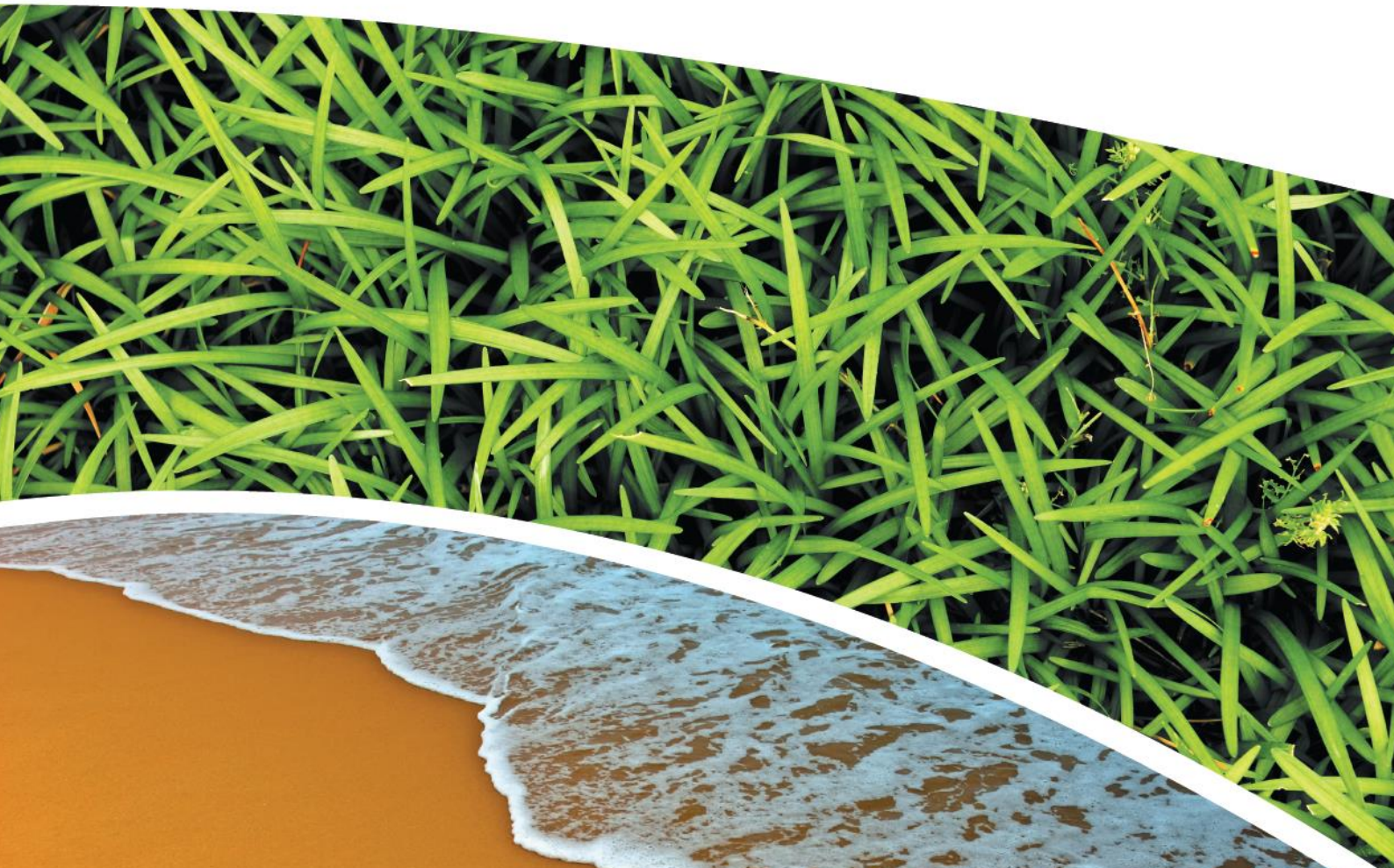


**AIR, WATER AND METEOROLOGICAL MONITORING – AUGUST 2020
PINE DALE MINE, BLACKMANS FLAT**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1833/0



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DOCUMENT STATUS						
Rev No	Comment	Author	Reviewer	Approved for Issue (Project Manager)		
				Name	Signature	Date
/0	Final	C. Rocher	K Davies	C. Rocher		16.09.2020

DOCUMENT DISTRIBUTION				
Rev No	Copies	Format	Issued to	Date
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin graham.goodwin@energyaustralia.com.au	16.09.2020
/0	1	Electronic (email)	Energy Australia- Mark Frewin mark.frewin@energyaustralia.com.au	16.09.2020
/0	1	Electronic (email)	Lithgow City Council – Andrew Muir andrew.muir@lithgow.nsw.gov.au	16.09.2020
/0	1	Electronic report	RCA – job archive	16.09.2020



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MONITORING LOCATIONS

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METEOROLOGICAL DATA

RCA ref 6880-1833/0

16 September 2020

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Attention: Mr Graham Goodwin

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**REPORT COMPILED FOR COMMUNITY CONSULTATIVE COMMITTEE
DETAILING AIR, WATER AND METEOROLOGICAL MONITORING AT PINE DALE
AUGUST 2020**

1 INTRODUCTION

This report presents the results of air, water and meteorological monitoring undertaken at Pine Dale Mine, Blackmans Flat during the month of August 2020.

Air and water samples were collected by RCA Laboratories – Environmental staff. Meteorological data was obtained from the site weather station.

This report satisfies the requirements to monitor environmental parameters as presented in the Pine Dale Mine Environmental Protection Licence (EPL 4911).

2 ANALYTICAL PROCEDURES

The analytical procedures used by RCA Laboratories – Environmental (NATA Accreditation number 9811) are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**.

Table 1 *Analytical Test Methods*

Analysis	Method	Units	Analysing Laboratory	NATA Accreditation Status
Determination of Suspended Particulate Matter	ENV-LAB003	µg/m ³	RCA Laboratories – Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	g/m ² per month	RCA Laboratories – Environmental	NATA Analysis
pH	ENV-LAB006	pH	RCA Laboratories – Environmental	NATA Analysis
Conductivity	ENV-LAB010	µS/cm	RCA Laboratories – Environmental	NATA Analysis
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories – Environmental	NATA Analysis
Turbidity	ENV-LAB037	NTU	RCA Laboratories - Environmental	NATA Analysis
Oil and Grease	ENV-LAB022	mg/L	RCA Laboratories - Environmental	Non-NATA Analysis
Major Anions (Alkalinity, Cl, SO ₄)	ED037, ED041, ED045	mg/L	ALS	NATA Analysis
Major Cations (Ca, Mg, Na, K)	ED093	mg/L	ALS	NATA Analysis
Dissolved Metals	EG020F	mg/L	ALS	NATA Analysis

ALS Environmental has been used to obtain analysis of anions, cations and dissolved metals (NATA Accreditation number 825).

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of two (2) groundwater samples were collected from within the Pine Dale Mine site during August 2020. Water quality analysis results are shown in **Table 2**. Groundwater monitoring locations are shown in **Appendix A**.

Table 2 Groundwater Analysis Results

ANALYSIS	UNITS	P6	P7
Sample Number	-	08206880011	08206880012
Date Sampled	-	04/08/20	04/08/20
Time Sampled	-	6:55	7:56
Depth to Water from Surface	m	25.20	6.41
Water Level (AHD)	m	891.75	887.99
Temperature	°C	11.1	10.7
pH	pH	6.25	6.20
Conductivity	µS/cm	1870	800
Turbidity	NTU	52	
Dissolved Oxygen	mg/L	4.9	
Total Suspended Solids	mg/L	43.0	
Oil and Grease	mg/L	6	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	102	219
Total Alkalinity (CaCO ₃)	mg/L	102	219
Sulphate (as SO ₄)	mg/L	829	39
Chloride	mg/L	60	117
Calcium	mg/L	171	42
Magnesium	mg/L	87	43
Sodium	mg/L	172	54
Potassium	mg/L	25	8
Cobalt (dissolved)	mg/L	0.051	
Manganese (dissolved)	mg/L	3.32	
Nickel (dissolved)	mg/L	0.108	
Zinc (dissolved)	mg/L	0.016	
Iron (dissolved)	mg/L	45.6	2.02
Trigger Values			
pH trigger level ^a	pH	6.2 – 8.0	6.3 – 8.0
Conductivity trigger level	µS/cm	1180	852
Water Level (AHD) ^b	m	887.90	883.28
Revised Trigger Values^c			
pH trigger level ^d	pH	5.6	6.3
Water Level (AHD) ^b	M	887.9	--

☐ Indicates analysis was not required.

^a pH trigger value is exceeded if the pH is outside the nominated range.

^b Water Level trigger is exceeded if the AHD water level drops below the nominated trigger level.

^c Proposed trigger values to be used alongside the currently approved trigger values.

^d pH trigger value is exceeded if pH is below the nominated value.

Results shown in **bold** indicates exceedance of trigger value

Results shown in underline indicates exceedance of revised trigger value.

3.2 SURFACE WATER MONITORING

Quarterly surface water monitoring undertaken during August 2020. Results are shown in **Table 3**.

Table 3 Quarterly Surface Water results

ANALYSIS	UNITS	EPA Point 2 Neubeck's Ck Upstream	EPA Point 3 Neubeck's Ck Downstream	EPA Point 14 Cox's River Downstream
Sample Number	-	08206880009	08206880004	08206880010
Date Sampled	-	3/08/2020	3/08/2020	3/08/2020
Time Sampled	-	15:45	15:55	15:55
Temperature	°C	9.2	9.9	10.0
pH	pH	7.33	7.08	7.25
Conductivity	µS/cm	581	440	614
Sulfate	NTU	178	586	1730
Dissolved Iron	mg/L	0.06	0.62	<0.05
Total Suspended Solids	mg/L	<5	7	<5
Turbidity	mg/L	4	4	10
Trigger Values				
pH ^a	pH	7.1 – 8.0	6.4 – 8.0	7.5 – 8.0
Conductivity	µS/cm	2055	2223	1166
Total Suspended Solids	mg/L	30	30	30
Proposed Trigger Values^c				
pH trigger level ^a	pH	6.5 – 8.0	6.5 – 8.0	--
Electrical conductivity (µS/cm)	µS/cm	5592	5592	--
TSS (mg/L)	mg/L	25	25	--

Results shown in **bold** indicates exceedance of trigger value

Results shown in underline indicates exceedance of revised trigger value.

4 AIR QUALITY RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

Monitoring of particulate matter less than 10 micrometres (PM₁₀) and total suspended particulates (TSP) is undertaken at Pine Dale Mine using High Volume Air Samplers (HVAS). HVAS at this facility conform to AS/NZS 3580.9.3:2015, AS/NZS 3580.9.6:2015 and AS/NZS 3580.1.1:2016. The HVAS run on a one in six-day cycle, as stipulated in the *Air Quality and Greenhouse Gas Management Plan for the Pine Dale Coal Mine*. The locations of the HVAS units are shown in **Appendix A**.

Intermittent timer issues associated with the PM₁₀ HVAS resulted in HVAS runs outside the one in six-day cycle. HVAS TSP results are shown in **Table 4**. PM₁₀ results are shown in **Table 5**. HVAS Monitoring locations are shown in **Appendix A**. Graphical HVAS result presentations are shown in **Appendix B**.

Table 4 Total Suspended Particulates (TSP)

Run Date	TSP ($\mu\text{g}/\text{m}^3$)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
6-Aug-20	13	08206880032	9806659	07-Aug-20	13:19	Client	24.00
12-Aug-20	14	08206880034	9806657	17-Aug-20	13:19	Client	24.00
18-Aug-20	5	08206880036	9843637	20-Aug-20	13:20	Client	23.98
24-Aug-20	6	08206880038	9806671	27-Aug-20	8:20	Client	23.92
30-Aug-20	19	08206880040	9806673	04-Sep-20	8:19	RCA	24.00

Table 5 Suspended Particulate Matter <math> < 10 \mu\text{m}</math> (PM_{10})

Run Date	PM_{10} ($\mu\text{g}/\text{m}^3$)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
18-Aug-20	1	08206880037	9843639	20-Aug-20	13:21	Client	24.00
21-Aug-20	5	08206880033	9843643	23-Aug-20	13:10	Client	24.00
24-Aug-20	<1	08206880039	9806655	27-Aug-20	8:25	Client	24.00
28-Aug-20	9	08206880035	9806674	29-Aug-20	8:29	Client	24.00
30-Aug-20	8	08206880041	9806680	04-Sep-20	8:22	SK	62.24

4.1.1 TSP SUMMARY

The NSW EPA Annual Mean TSP allowable limit is $90\mu\text{g}/\text{m}^3$. All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (September 2019 to August 2020) for TSP is $49.9\mu\text{g}/\text{m}^3$, which is below the allowable limit of $90\mu\text{g}/\text{m}^3$.

The twelve-monthly graph is provided in **Appendix B**.

4.1.2 PM_{10} SUMMARY

The NSW EPA twenty-four (24) hour maximum PM_{10} allowable limit is $50\mu\text{g}/\text{m}^3$; there were no PM_{10} concentrations in excess of this limit. The HVAS PM_{10} annual average result is above the long-term assessment criterion of $25\mu\text{g}/\text{m}^3$ with the result currently at $28.8\mu\text{g}/\text{m}^3$ (refer **Appendix B**): it is considered this has been influenced by bushfire activity. During November 2019 – January 2020, the air quality in the Lithgow area was impacted by bushfires, predominantly the Gaspers' Mountain fire which occurred within Wollemi National Park, moving through to Ben Bullen State forest and Pine Dale Mine during January 2020.

4.2 DEPOSITIONAL DUST MONITORING

The depositional dust monitoring exposure period for August 2020 was 2 July – 3 August 2020. Depositional dust gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. The August exposure period was 32 days which is within the 30 ± 2 days dust exposure period stipulated in AS/NZS 3508.10.1:2016. Depositional dust monitoring results are shown in **Table 6**. Depositional dust monitoring locations are shown in **Appendix A**.

Table 6 *Depositional Dust Monitoring*

Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
D1	32	IT	0.6	0.1	0.5
D3	32	I	0.6	0.3	0.3
D4	32	I	0.4	0.1	0.3
D5	32	I	0.4	0.1	0.3
D6	32	IT	0.1	<0.1	0.1

All units are g/m²/month

I – Insects (eg, Ants, Spiders)

T – Tree litter (leaves, gumnuts)

4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS

The EPA long term (annual average) deposited dust limit is 4g/m² per month. The rolling annual average depositional dust results for all sites within the period (September 2019 – August 2020) are in compliance with consent conditions. The annual average for dust gauges D1, D3, D4, D5 and D6 are all less than or equal to 1.7g/m² per month. Annual averages are shown in the depositional dust gauge graphs provided in **Appendix B**.

5 METEOROLOGICAL MONITORING

Pine Dale Mine records meteorological data continuously via an onsite weather station. Details of the weather data recorded during the period 1 to 31 August 2020 are shown in **Appendix C**.

Data availability during this period was 100%.

6 BLASTING RESULTS

No blasting was undertaken during this month as mining operations have ceased since the end of March 2014.

7 NOISE MONITORING RESULTS

Quarterly noise monitoring was not required to be undertaken during August 2020.

8 OPERATIONAL ACTIVITIES

All of the approved minable reserves at the Pine Dale Mine have now been exhausted. Operational mining and the last coal sales ceased as of the end of March 2014.

Pine Dale Mine has been placed in care and maintenance since April 2014. All former operators have been made redundant; however, some statutory positions still remain.

9 SUMMARY

During the month of August 2020 environmental monitoring results were found to be generally in compliance with stipulated criteria with the exception of:

- The pH at groundwater bore P7 and surface water site EPA Point 14 were below the lower site-specific trigger value.
- Electrical conductivity in groundwater sample P6 was in excess of the site-specific trigger value.
- The PM₁₀ rolling annual average (September 2019 – August 2020) is presently in excess of the annual average criterion.

The revised trigger values do not have a limit for electrical conductivity, as such P6 would be compliant. The revised pH trigger value at P7 remains the same as the current trigger value. As such the pH at P7 is also below the proposed trigger value during the August monitoring event.

The rolling annual average from the TSP High Volume Air Sampler is well below the EPA Annual Mean TSP criterion of 90µg/m³. The rolling annual average from the PM₁₀ High Volume Air Sampler (28.8µg/m³) is above the EPA Annual Mean PM₁₀ criterion of 25µg/m³; however, this annual average concentration is considered to be influenced by bushfire activity during November 2019 – January 2020. There are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m².month based upon a rolling average of the past 12 months.

Meteorological monitoring was undertaken for the entire month of August with 100% data capture.

Pine Dale Mine ceased operation in March 2014 and therefore no blasting occurred at the site.

10 LIMITATIONS

This report has been prepared for Enhance Place Pty Ltd in accordance with an agreement with RCA Australia (RCA). The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Enhance Place. The report may not contain sufficient information for purposes of other uses or for parties other than Enhance Place. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used following a significant period of time after the date of issue.

Yours faithfully

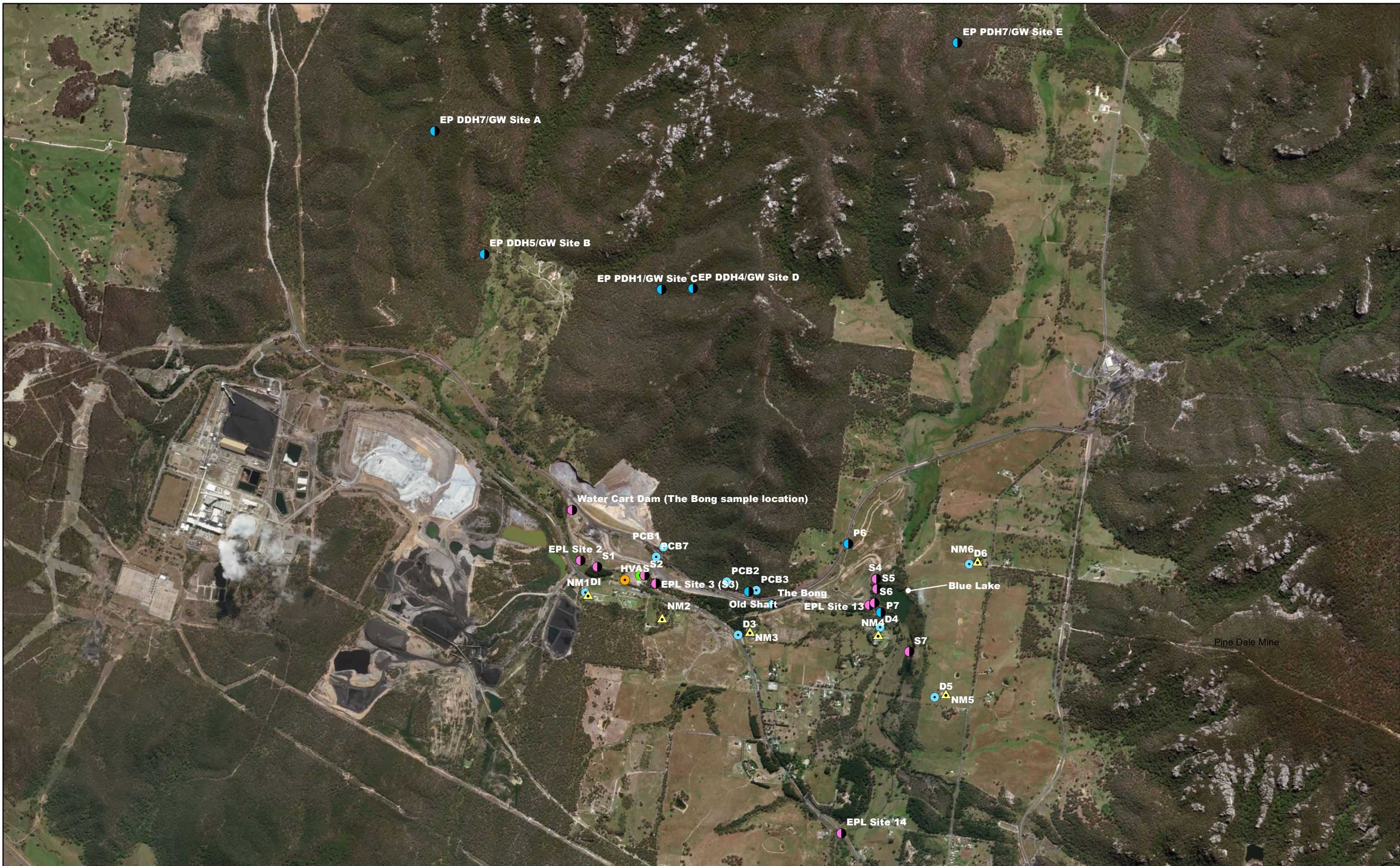
RCA AUSTRALIA



Carmen Rocher
Environmental Engineer

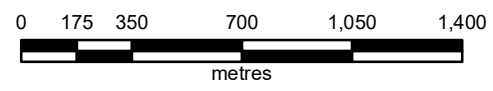
Appendix A

Monitoring Locations



LEGEND

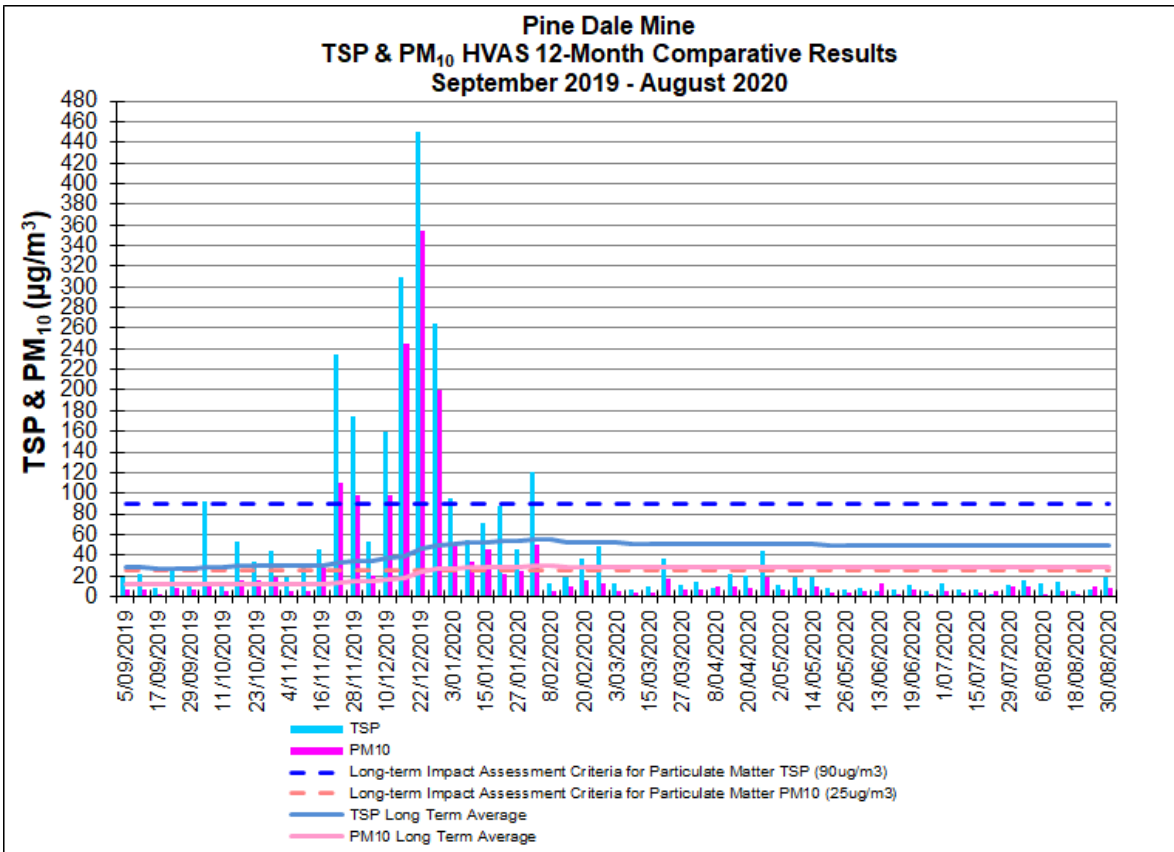
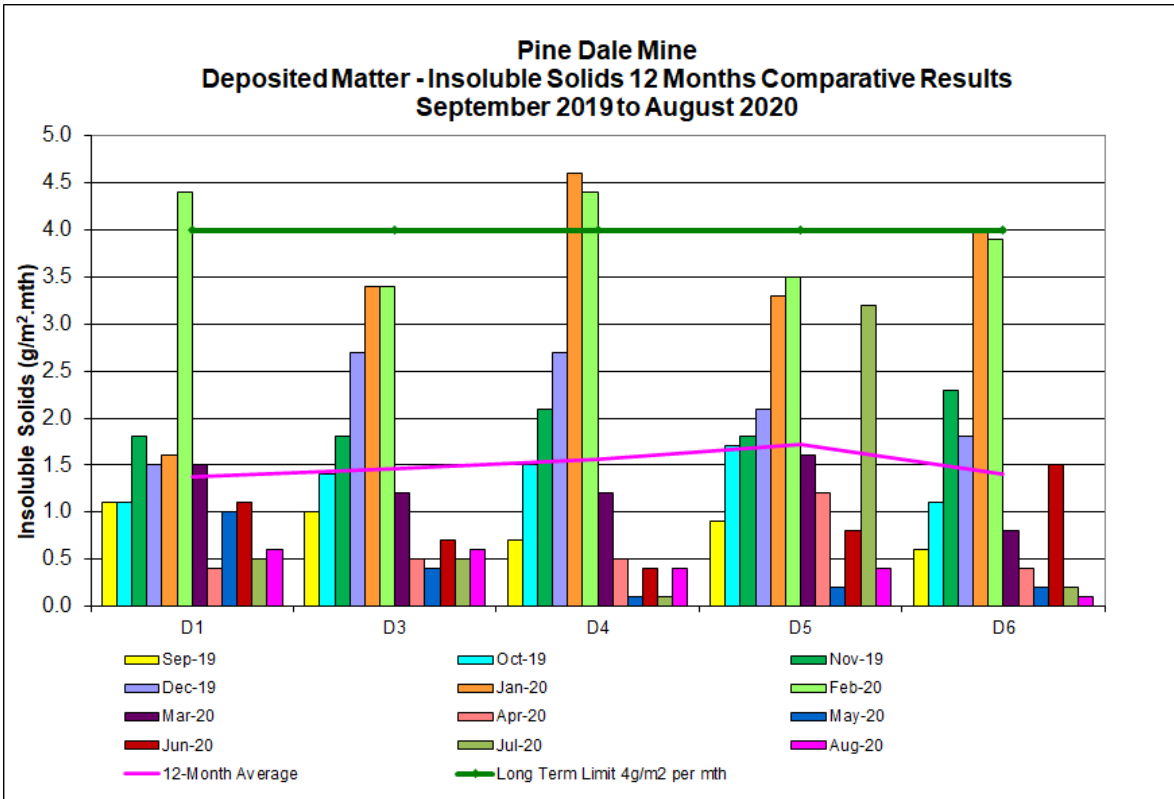
- ▲ Noise Monitoring Location
- Depositional Dust Monitoring Location
- Groundwater Monitoring Location
- High Volume Air Sampling Location
- Meteorological Monitoring Location
- Surface Water Monitoring Location



**PINE DALE MINE
ENVIRONMENTAL MONITORING
LOCATION PLAN**

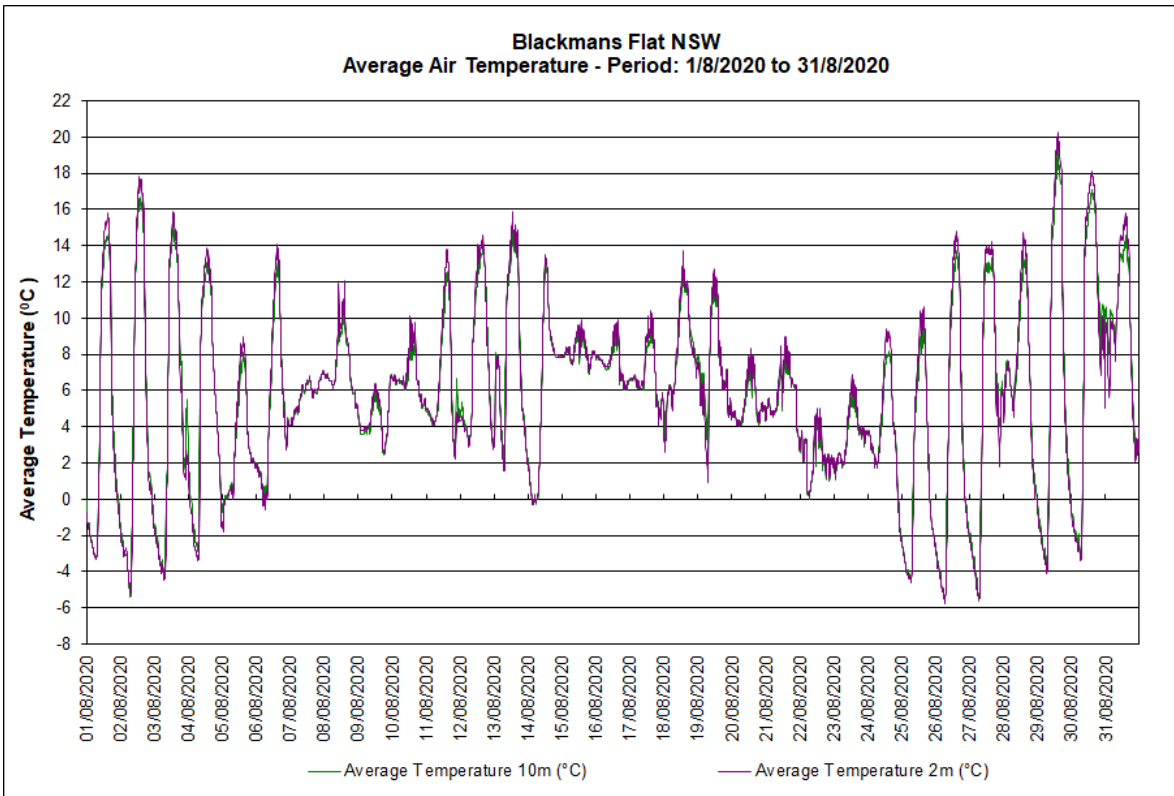
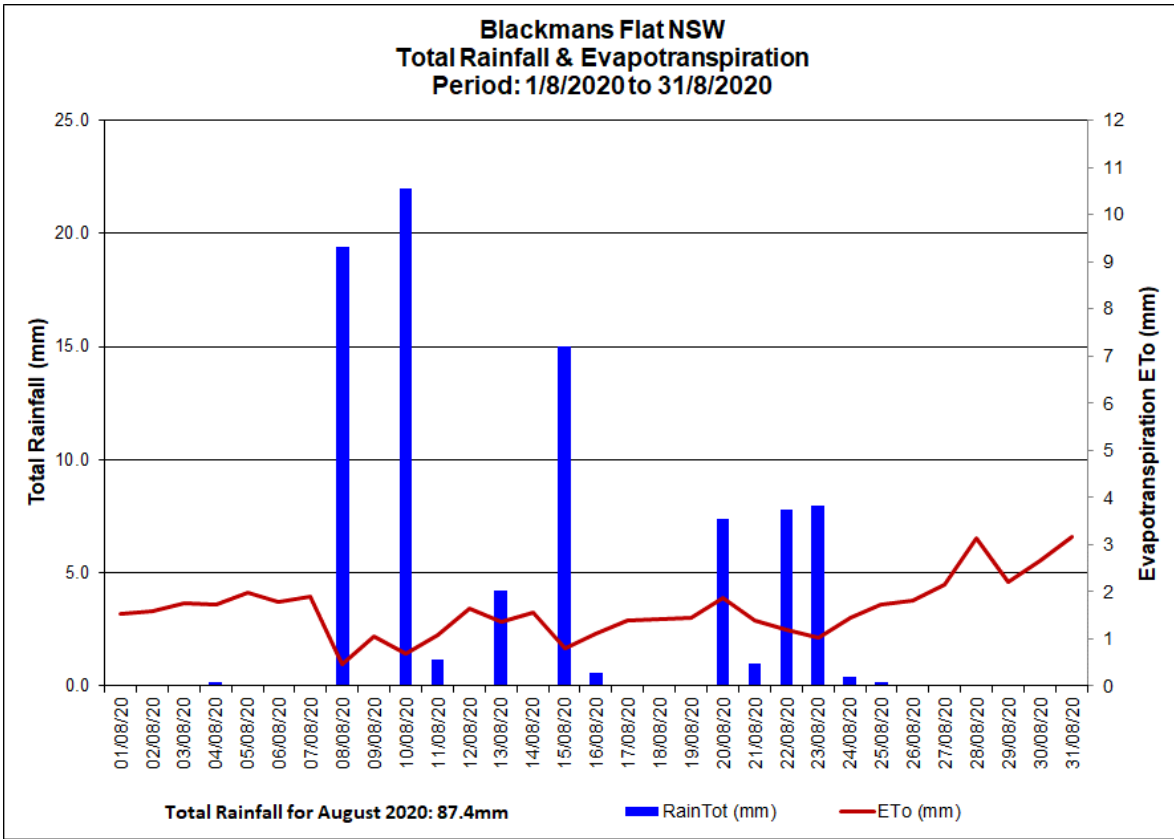
Appendix B

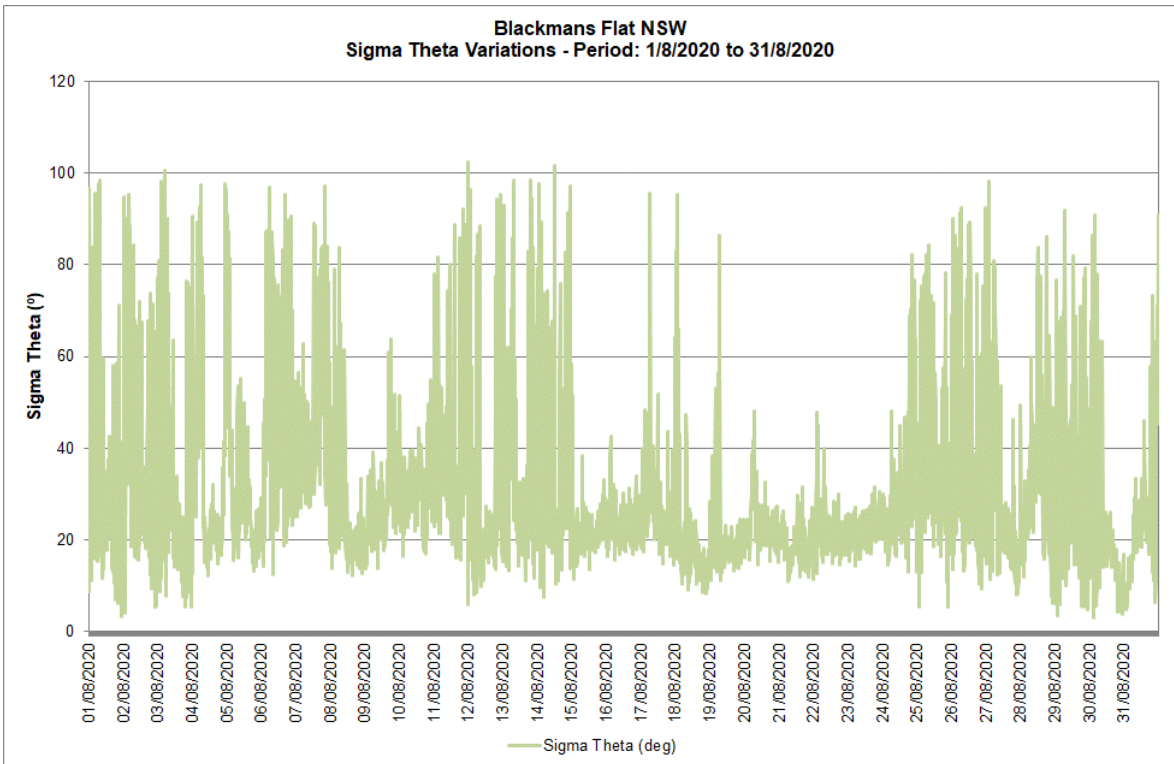
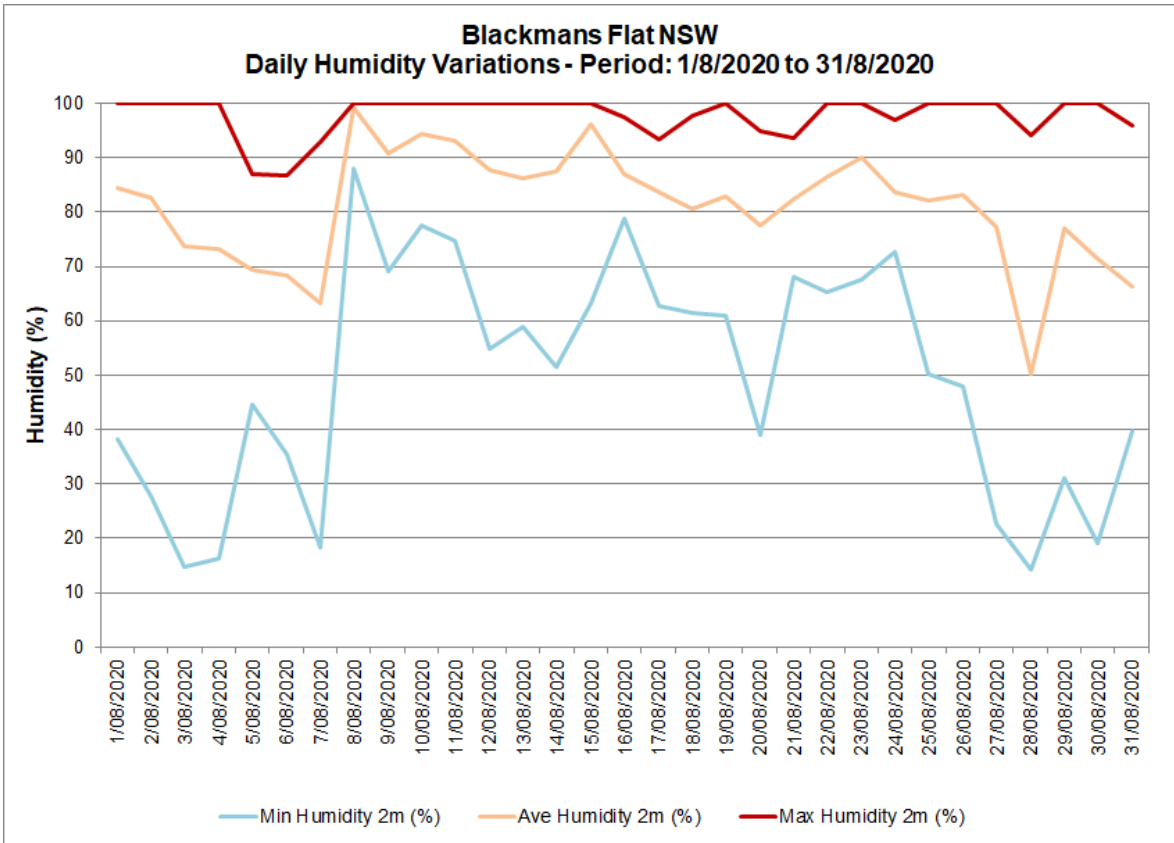
Depositional Dust and HVAS Graphs



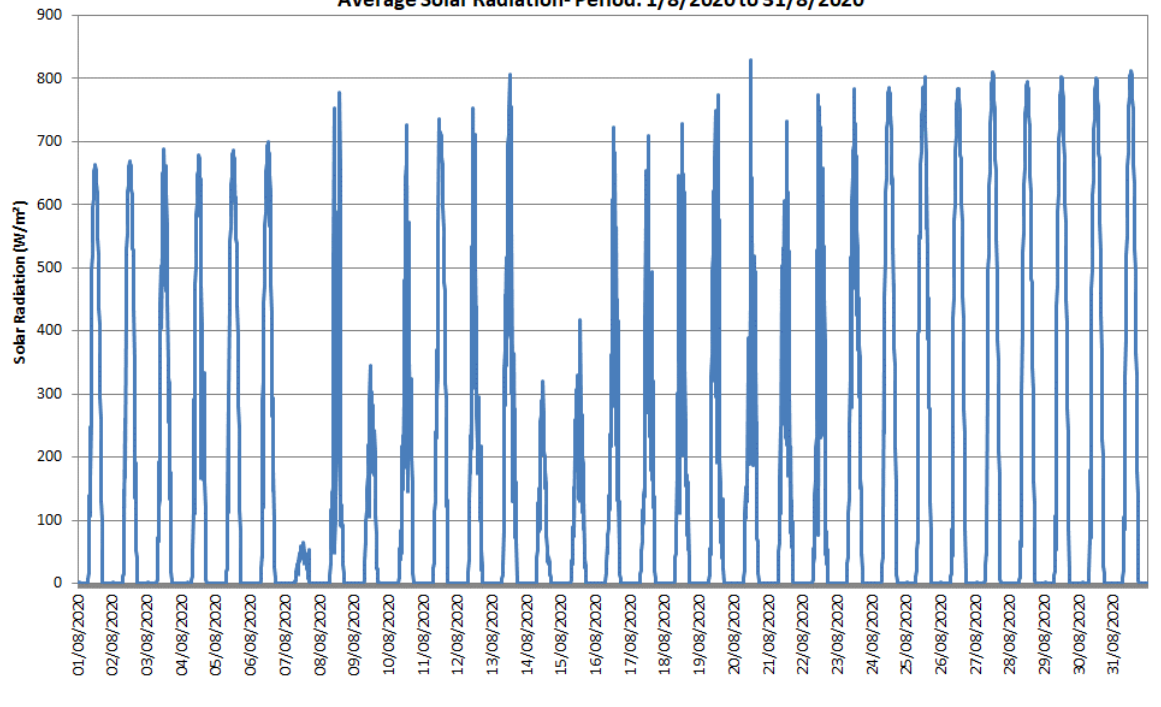
Appendix C

Meteorological Data



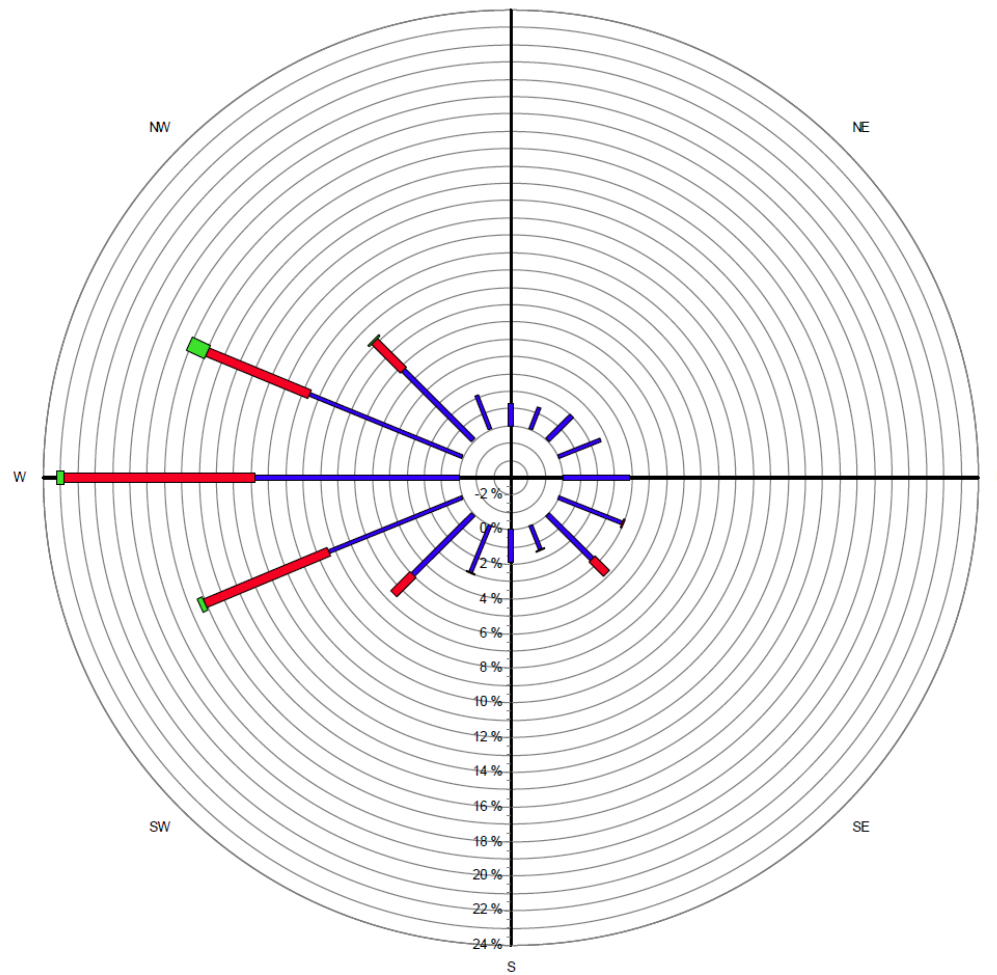
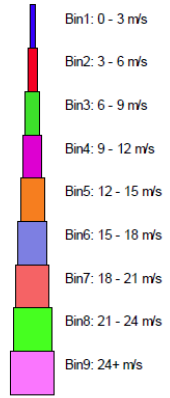


Blackmans Flat NSW
Average Solar Radiation- Period: 1/8/2020 to 31/8/2020



Blackmans Flat Windrose

1/08/2020 to 31/08/2020



Source data:
PineDale.SCM
10 minutely data - Ave WndDir (deg)
10 minutely data - Ave WndSpd (m/sec)