

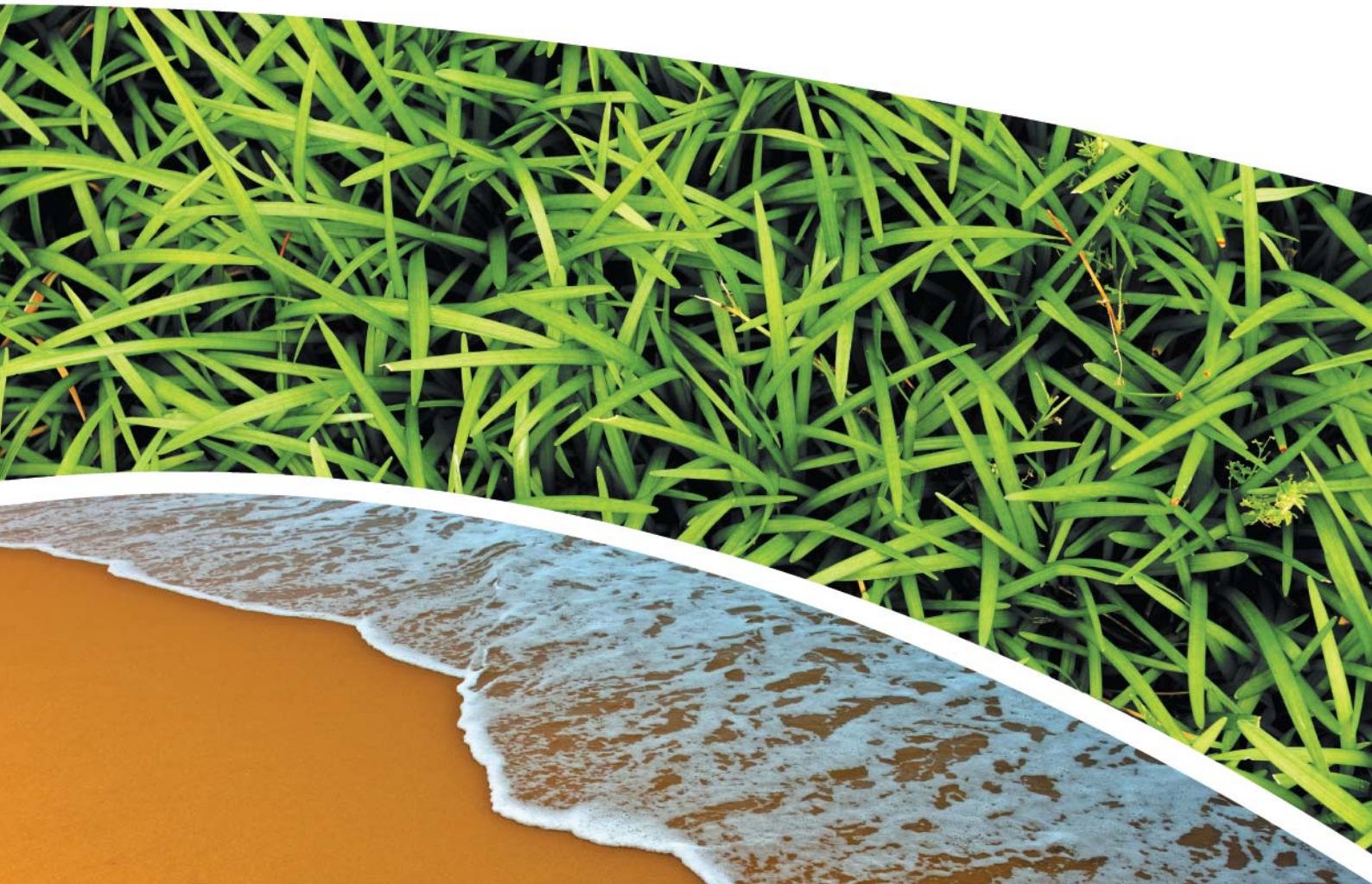
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-876/0

February 2015



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RCA LE ref 6880-876/0



16 March 2015

Pine Dale Mine
PO Box 202
WALLERAWANG NSW 2845

Attention: Mr Graham Goodwin

**REPORT COMPILED FOR
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE
DETAILING SURFACE WATER, GROUNDWATER DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING
FEBRUARY 2015**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of February 2015.

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 are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**. When an external testing laboratory is used to obtain the analysis of samples which become a part of this report, then the details of that laboratory's official report will be attached in an Appendix.

Table 1 *Analytical Test Methods*

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA / NON-NATA ANALYSIS
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

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of 2 on-site groundwater samples were collected during the month of February 2015. Sampling at Bores P2, P3 and P7a are no longer required under the new sampling regime undertaken in accordance with Project Approval (PA 10_0041) and the Pine Dale Mine Water Management Plan (Report No. 613/20). The new sampling regime commenced 1 August 2013. Water quality analysis results are shown in **Table 2**.

Table 2 Groundwater Analysis Results

ANALYSIS	UNITS	P6	P7
Sample Number	-	02156880011	02156880012
Date Sampled	-	11/02/15	11/02/15
Time Sampled	-	14:03	14:57
Depth to Water from Surface*	m	25.43	6.60
Water Level (AHD)	m	891.52	887.80
Temperature	°C	16.8	18.0
pH	pH	6.08	6.61
Conductivity	µS/cm	1162	867
Turbidity	NTU	25	
Dissolved Oxygen	mg/L	3.8	
TSS	mg/L	12	
Oil & Grease	mg/L	<2	
Bicarbonate Alkalinity (CaCO ₃)	mg/L	50	221
Total Alkalinity (CaCO ₃)	mg/L	50	221
Sulfate (as SO ₄)	mg/L	587	64
Chloride	mg/L	29	118
Calcium	mg/L	120	42
Magnesium	mg/L	61	50
Sodium	mg/L	56	70
Potassium	mg/L	19	8
Cobalt (dissolved)	mg/L	0.063	
Manganese (dissolved)	mg/L	2.64	
Nickel (dissolved)	mg/L	0.105	
Zinc (dissolved)	mg/L	0.181	
Iron (dissolved)	mg/L	19.1	

NOTES: *Depth relative to ground level (not standpipe height).

■ Indicates analysis was not required

Groundwater monitoring locations are shown in **Appendix 1**.

3.2 EPA SURFACE WATER MONITORING

Routine quarterly surface water monitoring was undertaken during the month of February 2015 at three surface water sites, EPA points 2, 3 and 14. Water quality analysis results are shown in **Error! Not a valid bookmark self-reference..**

Table 3 EPA Surface Water Analysis 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	-	02156880009	02156880004	02156880010
Date Sampled	-	11/02/2015	11/02/2015	11/02/2015
Time Sampled	-	13:11	13:38	10:22
Temperature	°C	22.3	22.3	22.3
pH	pH	6.58	7.42	8.65
Conductivity	µS/cm	1653	2757	1134
Turbidity	NTU	1	1	15
Total Suspended Solids	mg/L	8	<5	17
Sulfate	mg/L	775	1470	72
Dissolved Iron	mg/L	0.11	0.14	<0.05

4 AIR QUALITY MONITORING RESULTS

4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

HVAS at this facility conform to AS/NZS 3580.9.3:2003, AS/NZS 3580.9.6:2003 and AS/NZS 3580.1.1:2007.

HVAS Total Suspended Particulate analysis results are shown in **Table** .

PM₁₀ Suspended Particulate Matter results are shown in **Table** .

Table 4 Total Suspended Particulates ($\mu\text{g}/\text{m}^3$ 0°C 101.3 kPa)

RUN DATE	TSP ($\mu\text{g}/\text{m}^3$)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
04-Feb-15	12	02156880032	8901759	05-Feb-15	7:30	Client	24.04
10-Feb-15	15	02156880034	8890608	11-Feb-15	13:50	Client	24.00
16-Feb-15	19	02156880036	8890617	17-Feb-15	6:50	Client	24.00
22-Feb-15	5	02156880038	8890625	24-Feb-15	3:25	Client	24.00
28-Feb-15	16	02156880040	8890633	01-Mar-15	12:25	Client	24.00

Table 5 *Suspended Particulate Matter PM₁₀ (µg/m³ 0°C 101.3 kPa)*

RUN DATE	PM ₁₀ (µg/m ³)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
04-Feb-15	6	02156880033	8901760	05-Feb-15	7:34	Client	24.00
10-Feb-15	9	02156880035	9091946	11-Feb-15	13:52	Client	24.00
16-Feb-15	9	02156880037	8890618	17-Feb-15	6:52	Client	24.00
22-Feb-15	5	02156880039	8890632	24-Feb-15	3:27	Client	24.00
28-Feb-15	9	02156880041	8890640	01-Mar-15	12:27	Client	24.00

4.1.1 TSP Summary

The EPA Annual Mean TSP allowable limit is 90µg/m³. All TSP HVAS results recorded during this monitoring period are in compliance with consent conditions, as the *current rolling annual mean* (from March 2014 to February 2015) for the TSP unit is 17.8µg/m³, which is well below the allowable limit of 90µg/m³.

4.1.2 PM₁₀ Summary

The EPA 24h Maximum PM₁₀ allowable limit is 50µg/m³. The EPA Annual Mean PM₁₀ allowable limit is 30µg/m³. All PM₁₀ HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the PM₁₀ unit is 8.2µg/m³, which is below the allowable limit of 30µg/m³. The 24 hour maximum allowable limit of 50µg/m³ was not exceeded during the month of February 2015.

4.1.3 Comments

HVAS monitoring locations are shown in **Appendix 1**.

Graphical HVAS results presentations are shown in **Appendix 2**.

4.2 DEPOSITIONAL DUST

Depositional Dust Gauges at this facility conform to AS/NZS 3580.10.1:2003 and AS/NZS 3580.1.1:2007. Depositional Dust monitoring results are shown in **Table 6**.

Table 6 *Depositional Dust Monitoring - Deposited Matter February 2015*

SAMPLE NUMBER	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NUMBER OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m ² .month)	ASH (g/m ² .month)	COMBUSTIBLE MATTER (g/m ² .month)
02156880022	D1	14/01/2015	11/02/2015	28	T	0.8	0.4	0.4
02156880023	D2	14/01/2015	11/02/2015	28	I	0.9	0.4	0.5
02156880024	D3	14/01/2015	11/02/2015	28	I	1.2	0.6	0.6
02156880025	D4	14/01/2015	11/02/2015	28	I	0.8	0.2	0.6
02156880026	D5	14/01/2015	11/02/2015	28	I	2.3	1.2	1.1
02156880027	D6	14/01/2015	11/02/2015	28	I	1.0	0.5	0.5

4.2.1 Glossary of Terms Used in Notes

I Insects (eg, Ants, spiders)

T Tree Litter (eg. Twigs, leaves, gumnuts)

4.2.2 Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is 4g/m² per month. All Depositional Dust results during this monitoring period are in compliance with consent conditions. The Annual Average for Dust Gauges D1, D2, D3, D4, D5 and D6 are all less than or equal to 0.9g/m² per month, which is below the allowable Annual Average Long Term Limit of 4g/m² per month.

Depositional Dust monitoring locations are shown in **Appendix 1**. Graphical Depositional Dust results are shown in **Appendix 2**.

5 BLASTING RESULTS

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

6 NOISE MONITORING RESULTS

Routine quarterly noise monitoring was not undertaken this month. Routine quarterly noise monitoring is next scheduled for March 2015.

7 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 May 2014.

8 SUMMARY

During the month of February 2015 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Rolling annual averages from both the TSP and PM₁₀ High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM₁₀ criterion of 90µg/m³ and 30µg/m³ respectively.

Currently 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.

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

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Please contact the undersigned if you have any queries.

Yours sincerely



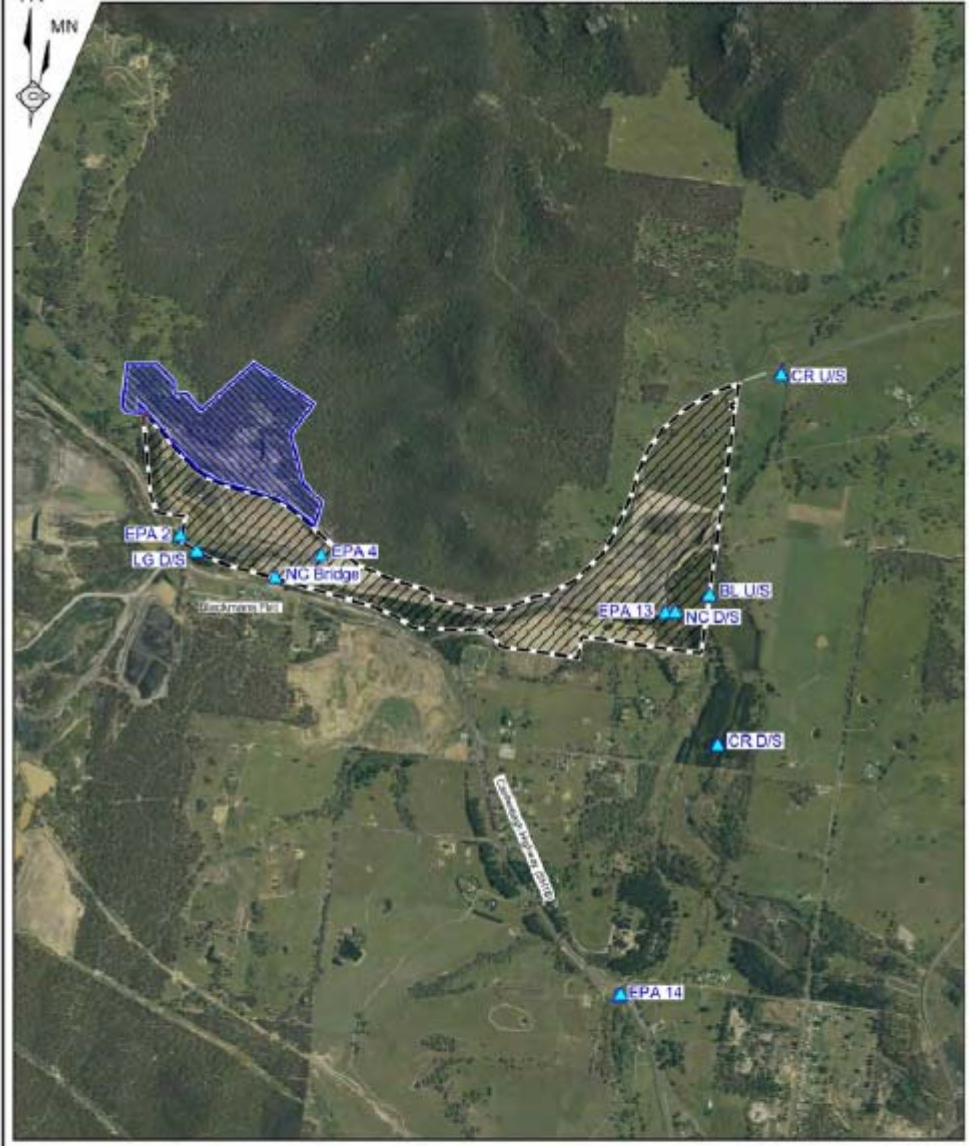
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



Karen Tripp
Senior Environmental Scientist/Hygienist
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental

Appendix 1

Surface Water Groundwater and Air Quality Monitoring Locations



REFERENCE
Pine Dale Coal Mine
Yarraboldy Extension
EPA 14 Surface Water Monitoring Location

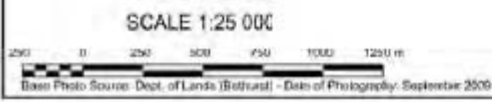


Figure WM5
SURFACE WATER
MONITORING LOCATIONS

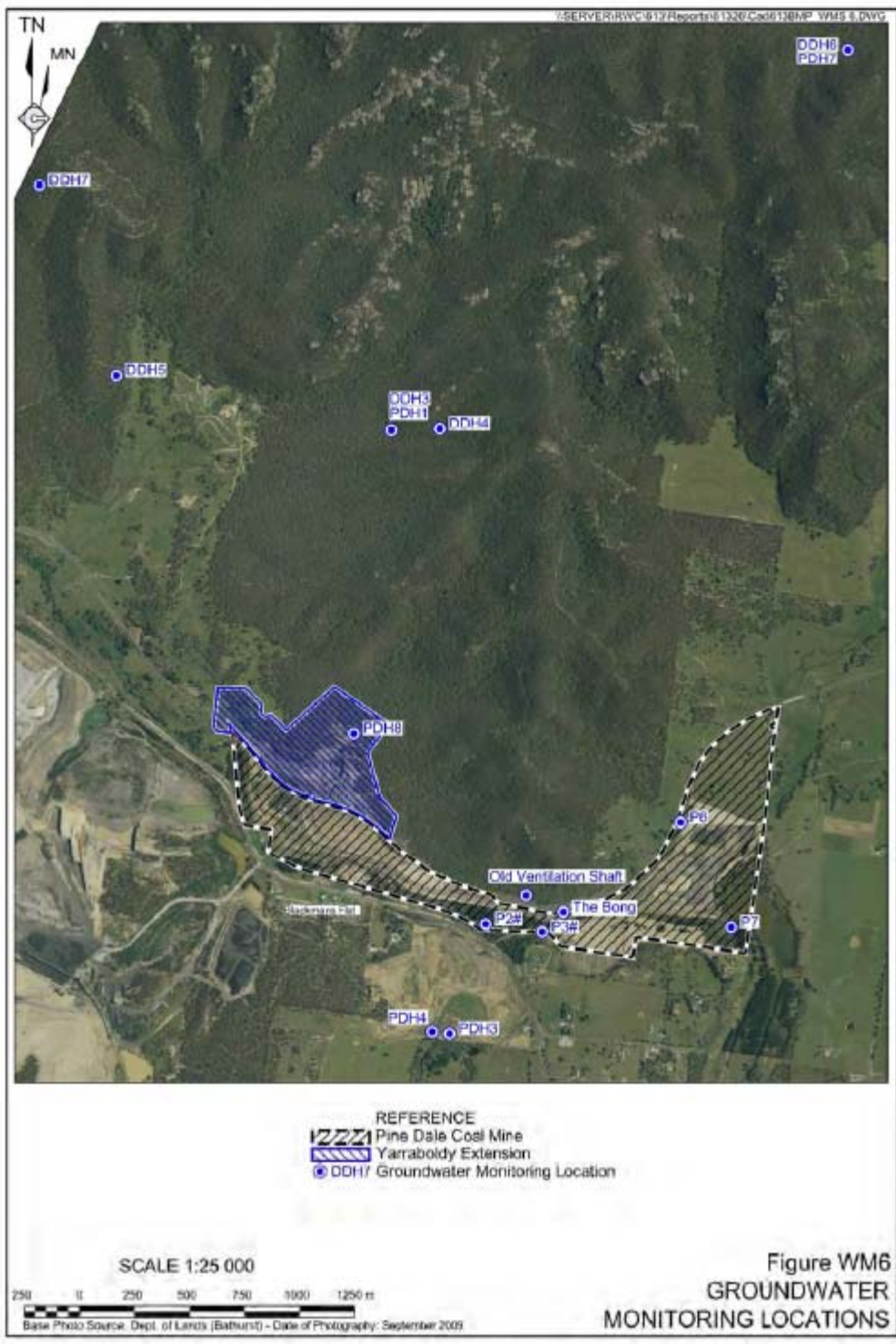
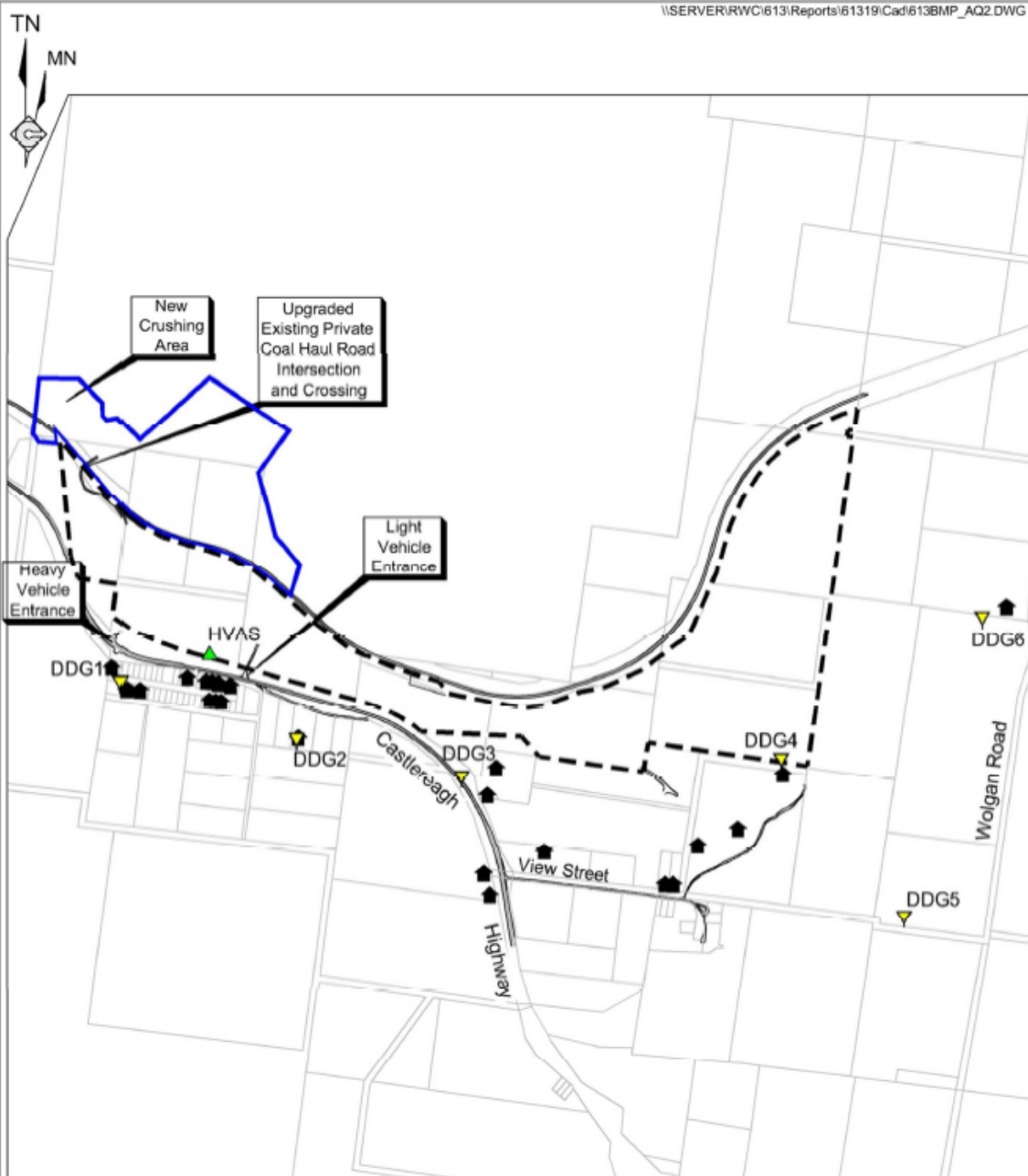


Figure WM6
GROUNDWATER
MONITORING LOCATIONS



- REFERENCE
- Pine Dale Coal Mine
 - Yarraboldy Extension
 - Cadastral Boundary
 - 🏠 Residence
 - DDG1 ▾ Air Quality Monitoring Location (Deposited Dust)
 - HVAS ▲ Air Quality Monitoring Location (High Volume Sampling)

SCALE 1:20 000

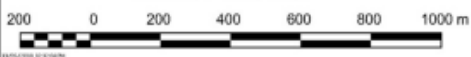
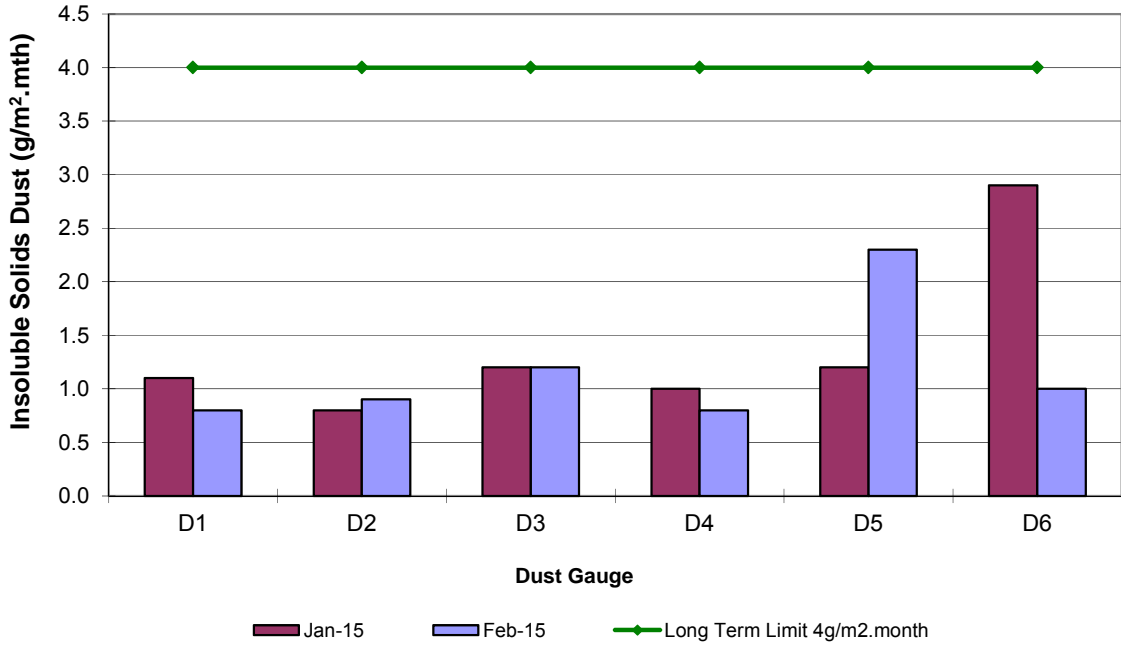


Figure AQ2
AIR QUALITY MONITORING
LOCATIONS

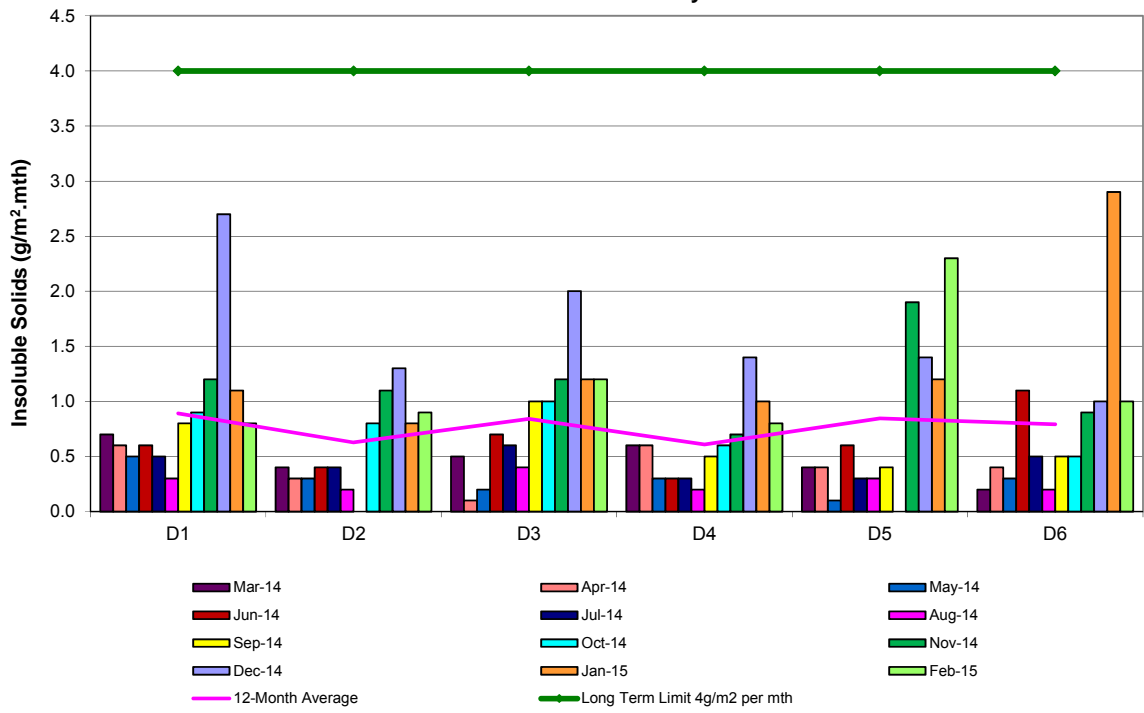
Appendix 2

Depositional Dust and HVAS Graphs

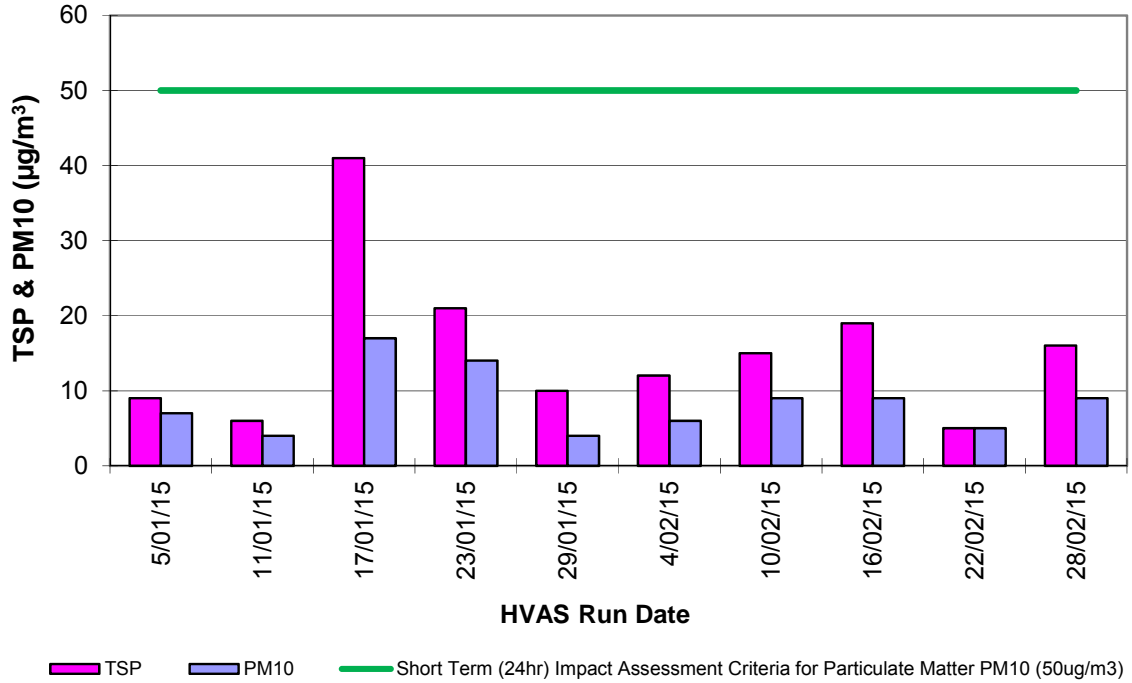
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
January 2015 to February 2015**



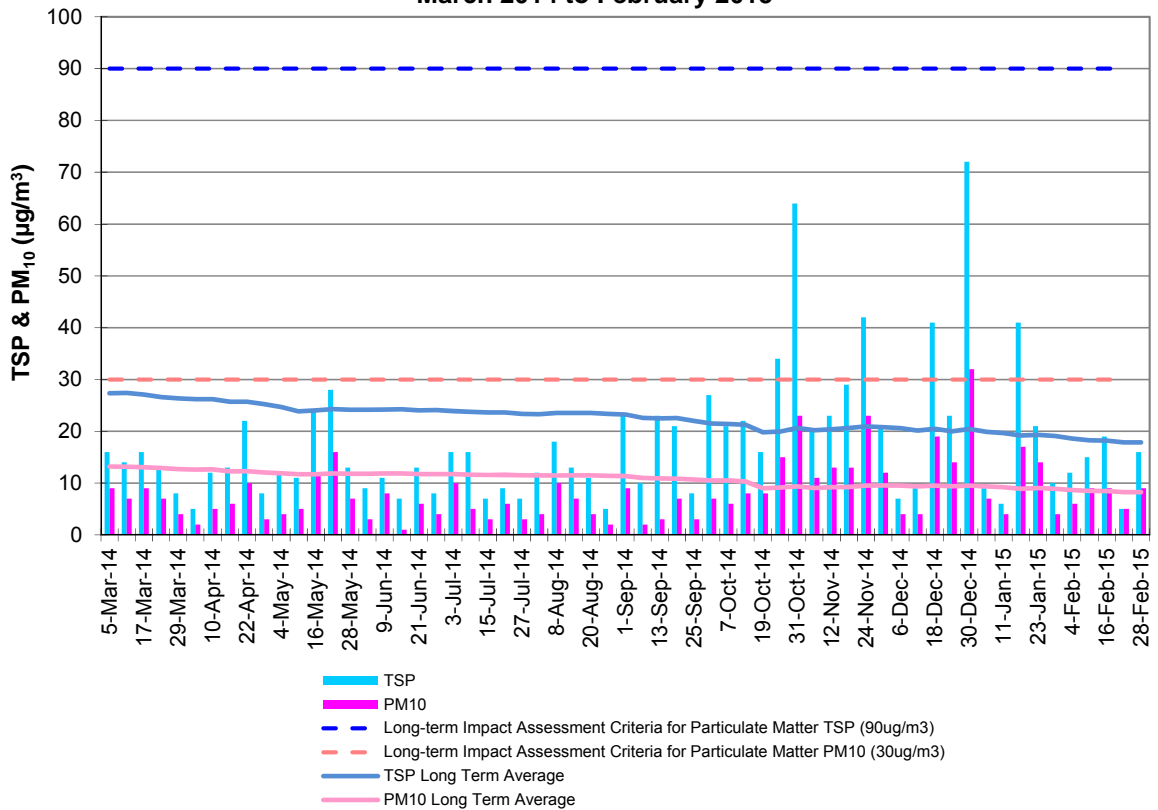
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
March 2014 to February 2015**



Pine Dale Mine TSP & PM₁₀ Results January 2015 to February 2015

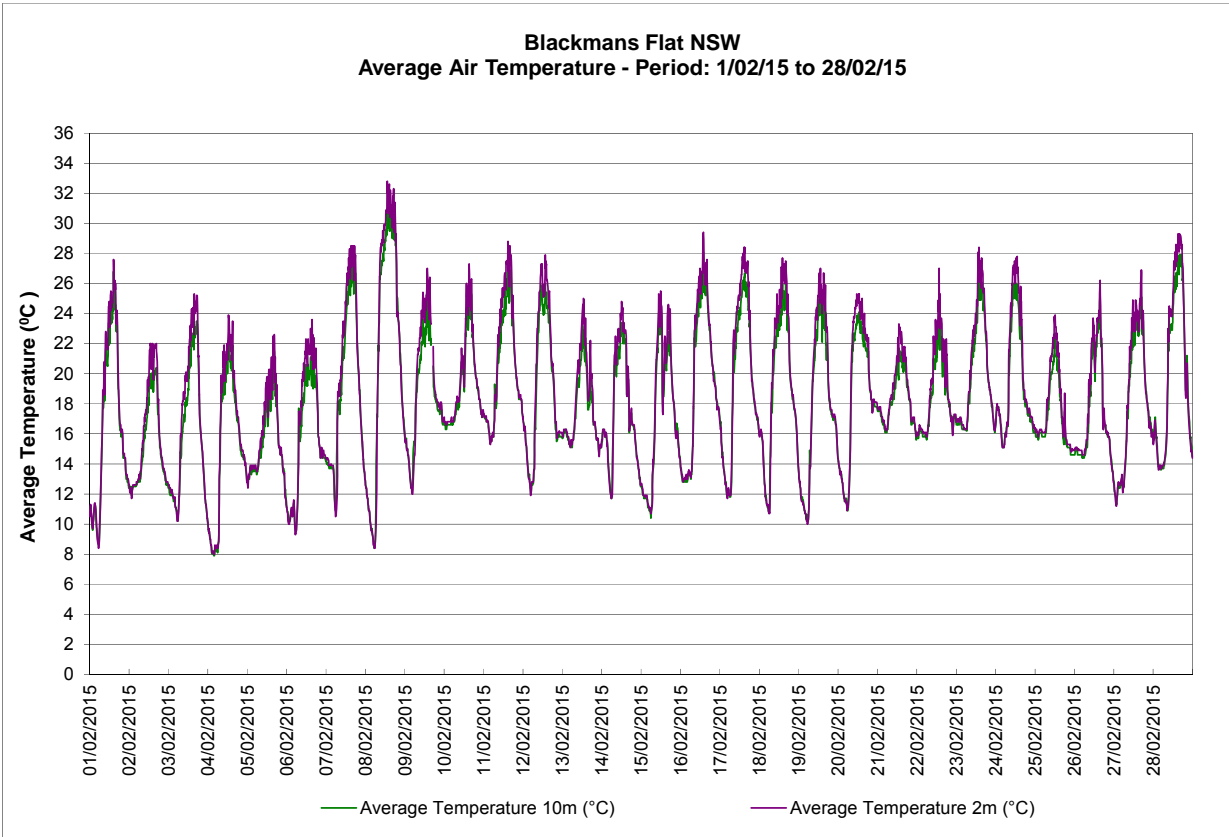
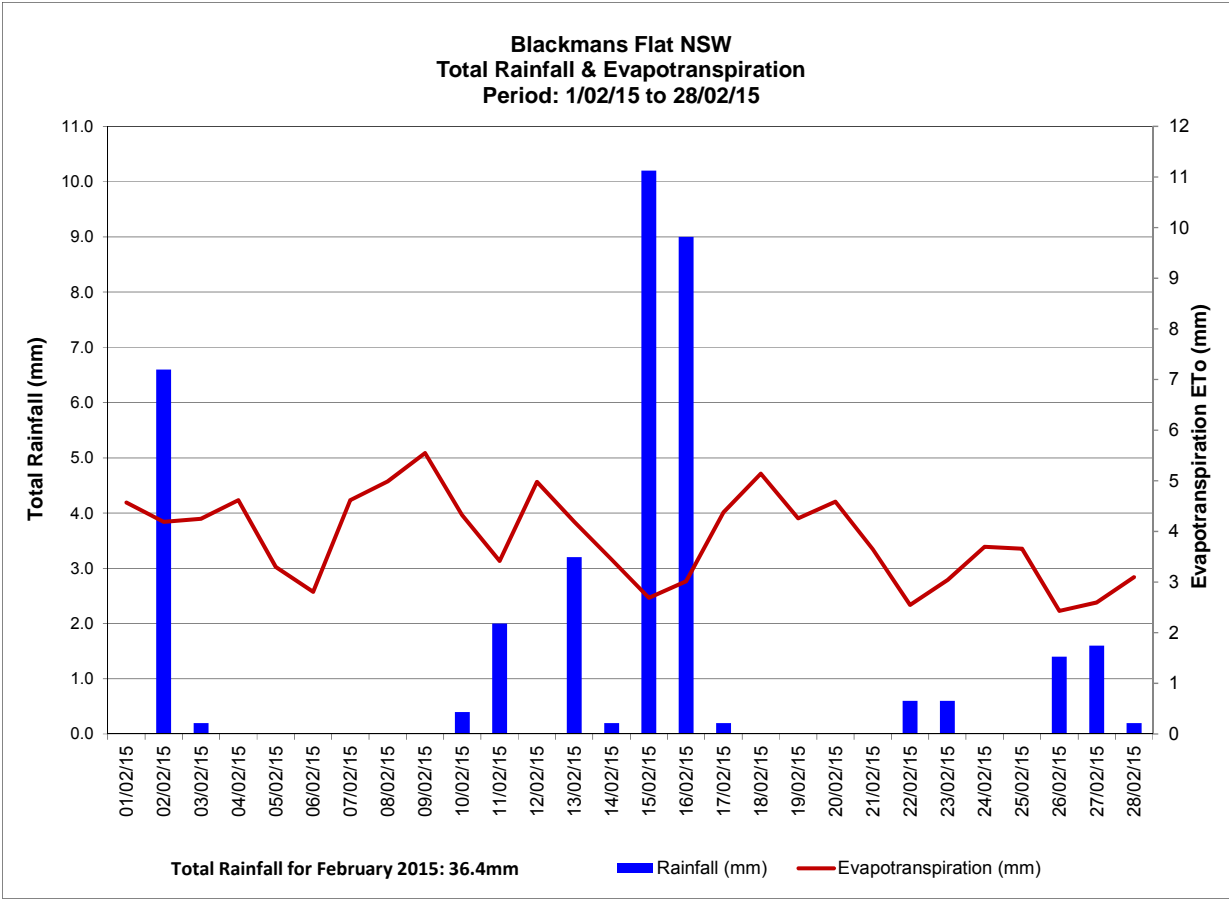


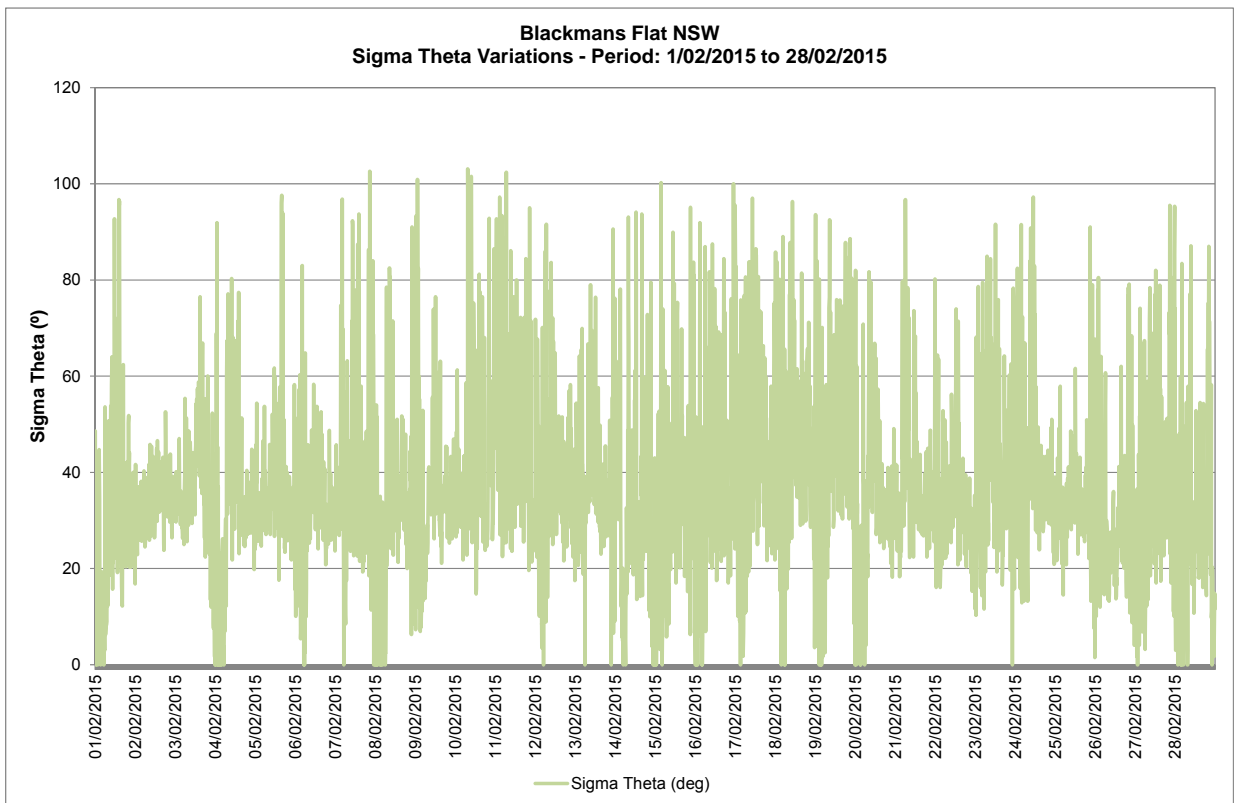
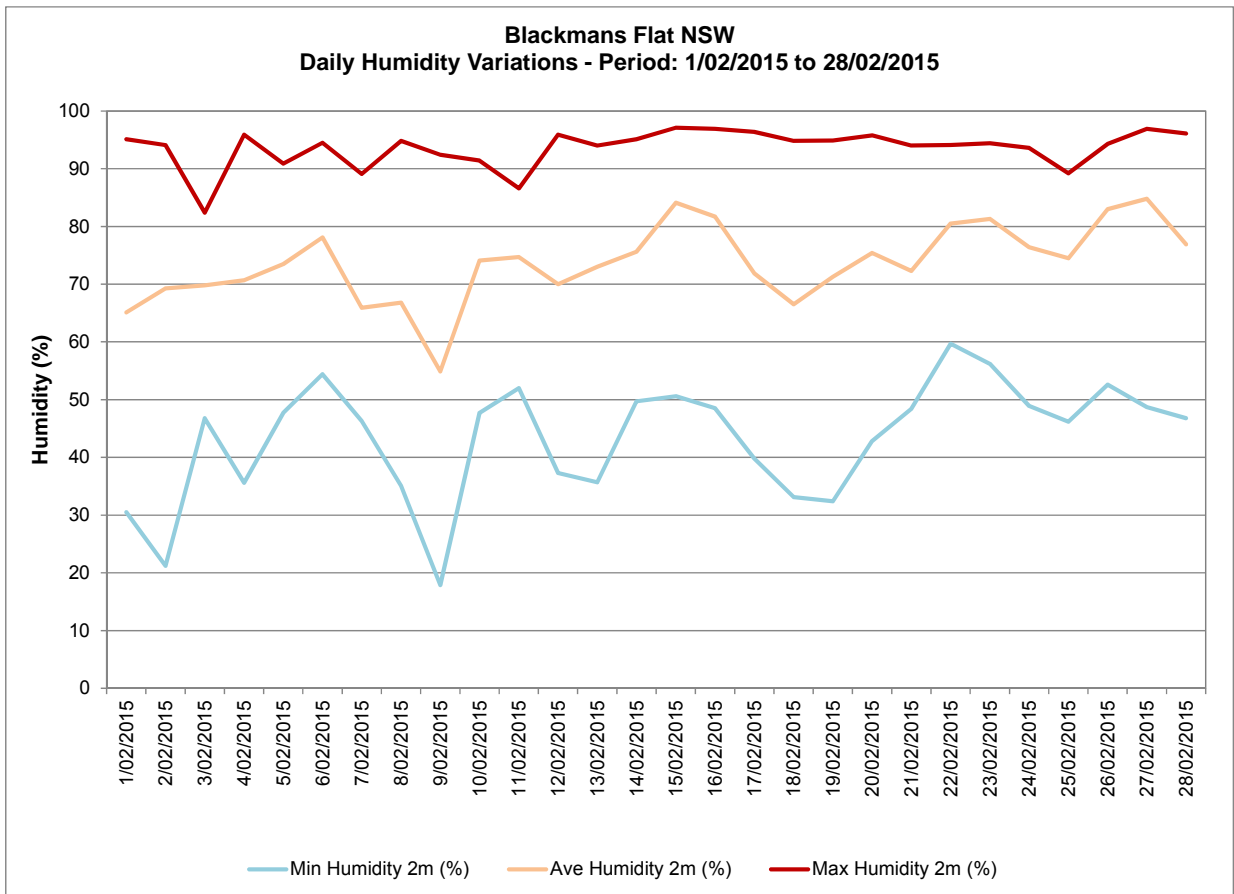
Pine Dale Mine TSP & PM₁₀ HVAS 12-Month Comparative Results March 2014 to February 2015

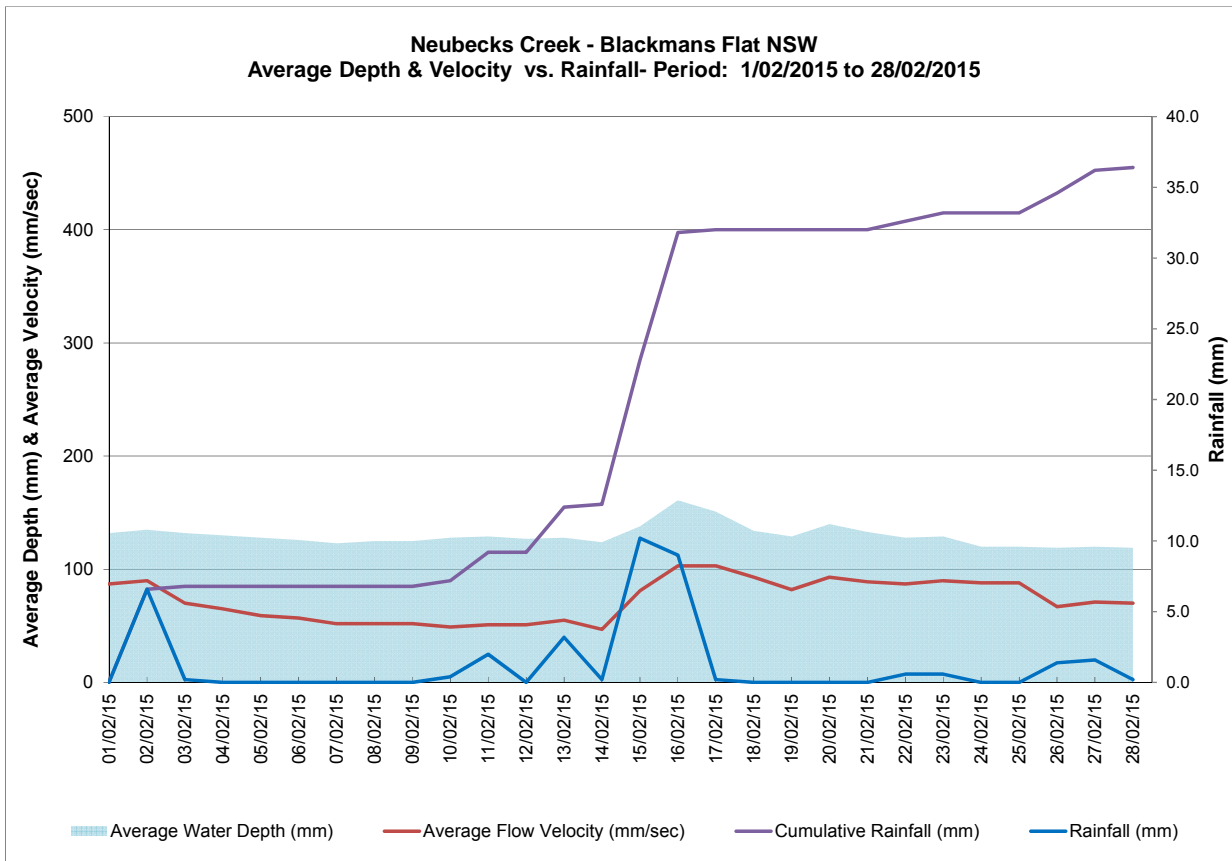
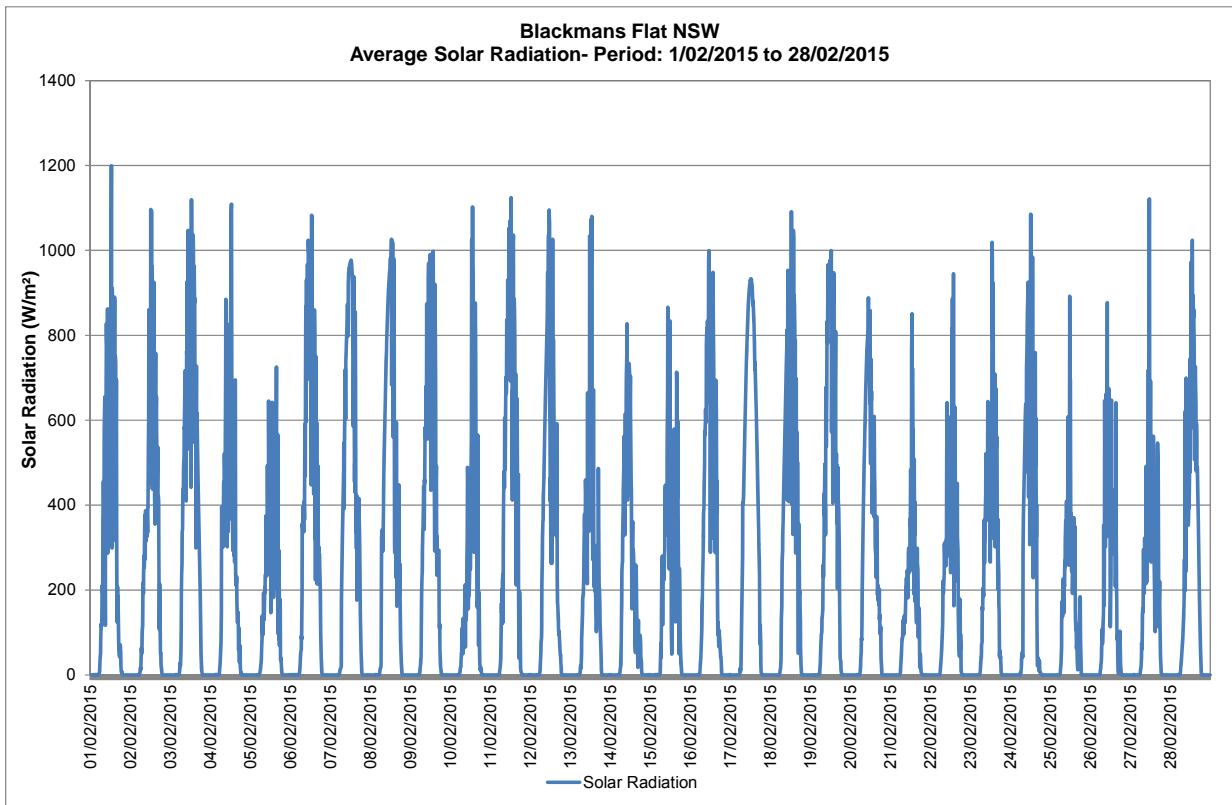


Appendix 3

Meteorological Data



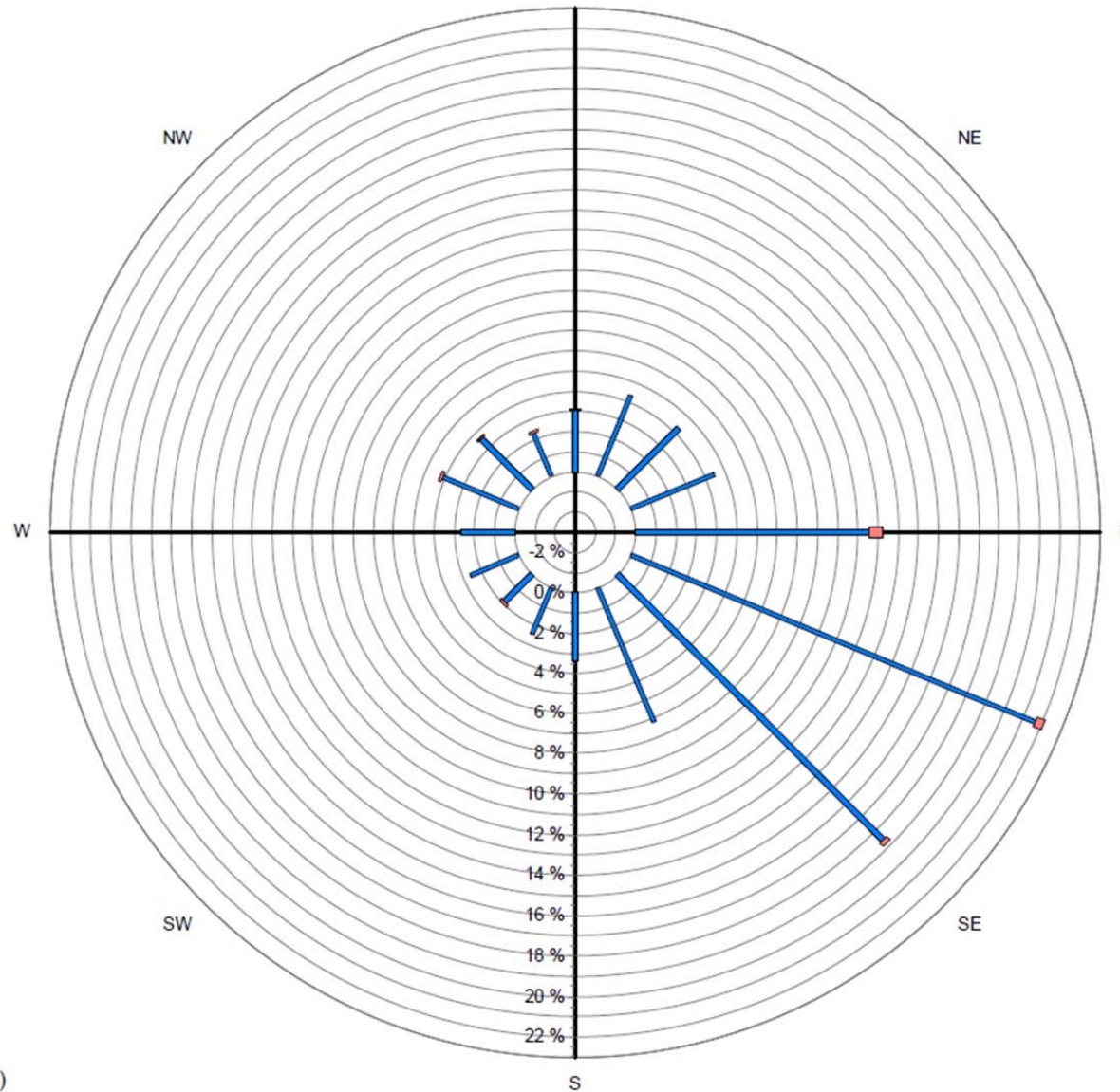
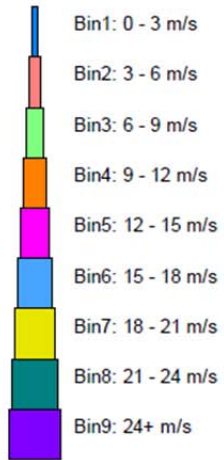




Blackmans Flat Windrose

1/02/2015 to 28/02/2015

N



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