

Rasp Mine  
Monthly Environmental Monitoring Report  
April 2022



## **INTRODUCTION**

Broken Hill Operations Pty Ltd (BHOP) [a wholly owned subsidiary of CBH Resources Limited (CBH)] owns and operates the Rasp Mine (the Mine), which is located centrally within the City of Broken Hill on Consolidated Mine Lease 7 (CML7).

Mining has been undertaken within CML7 since 1885. The existing operations at the Rasp Mine include underground mining operations, a processing plant producing zinc and lead concentrates and a rail siding for concentrate dispatch. These operations are undertaken in accordance with Project Approval 07\_0018 granted 31 January 2011, under Part3A of the Environmental Planning and Assessment Act 1979 (EP&A Act).

As the holder of an Environmental Protection Licence, 12559, BHOP is required, under Section 66(6) of the NSW *Protection of the Environment Operations Act 1997*, to publish pollution monitoring data. In addition BHOP is required to publish data in accordance with its Project Approval 07\_0018 Schedule 4 Condition 9. These documents can be found on the Rasp Mine web site.

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## 1 Air Quality

The following criteria as listed in the Project Approval (DA 07\_0018 MOD9 December 2021) apply to air quality monitoring:

### Long Term Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Total solid particles (TSP)	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	25 µg/m <sup>3</sup>

### Short Term Criterion for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

### Long Term Criteria for Deposited Dust

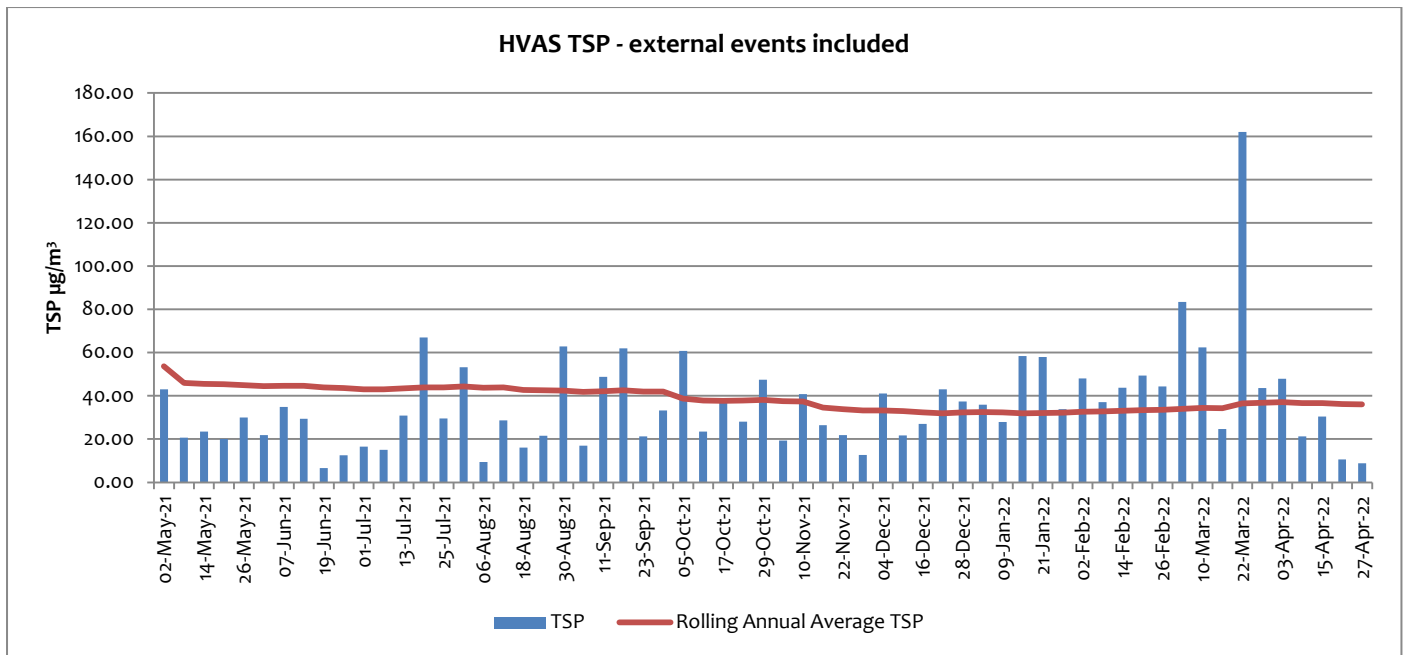
Pollutant	Averaging Period	Maximum Project Contribution	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

### 1.1 High Volume Air Samplers

There are four high volume air samplers used to measure ambient air quality at the Rasp Mine – HVAS (EPL10) and HVAS1 (EPL11) are located at the Silver Tank, central and to the south of the mine lease, and HVAS2 (EPL12) and HVAS3 (EPL57) are located adjacent to and north of Blackwood Pit. A map indicating these locations can be found on the Rasp Mine web site. HVAS and HVAS3 sample for total suspended particulates (TSP) and lead dust, and HVAS1 and HVAS2 sample for particulate matter less than 10 microns (PM<sub>10</sub>) and lead dust.

#### *HVAS (EPL10) - Silver Tank (On Site) Results for April 2022*

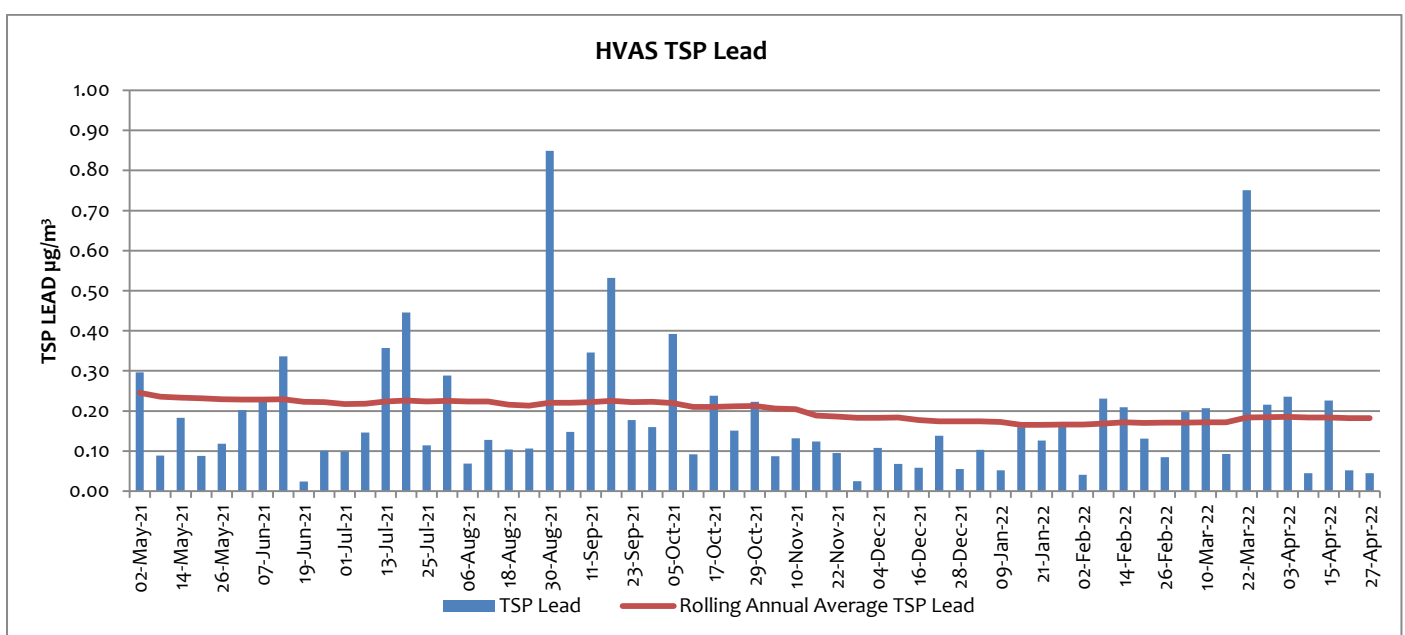
DATE	TSP (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )
03-Apr-22	47.90	0.24
09-Apr-22	21.30	0.05
15-Apr-22	30.40	0.23
21-Apr-22	10.60	0.05
27-Apr-22	8.80	0.05



HVAS (EPL10) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

TSP dust results at HVAS were low for the month of April compared to previous months. The highest TSP levels for April were  $47.90\mu\text{g}/\text{m}^3$  on 3 April when winds were predominantly from the South, suggesting the dust originated off-site. The annual rolling average for TSP at this location is  $35.98\mu\text{g}/\text{m}^3$  at the end of April, lower than the average at the beginning of May 2021 which was  $53.59\mu\text{g}/\text{m}^3$ .

The annual rolling average for TSP is determined using data with extreme dust events included.



TSP Lead dust results at HVAS were lower in the month of April compared to previous months. The highest TSP Lead level for April was  $0.24\mu\text{g}/\text{m}^3$  on 3 April when winds were predominately from the South and SSW so the source was

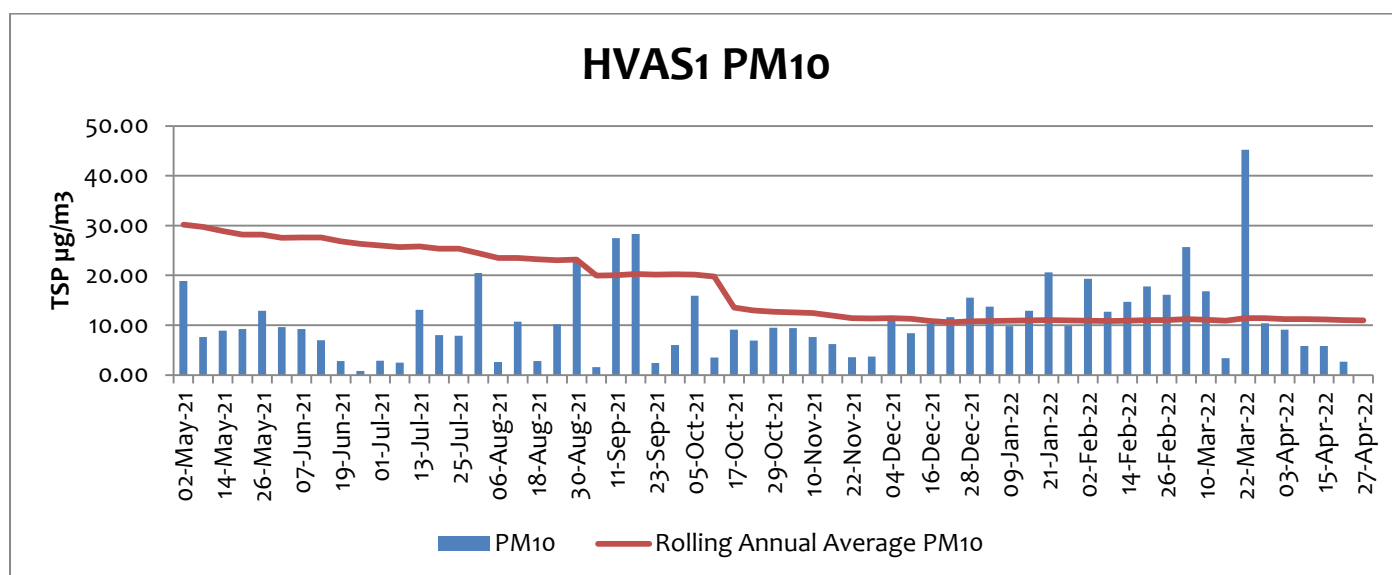


likely off-site. The rolling annual average for TSP Lead in April 2022 was  $0.17 \mu\text{g}/\text{m}^3$  which is lower than the rolling annual average of  $0.25 \mu\text{g}/\text{m}^3$  for TSP Lead at the beginning of May 2021.

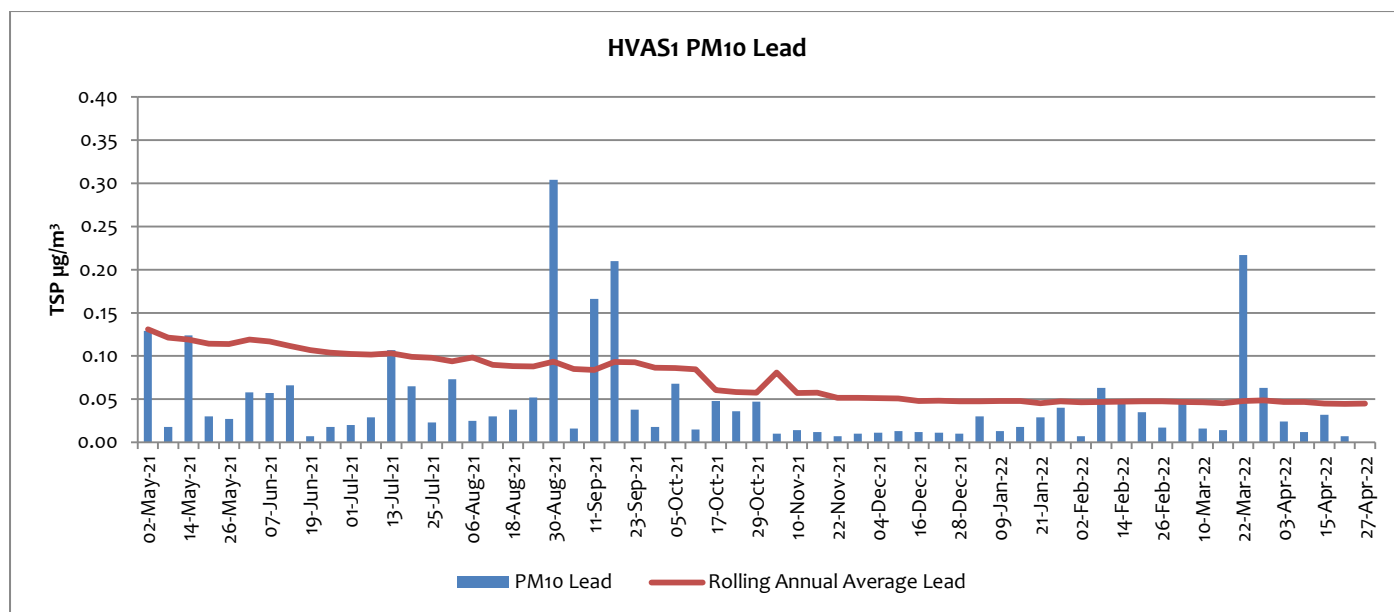
#### HVAS1 (EPL11) - Silver Tank (On Site) Results for April 2022

DATE	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> Lead ( $\mu\text{g}/\text{m}^3$ )
03-Apr-22	9.10	0.02
09-Apr-22	5.80	0.01
15-Apr-22	5.80	0.03
21-Apr-22	2.70	0.01
27-Apr-22	<0.10	<0.007

HVAS1 (EPL11) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.



PM<sub>10</sub> dust results at HVAS1 were low in the month of April compared to previous months. The highest PM<sub>10</sub> dust levels for April was  $9.10 \mu\text{g}/\text{m}^3$  on 3 April when winds were predominantly from the South and SSW. The annual rolling average for PM<sub>10</sub> dust at this location is  $11.0 \mu\text{g}/\text{m}^3$  at the end of April 2022, lower than the average at the beginning of May 2021 which was  $30.2 \mu\text{g}/\text{m}^3$ . External and extreme dust events are recorded in measurements.



PM<sub>10</sub> Lead dust results at HVAS1 were low in the month of April compared to previous months. The highest Lead PM<sub>10</sub> result for April was 0.03 µg/m<sup>3</sup> on 15 April. The rolling annual average for PM<sub>10</sub> Lead in April 2022 was 0.05 µg/m<sup>3</sup>, down from 0.13 µg/m<sup>3</sup> in April 2021.

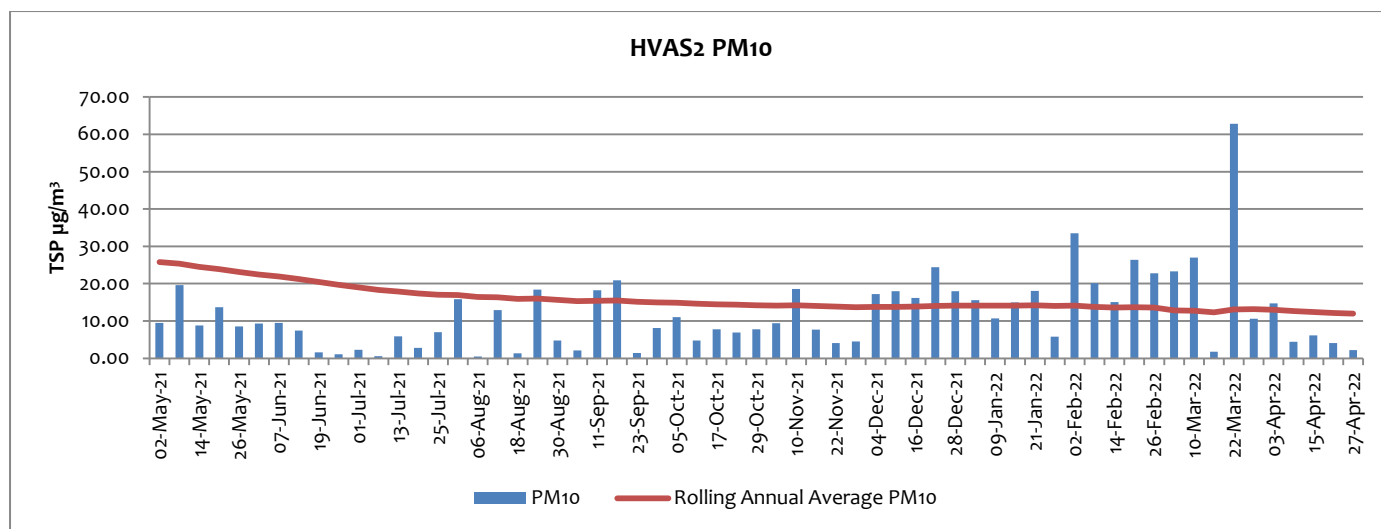
#### ***HVAS 2 (EPL12) - Blackwood Pit (On Site) Results for April 2022***

DATE	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> Lead (µg/m <sup>3</sup> )
03-Apr-22	14.70	0.21
09-Apr-22	4.40	0.017
15-Apr-22	6.10	0.06
21-Apr-22	4.10	0.01
27-Apr-22	2.20	0.01

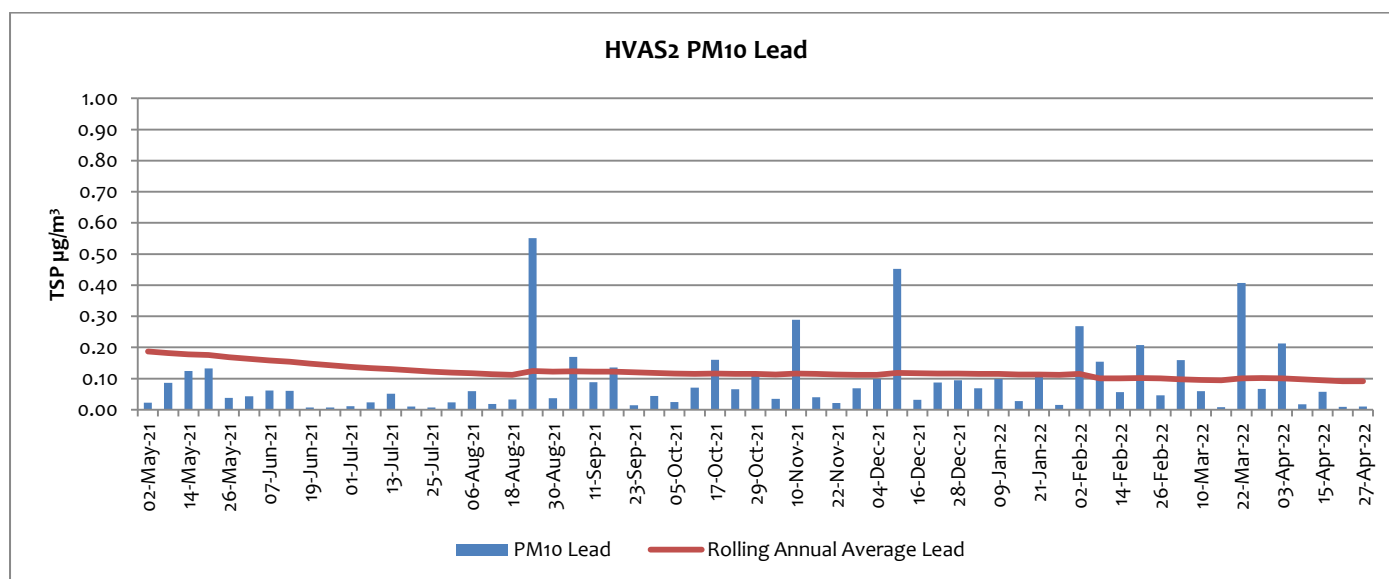
HVAS2 (EPL12) is located on the northern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

PM<sub>10</sub> levels at HVAS2 in April were lower than in previous months. The highest recorded PM<sub>10</sub> dust reading for April was 14.70 µg/m<sup>3</sup> on 3 April when dust was from the South and SSW, which suggests there may have been contribution from site as well as off-site activities. The TSF2 sprinkler system is under construction and likely to be completed in coming months which will further reduce the dust generation of site activities. The annual rolling average for PM<sub>10</sub> dust at this location is 11.94 µg/m<sup>3</sup> at the end of April 2022, down from 25.74µg/m<sup>3</sup> at the beginning of May 2021.

The annual rolling average for PM<sub>10</sub> dust is determined using data with extreme dust events included.



There were low PM<sub>10</sub> lead levels in April despite there being no change in wind activity in the area. The rolling annual average for PM<sub>10</sub> Lead in April 2022 was 0.09  $\mu\text{g}/\text{m}^3$ , down from 0.19  $\mu\text{g}/\text{m}^3$  at the beginning of May 2021. An elevated result of 0.21  $\mu\text{g}/\text{m}^3$  on 3 April was likely due to contribution from site activities.



## HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for April 2022

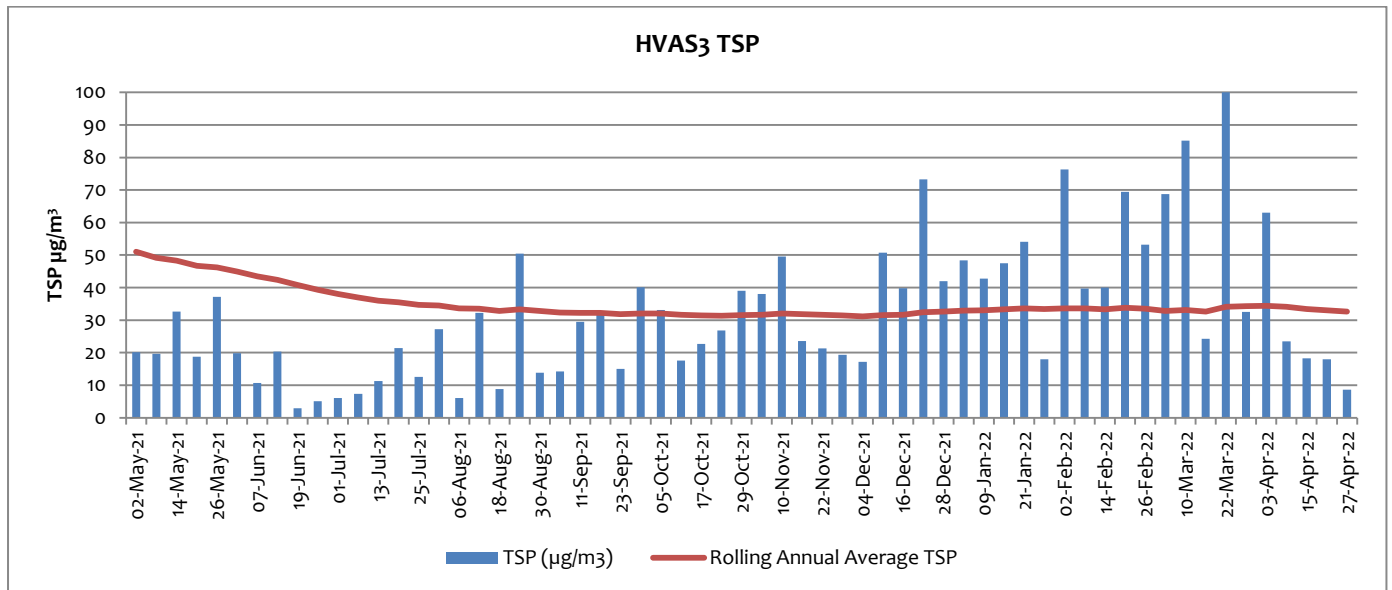
DATE	TSP ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
03-Apr-22	63.00	1.09
09-Apr-22	23.50	0.091
15-Apr-22	18.30	0.16
21-Apr-22	18.00	0.038
27-Apr-22	8.60	0.021

HVAS3 (EPL57) was included in EPL 12559 on 14 March 2019 to provide for monitoring of TSP Dust on the northern boundary of the site at Blackwoods Pit TSF2.

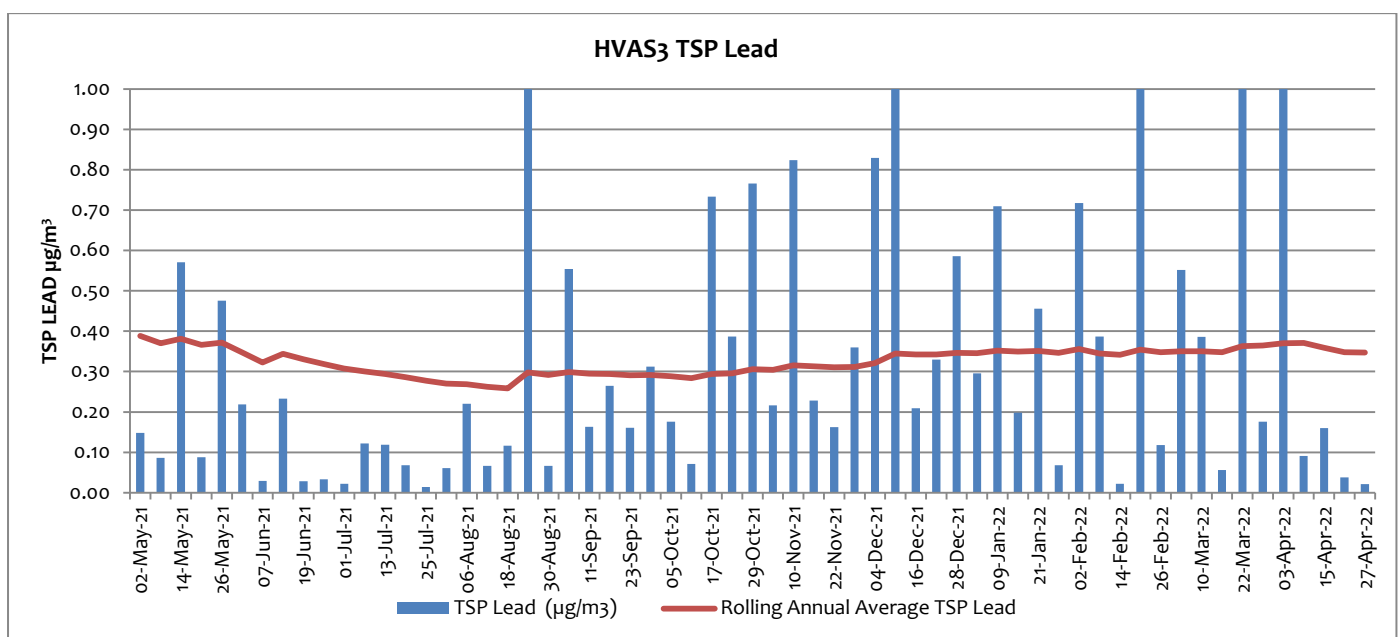


TSP levels were highest on 3 April with results of  $63.00\mu\text{g}/\text{m}^3$ ; wind on this day was predominately from the South and SSW suggesting potential dust contribution from TSF2. The TSF2 sprinkler system is under construction and likely to be completed in coming months which will further reduce the dust generation of site activities. The annual rolling average for TSP dust at this location is  $32.63\mu\text{g}/\text{m}^3$  at the end of April 2022, down from  $51.02\mu\text{g}/\text{m}^3$  at the beginning of May 2021.

The annual rolling average for TSP is determined using data with extreme dust events included.



TSP Lead levels were low through most of April excluding 3 April where results of  $1.09\mu\text{g}$  were recorded when winds were from the South and SSW which suggests there may have been contribution of dust from Blackwoods TSF2. The rolling annual average for TSP Lead in April was  $0.35\mu\text{g}/\text{m}^3$ , down from  $0.39\mu\text{g}/\text{m}^3$  at the beginning of May 2021.







## 1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

There are two Tapered Element Oscillating Microbalance (TEOM) sampling units used to measure ambient air quality at the Rasp Mine – TEOM1 (EPL13) is located off-site within the perimeter fence of Essential Water south of the mine lease, and TEOM2 (EPL14) is located on-site adjacent to Blackwood Pit to the north of the mine lease. A map indicating these locations can be found on the Rasp Mine web site. TEOM1 and TEOM2 are designed to operate continuously and sample for particulate matter less than 10 microns ( $PM_{10}$ ) in size.

TEOM2 was temporarily decommissioned in 19 June 2019 due to Embankment 2 TSF2 construction works. The decommissioning is in accordance with dust management strategies agreed with the EPA which includes the operation of a real-time  $PM_{10}$  monitor north of the construction works. Both Project Approval and Environment Protection Licence criteria exclude dust storms and other extraordinary events.

Project Approval 07\_0018 criteria apply at TEOM1 and TEOM2, with two criteria listed for  $PM_{10}$ , a 24 hour average criteria of  $50 \mu g/m^3$  and an annual average criteria of  $25 \mu g/m^3$ .

TEOM data is validated by third party consultants using Australian Standards and internal procedures, and is used to populate the table of TEOM monthly data provided below.



**TEOM1 (EPL13) (Off Site) and TEOM2 (EPL14) (On Site) Validated Results for April 2022**

Particulate Matter <10 Microns 24Hr Average				
Date	TEOM 1 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?	TEOM 2 ( $\mu\text{g}/\text{m}^3$ )	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?
1-Apr-22	25.6	Y	36.5	Y
2-Apr-22	17.1	Y	17.4	Y
3-Apr-22	13.8	Y	19.5	Y
4-Apr-22	10.4	Y	15.2	Y
5-Apr-22	13.7	Y	13.5	Y
6-Apr-22	26.2	Y	37.9	Y
7-Apr-22	13.9	Y	24.2	Y
8-Apr-22	13.0	Y	12.8	Y
9-Apr-22	11.2	Y	6.9	Y
10-Apr-22	10.3	Y	9.4	Y
11-Apr-22	SC	Y	20.9	Y
12-Apr-22	SC	Y	SC	Y
13-Apr-22	16.0	Y	SC	Y
14-Apr-22	25.5	Y	14.7	Y
15-Apr-22	10.7	Y	7.7	Y
16-Apr-22	10.7	Y	6.8	Y
17-Apr-22	15.9	Y	10.1	Y
18-Apr-22	19.4	Y	15.8	Y
19-Apr-22	7.1	Y	3.7	Y
20-Apr-22	8.2	Y	6.0	Y
21-Apr-22	6.8	Y	6.7	Y
22-Apr-22	7.2	Y	6.5	Y
23-Apr-22	11.6	Y	9.2	Y
24-Apr-22	7.8	Y	4.6	Y
25-Apr-22	8.7	Y	5.7	Y
26-Apr-22	4.0	Y	2.2	Y
27-Apr-22	4.7	Y	2.3	Y
28-Apr-22	8.1	Y	3.1	Y
29-Apr-22	7.7	Y	4.1	Y
30-Apr-22	9.2	Y	6.6	Y

NS – no sample collected. SC – sample collected.

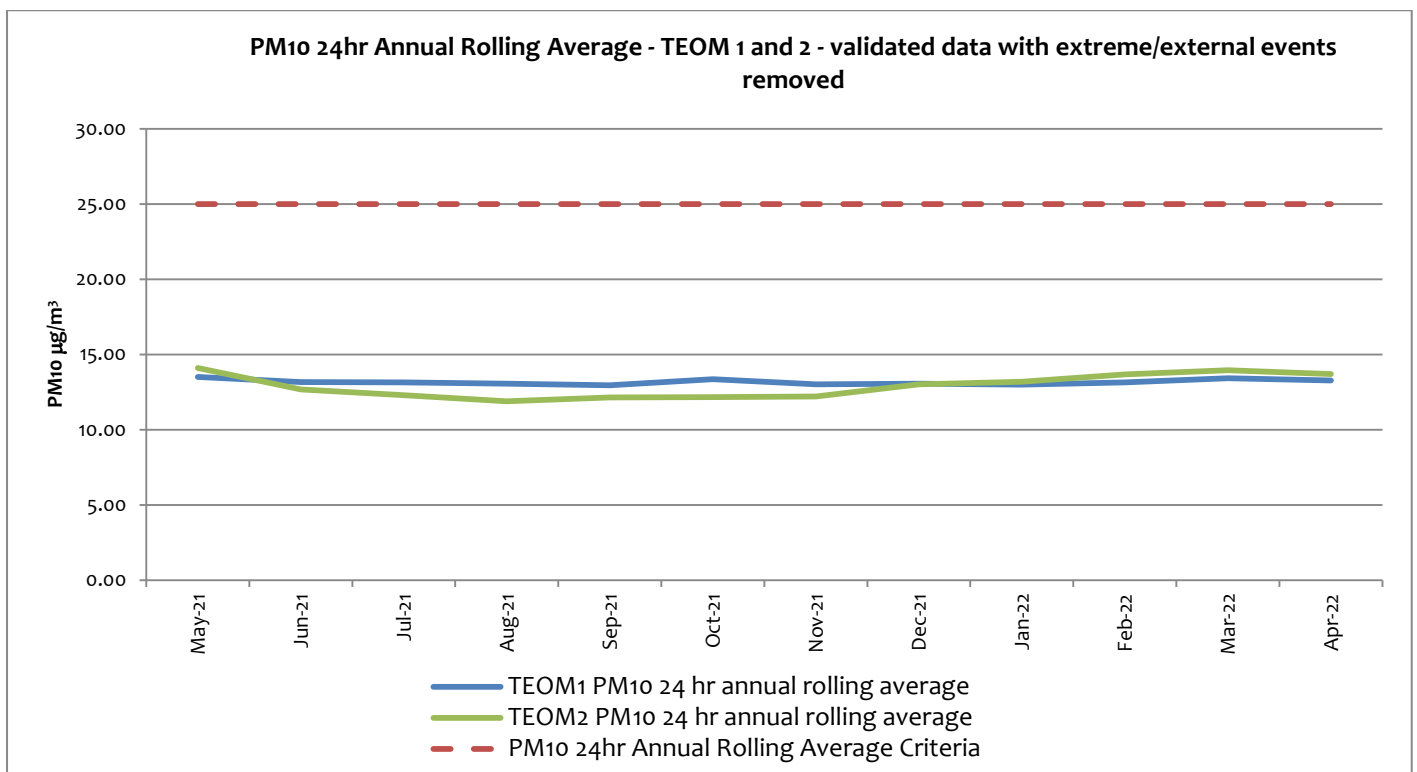
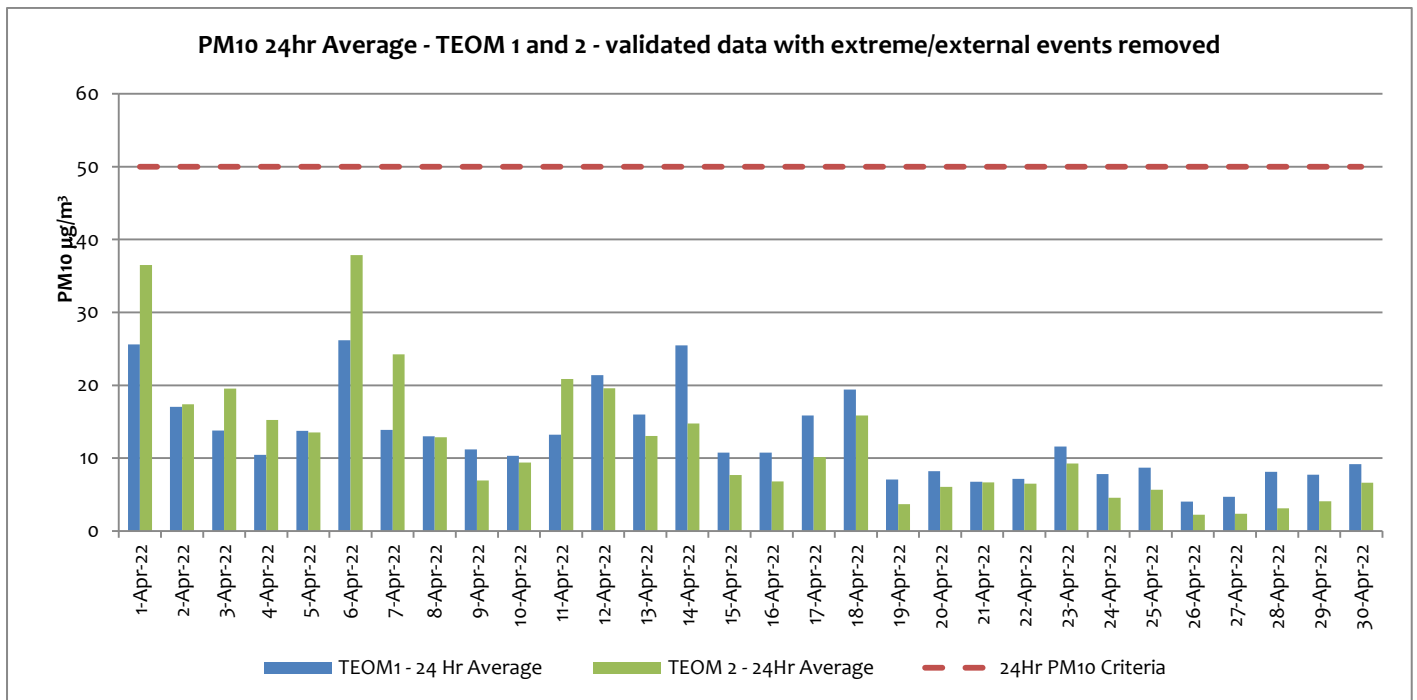
PM<sub>10</sub> dust levels at both TEOM units were low in the month of April, neither site recorded daily average over the daily limit of 50  $\mu\text{g}/\text{m}^3$ . Yearly calibration was performed on TEMO1 on 11 and 12 April 2022 and on TEOM2 on 12 and 13 April 2022.

The rolling annual average for PM10 with external dust events removed at TEOM1 for the period is 13.67  $\mu\text{g}/\text{m}^3$ , down from 13.50  $\mu\text{g}/\text{m}^3$  at the end of April 2021.

The rolling annual average for PM10 with external dust events removed at TEOM2 for the period is 13.70  $\mu\text{g}/\text{m}^3$ , down from 15.61  $\mu\text{g}/\text{m}^3$  at the end of April 2021.



The PM<sub>10</sub> 24-hour rolling annual average for both TEOM sites remain below the annual average criteria of 25 µg/m<sup>3</sup>.





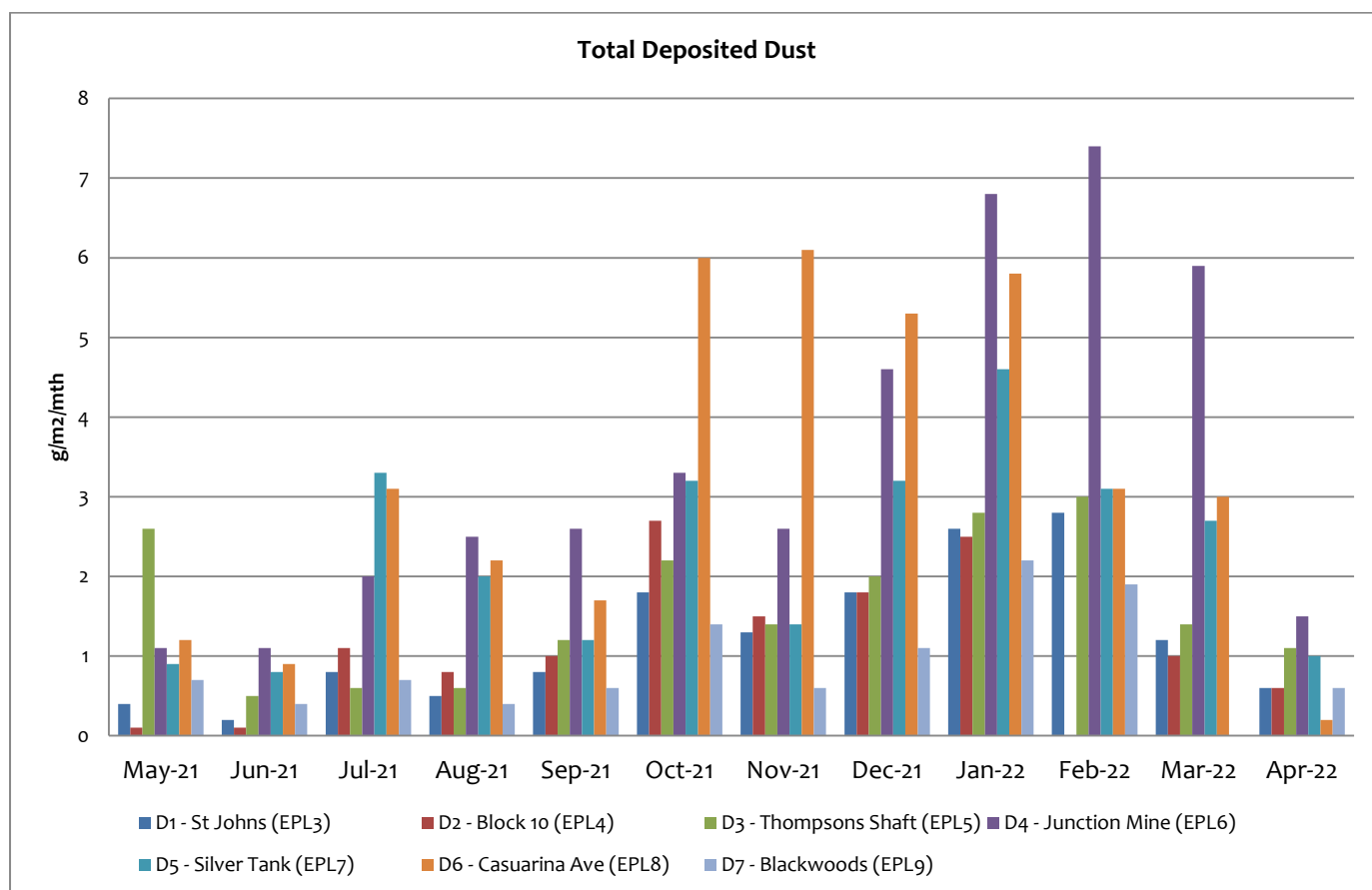
### 1.3 Dust Deposition Sampling

There are seven dust deposition gauges to measure ambient air quality at the Rasp Mine – D1 to D7. D1 and D6 are located off-site, D1 near the St Johns training facility north of the Rasp Mine and D6 in Casuarina Avenue south of the Rasp Mine. D2 to D5 and D7 are located on the mine lease in various locations. A map indicating these locations can be found on the Rasp Mine web site. Dust samples are collected monthly and analysed for total deposited dust and deposited lead dust.

#### *Dust Deposition Gauges D1 (EPL3) to D7 (EPL9) – Results for April 2022*

Total Deposited Dust (g/m <sup>2</sup> /Month)							
Sample Period	D1 (off site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off site)	D7 (on site)
April 2022	0.6	0.6	1.1	1.5	1.0	0.2	0.6
Background (2010)	4.0	3.1	4.3	5.7	- <sup>1</sup>	5.8	- <sup>1</sup>
Compliant?	Y	N/A	N/A	Y	N/A	Y	N/A

Note: "<sup>1</sup>" = background not available, N/A = not applicable as dust deposition unit is located on site, NS = No sample



The dust levels recorded in Dust Gauges in April 2022 were significantly lower than previous months. The highest dust level recorded for the month was in in the D4 Junction Mine gauge, which is surrounded by exposed areas. The predominant wind direction for April was from the South as shown in the Wind Rose in Section 4.

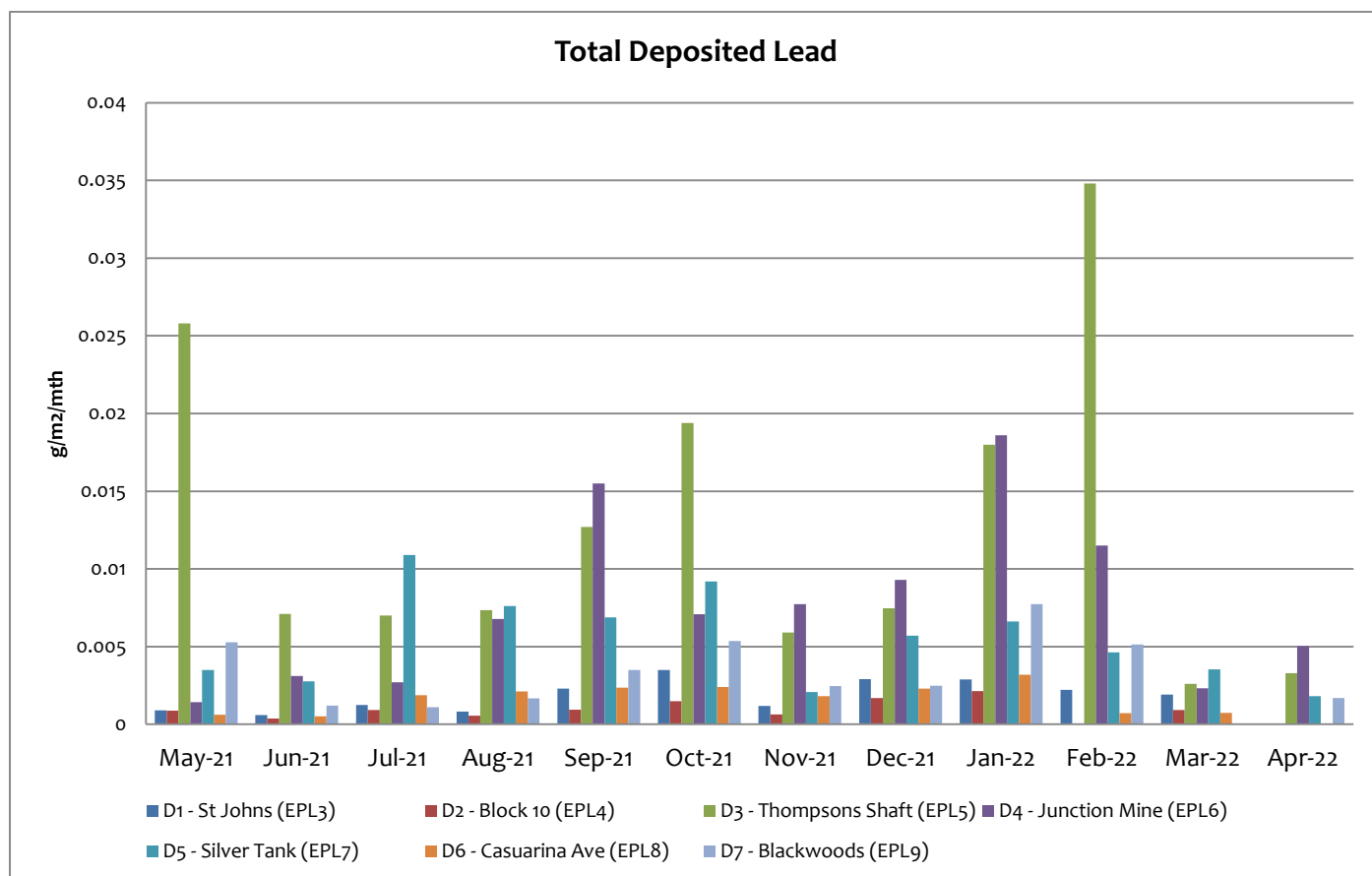


Total Deposited Lead (g/m <sup>2</sup> /Month)							
Sample Period	D1 (off Site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off Site)	D7 (on site)
April 2022	<0.000874	<0.000874	0.0033	0.00503	0.00181	<0.000874	0.0017
Background (2010)	0.0034	0.005	0.005	0.006	-1	0.004	-1

Note: "1" = background not available, NS = No sample

There are no guidelines for deposited lead dust. Lead results in April 2022 were highest in the D4 Junction Mine gauge but low compared to previous months. The haul road and loading areas alongside the train is a concrete pad which is regularly swept and watered. A water cart will also attend to the haul road between the concentrate loading shed at the Mill and the rail loadout area when concentrate containers are being transported on site.

Dust suppressant is applied to unsealed areas of the site and roads are frequently watered using water carts in an attempt to control dust emissions. The waste dump adjacent to the rail loadout is treated with dust suppressant to capture any loose dust accumulating on the lower batters and on the upper surface.





## 1.4 Ventilation Outlets and Bag House Monitoring

There are two locations to measure pollutants from exhausts or stacks; these include the Primary Ventilation Shaft, measuring pollutants from underground firings, and the Baghouse Stack at the crusher measuring dust. Each are located on site; the Primary Ventilation Shaft is located centrally and to the north of the mine lease and the Primary Crusher Baghouse Stack is located within the area of the processing plant to the east of the lease. Shaft 6 (EPL56) was removed as a monitoring location with the variation of EPL12559 in March 2019 as it became an intake rather than an exhaust in April 2018. A map indicating these locations can be found on the Rasp Mine web site. Samples are collected quarterly and analysed for a number parameters listed in below. Reference to the item required in the Rasp Mine Environment Protection Licence (EPL) is provided below. Emissions monitoring is conducted quarterly.

The following criteria apply:

### Primary Ventilation Shaft (EPL1)

	Unit	Criteria
Nitrogen Oxides	mg/m <sup>3</sup>	350
Volatile Organic Compounds	mg/m <sup>3</sup>	40

### Primary Ventilation Shaft (EPL1) and Crusher Baghouse (EPL2)

	Unit	Criteria
Total Suspended particles (TSP)	mg/m <sup>3</sup>	20
Type 1 and Type 2 <sup>1</sup>	mg/m <sup>3</sup>	1

**Note 1:** "Type 1 substance" means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

"Type 2 substance" means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements.

### *Primary Vent Shaft (EPL1) and Crusher Baghouse (EPL2) Results for April 2022*

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Monitoring was conducted at the Primary Vent Shaft (EPL1) and the Crusher Baghouse (EPL2) on 22 February 2022. The monitoring results for the Primary Vent Shaft and the Crusher Baghouse from this monitoring event were below the licence criteria.

## 2 Noise

### 2.1 Blasting (Vibration and Overpressure)

There are five compliance vibration monitors at various locations measuring for vibration and overpressure from blast firings. These include V1 to V5 which are located on-site and off-site. A map indicating these locations can be found on the Rasp Mine web site. In addition, there are a number of roving monitors which may be used to monitor vibration and overpressure at particular locations as required. Monitors operate continuously and are automatically triggered to record when a blast occurs. The following conditions apply as listed in the PA 07\_0018 and EPL 12559:



### Blasting Criteria (Western Mineralisation and Main Lodes excluding Block 7)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	5	5% of the total number of blasts over a 12-month period <sup>1</sup>
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Public Infrastructure	-	100	0%

**Note 1:** Does not apply until completion of Pollution Reduction Program on the EPL at the end of 2018. Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.

### Blasting Criteria (Block 7)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	3 (interim)	5% of the total number of blasts over a 12-month period <sup>1</sup>
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Broken Hill Bowling Club, Italio (Bocce) Club, Heritage Items within CML7	-	50	0%
Perilya Southern Operations	-	100	0%
Public Infrastructure	-	100	0%

**Note 1:** Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.

In addition the following conditions also apply:

- Production blasts may occur between 6.45 am and 7.15 pm on any day
- 1 production blast per day, with 6 per week averaged over a calendar year
- 6 development blasts per day, with 42 per week averaged over a calendar year

### **Blasting Data Summary Results for April 2022**

#### **Total Blasts:**

- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 2.48 per week over the previous calendar year
- The number of Development blasts averaged 25.48 per week over the previous calendar year

#### **Western Mineralisation and Main Lodes (excluding Block 7):**

- 1 Blast recorded >5 mm/s
- 0 Blasts recorded >10 mm/s
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)



- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115dBL (7am to 7pm)
- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 5 mm/sec for the annual period = 0%
- Percentage of production blasts over 5 mm/sec for the annual period = 0.9%

**Block 7:**

- 0 Blasts recorded >3 mm/s
- 0 Blasts recorded >10 mm/s
- 0 Blasts recorded >50 mm/s at V6
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)
- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115 dBL (7am to 7pm)
- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 3mm/sec for the annual period = 0%
- Percentage of production blasts over 3mm/sec for the annual period = 0%

The percentage of production blasts in the Western Mineralisation and Main Lodes producing vibration at monitors over 5 mm/sec for the 12-month period is 0.9%.

There have been two production blasts in Block 7 over the last 12 months, neither of which produced vibration at monitors over 3 mm/sec. No complaints have been received about Block 7 blasts.

## **2.2 Noise**

Noise monitoring is undertaken as per the NSW Noise Policy for Industry at a frequency of once per annum. Annual noise monitoring was conducted during two consecutive night-time periods from 3 to 5 May 2021.

The monitoring assessment found that site LAeq, 15min noise contributions satisfied the relevant limits during the measurements at all assessment locations.

## **3 Water**

### **3.1 Groundwater**

There are eighteen sampling locations for groundwater. GW01 (EPL37) to GW16 (EPL52) are piezometers installed at various locations around the mine site and are sampled quarterly. There are also two sampling locations for water pumped from underground mining, Shaft 7 (EPL53) and Kintore Pit (EPL54), which are sampled monthly. A map indicating these locations can be found on the Rasp Mine web site. Groundwater monitoring is scheduled for completion in March, June, September and December. No limits are applied in the EPL to the results from groundwater monitoring.

#### **Groundwater Monitoring Requirements**

EPA Identification Number	Frequency	Parameters to be analysed
Shaft 7 EPL53	Monthly	alkalinity (calcium carbonate (CaCO <sub>3</sub> )), cadmium (Cd), calcium (Ca), chloride (Cl), electrical conductivity (EC), iron (Fe), lead Pb), magnesium (Mg), manganese (Mn), pH, sodium (Na), sulphate (SO <sub>4</sub> ), total dissolved solids (TDS) and zinc (Zn)
Kintore Pit (U/G dewatering) EPL54	Monthly	
Piezometers EPL37 (GW01) to EPL52 (GW16)	Quarterly	





### Shaft 7 (EPL53) and Kintore Pit (EPL54) Results for April 2022

Sample Point	pH	EC (µS/cm <sup>2</sup> )	TDS (mg/l)	Alkalinity (CaCO <sub>3</sub> ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
Shaft 7 (EPL53)	5.56	1120	1300	28	5930	1490	529	280	1470	2.03	1.75	278	931	<0.05
Kintore Pit (EPL54)	5.85	14300	16500	14	6870	2170	553	370	1900	4.22	1.71	473	1080	0.13

### Groundwater Bores (EPL37 - EPL52) Results for April 2022

No groundwater monitoring was scheduled in April 2022.

## 3.2 Surface Water Sample Record

There are seven sampling locations for surface water, these include surface water basins located on the mine lease to capture and retain rainfall and two locations up and down stream of an ephemeral creek located south of the mine lease boundary. A map indicating these locations can be found on the Rasp Mine web site. Based on historical data, sampling is most likely to be undertaken in October (highest rainfall month as recorded by Bureau of Meteorology) and April.

Surface water monitoring was conducted on 19 April following 18.7mm of rain and on 27 April following 27.8mm of rain; results for all locations were similar to those seen following previous events.

### Surface Water Monitoring Requirements

Description	Frequency	Parameters to be Analysed
Federation Way Culvert EPL29/S31-1	2 x per year, six months apart	cadmium (Cd), chloride (Cl), electrical conductivity (EC), lead Pb), manganese (Mn), pH, sodium (Na), sulphate (SO <sub>4</sub> ), total dissolved solids (TDS) and zinc (Zn)
Ryan Street Dam EPL31/S49	2 x per year, six months apart	
Adjacent Olive Grove EPL32/S1A	2 x per year, six months apart	
Adjacent Bowls Club EPL33 /S9-B2	2 x per year, six months apart	
Horwood Dam EPL34/S34	2 x per year, six months apart	
Upstream Bonanza St EPL35	2 x per year, six months apart	
Downstream Sydney Rd EPL36	2 x per year, six months apart	

### Surface Water Monitoring Results for 19 April 2022

Sample Point	pH	EC (µS/cm <sup>2</sup> )	TDS (mg/l)	Alkalinity (CaCO <sub>3</sub> ) (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
S9B-2 (EPL 33)	6.6	375	326	7	147	13	46	5	12	0.114	1.78	0.535	8.36	<0.05



## Rasp Mine Monthly Environment Monitoring Report

Sample Point	pH	EC ( $\mu\text{S}/\text{cm}^2$ )	TDS (mg/l)	Alkalinit y ( $\text{CaCO}_3$ ) (mg/l)	SO4 (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
S31-1 (EPL 29)	6.21	1140	1180	4	672	18	109	8	17	1.42	40.3	1.28	185	<0.05
S1A (EPL 32)	7.02	511	440	9	22	8	81	5	6	0.0992	2.35	0.161	10	<0.05
Upstream (EPL 35)	7.18	64	75	24	4	5	10	1	5	0.0017	0.01	0.016	0.067	<0.05
Downstream (EPL 36)	7.95	222	407	67	20	20	16	4	29	0.0004	0.009	0.002	0.036	<0.05
S49 (EPL 31)	6.64	322	292	6	135	2	37	4	5	0.119	5.63	0.113	18.8	<0.05
S44 (EPL 30)	6.5	846	675	17	335	54	112	13	41	0.156	2.08	0.464	6.6	<0.05
Horwood Dam (EPL 34)	6.44	6690	6920	5	2910	1030	345	187	913	3.32	145	2.02	194	<0.05

### Surface Water Monitoring Results for 27 April 2022

Sample Point	pH	EC ( $\mu\text{S}/\text{cm}^2$ )	TDS (mg/l)	Alkalinit y ( $\text{CaCO}_3$ ) (mg/l)	SO4 (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
S9B-2 (EPL 33)	6.79	246	162	9	76	11	22	2	11	0.0666	0.272	1.01	5.6	<0.05
S31-1 (EPL 29)	6.21	1040	986	2	579	15	66	8	23	1.06	1.21	42.8	117	<0.05
S1A (EPL 32)	6.96	225	187	13	91	4	30	2	4	0.0556	0.096	1.69	6.79	<0.05
Upstream (EPL 35)	6.32	1960	1710	26	893	126	212	35	123	0.783	0.023	168	98.1	<0.05
Downstream (EPL 36)	7.16	224	170	60	22	18	16	4	18	0.005	<0.001	0.004	0.098	<0.05
S49 (EPL 31)	6.52	685	556	7	335	6	74	7	10	0.331	0.134	15	48.3	<0.05
S44 (EPL 30)	6.79	242	167	15	61	10	20	3	11	0.131	0.193	0.574	3.37	<0.05
Horwood Dam (EPL 34)	6.62	5640	4640	6	2090	780	286	135	661	2.4	2.07	96.8	119	<0.05



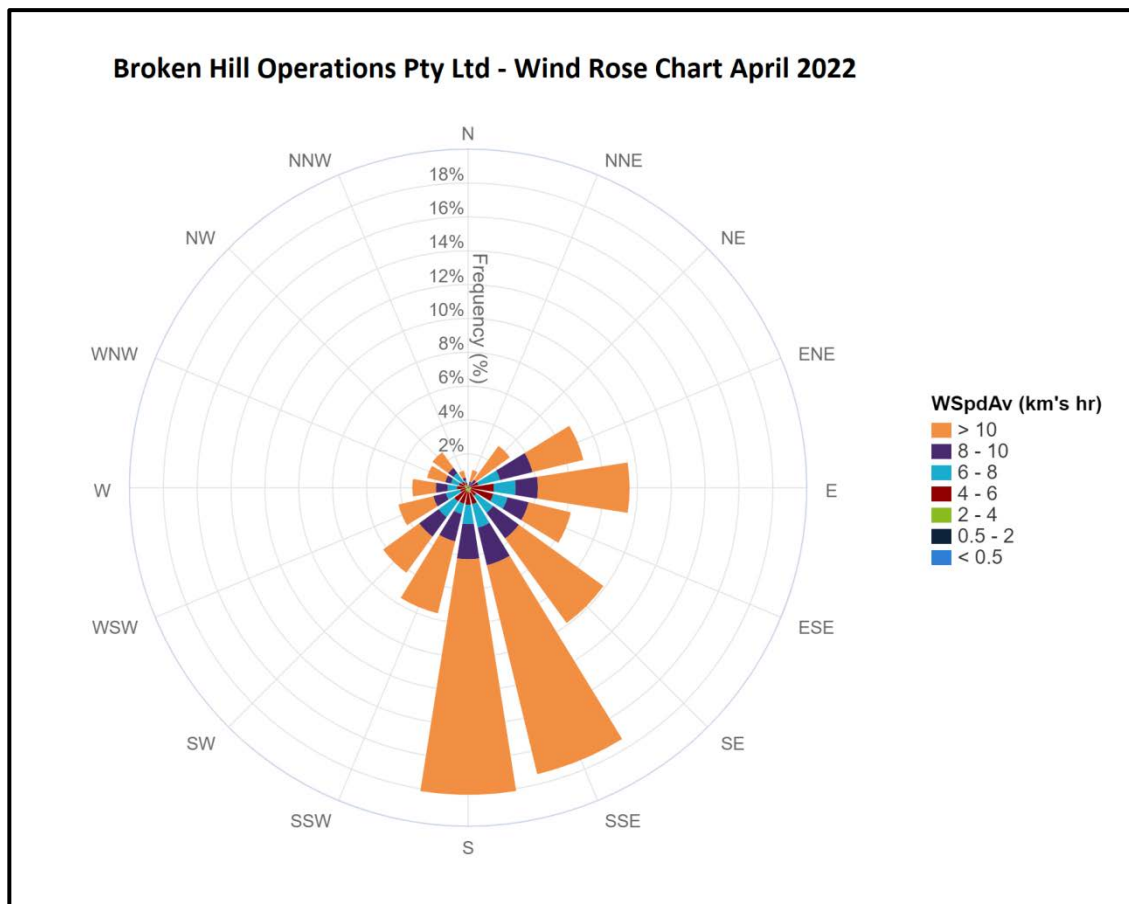
## 4 Weather Data

The weather station continuously monitors the following parameters as per Point 55 of the Environmental Protection Licence.

The following parameters are required to be recorded each month as listed in the EPL 12559:

### Rasp Mine Weather Station (EPL55) Monitoring Requirements

Parameter	Sampling method	Units of measure	Averaging period	Frequency
Temperature at 10 metres	AM-4	degrees Celsius	15 minutes	Continuous
Wind Direction at 10 metres	AM-4	degrees in a clockwise direction from True North	15 minutes	Continuous
Wind Speed at 10 metres	AM-4	metres per second	15 minutes	Continuous
Rainfall	AM-4	millimetres	1 hour	Continuous
Sigma theta	AM-2 & AM-4	degrees	15 minutes	Continuous



The wind rose provided below indicates the predominant wind directions for the month of April was from the South and SSE.



### Weather Data Summary for April 2022

Date	Temperature @ 10m (°C)		Wind Speed @ 10m (km/hr)		Predominant Wind Direction @ 10m		Rainfall (mm)
	Min	Max	Min	Max	Cardinal	Degree	Total
01-Apr-22	12.0	21.3	6.8	36.9	NE	159	0.00
02-Apr-22	11.4	19.7	4.6	22.9	ENE	167	0.00
03-Apr-22	13.0	22.5	1.8	20.2	NE	184	0.00
04-Apr-22	14.7	24.3	2.9	15.4	South	152	0.00
05-Apr-22	18.2	27.1	0.8	19.4	South	160	0.00
06-Apr-22	15.1	25.2	7.0	40.6	South	169	0.00
07-Apr-22	12.3	23.1	4.3	27.9	South	174	0.00
08-Apr-22	13.1	23.2	4.8	21.6	West	137	0.00
09-Apr-22	15.0	26.3	1.2	14.9	South	115	0.00
10-Apr-22	17.6	29.2	2.3	18.3	SSW	108	0.00
11-Apr-22	17.3	28.2	2.5	22.5	South	141	0.00
12-Apr-22	15.5	25.3	6.4	28.1	East	143	0.00
13-Apr-22	14.4	23.5	3.2	22.6	SSW	132	0.00
14-Apr-22	14.2	26.1	3.7	28.2	SSW	99	0.00
15-Apr-22	18.7	26.3	2.6	19.6	SSW	113	0.60
16-Apr-22	18.7	26.2	4.0	15.3	South	98	0.00
17-Apr-22	19.4	29.7	0.9	37.4	South	117	0.00
18-Apr-22	15.4	28.6	2.3	36.2	South	163	0.30
19-Apr-22	10.4	15.9	5.3	36.5	NW	227	18.70
20-Apr-22	10.3	19.2	2.3	16.4	NW	243	0.00
21-Apr-22	12.4	19.2	2.7	19.6	SE	176	0.00
22-Apr-22	9.3	17.3	4.0	23.2	SW	151	0.00
23-Apr-22	9.7	22.7	4.7	19.3	SSW	163	0.00
24-Apr-22	16.1	22.7	6.0	25.9	SSW	92	0.00
25-Apr-22	16.1	22.4	2.4	26.8	South	79	0.10
26-Apr-22	13.9	17.5	4.2	34.3	South	76	27.60
27-Apr-22	13.9	17.8	0.8	15.2	SSE	235	0.00
28-Apr-22	15.2	21.3	5.4	22.9	SSE	128	0.00
29-Apr-22	14.1	22.4	7.0	26.6	SSE	211	1.90
30-Apr-22	12.6	17.1	1.8	35.1	ENE	190	0.00

Rainfall of 49.2mm fell in April 2022.



## 5 Data Log

Sample	Result Received
Hi Volume Samples	31-05-2022
TEOM	28-05-2022
Dust Deposition	06-06-2022
Vents & Bag House	15-03-2022
Noise	14-05-2021
Water	09-05-2022
Blast vibration and overpressure	18-04-2022
Weather	24-05-2022
Date posted to web site	17-06-2022

## 6 Correction Log

No corrections.