

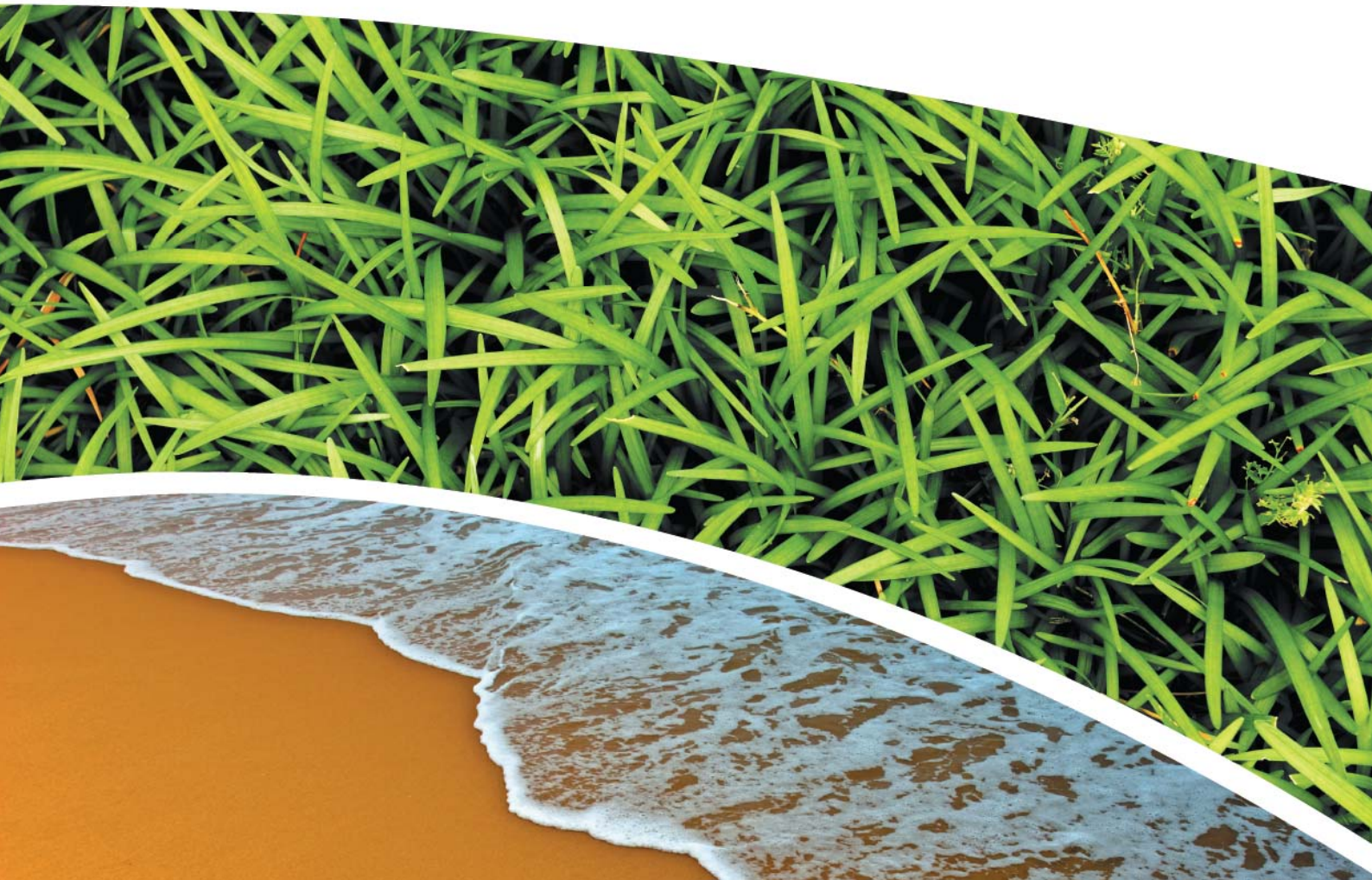
**SURFACE WATER, DEPOSITIONAL DUST,
HVAS AND METEOROLOGICAL MONITORING**

Prepared for Pine Dale Mine Community Consultative Committee

Prepared by RCA Australia

RCA ref 6880-846/0

February 2014



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18 March 2014

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 2014**

1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of February 2014.

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	Non-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

*Note that turbidity sampling and analysis is conducted to NATA approved method ENV-LAB037, however as the meter is not owned by RCA Laboratories-Environmental the test cannot be considered NATA accredited.

3 WATER MONITORING RESULTS

3.1 GROUNDWATER

A total of 4 on-site groundwater samples were collected during the month of February 2014. 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	Old Shaft	Old Shaft
Sample Number	-	02146880014	02146880015	02146880001	02146880020
Date Sampled	-	18/02/14	18/02/14	3/02/2014	18/02/2014
Time Sampled	-	15:16	15:46	9:05	14:45
Depth to Water from Surface*	m	26.42	6.80	11.9	11.9
Water Level (AHD)	m	890.53	887.60		
Temperature	°C	15	16.00	17.3	16.0
pH	pH	7.7	6.8	6.10	7.08
Conductivity	µS/cm	1270	8	827	880
Turbidity	NTU	20		21	25
Dissolved Oxygen	mg/L	4			4.75
TSS	mg/L	27			31
Oil & Grease	mg/L	<2			<2
Bicarbonate Alkalinity (CaCO ₃)	mg/L	66	198		59
Total Alkalinity (CaCO ₃)	mg/L	66	198		59
Sulfate (as SO ₄)	mg/L	526	70		376
Chloride	mg/L	25	93		12
Calcium	mg/L	115	43		82
Magnesium	mg/L	53	47		38
Sodium	mg/L	40	46		31
Potassium	mg/L	21	8		16
Cobalt (dissolved)	mg/L	0.081			0.258
Manganese (dissolved)	mg/L	3.19			7.68
Nickel (dissolved)	mg/L	0.128			0.203
Zinc (dissolved)	mg/L	0.132			0.085
Iron (dissolved)	mg/L	18.3	1.02		15.1

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 2014 at three surface water sites, EPA points 2, 3 and 14. Water quality analysis results are shown in **Table 3**. No samples were obtained from Point 13 as there was no discharge occurring at this location.

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	-	02146880018	02146880009	02146880019
Date Sampled	-	18/02/2014	18/02/2014	18/02/2014
Time Sampled	-	11:20	16:56	11:52
Temperature	°C	17.0	24.0	20.0
pH	pH	6.98	7.91	7.24
Conductivity	µS/cm	3160	1064	1093
Turbidity	NTU	1.71	1.7	5.58
Total Suspended Solids	mg/L	1.5	2	6
Sulfate	mg/L	1620	1680	59
Dissolved Iron	mg/L	0.32	<0.05	<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 3**.

PM₁₀ Suspended Particulate Matter results are shown in **Table 4**.

Table 3 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
03-Feb-14	42	02146880036	8890610	05-Feb-14	1:10	Client	24.00
09-Feb-14	35	02146880038	8890612	11-Feb-14	10:35	Client	24.00
15-Feb-14	22	02146880040	8890614	18-Feb-14	9:15	Client	24.00
21-Feb-14	28	02146880042	8890616	24-Feb-14	11:05	Client	24.00
27-Feb-14	16	02146880044	8885665	03-Mar-14	13:05	Client	24.00

Table 4 Suspended Particulate Matter PM_{10} ($\mu\text{g}/\text{m}^3$ 0°C 101.3 kPa)

RUN DATE	PM_{10} ($\mu\text{g}/\text{m}^3$)	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
3-Feb-14	20	02146880037	8890611	05-Feb-14	1:10	Client	24.00
9-Feb-14	19	02146880039	8890613	11-Feb-14	10:35	Client	24.00
15-Feb-14	14	02146880041	8890615	18-Feb-14	9:15	Client	24.00
21-Feb-14	15	02146880043	8885664	24-Feb-14	11:05	Client	24.00
27-Feb-14	10	02146880045	8885675	03-Mar-14	13:05	Client	24.00

4.1.1 TSP Summary

The 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* (from March 2013 to February 2014) for the TSP unit is $27.4\mu\text{g}/\text{m}^3$, which is well below the allowable limit of $90\mu\text{g}/\text{m}^3$.

4.1.2 PM_{10} Summary

The EPA 24h Maximum PM_{10} allowable limit is $50\mu\text{g}/\text{m}^3$. The EPA Annual Mean PM_{10} allowable limit is $30\mu\text{g}/\text{m}^3$. 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 $13.2\mu\text{g}/\text{m}^3$, which is below the allowable limit of $30\mu\text{g}/\text{m}^3$. The 24 hour maximum allowable limit of $50\mu\text{g}/\text{m}^3$ was not exceeded during the month of February 2014.

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 5**.

Table 5 *Depositional Dust Monitoring - Deposited Matter February 2014*

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)
02146880024	D1	20/01/2014	18/02/2014	29	I	0.8	0.4	0.4
02146880025	D2	20/01/2014	18/02/2014	29	I	0.5	0.2	0.3
02146880026	D3	20/01/2014	18/02/2014	29	I	1.0	0.6	0.4
02146880027	D4	20/01/2014	18/02/2014	29	IG	0.4	<0.1	0.4
02146880028	D5	20/01/2014	18/02/2014	29	N	0.4	0.2	0.2
02146880029	D6	20/01/2014	18/02/2014	29	I	0.3	0.1	0.2

4.2.1 Glossary of Terms Used in Notes

I Insects (eg, Ants, spiders)

N No foreign matter

IG Insects, grass and grass seeds

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 1.5g/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

Blasting results for the month of February are shown in **Table 6**.

Table 6 *Blasting Results- Airblast Overpressure (dB) and Ground Vibration (mm/sec)*

Date	<i>Park</i>		<i>Noon St.</i>		<i>Summer St.</i>	
	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)	Overpressure (dB)	Vibration (mm/sec)
4/02/2014	NT	NT	101.9	0.02	NT	NT
7/02/2014	NT	NT	91.8	0.07	NT	NT
2012- 2013 Year to Date Information						
Minimum	96.9	0.38	78.3	0.07	87.2	0.08
Average	96.9	0.38	102.7	0.76	105.9	1.05
Maximum	96.9	0.38	113.5	2.21	113.3	2.17
% > EPL 95% Compliance Criteria	0	0	0	0	0	0
% > EPL 100% Compliance Criteria	0	0	0	0	0	0

Notes: NT - No Trigger. Blast monitoring unit was not triggered during the blast.

5.1.1 Allowable Blasting Limits

Conditions of EPL 4911 state that in relation to airblast overpressure levels a result of greater than 115dB must not be observed at any noise sensitive location for more than 5% of the total number of blasts over each annual reporting period. All blasts within the annual reporting period (100% of blasts) are not to exceed the compliance criteria of 120dB. Ground vibration peak velocity levels must not exceed 5mm/sec for 95% of blasts, whilst an intensity of 10mm/sec must not be exceeded by any blast during the reporting period. The reporting period runs as a rolling 12-month average from March 2013 to February 2014.

During February 2014, there was no exceedance of the EPL conditions for both overpressure and vibration levels. In terms of the rolling annual average, no blasts have exceeded the 100% compliance conditions of 120dB and 10mm/sec for overpressure and vibration respectively. The overpressure and vibration criteria of 115dB and 5mm/sec, respectively, have not been exceeded for more than 5% of the blasts during the reporting period.

Graphical presentation of the blasting results from overpressure and vibration are shown in **Appendix 2**.

6 NOISE MONITORING RESULTS

Routine quarterly noise monitoring was not required to be undertaken this month. Quarterly noise monitoring is next scheduled to be undertaken during the April 2014 period.

7 OPERATIONAL ACTIVITIES

Pine Dale Mine production rates in February 2014 were good, with no major issues recorded. There were 20 production days available with no weekend work undertaken during the month. Two blasts were shot throughout the month.

Slightly above average rainfall was observed throughout the month (when compared to long term average at Bureau of Meteorology Lithgow weather data). A total of 93.6mm of rain was recorded at the Blackmans Flat Meteorological monitoring station.

The overburden target was below budget this month and is now complete. Run of mine (ROM) coal from the mine to the raw coal crusher pad were above target this month and is also now complete. Waste production was below target this month with approximately 28,700 bank m³ of overburden excavated. Delivery of coal to Mt Piper was above budget with a total of 22,102 tonnes of coal delivered to Mt Piper Power Station. There is approximately 18,000 tonnes of coal left to process and send to Mt Piper Power Station in March.

8 SUMMARY

During the month of February 2013 all environmental monitoring constituents were found to be in compliance with EPL 4911.

Quarterly surface water sampling was undertaken this month, with all required sites sampled.

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.

During February the blasting limits documented in the Pine Dale Mine EPL were not exceeded. During the previous twelve-month reporting period, there have been zero non-conformance's based upon the 95% or 100% limits for either overpressure or vibration levels.

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Please contact the undersigned if you have any queries.

Yours sincerely



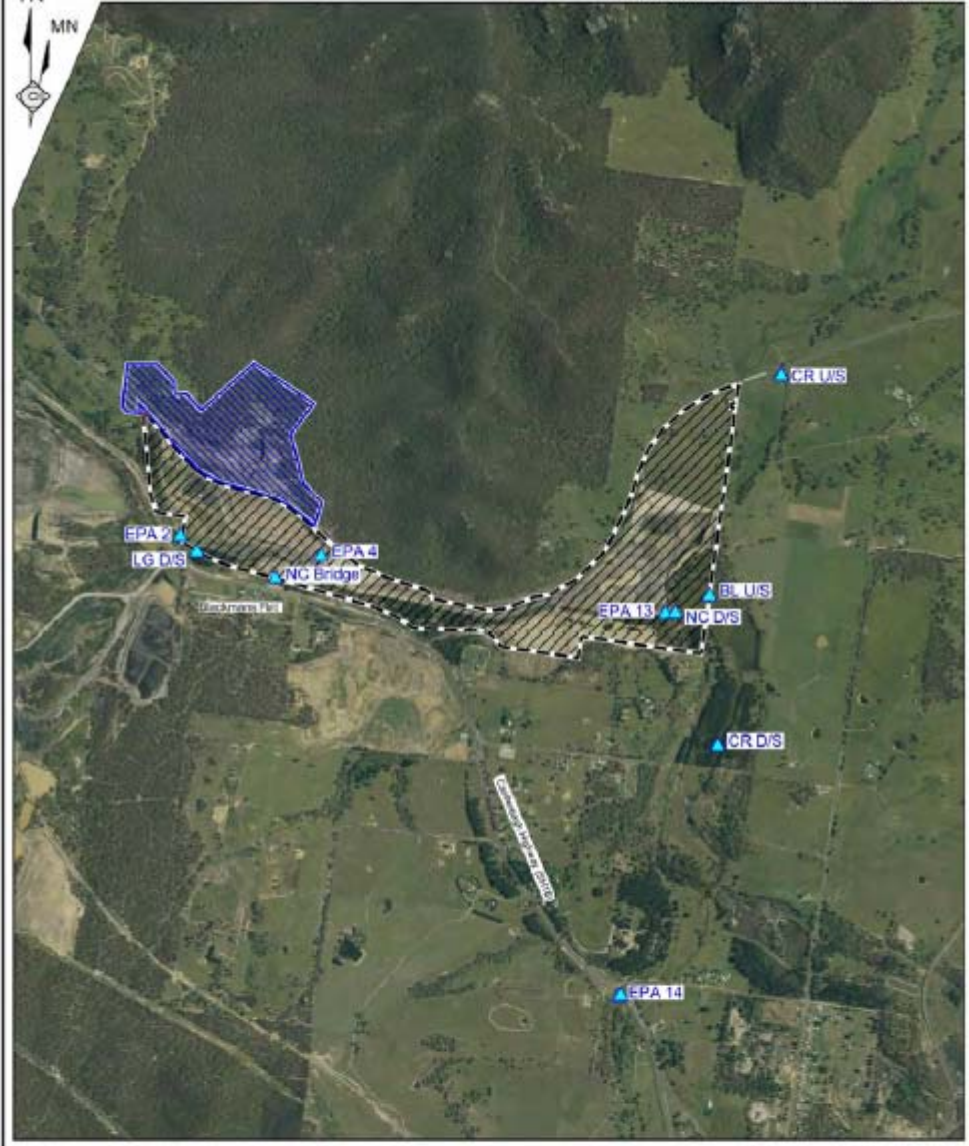
Carmen Rocher
Environmental Engineer
RCA Australia Pty Ltd trading as
RCA Laboratories – Environmental



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

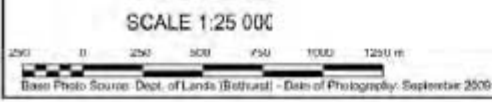
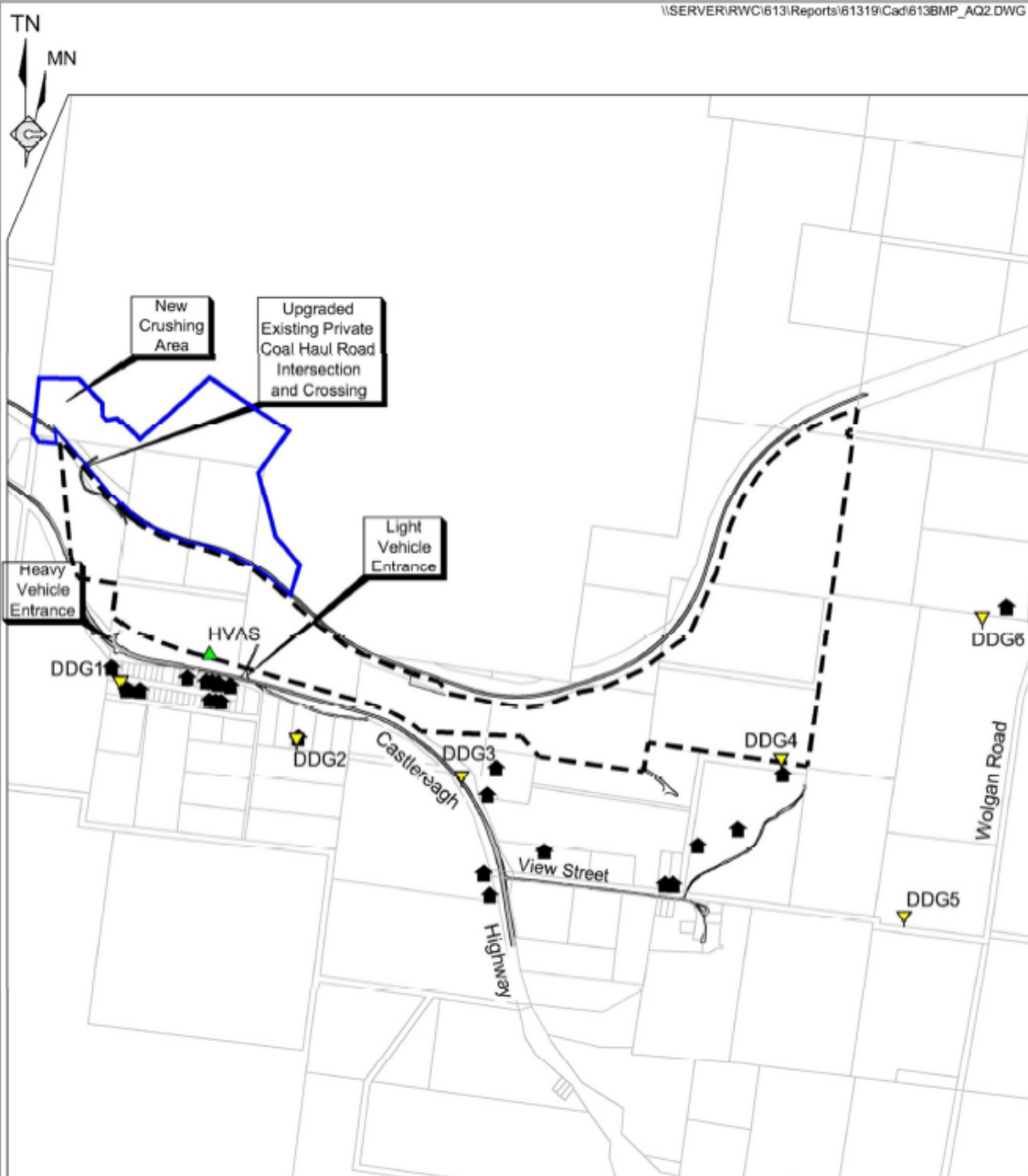


Figure WM5
SURFACE WATER
MONITORING LOCATIONS



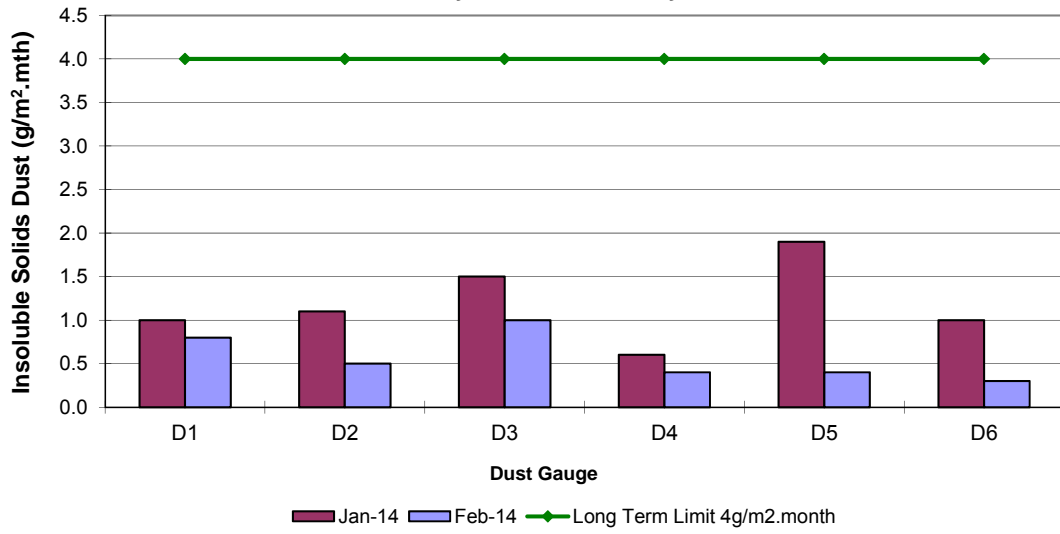
- REFERENCE
- Pine Dale Coal Mine
 - Yarraboldy Extension
 - Cadastral Boundary
 - 🏠 Residence
 - ▼ DDG1 Air Quality Monitoring Location (Deposited Dust)
 - ▲ HVAS Air Quality Monitoring Location (High Volume Sampling)

Figure AQ2
AIR QUALITY MONITORING
LOCATIONS

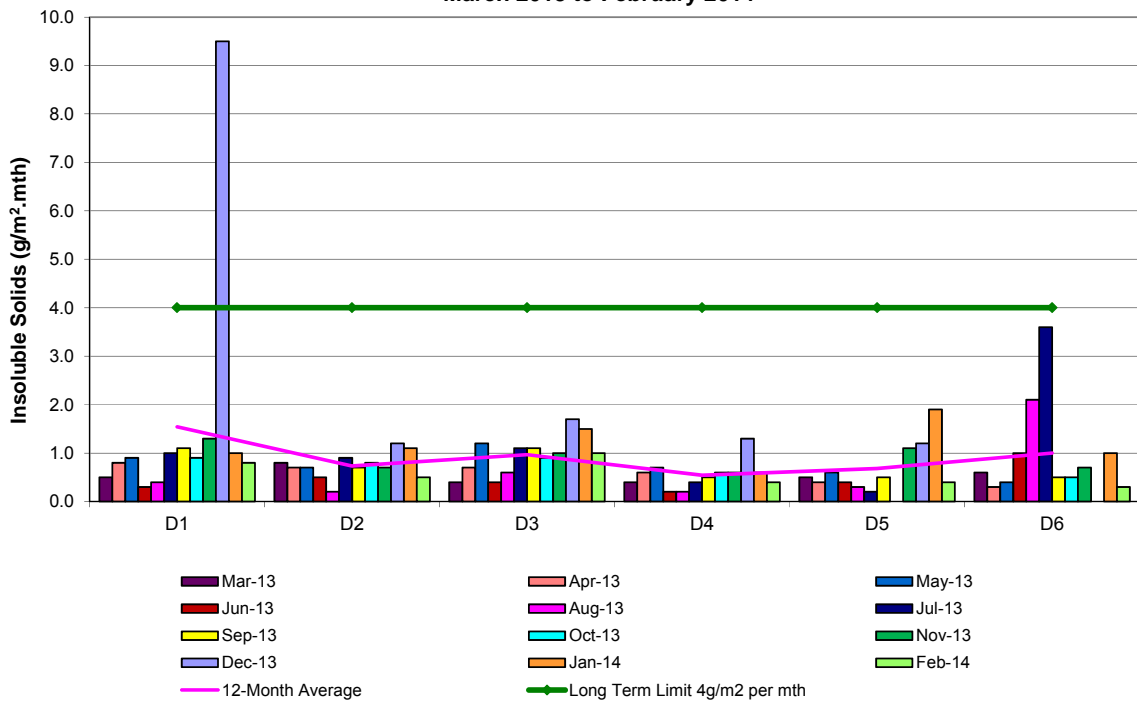
Appendix 2

Depositional Dust, HVAS and Blast Result Graphs

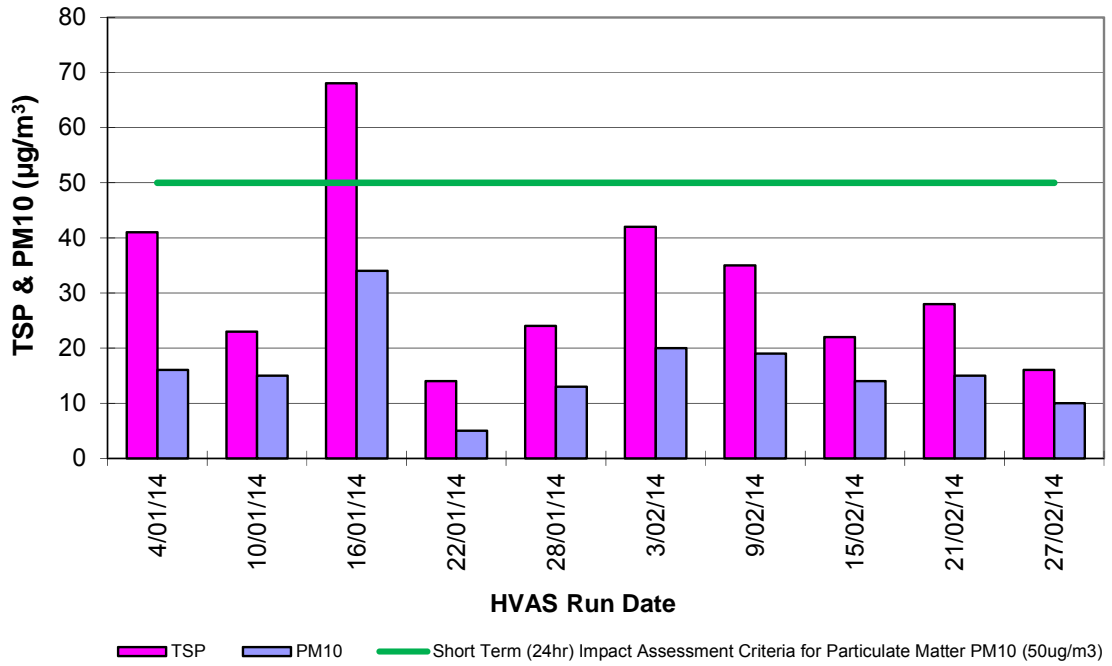
**Pine Dale Mine
Depositional Dust Gauge Comparative Results
January 2014 to February 2014**



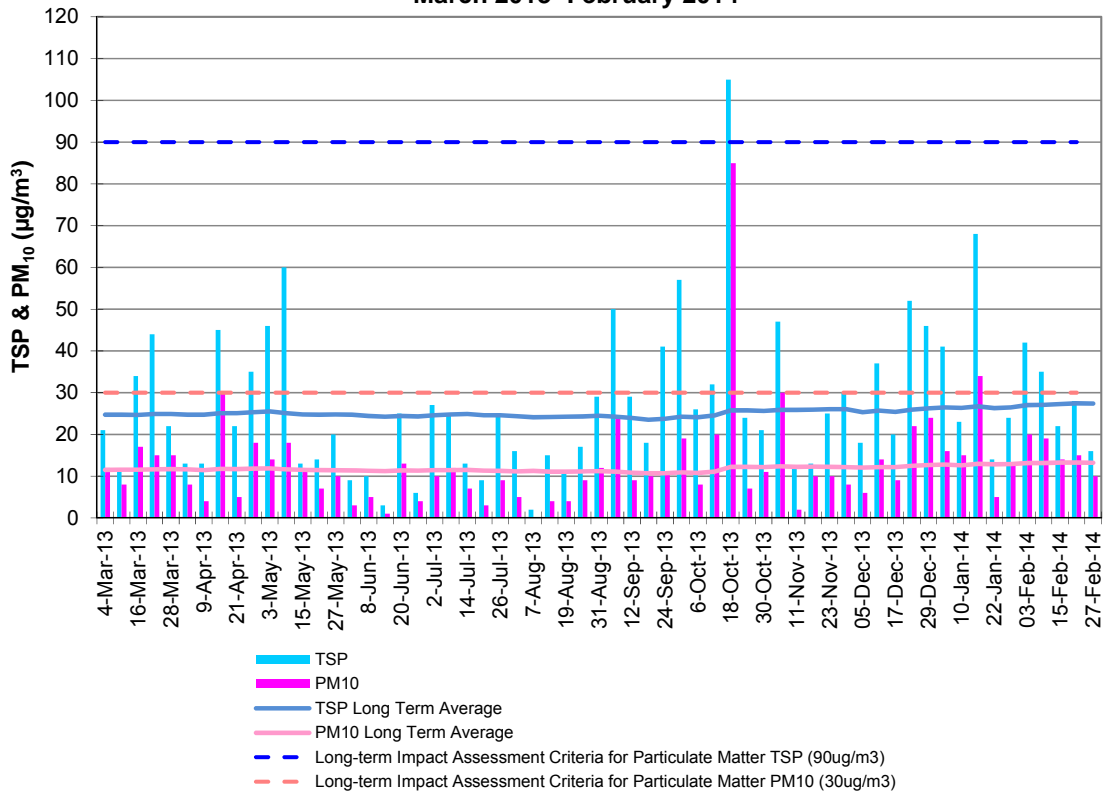
**Pine Dale Mine
Deposited Matter - Insoluble Solids 12 Months Comparative Results
March 2013 to February 2014**



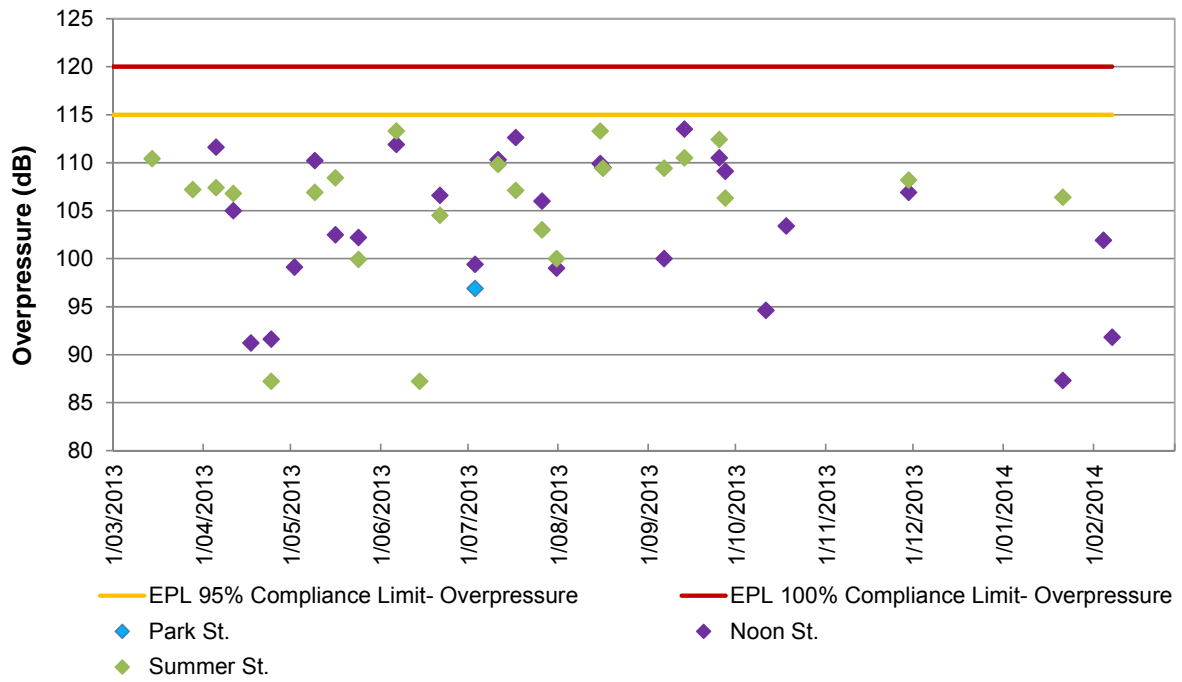
Pine Dale Mine TSP & PM₁₀ Results January - February 2014



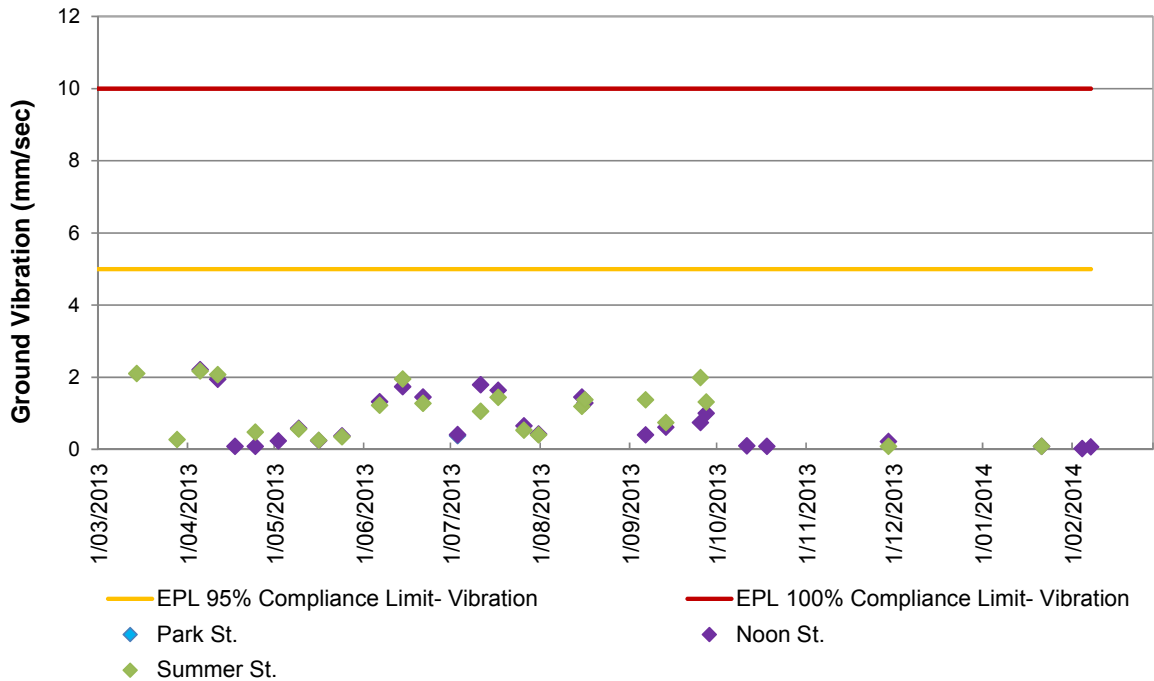
Pine Dale Mine TSP & PM₁₀ HVAS 12-Month Comparative Results March 2013- February 2014



**Pine Dale Mine
Blasting- Airblast Overpressure
March 2013 to February 2014 Comparable Data**



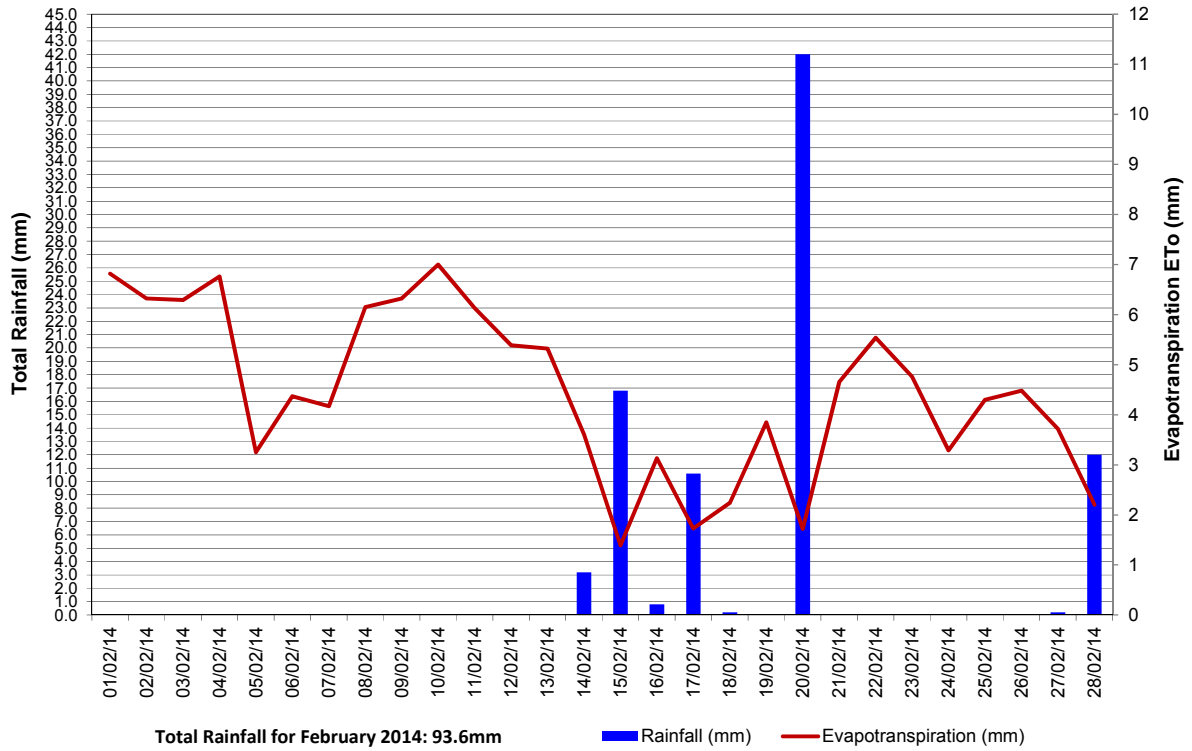
**Pine Dale Mine
Blasting- Ground Vibration
March 2013 to February 2014 Comparable Data**



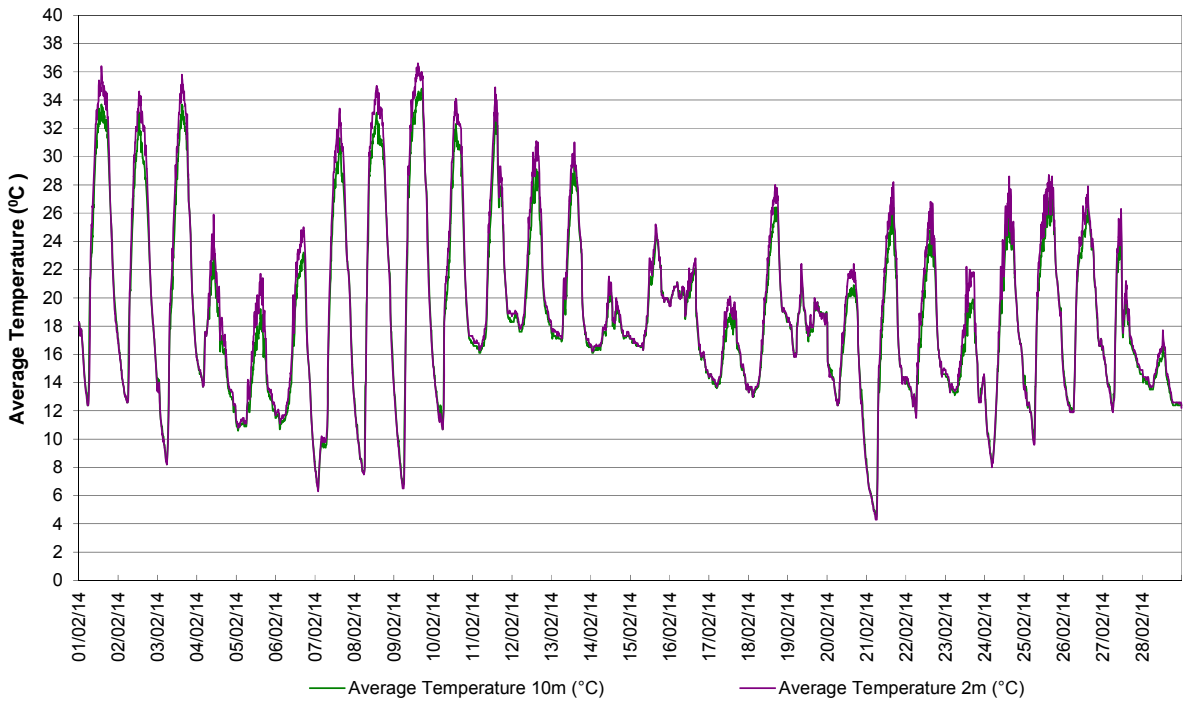
Appendix 3

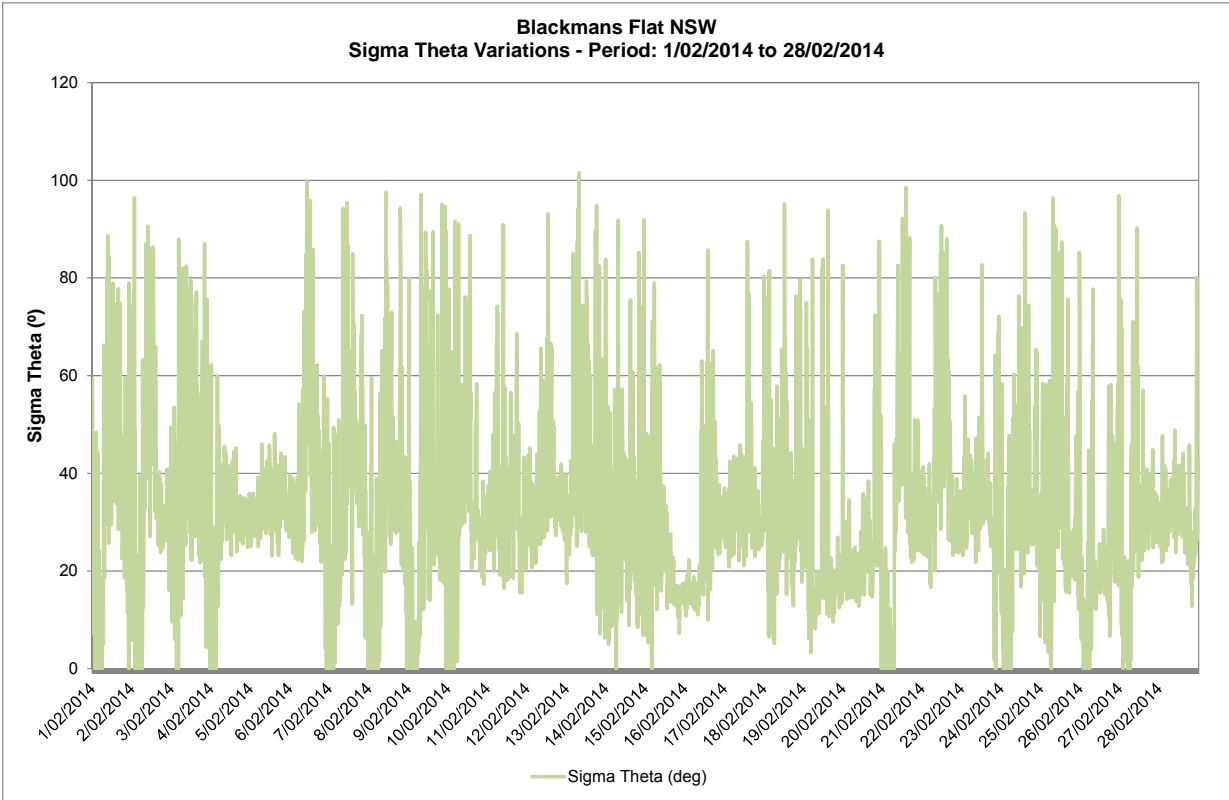
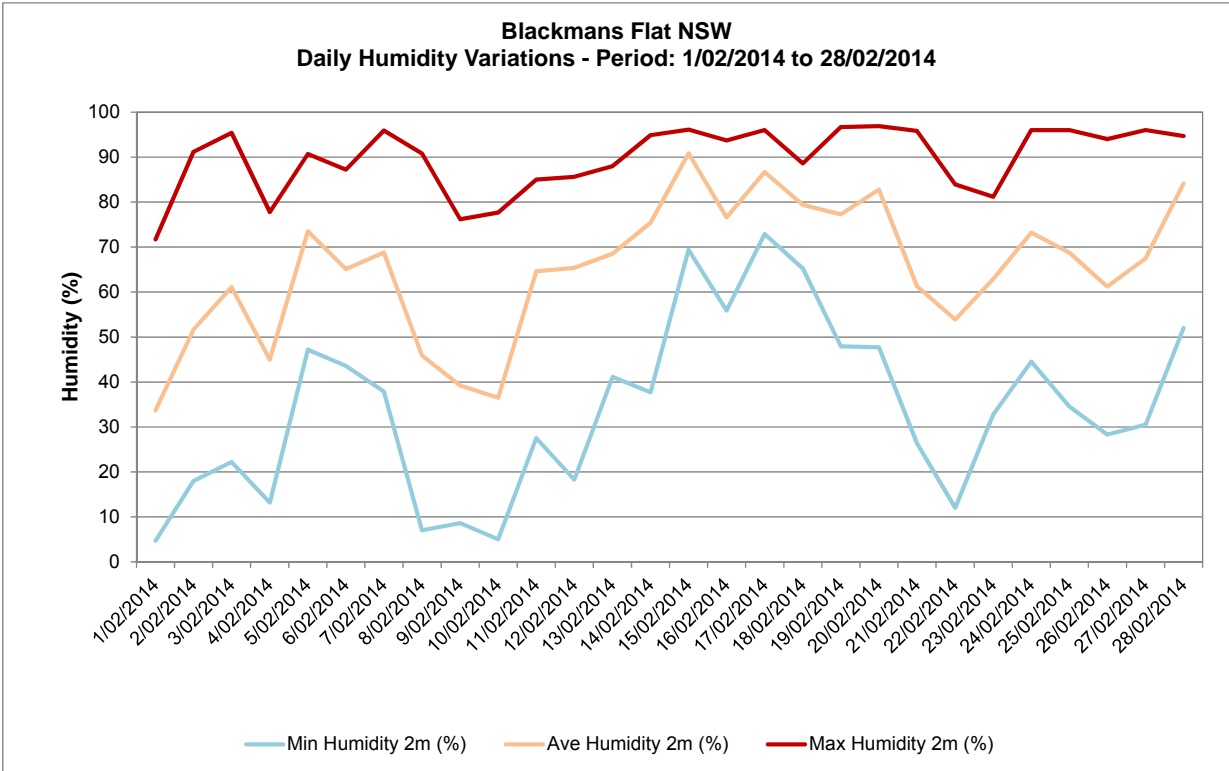
Meteorological Data

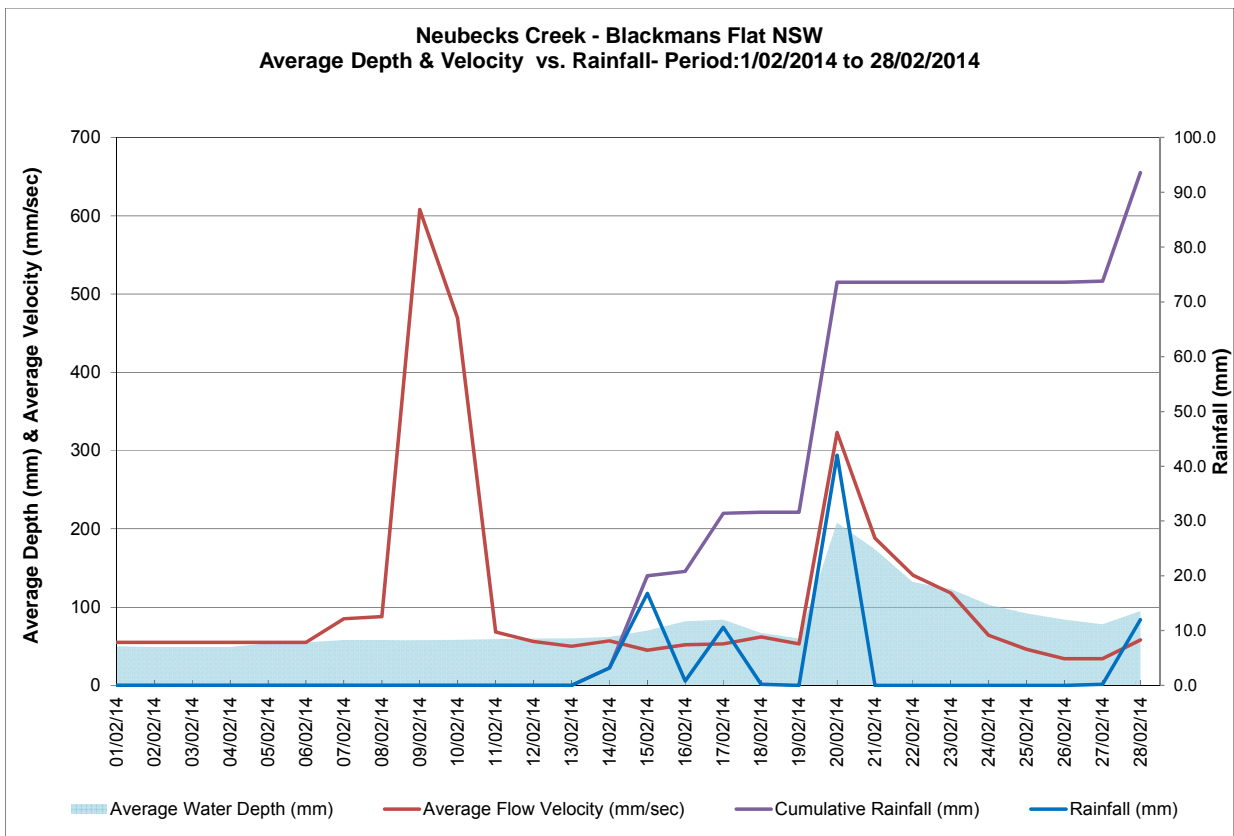
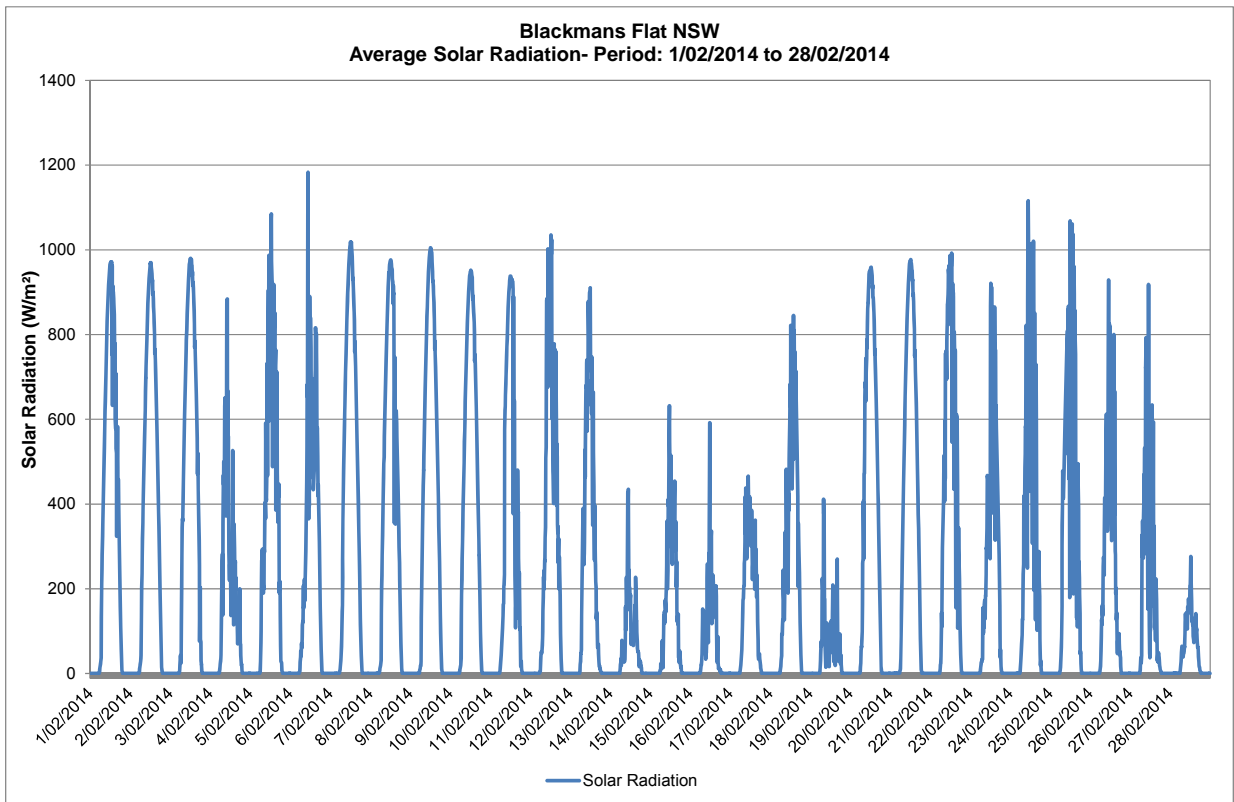
Blackmans Flat NSW
Total Rainfall & Evapotranspiration
 Period: 1/02/14 to 28/02/14



Blackmans Flat NSW
Average Air Temperature - Period: 1/02/14 to 28/02/14

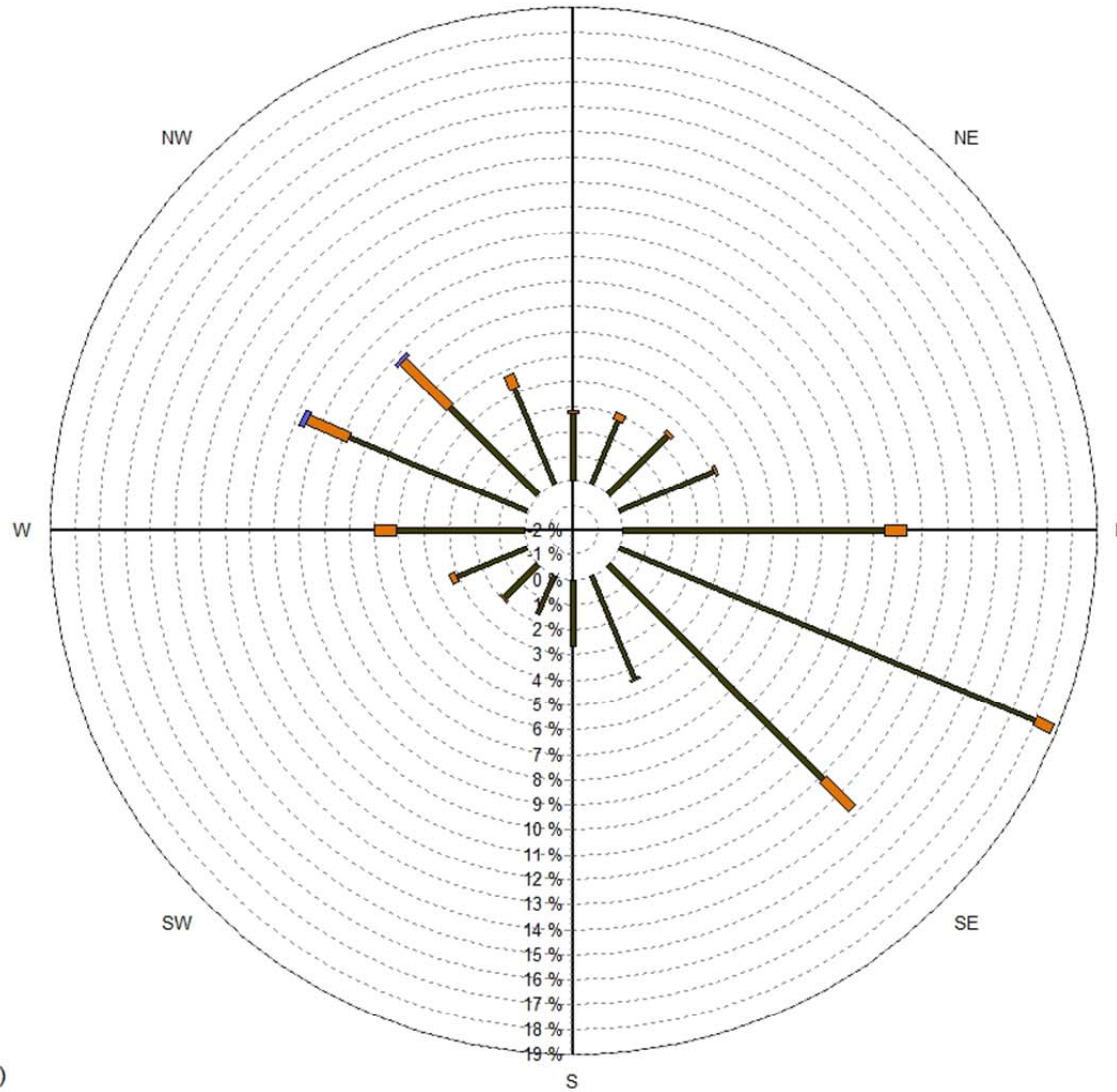
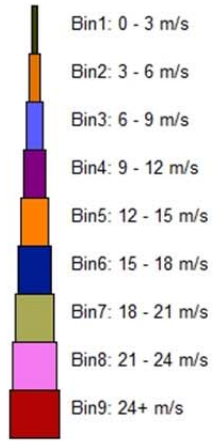






Blackmans Flat Windrose

1/02/2014 to 28/02/2014
N



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