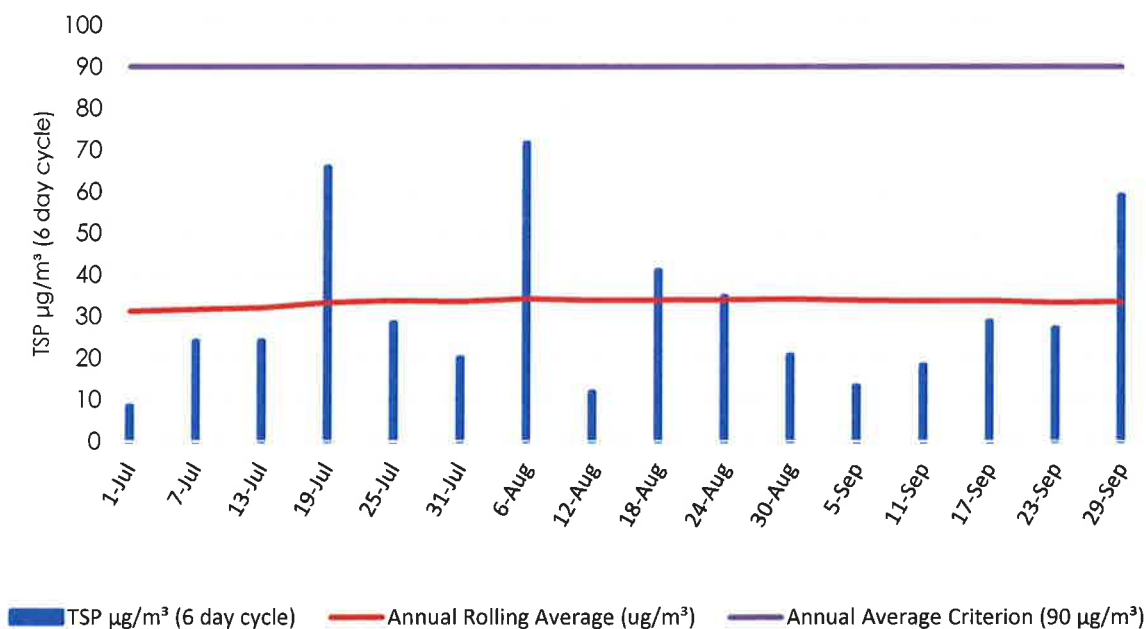


Figure 6: Hillview

## 2.3 Depositional Dust

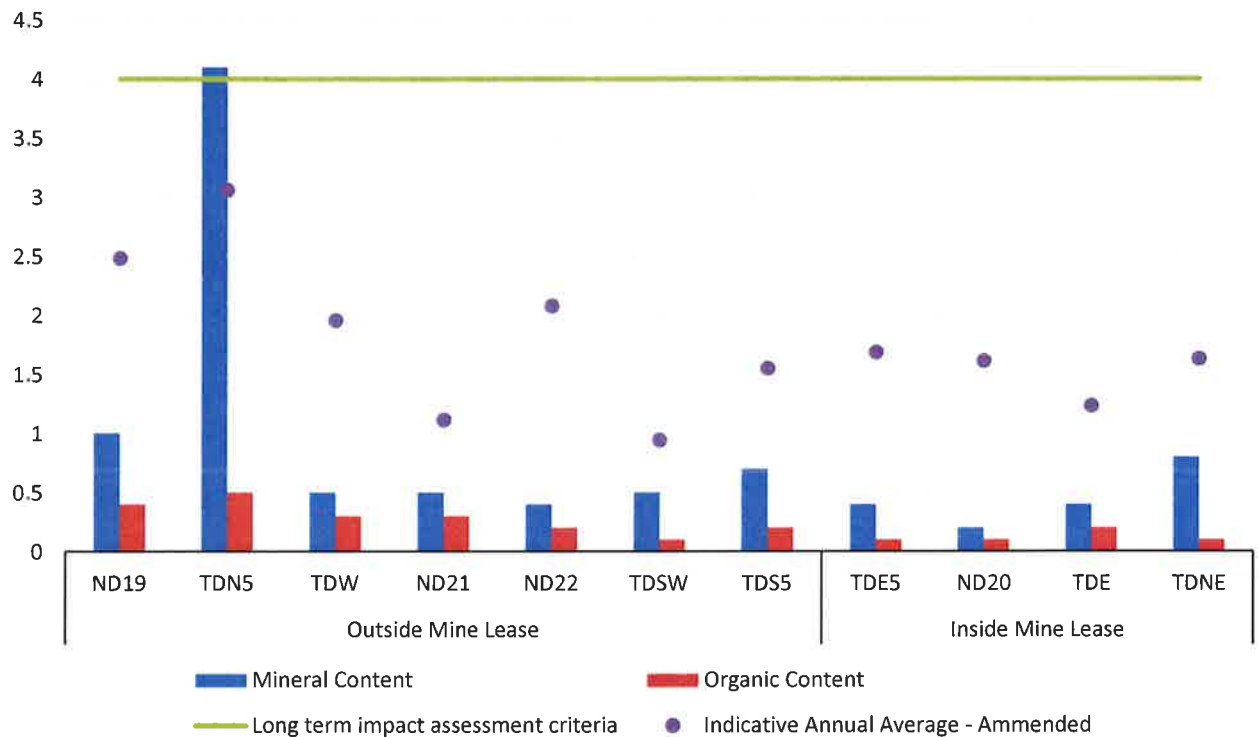
Depositional dust gauges record the total of deposited dust for a month long period and are a measure of broad scale changes to the local air quality.

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 in Figure 7, Figure 8 and Figure 9 respectively.

The indicative annual average for all locations are below the long-term impact assessment criteria, complying with the conditions of the Approval.

The elevated reading for July at monitoring location TDN5 are the result of increased heavy vehicle traffic movements along the Bogan Road coinciding with the road upgrade works. August's elevated depositional dust results at all locations directly correlate with the severe drought conditions and increased frequency of dust storm events experienced within the local area during the month.

### Depositional Dust Results for July 2018



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

### Depositional Dust Results for August 2018

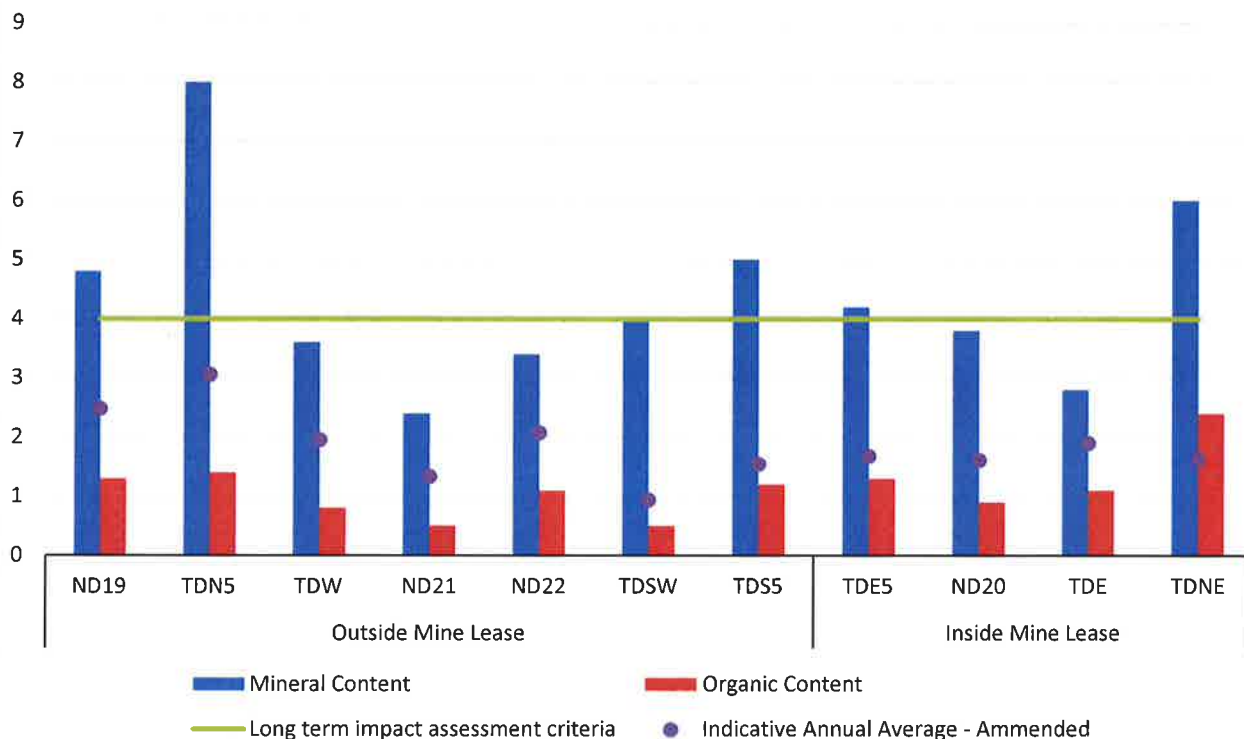


Figure 8: August depositional dust results for all locations

### Depositional Dust Results for September 2018

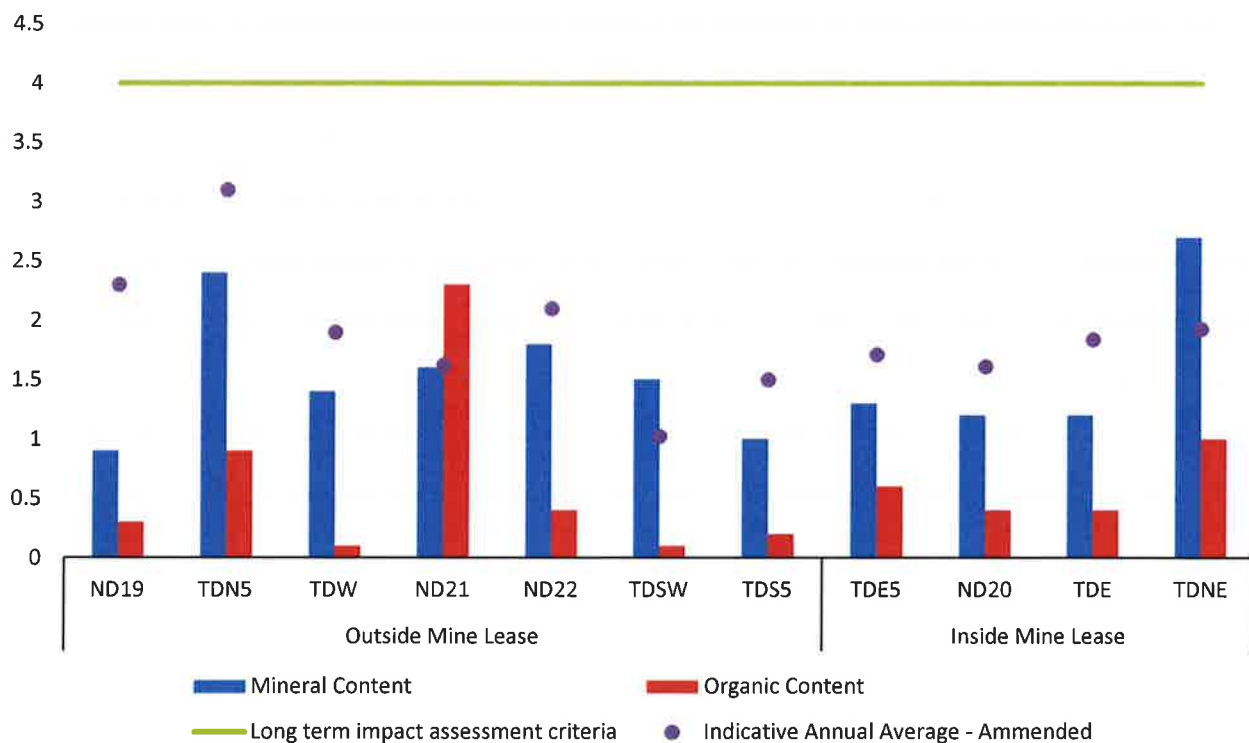


Figure 9: September depositional dust results for all locations



### **3. WATER**

#### **3.1 Overview**

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Approval. 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.

CMOC's groundwater monitoring program aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Approval. 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 successfully carried out for the reporting period with no significant changes to the pH, EC or copper concentrations for all locations. Due to below average rainfall prior to monitoring, many locations were deemed dry and unable to be sampled. A summary of the monitoring results at each location sampled are presented in Tables 1-8 below.



**Table 1: Process Water System**

	RP1	RP2	RP3	RP4	RP5	RP09	RP13	RP15	RP20	RP27	RP32	RP33	GT1	GT2	PWD	SD2	CALoola PIT
pH	9.14	8.5	9.69	8.9	8.05	7.93	8.68	8.02	8.27	8.21	8.99	9.16	8.77	8.86	8.93	8.89	9.27
EC (uS/cm)	588	1305	3329	898	811	5807	1282	1943	7872	4608	1282	278	2731	2120	2854	7540	8357
Cu (mg/L)	0.025	0.025	0.079	0.486	0.062	0.018	0.227	0.057	0.027	0.014	0.01	0.008	0.058	0.226	0.022	0.377	0.012

**Table 2: Sediment Ponds**

	SP3	SP10
pH	8.97	9.63
EC (uS/cm)	2622	559
Cu (mg/L)	0.013	0.025

**Table 3: Watercourses**

	WC12
pH	8.12
EC (uS/cm)	281
Cu (mg/L)	0.026

**Table 4: Farm Dams**

	FD4	FD5	FD6	FD7	FD11	FD16	FD18	FD21	FD25	FD26	FD27
pH	8.63	9.65	8.41	10.16	9.61	8.87	8.9	10.76	8.59	8.52	9.44
EC (uS/cm)	553	175	236	192	633	300	2971	504	516	785	625
Cu (mg/L)	0.011	0.016	0.019	0.011	0.008	0.019	0.008	0.12	0.019	0.004	0.004

**Table 5: TSF Bores**

	MB1	MB2	MB3	MB5	MB6b	W26	W27	W28	W29	W30	W31	W32	W33	W34	W35
pH	7.34	7.23	6.12	6.91	7.02	6.96	11.47	7.2	12.72	7.51	7.93	12.22	7.51	6.94	8
EC (uS/cm)	5052	9737	23405	23642	13368	15291	18242	16352	20708	1994	752	2719	11805	14621	1489
Cu (mg/L)	0.006	0.003	0.027	0.011	0.005	0.001	0.006	0.008	0.03	0.008	0.015	0.009	0.014	0.012	0.011

**Table 6: Opencut Bores**

	MB10	MB13	MB14	MB16	W14	W19	W20	W21	W22	W23	W24	W25
pH	7.1	6.95	7.24	6.7	7.38	7.61	7.39	10.75	7.24	7.66	7.89	8.16
EC (uS/cm)	13641	22824	2206	15960	8733	5877	3578	12966	17049	17265	1711	1212
Cu (mg/L)	0.012	0.026	0.011	0.009	0.006	0.02	0.009	0.005	0.008	0.133	0.004	0.016

**Table 7: Underground Bores**

	P101	P102	P103	P104	P139	P145	P149	MB17	MB18	MB19	MB20
pH	7.24	7.16	9.25	10.31	6.35	7.43	6.85	7.91	8.98	7.72	7.95
EC (uS/cm)	11109	27826	25754	17596	27860	166	27683	882	799	14595	12239
Cu (mg/L)	0.002	0.019			0.02	0.016	0.022	0.007	0.106	0.003	0.32

**Table 8: Regional Bores**

	Far Hillier	Wright	Moss
pH	6.91	7.13	7.36
EC (uS/cm)	372	2124	778
Cu (mg/L)	0.004	0.005	0.004

## **4. NOISE AND VIBRATION**

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.

### **4.1 Overview**

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

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.

### **4.2 Quarterly Monitoring Analysis**

Attended noise monitoring was undertaken on the 22<sup>nd</sup> and 24<sup>th</sup> of August 2018. Weather conditions were favourable for all noise monitoring periods and adequate noise measurements were obtained. Attended noise monitoring results indicate noise emissions from the mine site comply with the Project Approval criteria. A summary of the monitoring results at each monitoring location are presented in Tables 9-11 below.

**Table 9:** Attended noise monitoring results (daytime)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	22/08/2018 12:40	38.4	30.6	<b>28.5</b>	23.1	Yes	
	22/08/2018 12:56	46.4	36.5	<b>34.4</b>	24.7	Yes	Constant bird noise Mine not audible
	22/08/2018 13:12	38.3	32.2	<b>30.2</b>	24	Yes	
<b>Hubberstone</b>	22/08/2018 13:41	42	33.6	<b>31.2</b>	22.2	Yes	
	22/08/2018 14:01	44.3	34.2	<b>32.6</b>	23.4	Yes	Constant bird noise Mine barely audible
	22/08/2018 14:16	39.9	32.1	<b>29.7</b>	23.3	Yes	
<b>Milpose</b>	22/08/2018 15:46	42	35	<b>31.9</b>	23.5	Yes	
	22/08/2018 16:04	47.9	35.4	<b>34.2</b>	21.5	Yes	Bird noise Mine not audible
	22/08/2018 16:20	41.7	33.6	<b>30.8</b>	22.9	Yes	
<b>Lonepine</b>	22/08/2018 14:46	45.3	37.4	<b>34.9</b>	29.3	Yes	
	22/08/2018 15:01	44.3	36.4	<b>34.5</b>	28.2	Yes	Tractor noise Mine not audible
	22/08/2018 15:17	43.6	31.1	<b>30.4</b>	19.2	Yes	

**Table 10:** Attended noise monitoring results (evening)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	22/08/2018 18:46	39.7	32	<b>28.9</b>	16.9	Yes	
	22/08/2018 19:02	33.7	25.5	<b>24.2</b>	15.2	Yes	Mine not audible
	22/08/2018 19:17	35.2	24.4	<b>23.5</b>	15.9	Yes	
<b>Hubberstone</b>	22/08/2018 17:50	40.7	37.6	<b>34.5</b>	29.0	Yes	
	22/08/2018 18:05	30.3	30.7	<b>29.6</b>	23.4	Yes	Bird noise Mine not audible
	22/08/2018 18:20	35.1	29.5	<b>26.8</b>	21.5	Yes	
<b>Milpose</b>	23/08/2018 20:17	27.7	18.5	<b>19.9</b>	14.4	Yes	
	23/08/2018 20:33	24.7	18.8	<b>17.7</b>	15.1	Yes	Bird noise Mine not audible
	23/08/2018 20:49	32.7	22.6	<b>22.4</b>	14.6	Yes	
<b>Lonepine</b>	23/08/2018 21:14	34.5	25.8	<b>25.1</b>	14.3	Yes	
	23/08/2018 21:29	30.6	21.2	<b>21.4</b>	14	Yes	Sheep, bird and dog noise Mine not audible
	23/08/2018 21:44	31.7	24.8	<b>21.5</b>	14.3	Yes	

**Table 11:** Attended noise monitoring results (night)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	24/08/2018 1:03	<b>29.2</b>	23.7	<b>22.7</b>	20.7	Yes	
	24/08/2018 1:19	<b>29.0</b>	21.2	<b>21.8</b>	17.9	Yes	Mine not audible
	24/08/2018 1:34	<b>23.0</b>	19.5	<b>18.9</b>	17.7	Yes	
<b>Hübbestone</b>	24/08/2018 0:08	<b>34.3</b>	23.1	<b>22.8</b>	17.9	Yes	
	24/08/2018 0:23	<b>35.4</b>	23.3	<b>25.2</b>	18.2	Yes	Mine barely audible
	24/08/2018 0:38	<b>29.9</b>	21.5	<b>20.8</b>	17.3	Yes	
<b>Milpose</b>	23/08/2018 11:02	<b>33.1</b>	25.8	<b>24.5</b>	21.3	Yes	
	23/08/2018 11:17	<b>27.9</b>	24	<b>22.3</b>	19.2	Yes	Dog barking Mine not audible
	23/08/2018 11:32	<b>28.0</b>	24.9	<b>22.9</b>	20.5	Yes	
<b>Lonepine</b>	23/08/2018 22:02	<b>27.1</b>	19.7	<b>18.8</b>	14.7	Yes	
	23/08/2018 22:17	<b>30.1</b>	23.0	<b>20.0</b>	14.4	Yes	Sheep, bird and dog noise Mine not audible
	23/08/2018 22:32	<b>31.1</b>	22.8	<b>20.5</b>	15.1	Yes	