AIR, WATER AND METEOROLOGICAL MONITORING – APRIL 2018

PINE DALE MINE, BLACKMANS FLAT

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-1768/0

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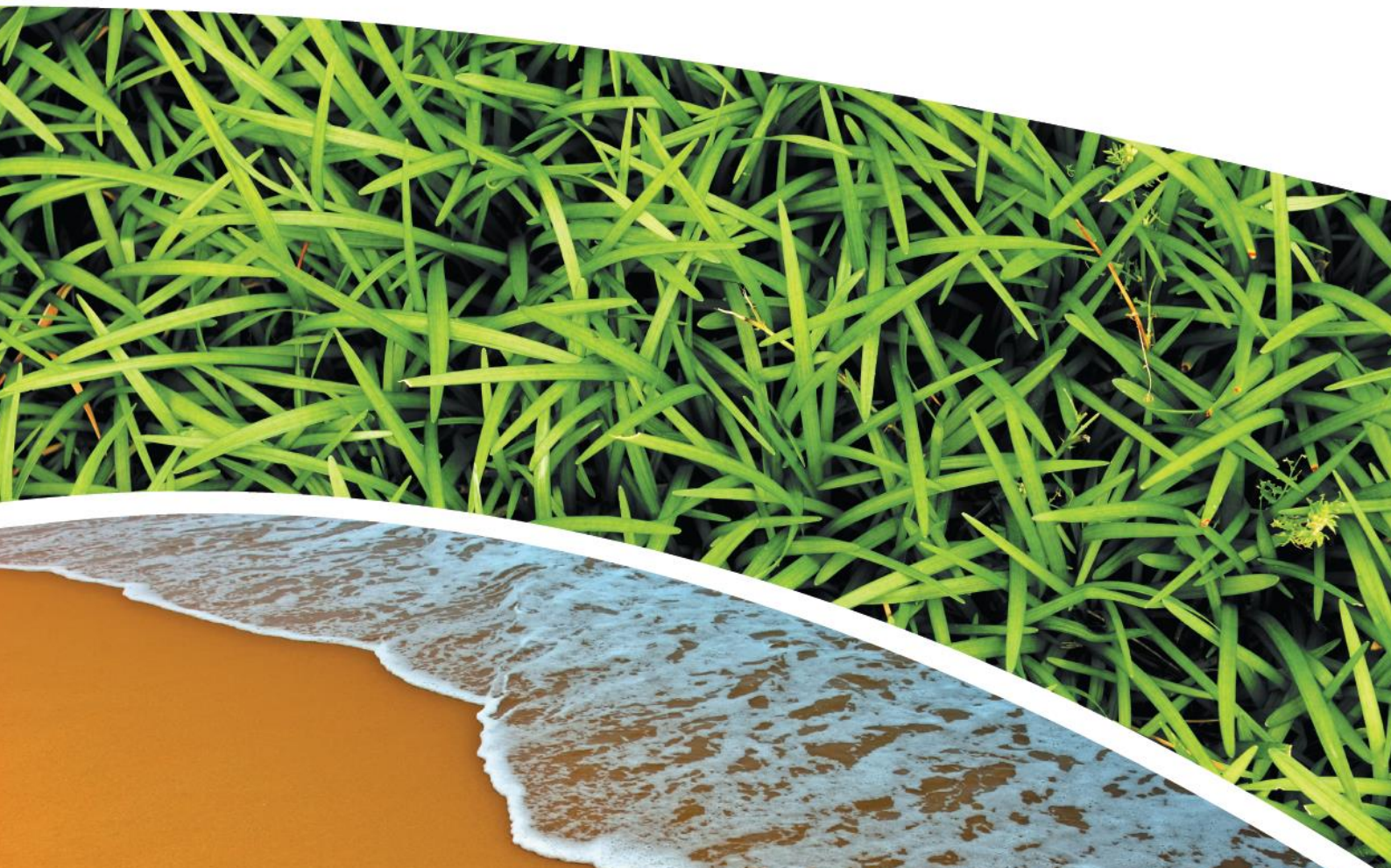
GEOTECHNICAL • ENVIRONMENTAL



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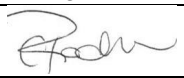
DOCUMENT STATUS						
Rev No	**Comment**	**Author**	**Reviewer**	**Approved for Issue (Project Manager)**		
				Name	**Signature**	**Date**
/0	Final	C Rocher	F Brooker	C Rocher		16.05.2018

DOCUMENT DISTRIBUTION				
Rev No	**Copies**	**Format**	**Issued to**	**Date**
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin graham.goodwin@energyaustralia.com.au	16.05.2018
/0	1	Electronic (email)	Energy Australia- Mark Frewin mark.frewin@energyaustralia.com.au	16.05.2018
/0	1	Electronic (email)	Lithgow City Council – Andrew Muir andrew.muir@lithgow.nsw.gov.au	16.05.2018
/0	1	Electronic report	RCA – job archive	16.05.2018

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RCA ref 6880-1768/0

16 May 2018

Pine Dale Mine
PO Box 202
WALLERWANG NSW 2845

Attention: Mr Graham Goodwin

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

Geotechnical Engineering
Engineering Geology
Environmental Engineering
Hydrogeology
Construction Materials Testing
Environmental Monitoring
Sound & Vibration
Occupational Hygiene

REPORT COMPILED FOR COMMUNITY CONSULTATIVE COMMITTEE DETAILING AIR, WATER AND METEOROLOGICAL MONITORING APRIL 2018

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of April 2018.

Samples received were sampled by RCA Laboratories – Environmental staff.

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.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 April 2018. 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	-	04186880009	04186880010
Date Sampled	-	11/04/18	11/04/18
Time Sampled	-	16:33	17:22
Depth to Water from Surface	m	25.28	6.92
Water Level (AHD)	m	891.67	887.48
Temperature	°C	18.6	17.9
pH	pH	***6.07***	***6.23***
Conductivity	µS/cm	***1400***	810
Turbidity	NTU	91	
Dissolved Oxygen	mg/L	2.0	
TSS	mg/L	83	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity ($CaCO_3$)	mg/L	56	
Total Alkalinity ($CaCO_3$)	mg/L	56	
Sulfate (as SO_4)	mg/L	645	
Chloride	mg/L	40	
Calcium	mg/L	132	
Magnesium	mg/L	63	
Sodium	mg/L	58	
Potassium	mg/L	18	
Cobalt (dissolved)	mg/L	0.072	
Manganese (dissolved)	mg/L	2.48	
Nickel (dissolved)	mg/L	0.118	
Zinc (dissolved)	mg/L	0.09	
Iron (dissolved)	mg/L	28.8	
Trigger Levels			
pH trigger level ^	pH	6.2 – 8.0	6.3 – 8.0
Conductivity trigger level	µS/cm	1180	852
Water Level (AHD) #	m	887.90	883.28

Indicates analysis was not required.

^ pH trigger level is exceeded if the pH is outside the nominated range

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

Results shown in ***bold italics*** indicates exceedance of trigger level.

3.2 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was not required to be undertaken during April 2018. The next round of quarterly surface water monitoring is scheduled for May 2018.

4 AIR QUALITY RESULTS

4.1 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.

HVAS Total Suspended Particulate analysis results are shown in **Table 3**. PM_{10} Suspended Particulate Matter results are shown in **Table 4**.

HVAS Monitoring locations are shown in **Appendix A**. Graphical HVAS result presentations are shown in **Appendix B**.

Table 3 *Total Suspended Particulates*

Run Date	TSP (µg/m3)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
01-Apr-18	25	04186880029	9520632	03-Apr-18	9:20	Client	24.00
07-Apr-18	24	04186880031	9520634	11-Apr-18	15:15	Client	23.96
13-Apr-18	38	04186880033	9520636	16-Apr-18	6:50	Client	24.00
19-Apr-18	20	04186880035	9520638	24-Apr-18	15:00	Client	24.00
25-Apr-18	8	04186880037	9520640	30-Apr-18	15:58	Client	24.00

Table 4 *Suspended Particulate Matter <10 µm (PM_{10})*

Run Date	PM_{10} (µg/m^3)	Sample Number	Filter Number	Date Filter Off	Time Filter Off	Field Tech	Hours Run
1-Apr-18	13	04186880030	9520633	03-Apr-18	9:25	Client	24.00
7-Apr-18	12	04186880032	9520635	11-Apr-18	15:20	Client	23.88
13-Apr-18	16	04186880034	9520637	16-Apr-18	6:55	Client	24.00
19-Apr-18	9	04186880036	9520639	24-Apr-18	15:05	Client	24.00
25-Apr-18	4	04186880038	9520641	30-Apr-18	15:59	Client	24.00

4.1.1 TSP SUMMARY

The NSW EPA Annual Mean TSP allowable limit is 90µg/m^3. All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (May 2017 to April 2018) for the TSP unit is 20.0µg/m^3, which is below the allowable limit of 90µg/m^3.

4.1.2 PM_{10} SUMMARY

The NSW EPA twenty four hour maximum PM_{10} allowable limit is 50µg/m^3. The EPA Annual Mean PM_{10} allowable limit is 25µg/m^3. All PM_{10} HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM_{10} unit is 8.9µg/m^3, which is below the allowable limit of 25µg/m^3. The 24 hour maximum allowable limit of 50µg/m^3 was not exceeded during the month of April 2018.

4.2 DEPOSITIONAL DUST MONITORING

Depositional Dust Gauges at this facility conform to AS/NZS 3580.10.1:2016 and AS/NZS 3580.1.1:2016. Depositional Dust monitoring results are shown in **Table 5**. Depositional dust monitoring locations are shown in **Appendix A**.

Depositional dust gauge D2 is situated on private property; this gauge was removed at the request of the property owner. Monitoring has ceased at this location since March 2018.

Table 5 *Depositional Dust Monitoring: 13 March – 11 April 2018*

Sample Number	Deposit Gauge	Number of Days	Notes	Insoluble Solids	Ash	Combustible Matter
04186880019	D1	29	I	1.5	0.5	1.0
04186880021	D3	29	I	0.4	0.2	0.2
04186880022	D4	29	I	1.0	0.4	0.6
04186880023	D5	29	I	0.4	0.2	0.2
04186880024	D6	29	I	0.6	0.4	0.2

All units are g/m^2/month

I indicates insects noted to be present in sample.

4.2.1 ALLOWABLE DEPOSITIONAL DUST LIMITS

The EPA long term (annual average) deposited dust limit is $4g/m^2$ per month. All rolling annual depositional dust results for the period (May 2017 – April 2018) 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 $0.8g/m^2$ per month, which is below the allowable annual average long term limit of $4g/m^2$ per month (refer to depositional dust graphs in **Appendix B**). The annual average for dust gauge D2 (May 2017 – February 2018) is also below the annual average long term limit.

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 April 2018 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 April 2018.

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.

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

9 SUMMARY

During the month of April 2018 environmental monitoring results were found to be generally in compliance with EPL 4911:

- Standing water levels within Pine Dale Mine groundwater bores were compliant with their respective trigger levels.
- Rolling annual averages from both the TSP and PM_{10} High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM_{10} criterion of 90µg/m^3 and 25µg/m^3 respectively. Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m^2.month based upon a rolling average of the past 12 months.

The exception was pH in groundwater samples P6 and P7, which were below the lower trigger level, and electrical conductivity in groundwater sample P6 which was in excess of the site specific trigger level.

Meteorological monitoring was undertaken for the entire month of April with 100% data recovery.

Pine Dale Mine ceased operation in March 2014 and therefore no blasting occurred at the site. Surface water monitoring and noise monitoring was not required in April.

Please contact the undersigned if you have any queries.

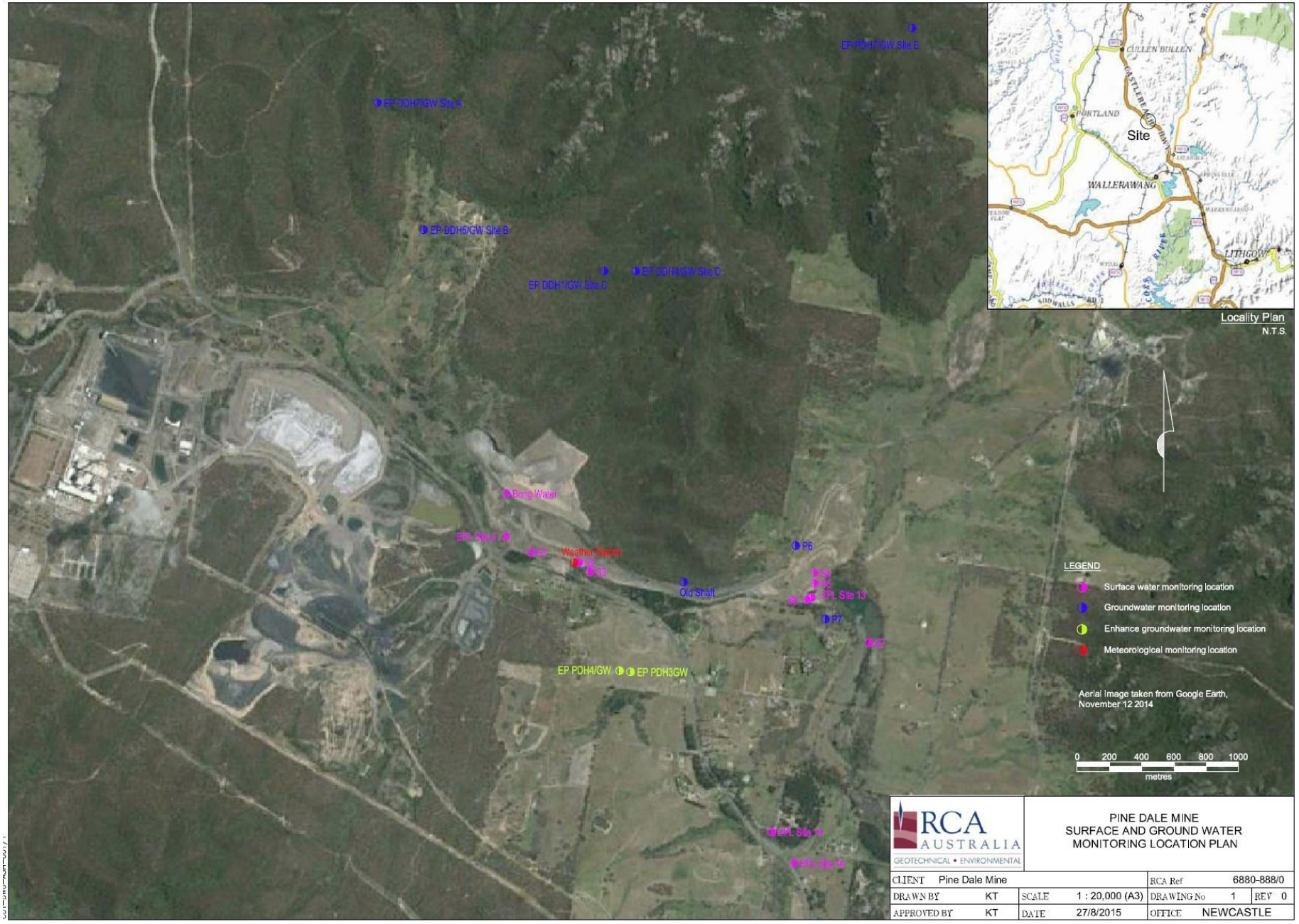
Yours sincerely

Carmen Rocher
Environmental Engineer
RCA Australia

Fiona Brooker
Associate Environmental Engineer
RCA Australia

Appendix A

Monitoring Locations



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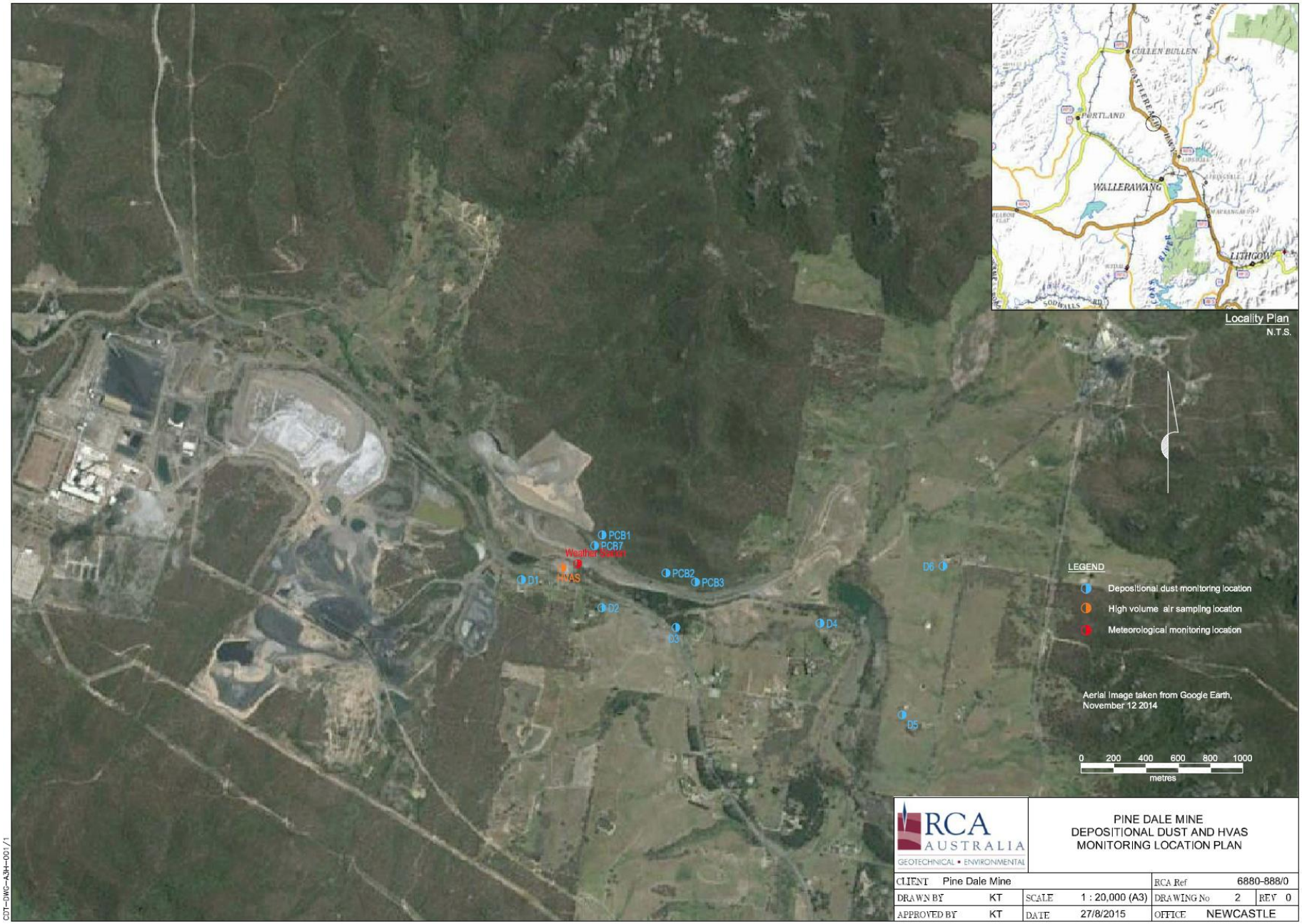
PINE DALE MINE
SURFACE AND GROUND WATER MONITORING LOCATION PLAN

CLIENT	Pine Dale Mine			RCA Ref	6880-888/0
DRAWN BY	KT	SCALE	1 : 20,000 (A3)	DRAWING No 1	REV 0
APPROVED BY	KT	DATE	27/8/2015	OFFICE	NEWCASTLE



Locality Plan
N.T.S.

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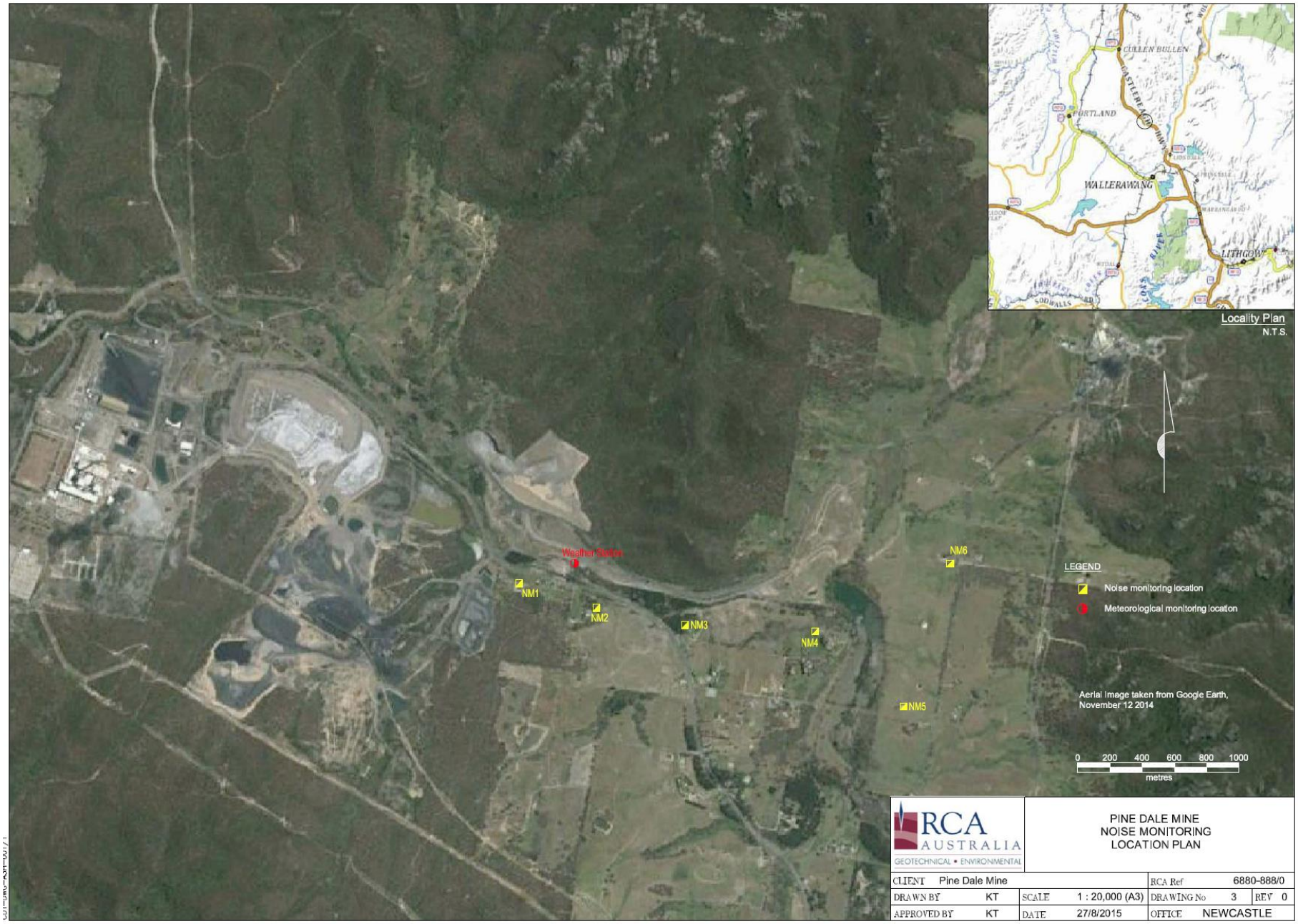
PINE DALE MINE
DEPOSITIONAL DUST AND HVAS
MONITORING LOCATION PLAN

CLIENT	Pine Dale Mine			RCA Ref	6880-888/0
DRAWN BY	KT	SCALE	1 : 20,000 (A3)	DRAWING No 2	REV 0
APPROVED BY	KT	DATE	27/8/2015	OFFICE	NEWCASTLE

CDT-DWG-A3H-001/1



RCA AUSTRALIA
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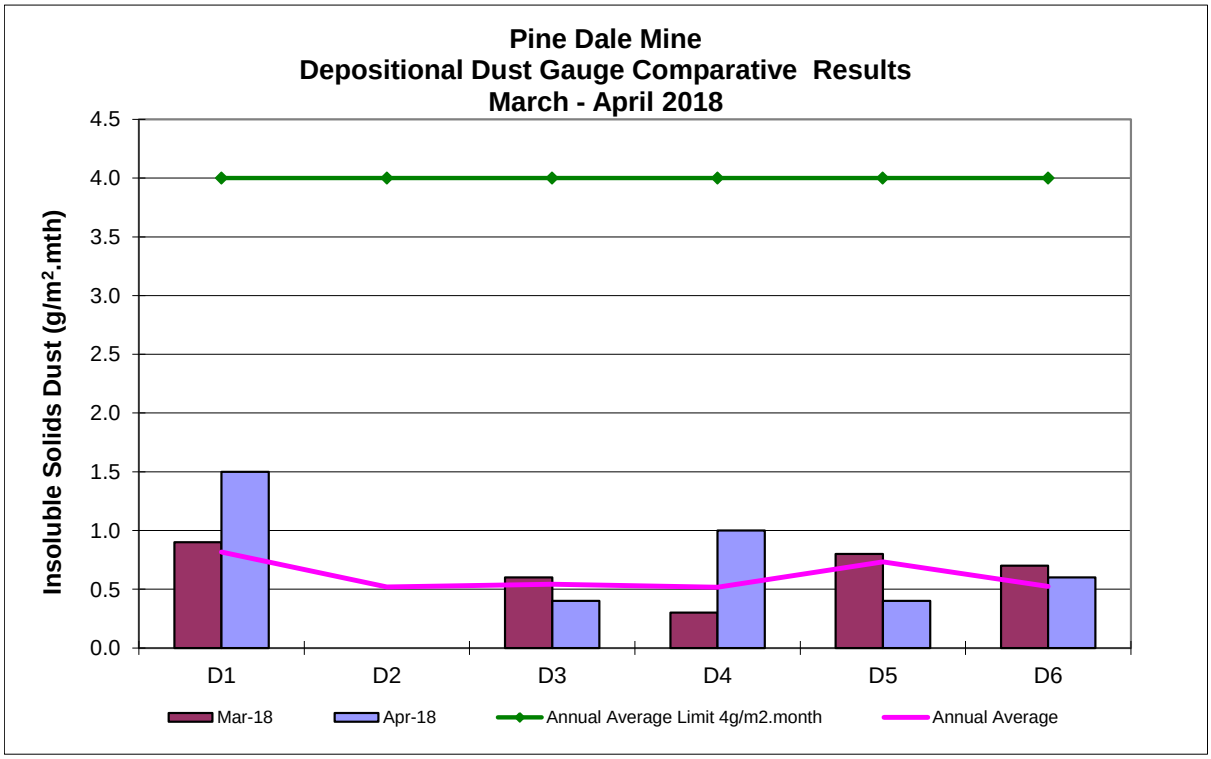
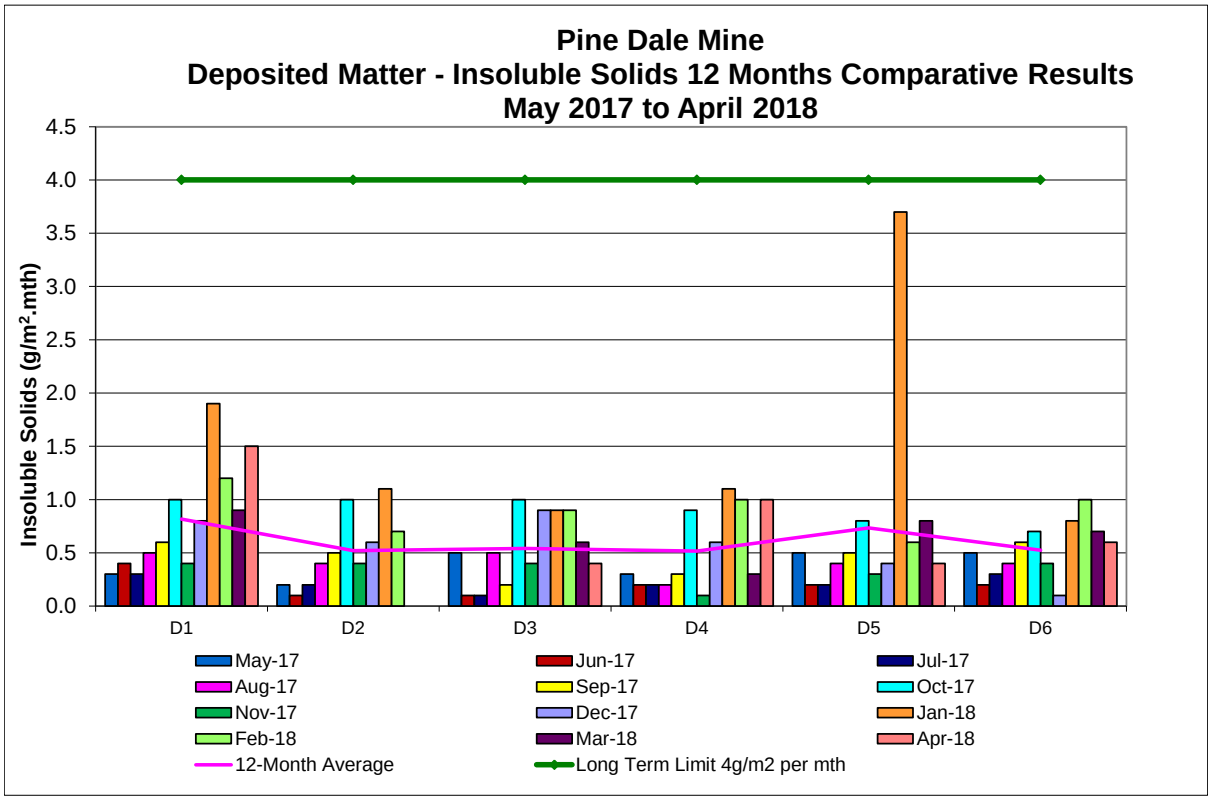
PINE DALE MINE
NOISE MONITORING
LOCATION PLAN

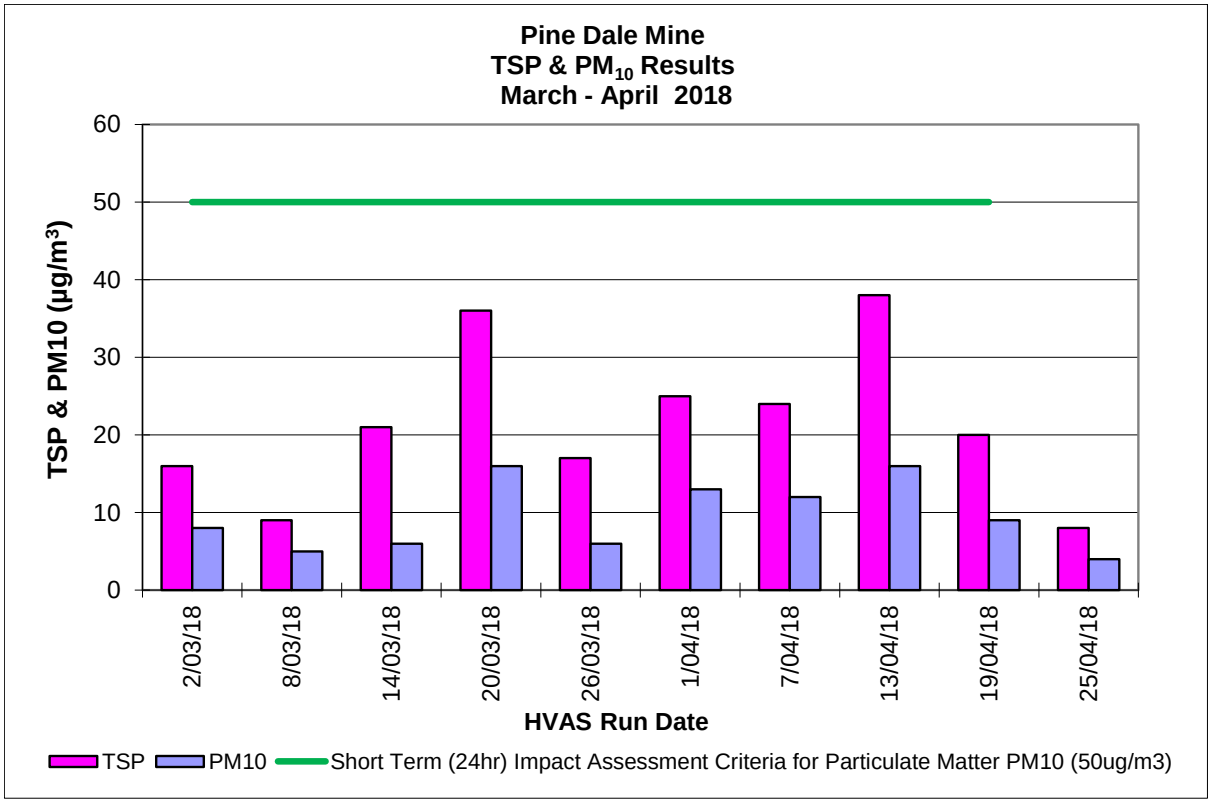
CLIENT	Pine Dale Mine			RCA Ref	6880-888/0
DRAWN BY	KT	SCALE	1 : 20,000 (A3)	DRAWING No 3	REV 0
APPROVED BY	KT	DATE	27/8/2015	OFFICE	NEWCASTLE

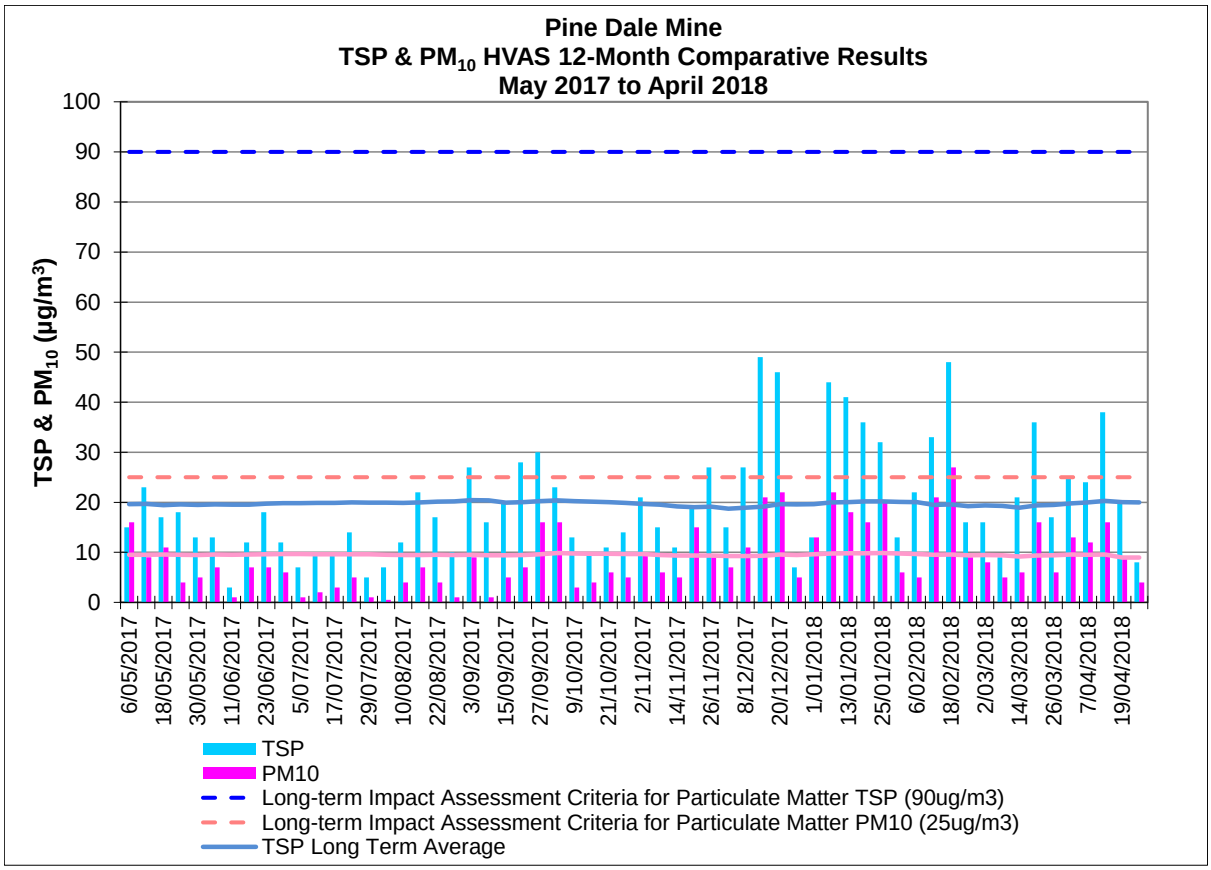
Appendix B

Depositional Dust and HVAS Graphs


Pine Dale Mine
Depositional Dust Gauge Comparative Results
March - April 2018
Insoluble Solids Dust (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
Mar-18
Apr-18
Annual Average Limit 4g/m2.month
Annual Average

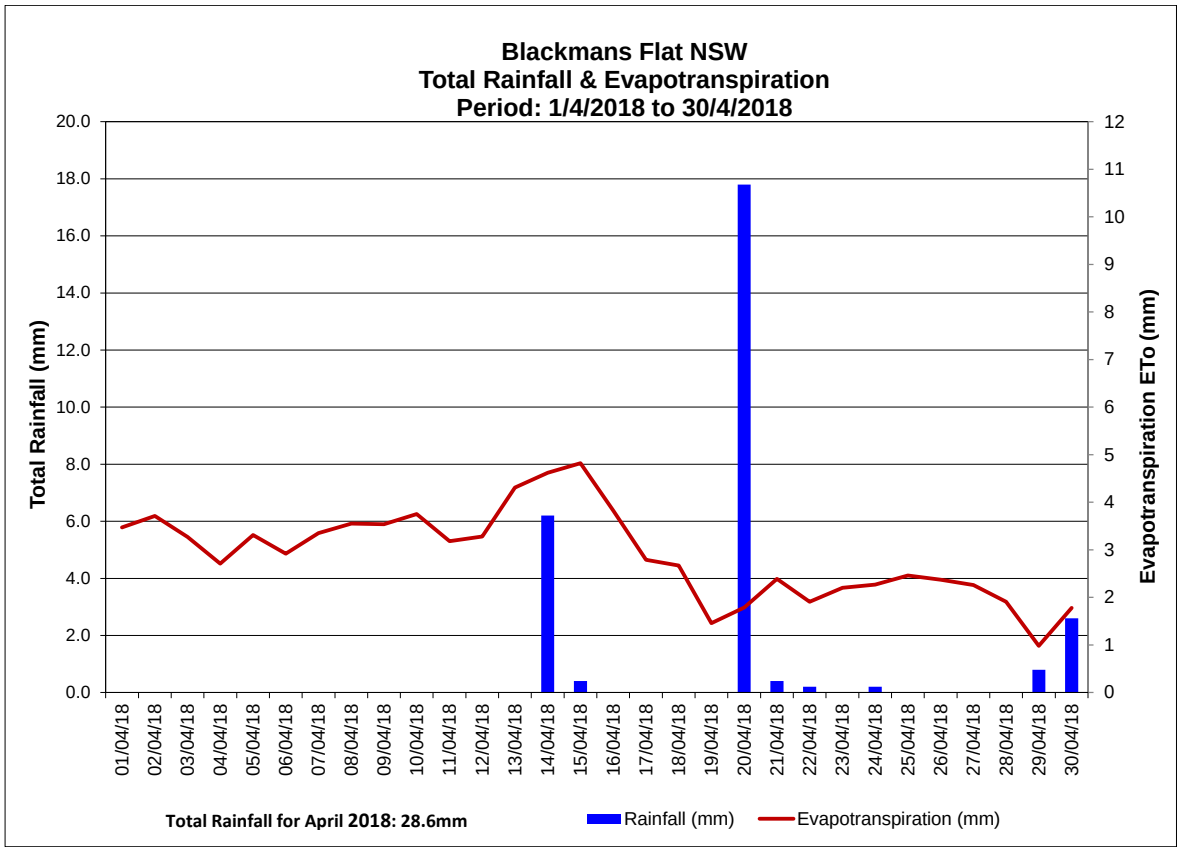

Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
May 2017 to April 2018
Insoluble Solids (g/m².mth)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
D1
D2
D3
D4
D5
D6
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
12-Month Average
Long Term Limit 4g/m2 per mth

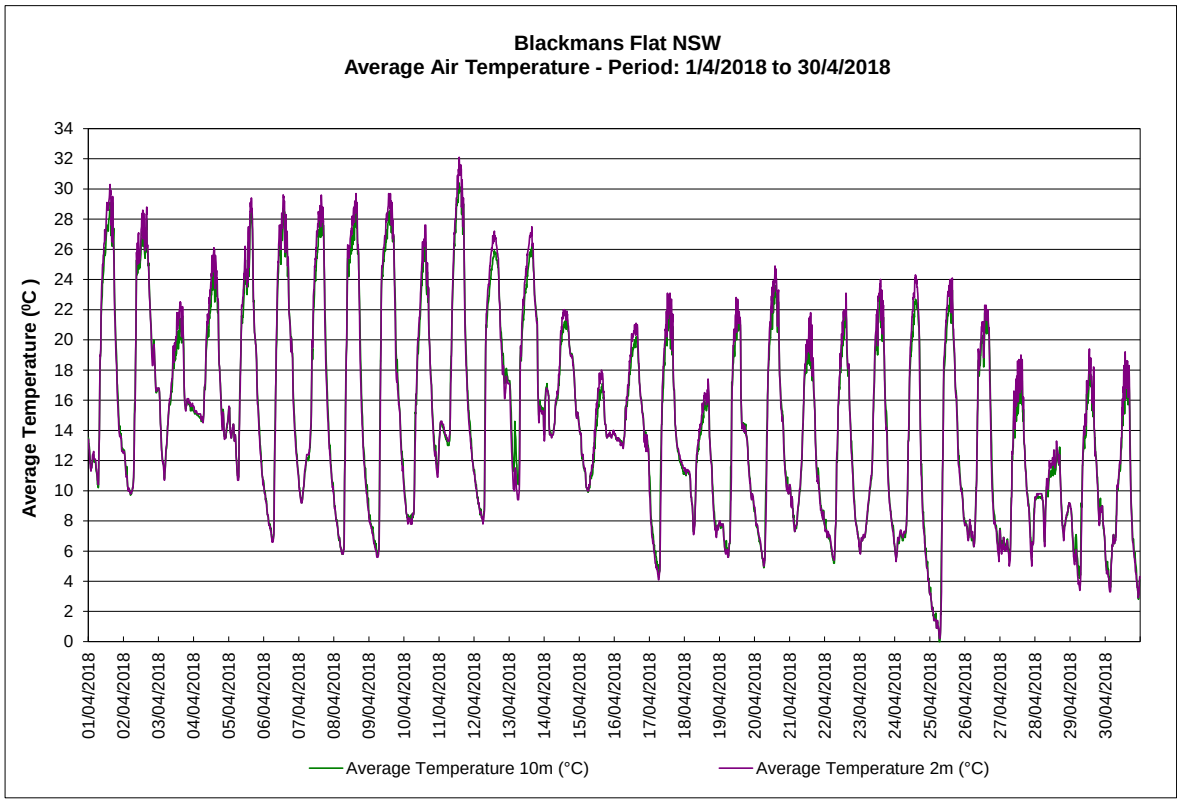

Pine Dale Mine
TSP & PM10 Results
March - April 2018
TSP & PM10 (µg/m³)
60
50
40
30
20
10
0
2/03/18
8/03/18
14/03/18
20/03/18
26/03/18
1/04/18
7/04/18
13/04/18
19/04/18
25/04/18
HVAS Run Date
TSP
PM10
Short Term (24hr) Impact Assessment Criteria for Particulate Matter PM10 (50ug/m3)

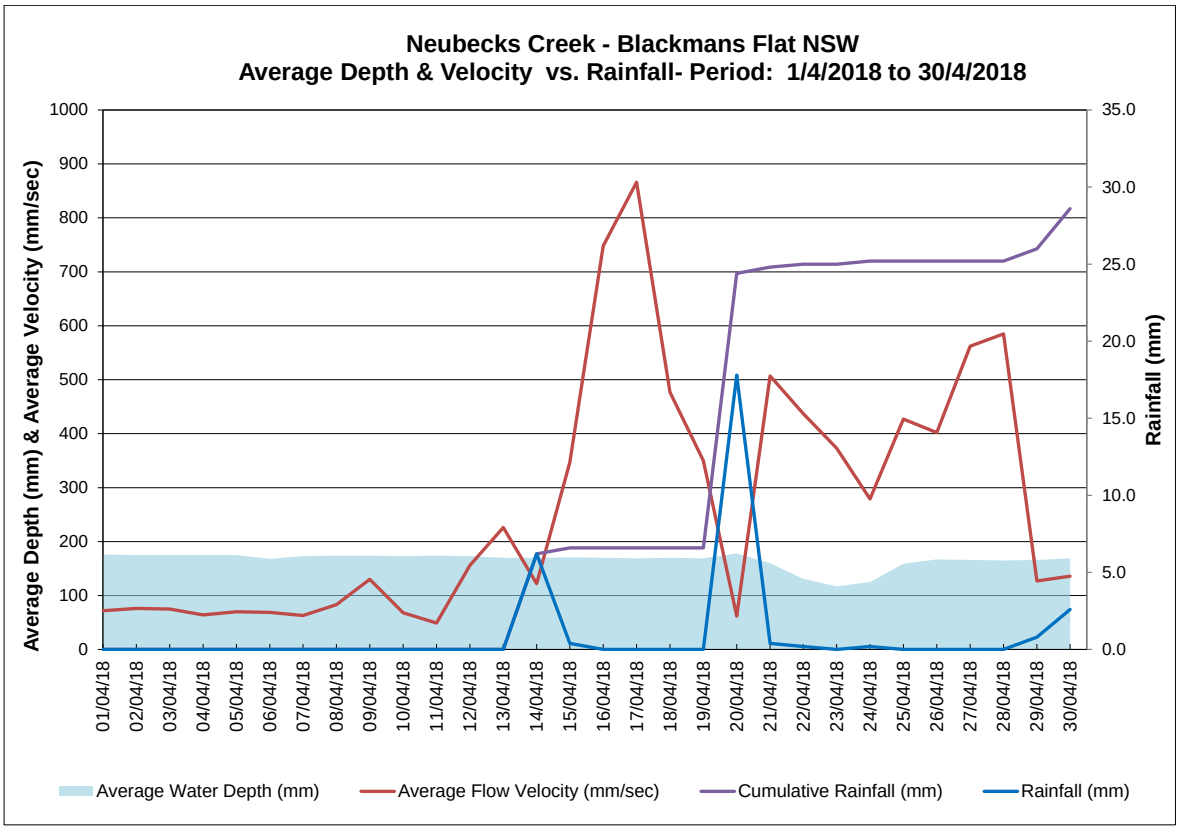

Pine Dale Mine
TSP & PM10 HVAS 12-Month Comparative Results
May 2017 to April 2018
TSP & PM10 (µg/m³)
100
90
80
70
60
50
40
30
20
10
0
6/05/2017
18/05/2017
30/05/2017
11/06/2017
23/06/2017
5/07/2017
17/07/2017
29/07/2017
10/08/2017
22/08/2017
3/09/2017
15/09/2017
27/09/2017
9/10/2017
21/10/2017
2/11/2017
14/11/2017
26/11/2017
8/12/2017
20/12/2017
1/01/2018
13/01/2018
25/01/2018
6/02/2018
18/02/2018
2/03/2018
14/03/2018
26/03/2018
7/04/2018
19/04/2018
TSP
PM10
Long-term Impact Assessment Criteria for Particulate Matter TSP (90ug/m3)
Long-term Impact Assessment Criteria for Particulate Matter PM10 (25ug/m3)
TSP Long Term Average

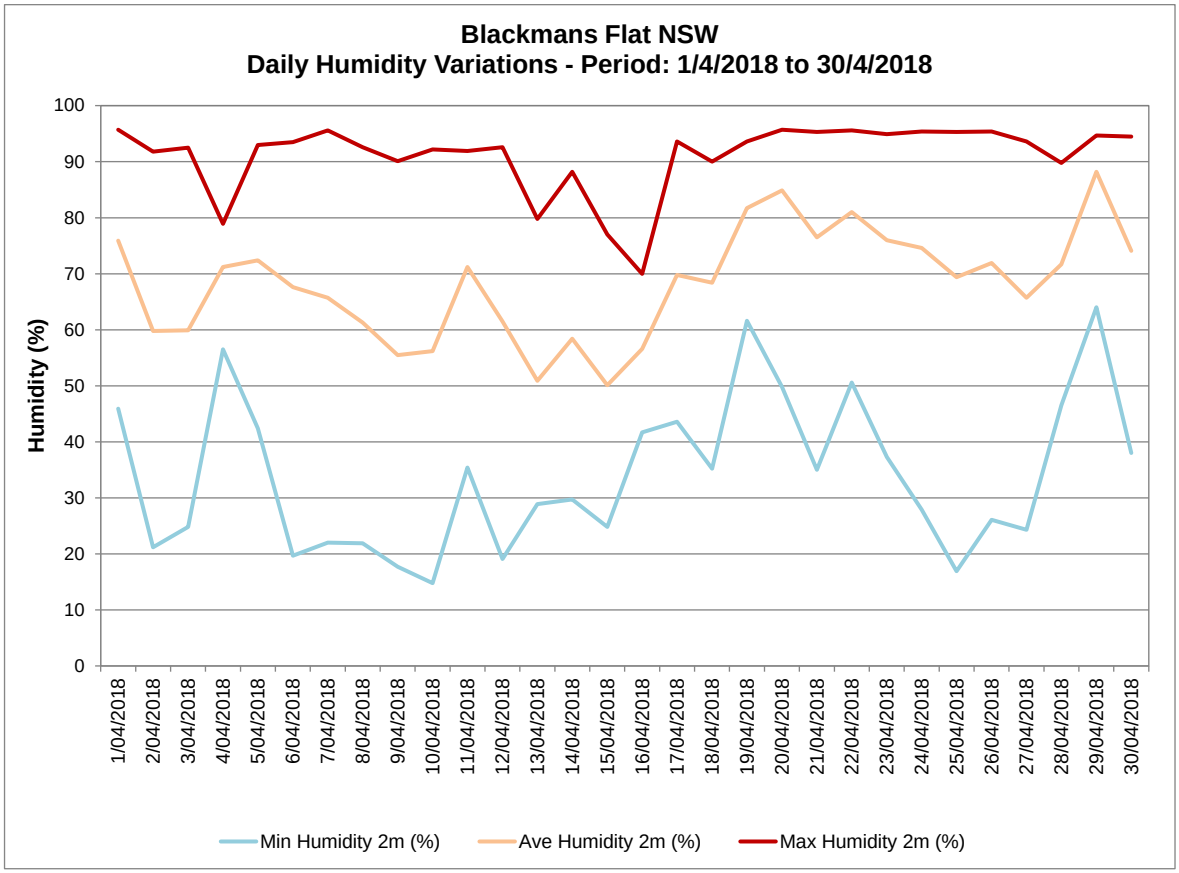
Appendix C

Meteorological Data


Blackmans Flat NSW
Total Rainfall & Evapotranspiration
Period: 1/4/2018 to 30/4/2018
Total Rainfall (mm)
Evapotranspiration ETo (mm)
Total Rainfall for April 2018: 28.6mm
Rainfall (mm)
Evapotranspiration (mm)


Blackmans Flat NSW
Average Air Temperature - Period: 1/4/2018 to 30/4/2018
Average Temperature (ºC)
Average Temperature 10m (°C)
Average Temperature 2m (°C)


Neubecks Creek - Blackmans Flat NSW
Average Depth & Velocity vs. Rainfall- Period: 1/4/2018 to 30/4/2018
Average Depth (mm) & Average Velocity (mm/sec)
Rainfall (mm)
1000
900
800
700
600
500
400
300
200
100
0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
01/04/18
02/04/18
03/04/18
04/04/18
05/04/18
06/04/18
07/04/18
08/04/18
09/04/18
10/04/18
11/04/18
12/04/18
13/04/18
14/04/18
15/04/18
16/04/18
17/04/18
18/04/18
19/04/18
20/04/18
21/04/18
22/04/18
23/04/18
24/04/18
25/04/18
26/04/18
27/04/18
28/04/18
29/04/18
30/04/18
Average Water Depth (mm)
Average Flow Velocity (mm/sec)
Cumulative Rainfall (mm)
Rainfall (mm)


Blackmans Flat NSW
Daily Humidity Variations - Period: 1/4/2018 to 30/4/2018
Humidity (%)
100
90
80
70
60
50
40
30
20
10
0
1/04/2018
2/04/2018
3/04/2018
4/04/2018
5/04/2018
6/04/2018
7/04/2018
8/04/2018
9/04/2018
10/04/2018
11/04/2018
12/04/2018
13/04/2018
14/04/2018
15/04/2018
16/04/2018
17/04/2018
18/04/2018
19/04/2018
20/04/2018
21/04/2018
22/04/2018
23/04/2018
24/04/2018
25/04/2018
26/04/2018
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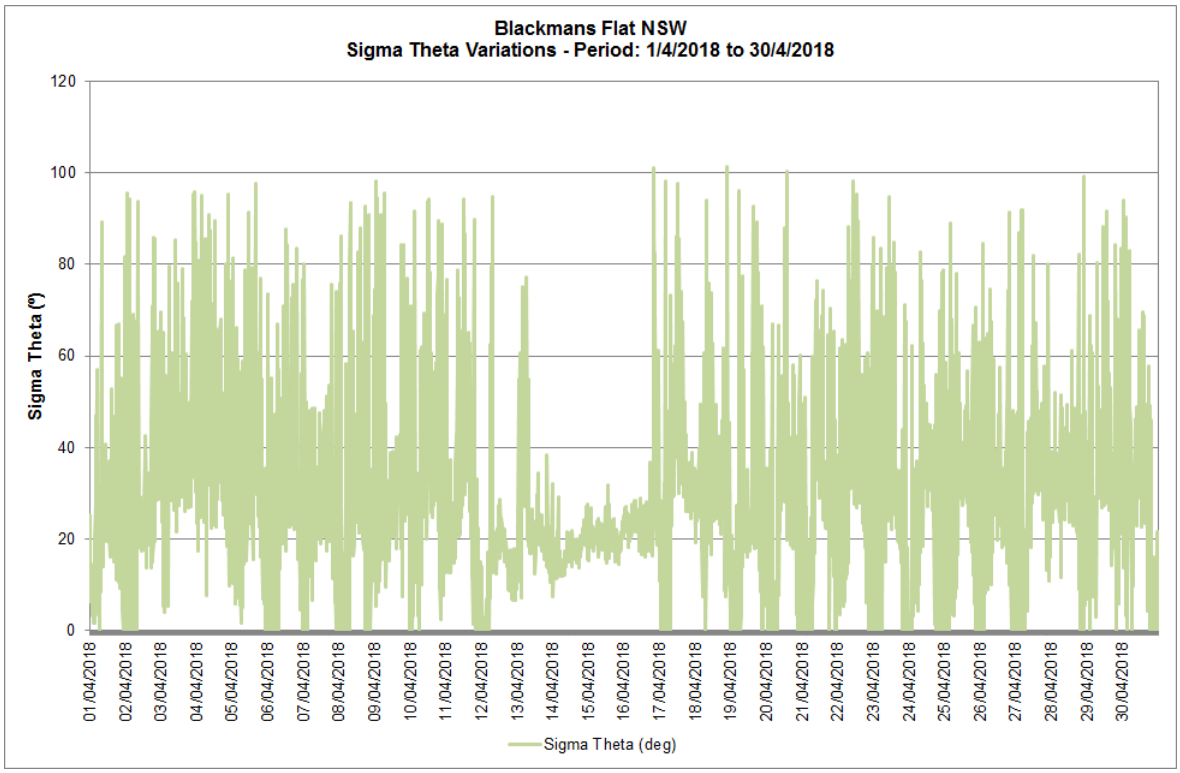
29/04/2018
30/04/2018
Min Humidity 2m (%)
Ave Humidity 2m (%)
Max Humidity 2m (%)


Blackmans Flat NSW
Sigma Theta Variations - Period: 1/4/2018 to 30/4/2018
Sigma Theta (°)
120
100
80
60
40
20
0
01/04/2018
02/04/2018
03/04/2018
04/04/2018
05/04/2018
06/04/2018
07/04/2018
08/04/2018
09/04/2018
10/04/2018
11/04/2018
12/04/2018
13/04/2018
14/04/2018
15/04/2018
16/04/2018
17/04/2018
18/04/2018
19/04/2018
20/04/2018
21/04/2018
22/04/2018
23/04/2018
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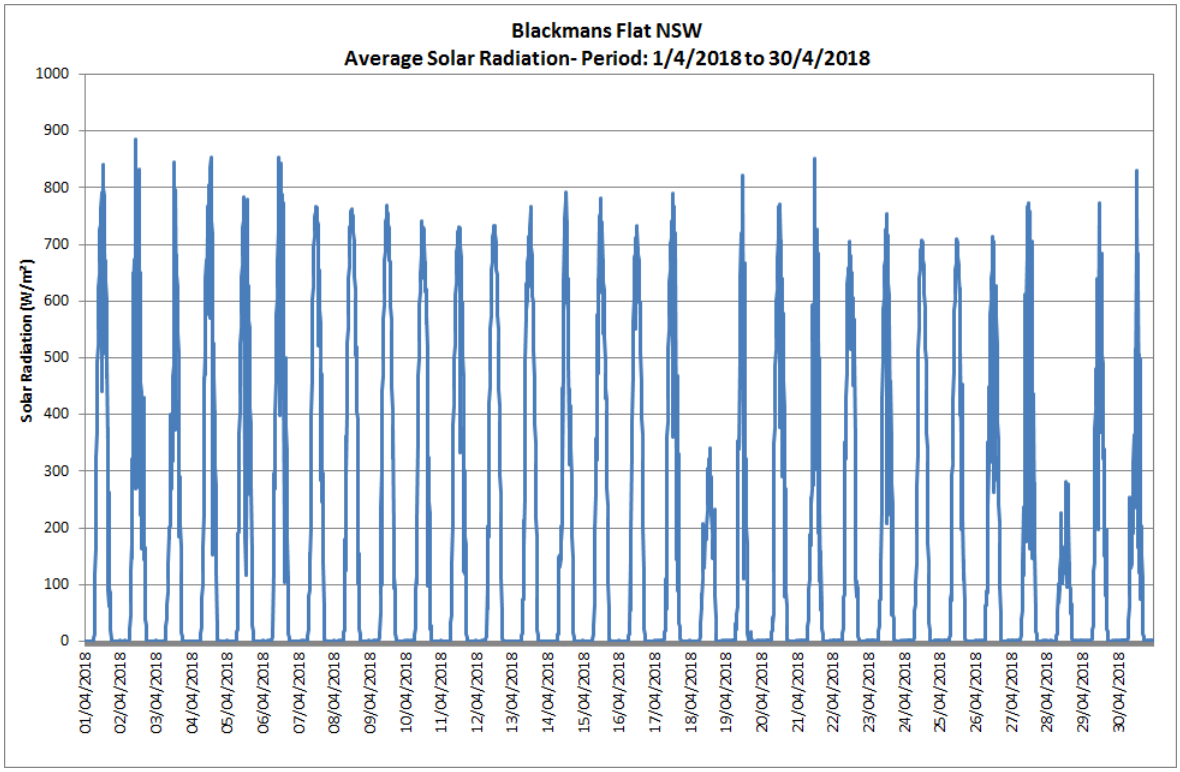
28/04/2018
29/04/2018
30/04/2018
Sigma Theta (deg)


Blackmans Flat NSW
Average Solar Radiation- Period: 1/4/2018 to 30/4/2018
Solar Radiation (W/m²)
1000
900
800
700
600
500
400
300
200
100
0
01/04/2018
02/04/2018
03/04/2018
04/04/2018
05/04/2018
06/04/2018
07/04/2018
08/04/2018
09/04/2018
10/04/2018
11/04/2018
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16/04/2018
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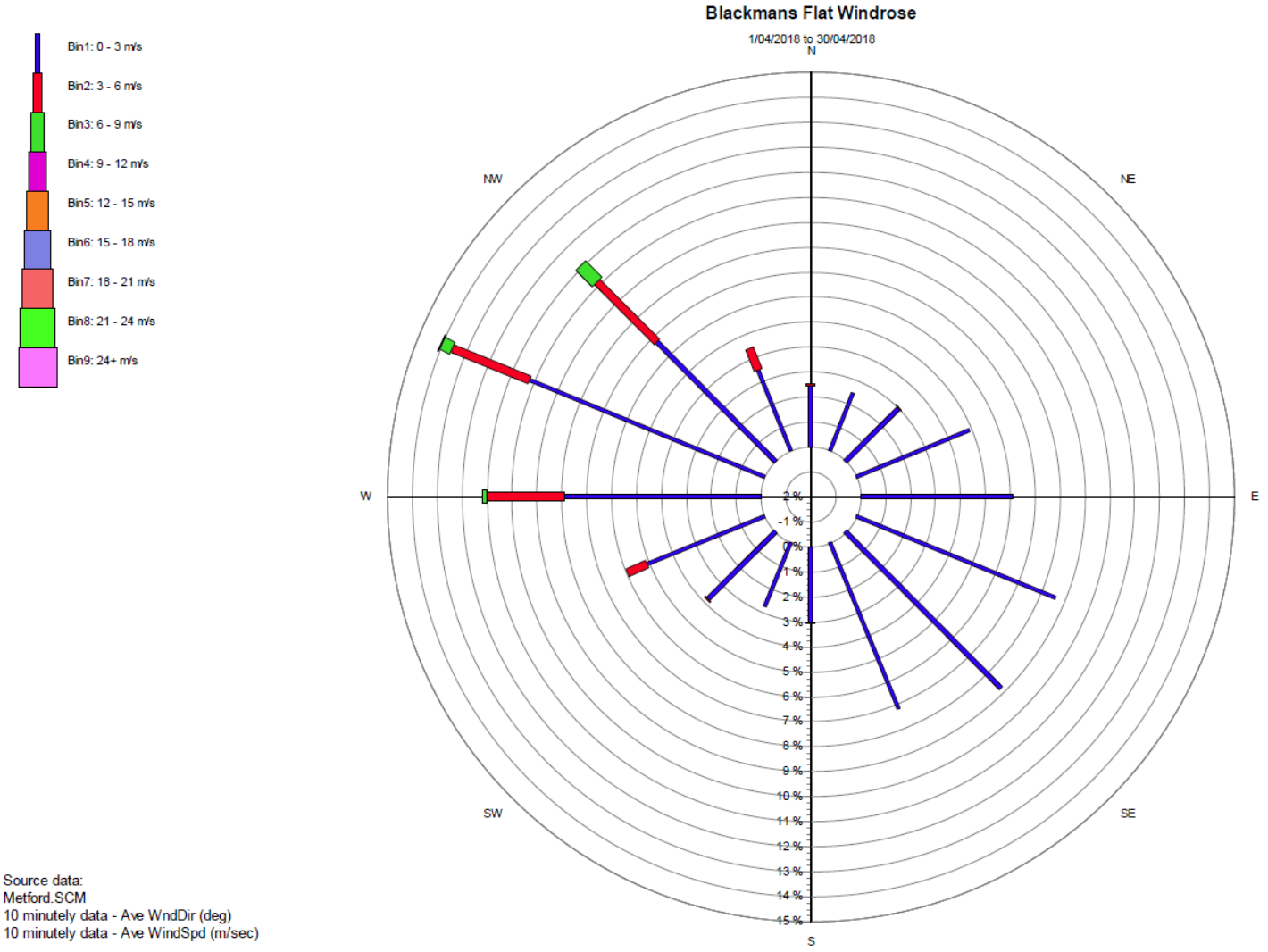

Source data:
Metford.SCM
10 minutely data - Ave WndDir (deg)
10 minutely data - Ave WindSpd (m/sec)