

Monthly Environmental Data June 2016

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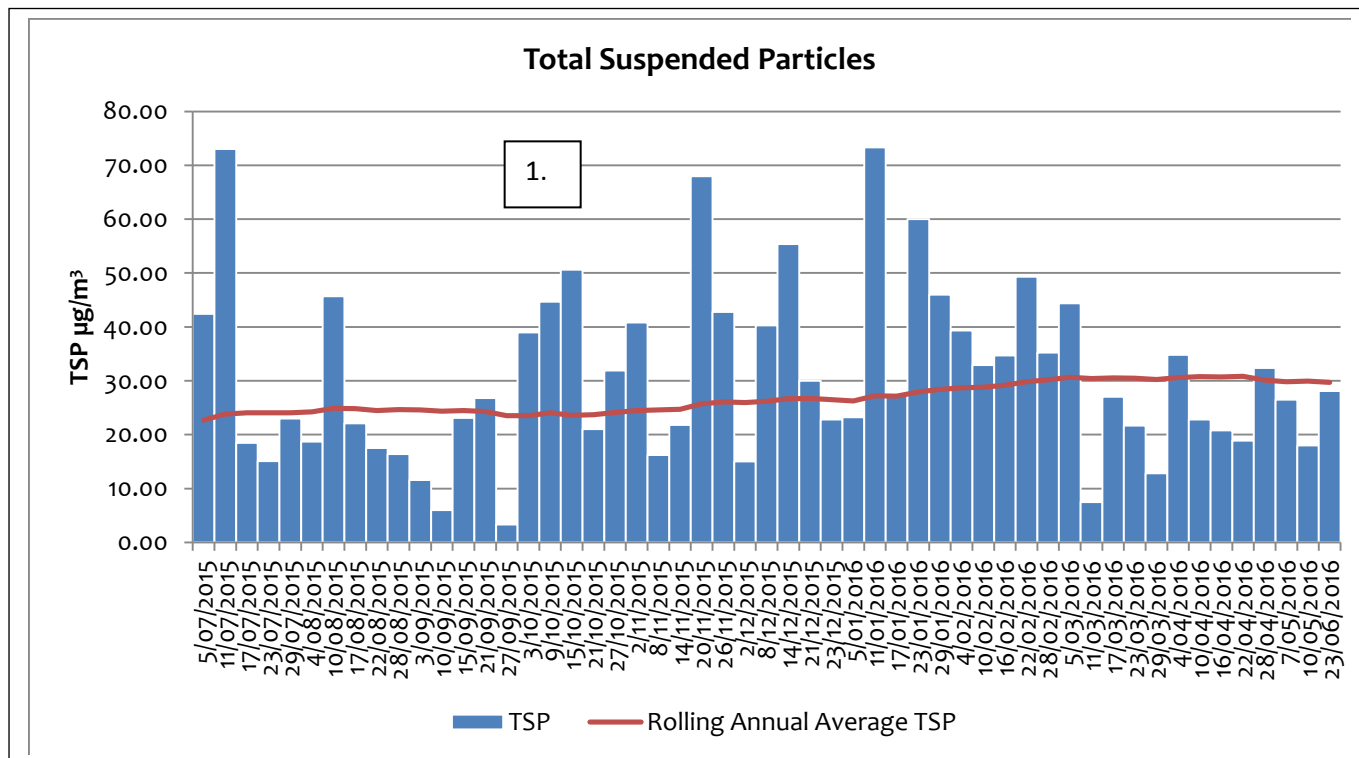
1 Air Quality

1.1 High Volume Air Samplers

High volume air samplers at Silver Tank both failed calibration during May 2016. Both units were sent back to Ecotech in Melbourne for repair. The units were underservice for the duration of May. In early June the transformer located at Silver Tank failed thus rendering the local power source for high volume samplers 1 and 2 under service. A back up genset was put in place to power the samplers however heavy diesel particulate contamination was found on the resulting filters. The EPA were approached on the 29 June proposing to shift the monitors to the closest operational switchboard near the change rooms. The EPA indicated their preferred option would be to leave the hi vols in situ and run a sufficient lead to them to provide power and avoid contamination (provided it can be done safely). Longer leads were put in place however subsequent samples found the genset was faulting under high voltage. The load on the genset was increased in an attempt to mitigate the high voltage faults and the supply was run through two separate UPS units but the problem persisted. Diagnosis was a possible fault with the genset. With all of the available gensets already in use the next alternative was to pair the high volume samplers with another genset close by. Another unit was in place operating at the essential communications hut adjacent the weather station. The high volume units are currently being trialled here. The first samples collected have again shown signs of diesel contamination even with 10 meters of separation between the genset and the samplers. As of the 27 June the ETA of the new transformer is 1 month as it will have to be engineered and custom built.

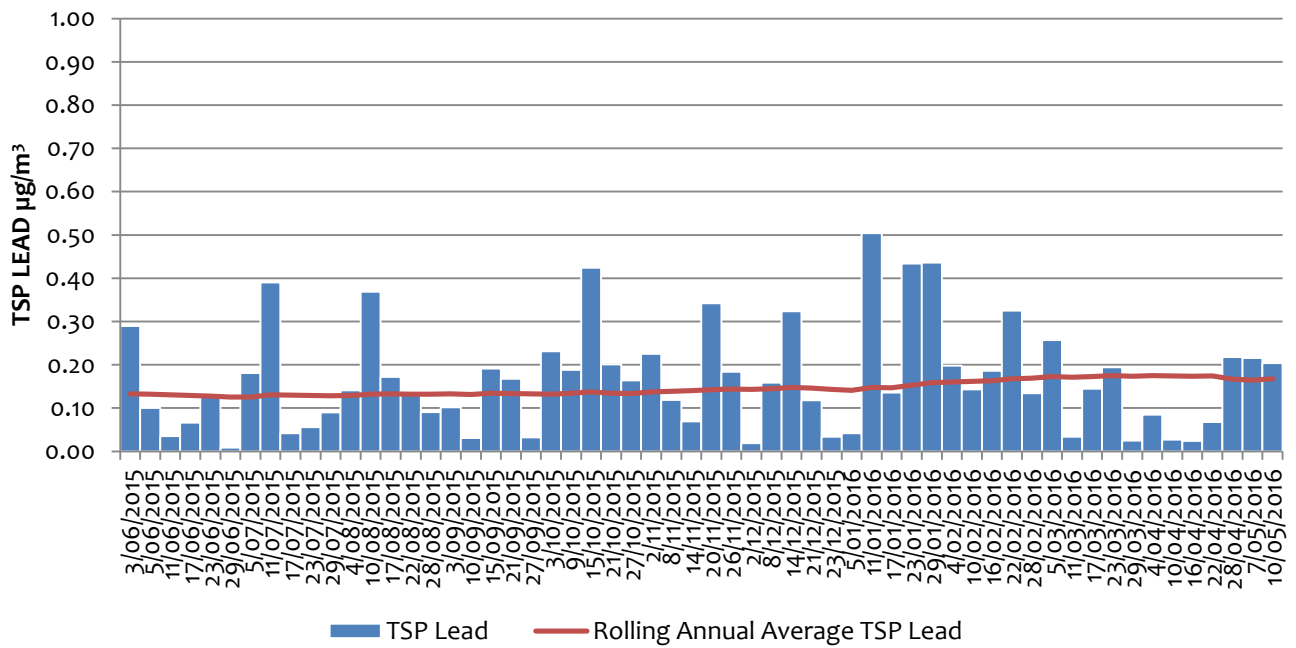
EPL10 - SILVER TANK HI VOL TSP - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
23/6/16	28.10	0.22



1. The spike on the 11th July also occurred when conditions were considered normal with 15km/h winds from a SE direction. Lab QC was okay, this may have been due to earthmoving activity (grading) in the local area. The spike on the 20th November coincides with 70kmh gusts coming from a westerly direction. On the 11th January gusts were recorded up to 65km/h in a WSW direction.

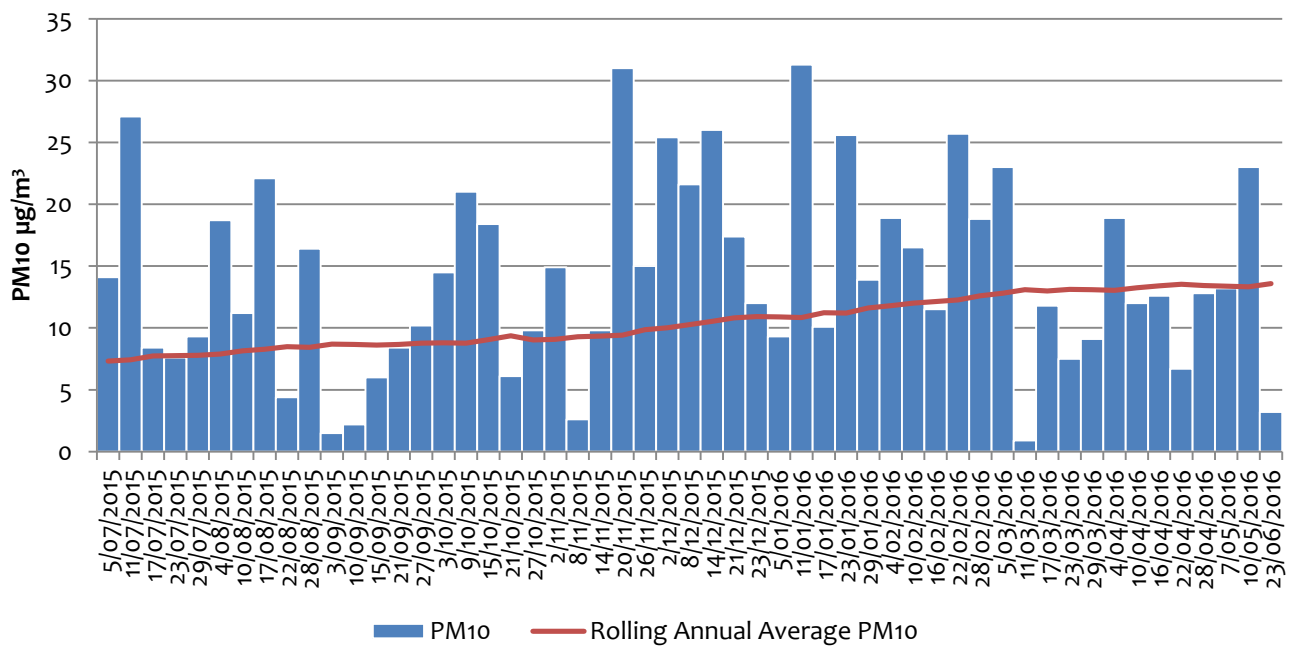
Total Suspended Particles - Lead

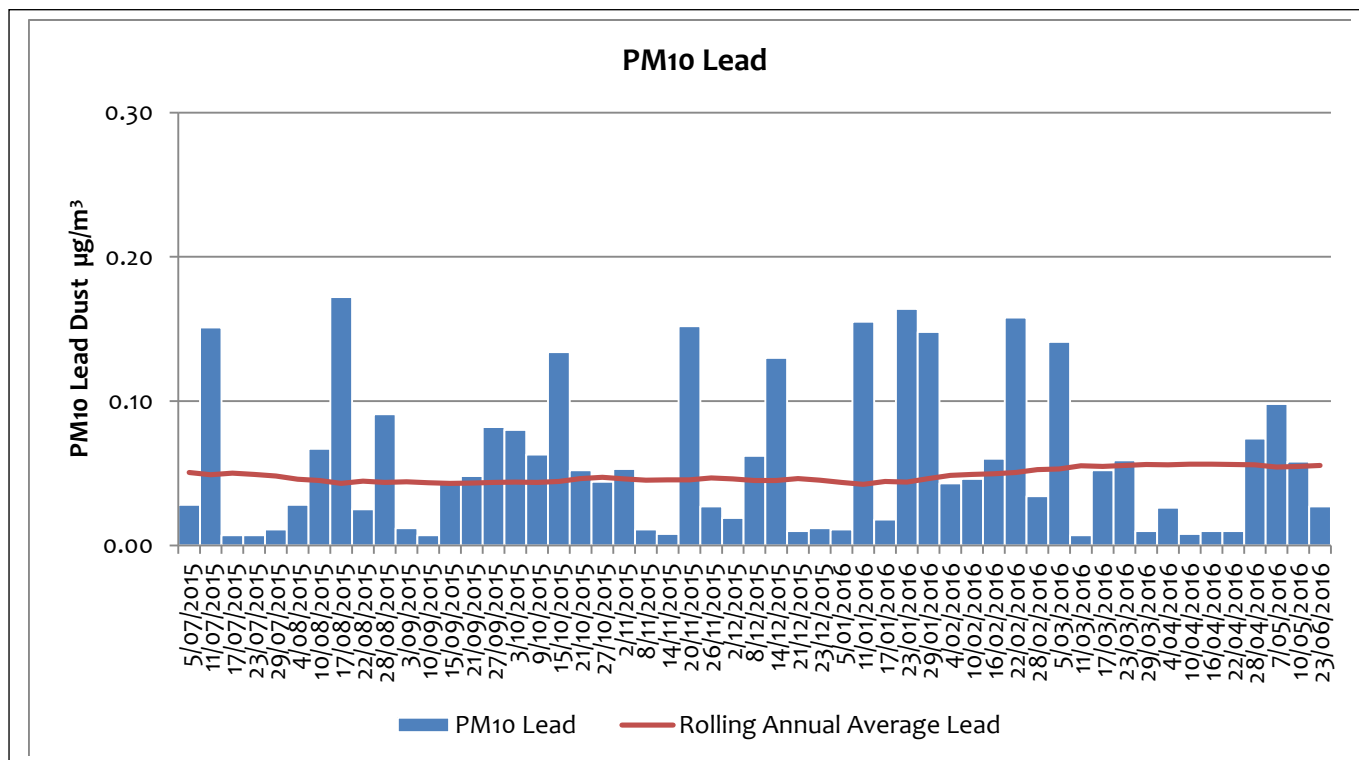


EPL11 - Silver Tank Hi Vol PM10 - On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
23/6/16	3.20	0.03

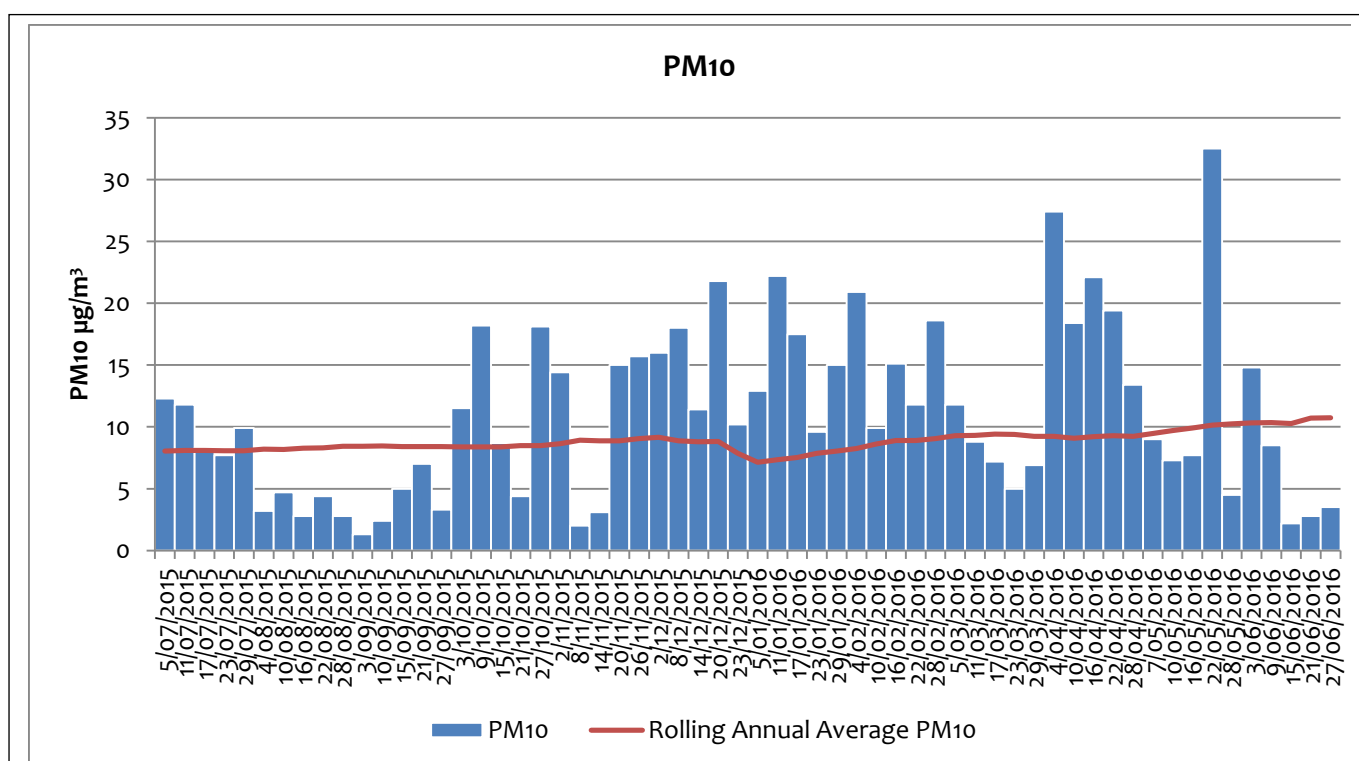
PM10



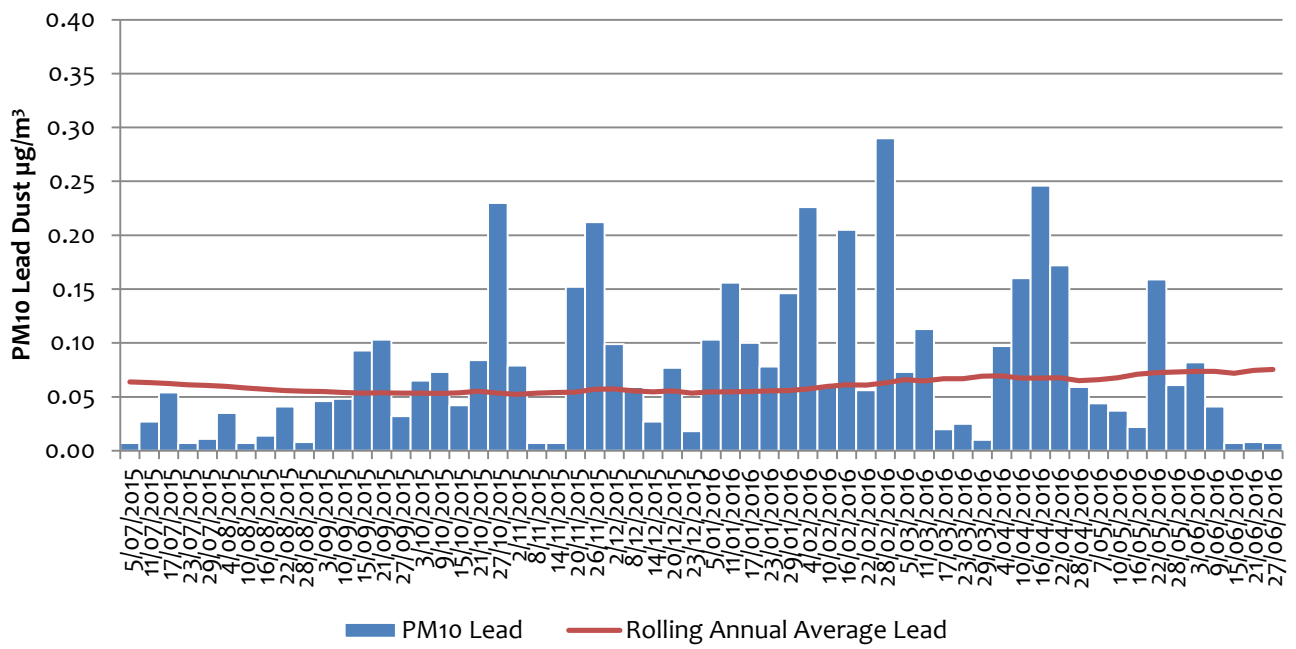


EPL12 - Blackwoods Pit Hi Vol PM10 – On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
3/06/2016	14.80	0.08
9/06/2016	8.50	0.04
15/06/2016	2.20	0.01
21/06/2016	2.80	0.01
27/06/2016	3.50	0.01



PM10 Lead



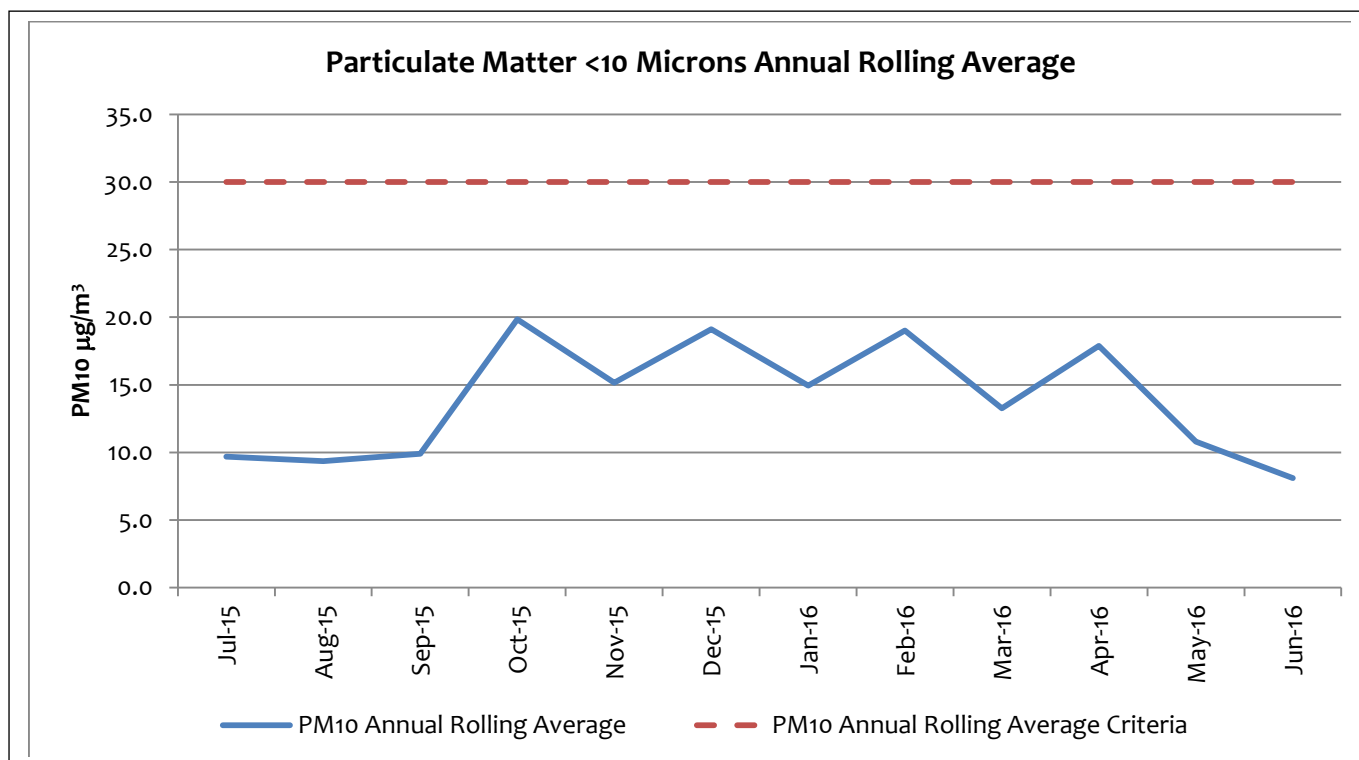
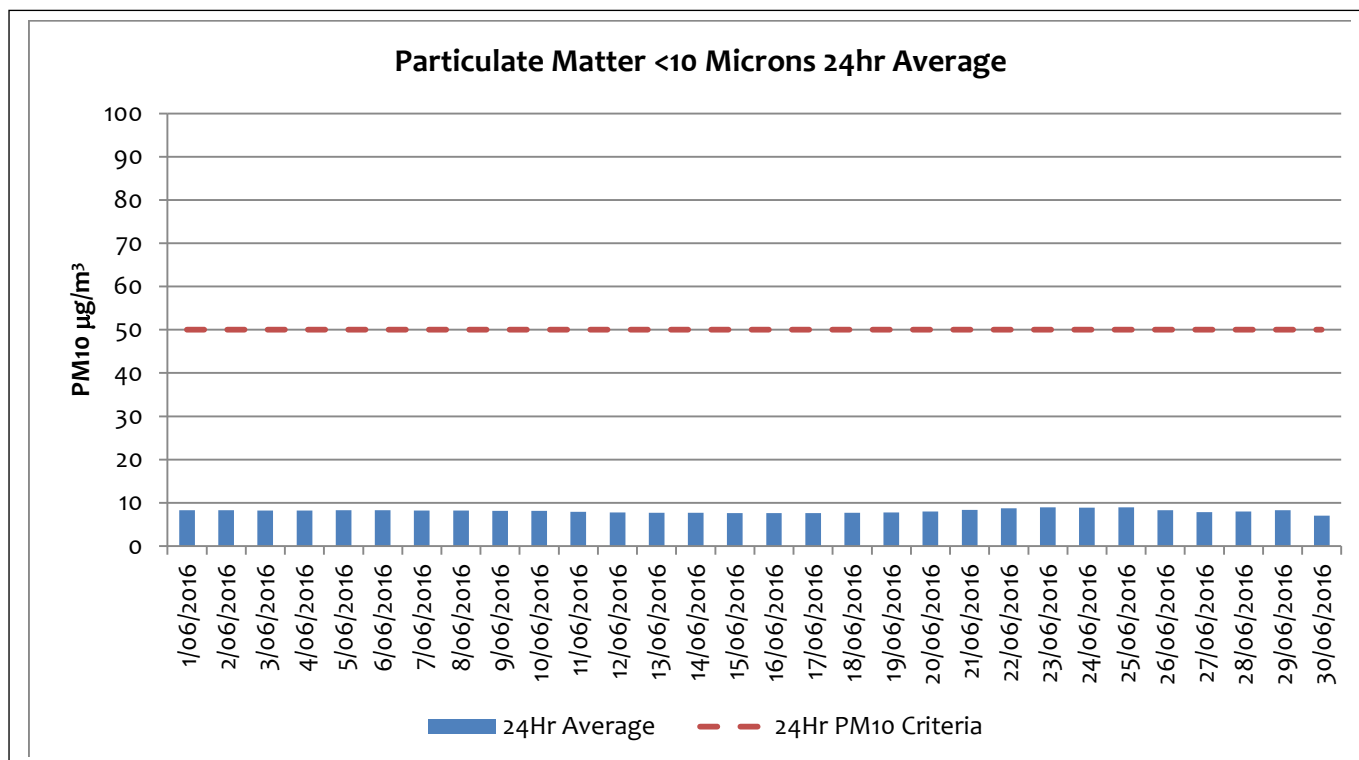
1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

Particulate Matter <10 Microns 24Hr Average		
Date	TEOM 1 - EPL 13 ($\mu\text{g}/\text{m}^3$) Essential Water – Off Site	TEOM 2 – EPL 14 ($\mu\text{g}/\text{m}^3$) Blackwoods Pit – On Site
1/06/2016	8.26	
2/06/2016	8.26	No data
3/06/2016	8.24	
4/06/2016	8.22	
5/06/2016	8.28	
6/06/2016	8.29	
7/06/2016	8.21	
8/06/2016	8.21	
9/06/2016	8.18	
10/06/2016	8.11	
11/06/2016	7.91	
12/06/2016	7.81	
13/06/2016	7.72	
14/06/2016	7.71	
15/06/2016	7.61	
16/06/2016	7.63	
17/06/2016	7.62	
18/06/2016	7.68	
19/06/2016	7.77	
20/06/2016	8.03	
21/06/2016	8.35	
22/06/2016	8.71	
23/06/2016	8.96	
24/06/2016	8.92	
25/06/2016	8.98	
26/06/2016	8.31	
27/06/2016	7.88	
28/06/2016	8.00	
29/06/2016	8.26	
30/06/2016	7.04	

TEOM 2 was calibrated by an external manufacturer's technician on May 5. The technician failed to reset the machine which lead to the machine failing to record data for the remainder of May and the whole of June. The error was found by the Environmental Officer during the monthly data download.

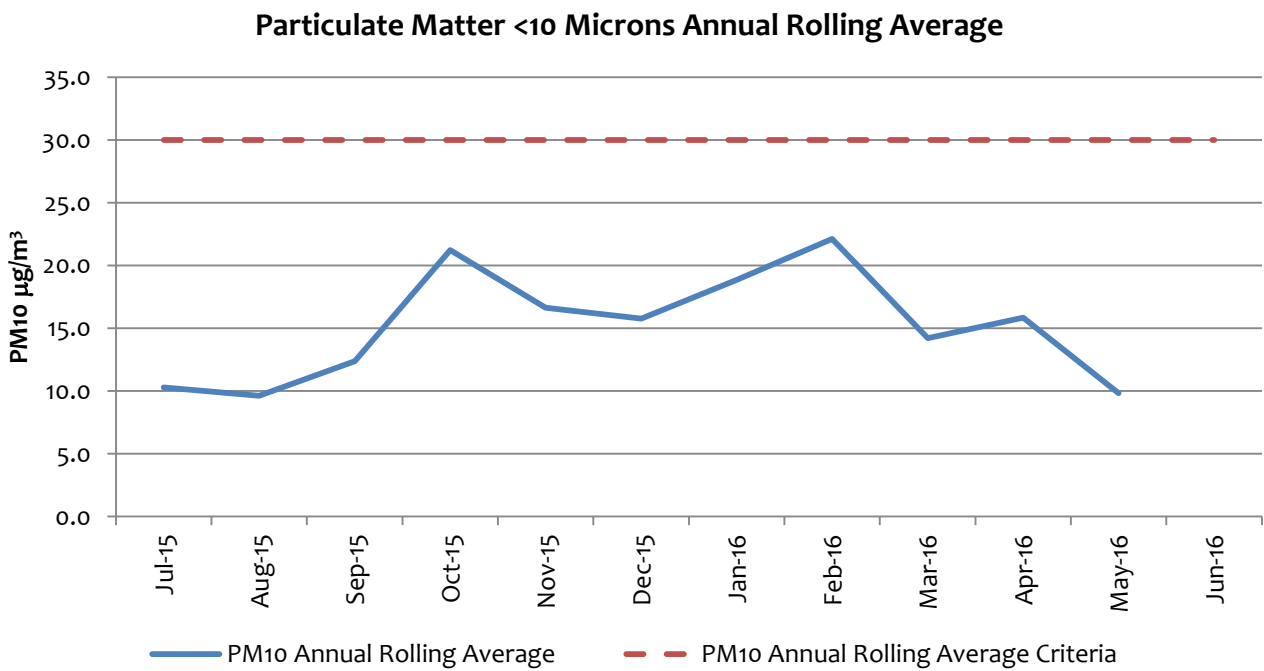
PM10 µg/m ³ 12 Month Rolling Average												
	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16
TEOM 1 EPL13 Essential Water Off Site	9.7	9.4	9.9	19.8	15.2	19.1	15.0	19.0	13.3	17.9	10.8	8.1
TEOM 2 EPL14 Blackwoods Pit On Site	10.3	9.6	12.4	21.2	16.6	15.8	18.8	22.1	14.2	15.9	9.8	N/A

EPL13 – Essential Water – Off Site (TEOM1)



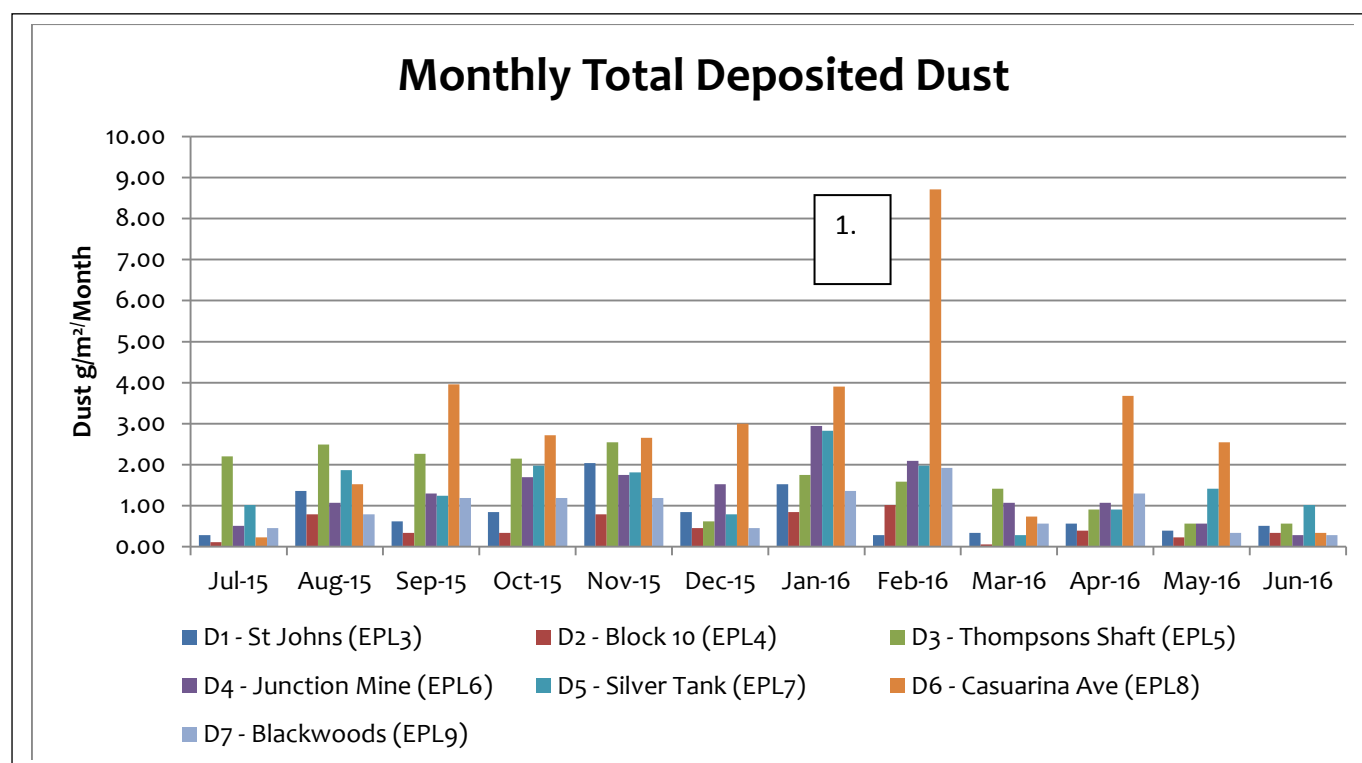
EPL14 – Blackwoods Pit – On Site (TEOM2)

No data available



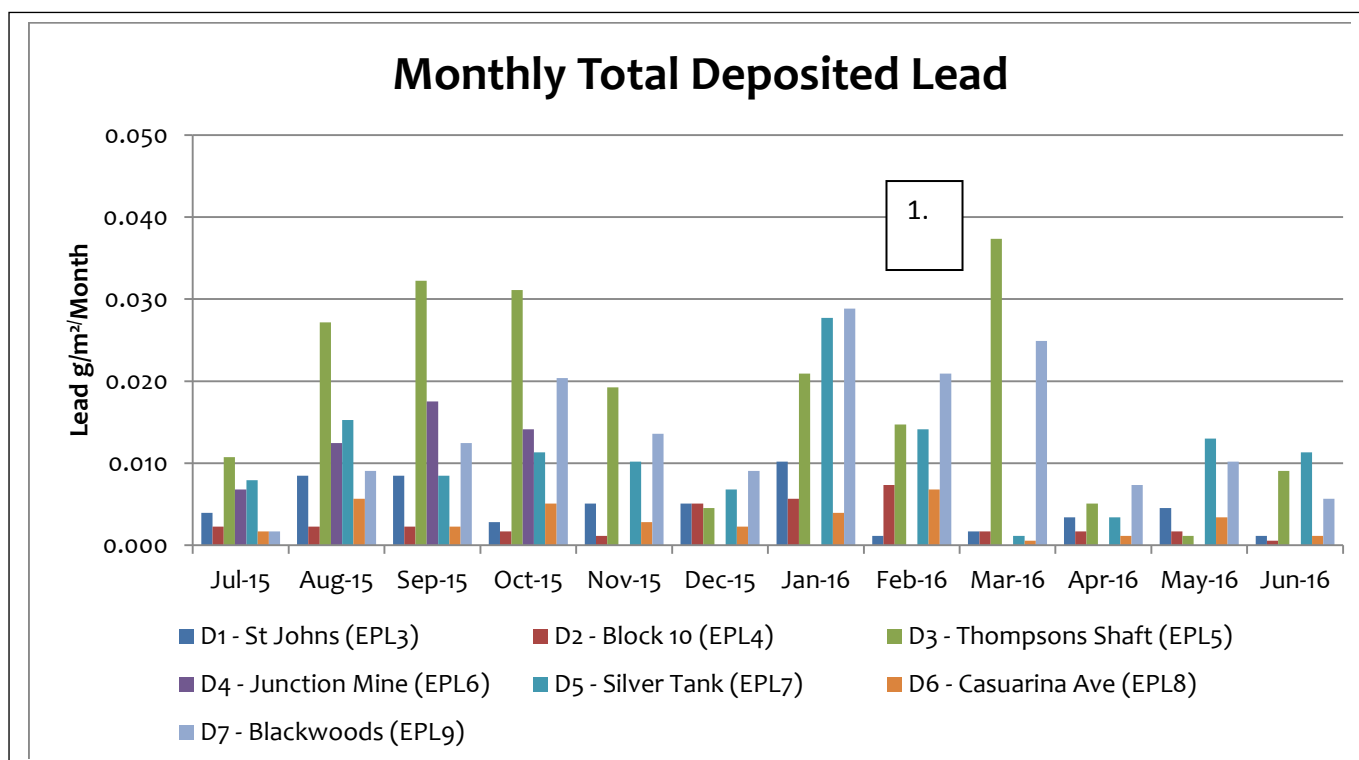
1.3 Dust Deposition Sampling

Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
June 2016	0.51	0.34	0.57	0.28	1.02	0.34	0.28
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a



1. When the sample for February was collected the sample stand had been relocated within the back yard of the residence. The resident was asked to move the stand back to its original location. Contamination from a nearby greenhouse is suspected.

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
June 2016	0.001	0.001	0.009	0.000	0.011	0.001	0.006
Background Average	0.0000	0.001	0.0018	0.0040	0.0010	0.0020	0.0100



1. Samples at Thompson's shaft spiked in lead concentration in August, September, October and again in March. Nearby vegetation and buildings have been identified as potential sources. Nearby vegetation was removed in September and October. A clean up of the haul road adjacent Thompsons Shaft was also carried out in September. The haul road will continue to be monitored. Further investigation is required with regard to nearby buildings, it is suspected the paint on the buildings contains lead and is in poor condition. There is also exposed remnant ore body at the surface in this location which may also contribute as a slightly higher than background influence. The dust bottle location was moved approximately 10m away from the buildings and has delivered a lower total deposited lead reading for December however levels are slightly higher again in January. Essential Water were performing earth works near the western boundary of the site during January which may have contributed in some way. Additionally some lead shipping containers were cleaned during January at the rail load out. The latest monthly result is the lowest on record for the last 12 months.

2 Blasting (Vibration and Overpressure)

Note: *Vibration is recorded in Peak Particle Velocity (ppv), Overpressure is recorded in Decibels (dBL)*

June Summary Block 7, Zinc Lode:

- 17 production firings
- 22 development firings
- 0 Blast recorded a ppv of >3mm/s
- 0 Blasts recorded a ppv of >10mm/s
- 0 Blasts recorded an over pressure level over 115dBL
- 0 Blasts recorded an over pressure above 120dBL

12 Month Summary of Zinc Lode:

- % of all blasts over 3mm/sec = **2.10%** (licence requirement <5%) calculated from 1st July 2015 until 30th June, 2016;
- % of production blasts over 3mm/sec = **2.94%** (licence pollution reduction plan target <5%) calculated from 1st July 2015 until 30th June, 2016.

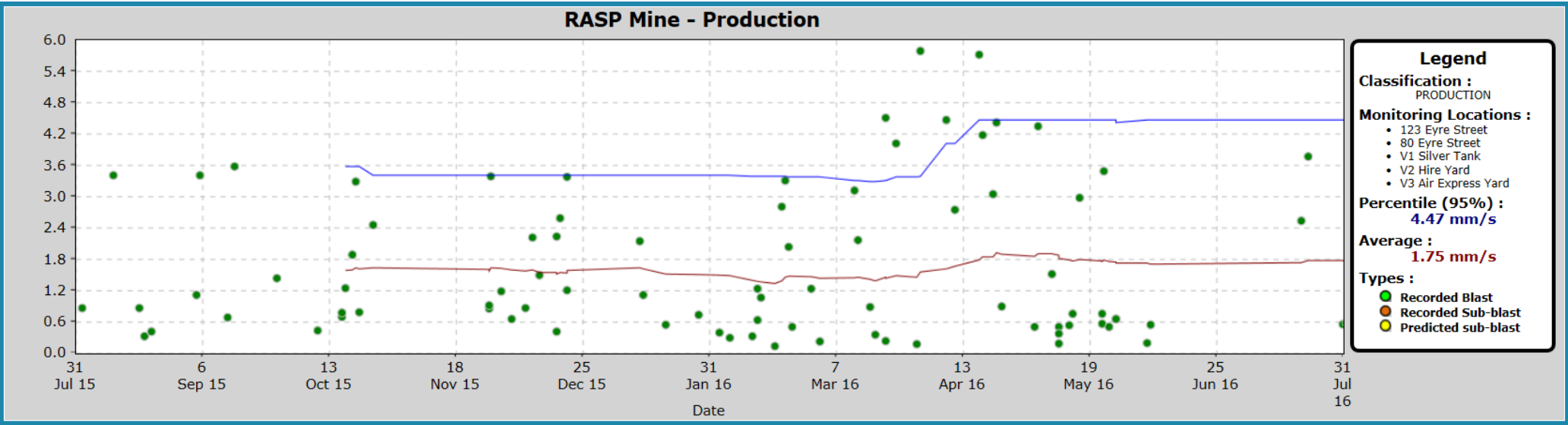
June Summary Rest of Mine, Western Mineralisation and Main Lode:

- 2 production firings
- 127 development firings
- 1 Blasts recorded a ppv of >5mm/s
- 0 Blasts recorded a ppv of >10mm/s
- 0 Blasts recorded an over pressure level over 115dBL
- 0 Blasts recorded an over pressure above 120dBL

12 Month Summary Rest of Mine, Western Mineralisation and Main Lode:

- % of all blasts over 5mm/sec = **0.45%** (licence requirement <5%) calculated from 1st July 2015 until 30th June, 2016;
- % of production blasts over 5mm/sec = **7.27%** (licence pollution reduction plan target <5%) calculated from 1st July 2015 until 30th June, 2016.
-

12 Month Production Blast Progress Chart



Noise

Noise monitoring is undertaken as per the NSW Industrial Noise Policy at a higher frequency of once per annum. A noise assessment was conducted during July 2016 data is currently being analysed by EMM. The final report is due in August.

3 Water

3.1 Ground Water Sampled 14/06/2016

pH Value	pH Unit	6.46	6.62
Electrical Conductivity @ 25°C	µS/cm	9980	11900
Total Dissolved Solids @180°C	mg/L	9470	10900
Hydroxide Alkalinity as CaCO ₃	mg/L	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	11	22
Total Alkalinity as CaCO ₃	mg/L	11	22
Sulfate as SO ₄ - Turbidimetric	mg/L	4890	5950
Chloride	mg/L	1170	1460
Calcium	mg/L	370	438
Magnesium	mg/L	182	276
Sodium	mg/L	1040	1340
Cadmium	mg/L	1.83	2.76
Lead	mg/L	0.12	2.76
Manganese	mg/L	236	436
Zinc	mg/L	664	908
Iron	mg/L	0.16	<0.10

3.2 Surface Water

Insufficient rainfall for opportunistic surface water sampling during April 2016

Surface Water Table Nov 2015 to Nov 2016

EPA Identification Number	Frequency	Comment
EPL29 (Federation Way culvert)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL31 (Ryan Street Dam)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL32 (S1-A adjacent olive grove)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL33 (Horwood Dam)	2 x Per year when contains water	Sampled 11/1/16, 10/2/16 & 9/5/16
EPL34 (Upstream Bonanza St)	2 x Per year when contains water	Sampled 1/8/16
EPL35 (Downstream Sydney Rd)	2 x Per year when contains water	Sampled 1/8/16

4 Weather Data

BHOP – Automatic Weather Station was unavailable for June. The new weather station was installed on June 15. The weather station continuously monitors the following parameters as per point 55 of the Environmental Protection Licence.

POINT 55

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 continuous data can be viewed at any time at the following web site using the username and password.

www.loggermonitor.com/login

user: CBHAdmin

pass: brokenhill

Summary reports for all licence parameters are available from the website however due to the 15 minute data being very large daily summary data was also obtained from the Bureau of Meteorology Broken Hill on the following page:

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am					3 pm							
		Min	Max				Dir	Spd	Time	Temp	RH	Cl	Dir	Spd	MSLP	Temp	RH	Cl	Dir	Spd	MSLP	
		°C	°C					km/h	local	°C	%	g th		km/h	hPa	°C	%	g th		km/h	hPa	
1	We						ESE	30	15:03				ESE	11	1025.8				SE	19	1023.3	
2	Th						SE	24	11:34				SE	4	1024.5				SE	15	1021.0	
3	Fr						SSW	31	14:32				S	11	1021.0				S	24	1017.5	
4	Sa						SW	43	12:45				SW	24	1016.2				SW	28	1012.0	
5	Su						WNW	50	14:46				NNW	13	1010.6				WNW	35	1006.6	
6	Mo						W	56	12:54				WNW	28	1010.1				W	35	1008.7	
7	Tu						W	31	09:08				W	24	1013.0				WNW	17	1010.7	
8	We						N	57	14:01				NNE	26	1008.9				N	35	1003.6	
9	Th						WNW	70	10:48				NW	44	1008.7				W	41	1011.9	
10	Fr						WNW	35	14:31				W	17	1024.6				WNW	24	1023.6	
11	Sa						SSE	35	13:45				SSW	24	1029.9				S	26	1029.9	
12	Su						SE	35	10:13				SE	19	1037.3				SE	22	1034.1	
13	Mo						ENE	30	02:59				ENE	11	1035.3				ENE	15	1031.6	
14	Tu						ENE	37	12:43				NE	22	1033.6				ENE	22	1031.4	
15	We						NE	39	10:30				NE	24	1030.8				ENE	26	1026.1	
16	Th						N	44	11:09				NNE	24	1018.7				WNW	24	1014.2	
17	Fr						NNW	17	00:05				NW	7	1015.0				Calm		1012.9	
18	Sa						ENE	24	12:53				Calm		1017.9				E	9	1015.7	
19	Su						S	44	15:20				S	20	1014.5				SSW	31	1011.2	
20	Mo						W	43	13:57				W	24	1012.4				WSW	24	1010.7	
21	Tu						NNW	48	13:07				NNW	26	1008.1				NNW	30	1004.7	
22	We						WNW	33	00:48				W	17	1013.7				WNW	17	1013.2	
23	Th						WNW	54	22:20				N	11	1010.5				NW	37	1005.9	
24	Fr						SW	61	12:24				W	31	1016.1				WSW	39	1018.0	
25	Sa						ESE	20	14:21				Calm		1025.7				ESE	13	1022.5	
26	Su						NE	17	10:57				NE	9	1020.6				NW	7	1016.5	
27	Mo						WNW	31	06:19				NW	17	1021.6				WSW	13	1021.1	
28	Tu						WNW	24	12:51				Calm		1028.6				N	11	1027.7	
29	We						N	37	11:56				NNE	15	1028.4				N	20	1023.0	
30	Th						WNW	54	15:10				NNW	26	1018.3				WNW	37	1015.1	
Statistics for June 2016																						
Mean														17	1020.0					23	1017.5	
Lowest														Calm	1008.1				Calm	1003.6		
Highest							WNW	70						NW	44	1037.3				W	41	1034.1
Total																						

Legend

Dir = Direction, Spd=Wind Speed, Temp=Temperature, RH=Relative Humidity, CLD=Cloud, MSLP=Mean Sea Level Pressure

5 Data Log

Sample	Date sent to lab	Result Received	Date Published
Hi Volume Samples	14/7/2016	25/7/2016	11/8/2016
TEOM	Real time	-	11/8/2016
Dust Deposition	14/7/2016	19/7/2016	11/8/2016
Water	20/6/2016	24/6/16	11/8/2016
Blast Vibration and overpressure	Real Time	-	11/8/2016

6 Correction Log

There are no corrections for the previous month

7 Attachments

Field monitoring data for June has been entered in to google forms. There are no attachments.