AIR, WATER AND METEOROLOGICAL MONITORING – NOVEMBER 2020

PINE DALE MINE, BLACKMANS FLAT

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1840/1

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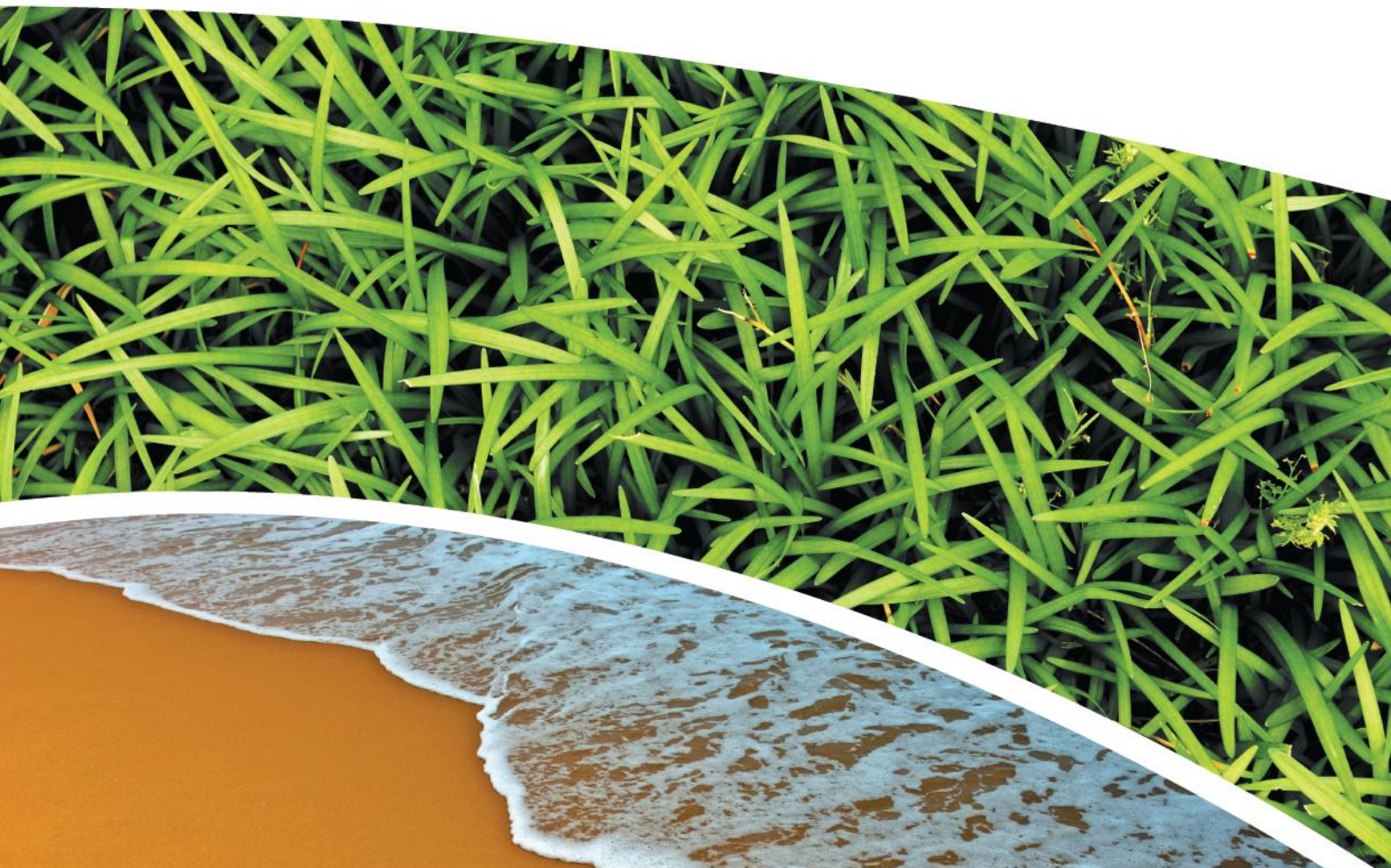

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DOCUMENT STATUS						
Rev No	**Comment**	**Author**	**Reviewer**	**Approved for Issue (Project Manager)**		
				Name	**Signature**	**Date**
/0	Final	C. Rocher	Z Laughlan	C. Rocher		17.12.2020
/1	Final	C. Rocher	Z Laughlan	C. Rocher		18.12.2020

DOCUMENT DISTRIBUTION				
Rev No	**Copies**	**Format**	**Issued to**	**Date**
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin graham.goodwin@energyaustralia.com.au	17.12.2020
/0	1	Electronic (email)	Energy Australia- Mark Frewin mark.frewin@energyaustralia.com.au	17.12.2020
/0	1	Electronic report	RCA – job archive	17.12.2020
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin graham.goodwin@energyaustralia.com.au	18.12.2020
/0	1	Electronic (email)	Energy Australia- Mark Frewin mark.frewin@energyaustralia.com.au	18.12.2020
/0	1	Electronic report	RCA – job archive	18.12.2020

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18 December 2020

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REPORT COMPILED FOR COMMUNITY CONSULTATIVE COMMITTEE DETAILING AIR, WATER AND METEOROLOGICAL MONITORING AT PINE DALE NOVEMBER 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 November 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 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 November 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	-	11206880011	11206880012
Date Sampled	-	03/11/20	03/11/20
Time Sampled	-	10:38	11:38
Depth to Water from Surface	m	23.34	5.42
Water Level (AHD)	m	893.61	888.98
Temperature	°C	16.9	16.7
pH	pH	6.22	**6.14**
Conductivity	µS/cm	**1610**	793
Turbidity	NTU	70	
Dissolved Oxygen	mg/L	6.9	
Total Suspended Solids	mg/L	106.0	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity ($CaCO_3$)	mg/L	60	239
Total Alkalinity ($CaCO_3$)	mg/L	60	239
Sulphate (as SO_4)	mg/L	687	57
Chloride	mg/L	49	111
Calcium	mg/L	142	46
Magnesium	mg/L	64	44
Sodium	mg/L	76	48
Potassium	mg/L	18	8
Cobalt (dissolved)	mg/L	0.041	
Manganese (dissolved)	mg/L	2.44	
Nickel (dissolved)	mg/L	0.096	
Zinc (dissolved)	mg/L	0.126	
Iron (dissolved)	mg/L	32.2	0.56
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] Revised 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 ambient surface water monitoring undertaken during November 2020. Results are shown in **Table 3**. There were no discharges from Pine Dale Mine during November 2020.

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	-	1120688009	11206880004	11206880010
Date Sampled	-	3/11/2020	3/11/2020	2/11/2020
Time Sampled	-	07:52	09:20	09:32
Temperature	°C	13.6	12.2	16.2
pH	pH	7.21	7.27	**7.10**
Conductivity	µS/cm	676	2210	681
Sulfate	NTU	145	842	226
Dissolved Iron	mg/L	0.1	0.3	0.11
Total Suspended Solids	mg/L	<5	7	10
Turbidity	mg/L	3	11	3
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 for TSP and PM_{10} using HVAS was removed from Environment Protection Licence 4911 in November 2020. The Pine Dale Mine Air Quality and Greenhouse Gas Management Plan (AQGGMP) was reviewed and updated to reflect this change. The updated AQGGMP was submitted to the Department of Planning, Industry and Environment (DPIE) for endorsement. The AQGGMP was endorsed by DPIE on 4 December 2020 and was subsequently uploaded onto the Pine Dale Mine website.

4.2 DEPOSITIONAL DUST MONITORING

The depositional dust monitoring exposure period for November 2020 was 1 October – 2 November 2020. Depositional dust gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. The November 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 4**. Depositional dust monitoring locations are shown in **Appendix A**.

Table 4 *Depositional Dust Monitoring*

Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
D1	32	I	0.7	0.3	0.4
D3	32	I	0.9	0.5	0.4
D4	32	I	0.5	0.2	0.3
D5	32	I	0.6	0.3	0.3
D6	32	I	0.5	0.2	0.3

All units are g/m^2/month
I – Insects (eg, Ants, Spiders)

4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS

The EPA long term (annual average) deposited dust limit is $4g/m^2$ per month. The rolling annual average depositional dust results for all sites within the period (December 2019 – November 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 $1.9g/m^2$ 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 30 November 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 at Pine Dale during November 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 November 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 ambient surface water site EPA Point 14 was below the lower site-specific trigger value.
- The electrical conductivity at P6 was in excess of the site-specific trigger value.

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 and this would remain slightly below the lower pH limit.

Depositional dust monitoring results are well below the annual average criterion.

Meteorological monitoring was undertaken for the entire month of November 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

EP PDH7/GW Site E

EP DDH7/GW Site A

EP DDH5/GW Site B

EP PDH1/GW Site C

EP DDH4/GW Site D

Water Cart Dam (The Bong sample location)

PCB1

PCB7

EPL Site 2

S1

S2

PCB2

PCB3

NM1

DI

EPL Site 3 (S3)

The Bong

Old Shaft

NM2

D3

NM3

P6

S4

S5

S6

P7

EPL Site 13

D4

NM4

S7

NM6

D6

Blue Lake

Pine Dale Mine

D5

NM5

EPL Site 14

LEGEND

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

0 175 350 700 1,050 1,400

metres

N

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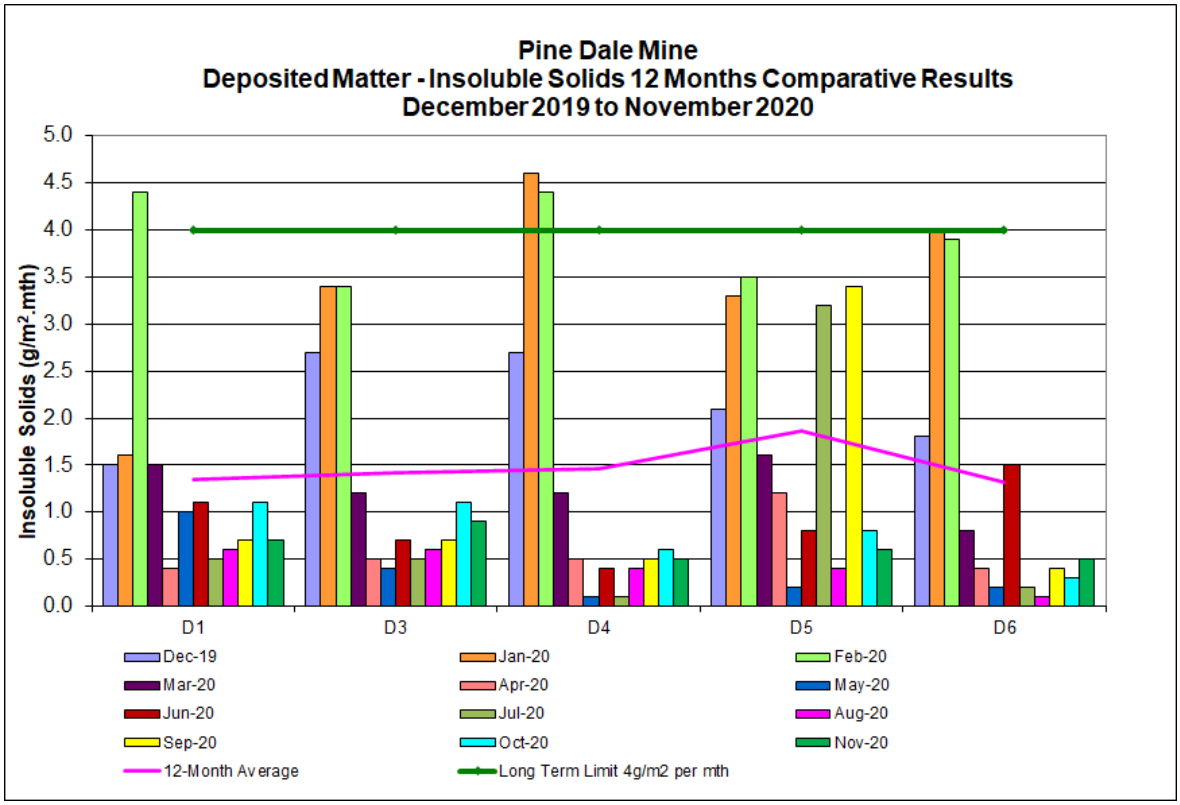
PINE DALE MINE ENVIRONMENTAL MONITORING LOCATION PLAN

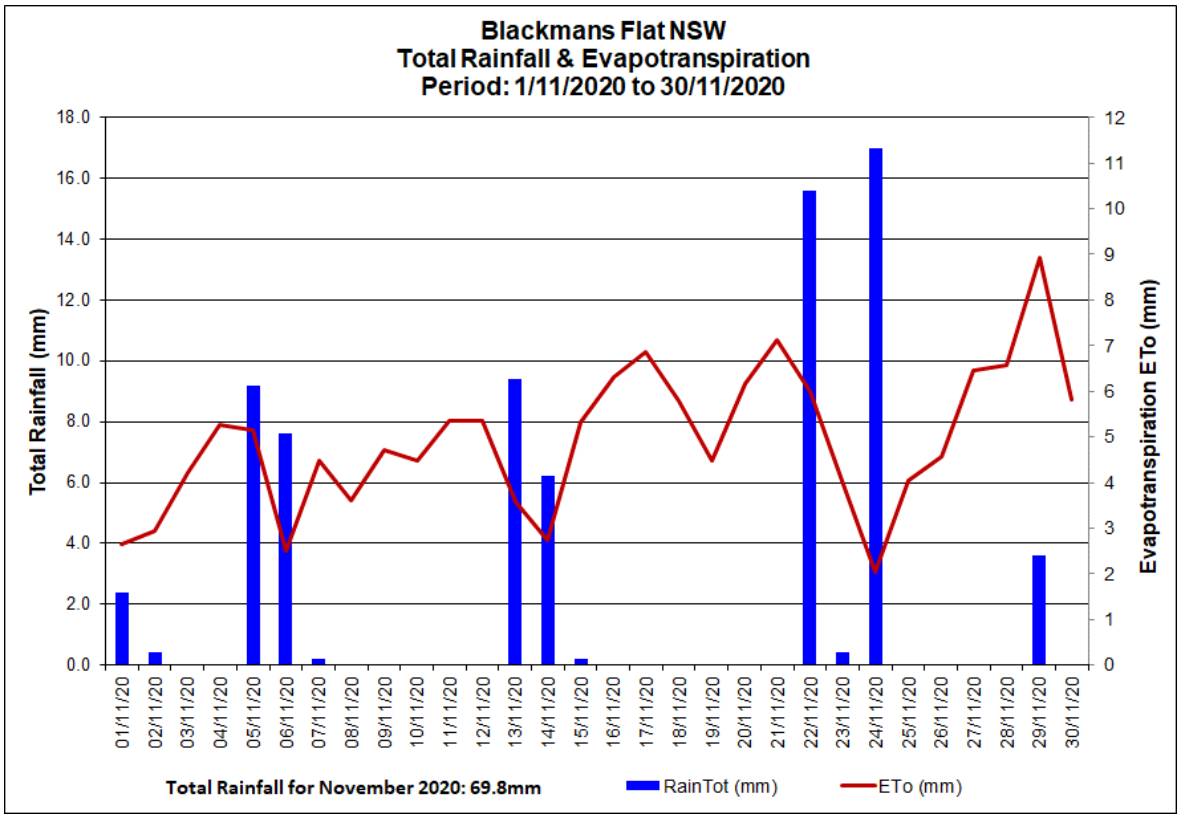
Appendix B

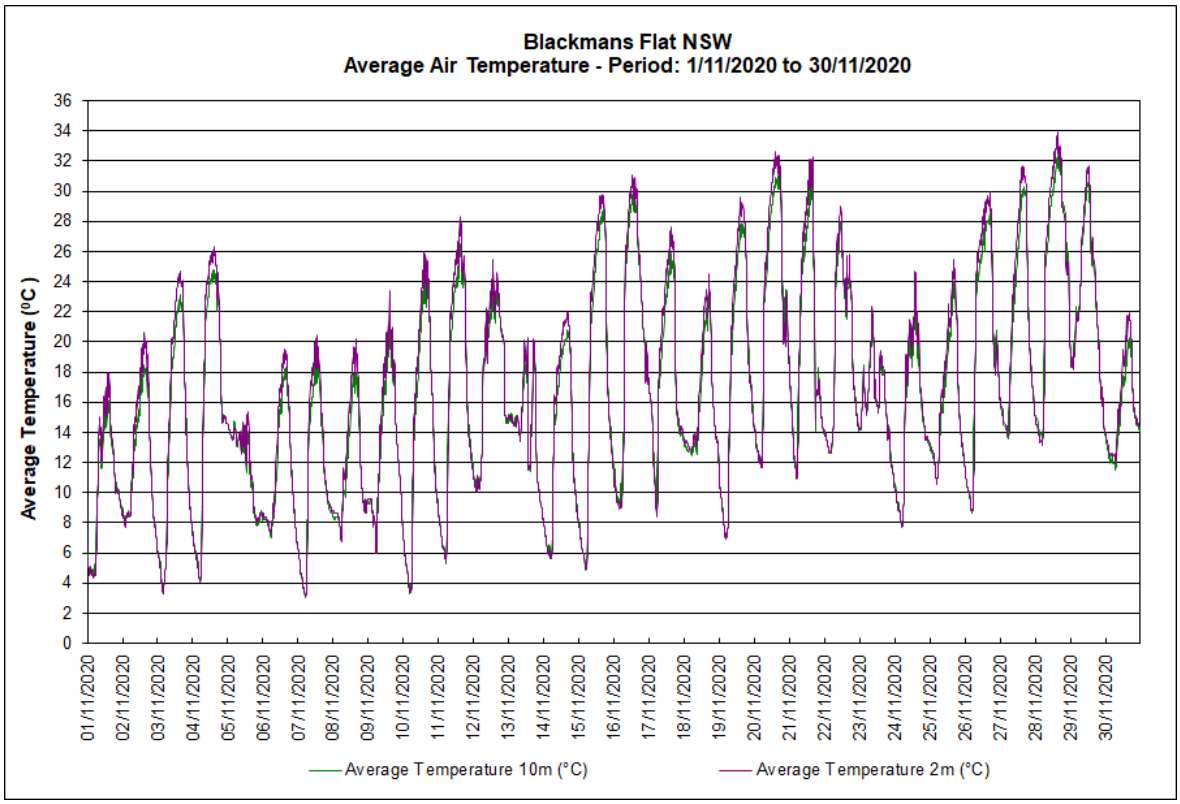
Depositional Dust Graph

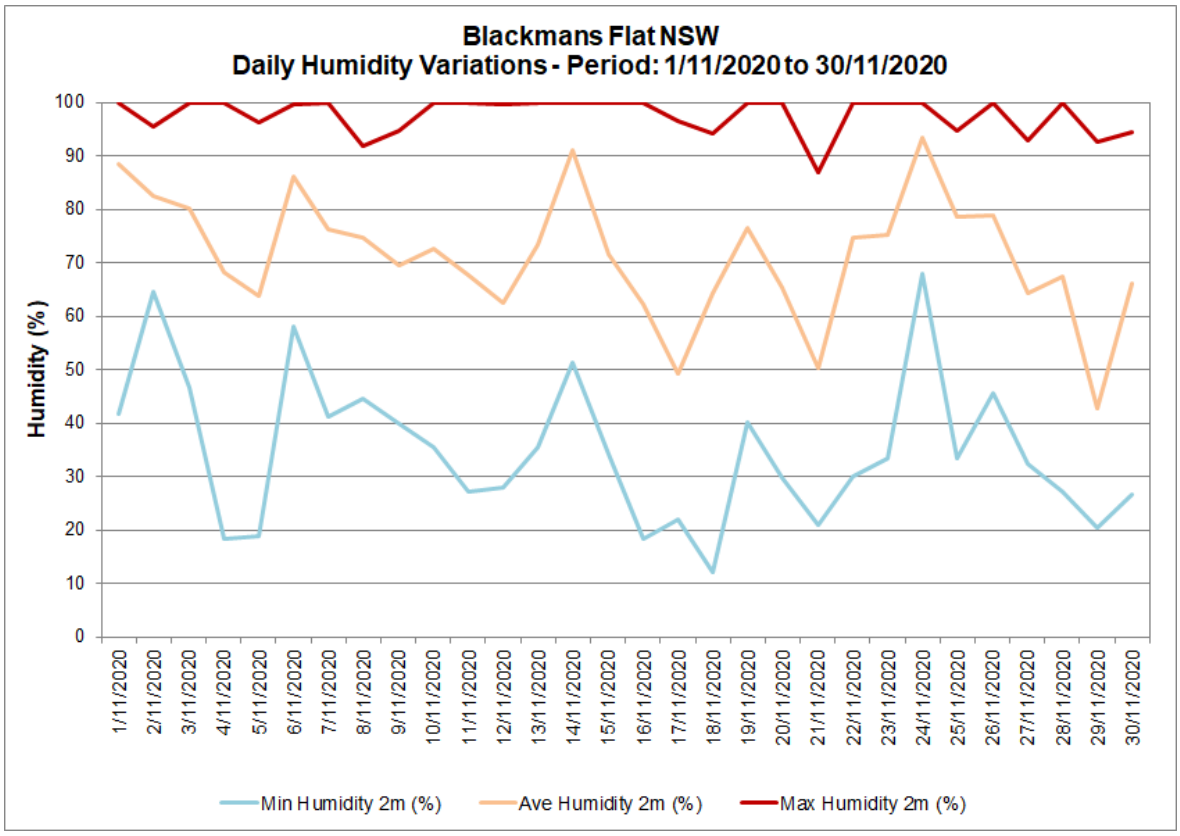

Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
December 2019 to November 2020
Insoluble Solids (g/m².mth)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D3
D4
D5
D6
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
12-Month Average
Long Term Limit 4g/m2 per mth

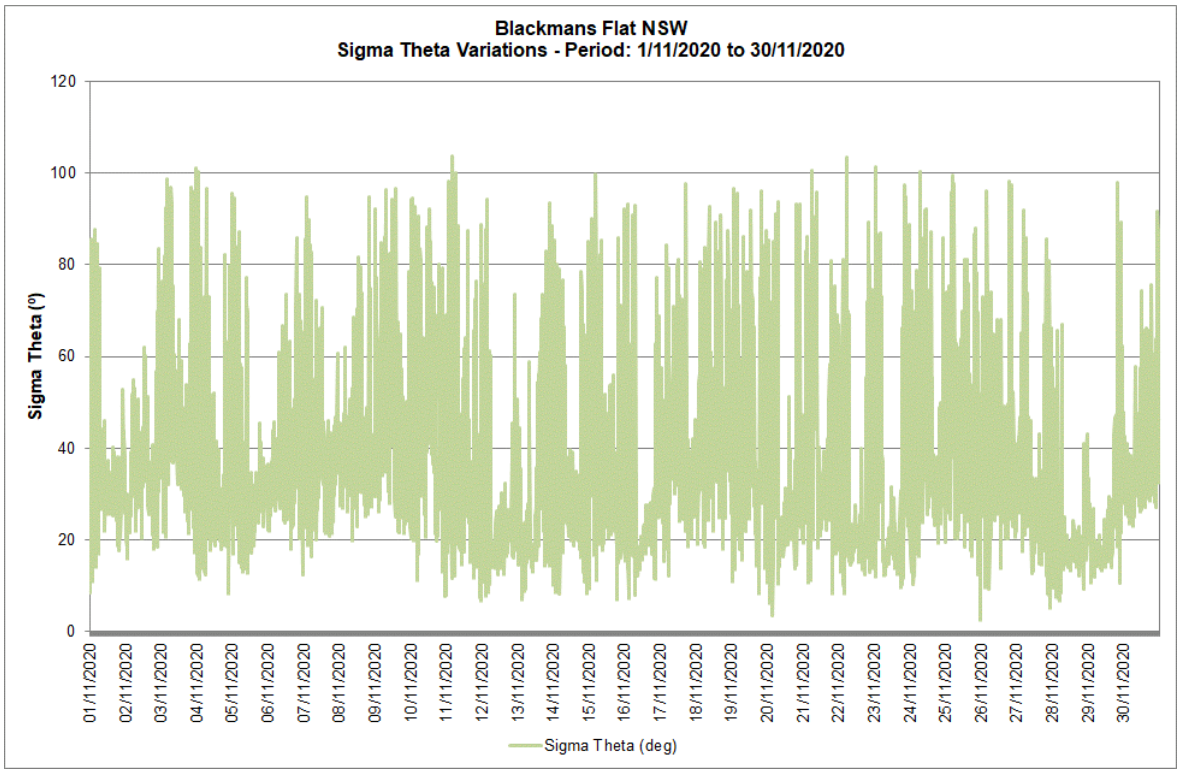
Appendix C

Meteorological Data


Blackmans Flat NSW
Total Rainfall & Evapotranspiration
Period: 1/11/2020 to 30/11/2020
Total Rainfall (mm)
Evapotranspiration ETo (mm)
Total Rainfall for November 2020: 69.8mm
RainTot (mm)
ETo (mm)


Blackmans Flat NSW
Average Air Temperature - Period: 1/11/2020 to 30/11/2020
Average Temperature (°C)
Average Temperature 10m (°C)
Average Temperature 2m (°C)


Blackmans Flat NSW
Daily Humidity Variations - Period: 1/11/2020 to 30/11/2020
Humidity (%)
100
90
80
70
60
50
40
30
20
10
0
1/11/2020
2/11/2020
3/11/2020
4/11/2020
5/11/2020
6/11/2020
7/11/2020
8/11/2020
9/11/2020
10/11/2020
11/11/2020
12/11/2020
13/11/2020
14/11/2020
15/11/2020
16/11/2020
17/11/2020
18/11/2020
19/11/2020
20/11/2020
21/11/2020
22/11/2020
23/11/2020
24/11/2020
25/11/2020
26/11/2020
27/11/2020
28/11/2020
29/11/2020
30/11/2020
Min Humidity 2m (%)
Ave Humidity 2m (%)
Max Humidity 2m (%)


Blackmans Flat NSW
Sigma Theta Variations - Period: 1/11/2020 to 30/11/2020
Sigma Theta (°)
120
100
80
60
40
20
0
01/11/2020
02/11/2020
03/11/2020
04/11/2020
05/11/2020
06/11/2020
07/11/2020
08/11/2020
09/11/2020
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22/11/2020
23/11/2020
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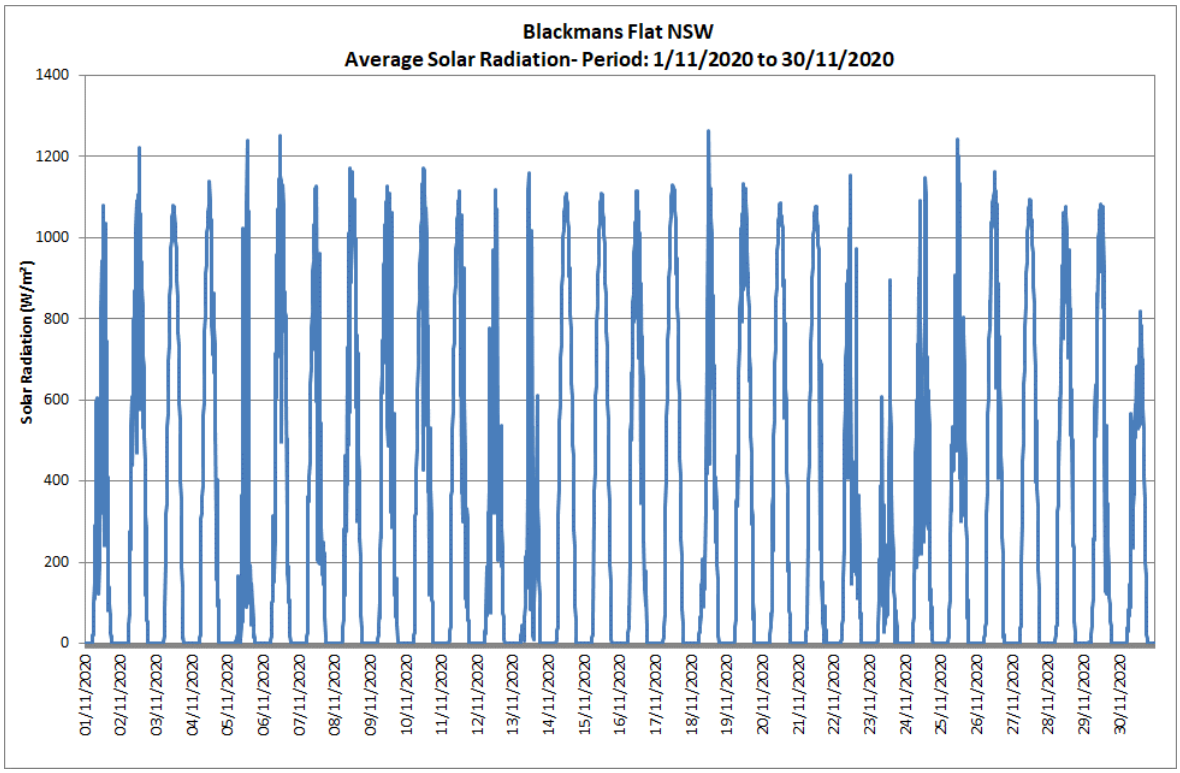
28/11/2020
29/11/2020
30/11/2020
Sigma Theta (deg)


Blackmans Flat NSW
Average Solar Radiation- Period: 1/11/2020 to 30/11/2020
Solar Radiation (W/m²)
1400
1200
1000
800
600
400
200
0
01/11/2020
02/11/2020
03/11/2020
04/11/2020
05/11/2020
06/11/2020
07/11/2020
08/11/2020
09/11/2020
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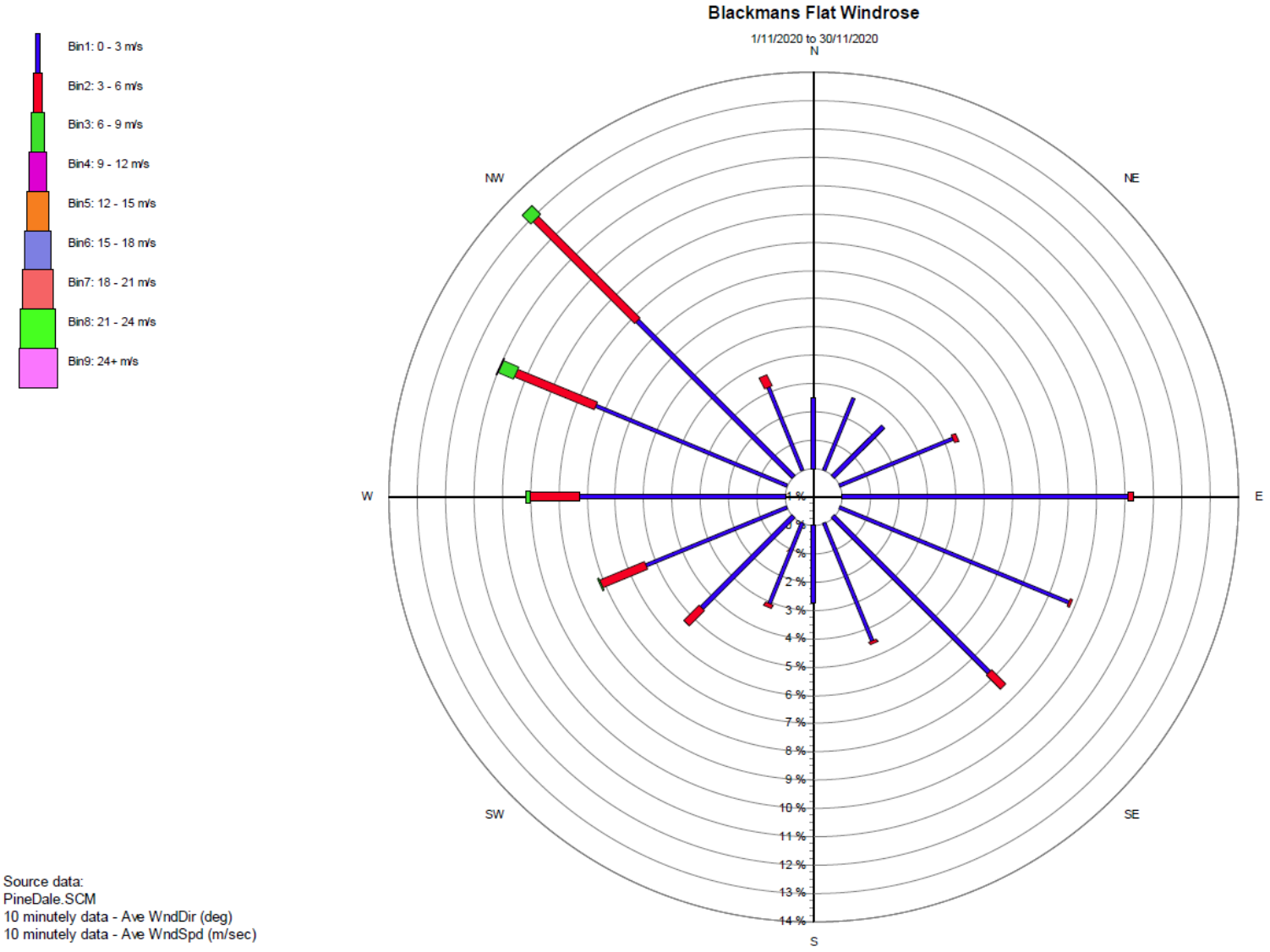

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10 minutely data - Ave WndSpd (m/sec)