

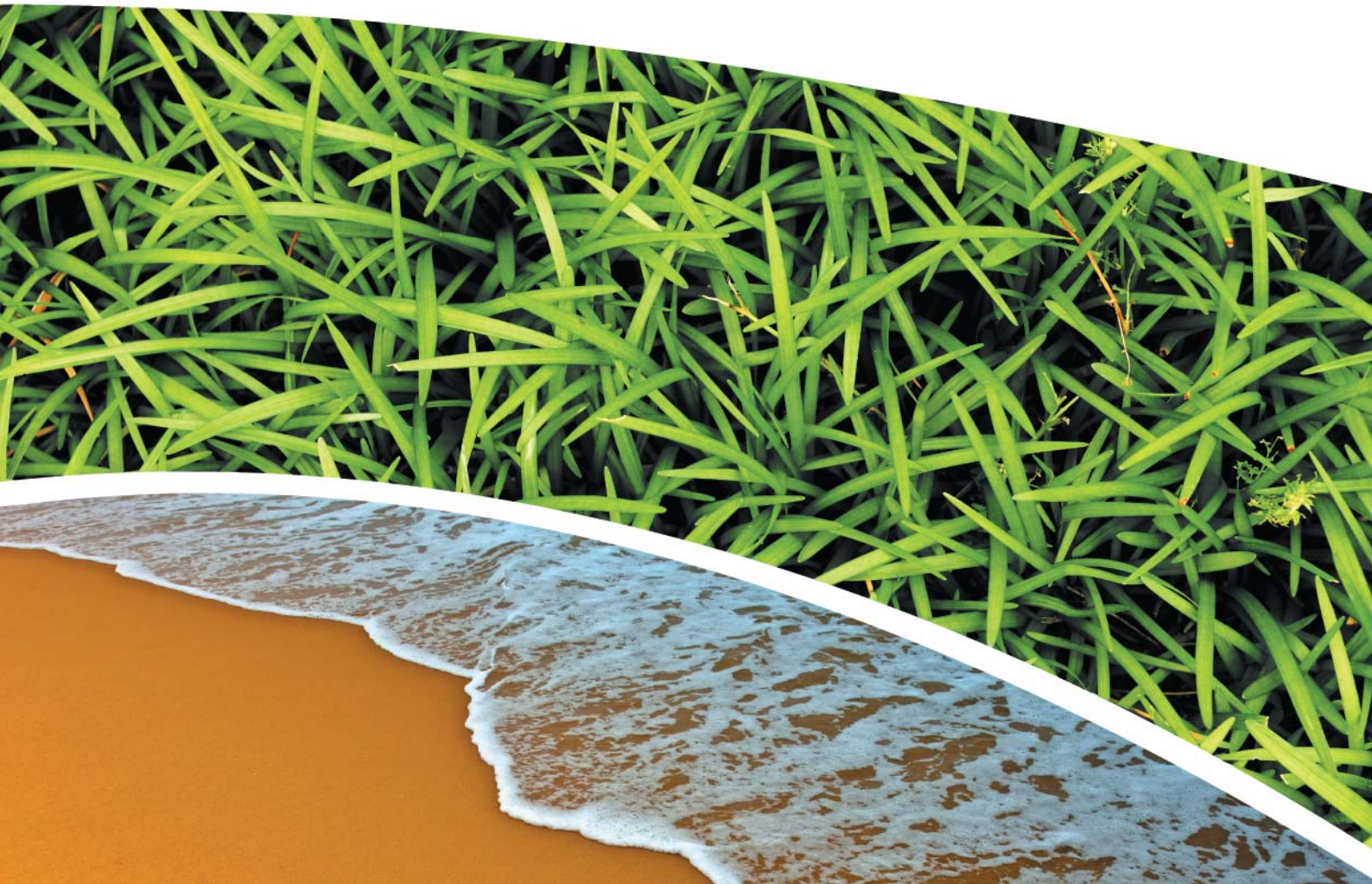
**SURFACE WATER, DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING**

**Prepared for Pine Dale Mine Community Consultative Committee**

**Prepared by RCA Australia**

**RCA ref 6880-1731/0**

**December 2016**



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Rev No	Comment	Author	Reviewer	Approved for Issue (Project Manager)		
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/0	Final	C Rocher	K Tripp	K Tripp		16.01.17

DOCUMENT DISTRIBUTION				
Rev No	Copies	Format	Issued to	Date
/0	1	Electronic (email)	Pine Dale Mine – Graham Goodwin <a href="mailto:graham.goodwin@energyaustralia.com.au">graham.goodwin@energyaustralia.com.au</a>	16.01.17
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RCA LE ref 6880-1731/0



16 January 2017

Pine Dale Mine  
PO Box 202  
WALLERAWANG NSW 2845

Attention Mr Graham Goodwin

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**REPORT COMPILED FOR  
PINE DALE MINE COMMUNITY CONSULTATIVE COMMITTEE  
DETAILING SURFACE WATER, GROUNDWATER DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING  
DECEMBER 2016**

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## 1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of December 2016.

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

**Table 1** Analytical Test Methods

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA / NON-NATA ANALYSIS
Determination of Suspended Particulate Matter	ENV-LAB003	µg/m <sup>3</sup>	RCA Laboratories – Environmental	NATA Analysis
Determination of Particulate Matter – Deposited Matter	ENV-LAB004	g/m <sup>2</sup> .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 <sub>4</sub> )	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 December 2016. 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). This sampling regime commenced 1 August 2013. Water quality analysis results are shown in **Table 2**.

**Table 2** Groundwater Analysis Results – Quarterly Monitoring

ANALYSIS	UNITS	P6	P7
Sample Number	-	12166880009	12166880010
Date Sampled	-	08/12/16	8/12/16
Time Sampled	-	10:59	11:34
Depth to Water from Surface	m	23.05	6.40
Water Level (AHD)	m	893.90	888.00
Temperature	°C	16.0	15.0
pH	pH	<b>6.14</b>	<b>6.21</b>
Conductivity	µS/cm	<b>1348</b>	771
Turbidity	NTU	12	
Dissolved Oxygen	mg/L	5.8	
TSS	mg/L	23	
Oil and Grease	mg/L	<5	
Bicarbonate Alkalinity (CaCO <sub>3</sub> )	mg/L	55	
Total Alkalinity (CaCO <sub>3</sub> )	mg/L	55	
Sulfate (as SO <sub>4</sub> )	mg/L	617	
Chloride	mg/L	35	
Calcium	mg/L	123	
Magnesium	mg/L	66	
Sodium	mg/L	62	
Potassium	mg/L	22	
Cobalt (dissolved)	mg/L	0.060	
Manganese (dissolved)	mg/L	2.43	
Nickel (dissolved)	mg/L	0.106	
Zinc (dissolved)	mg/L	0.068	
Iron (dissolved)	mg/L	28.7	
<b>Trigger Levels</b>			
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

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

■ Indicates analysis was not required

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

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

### 3.2 EPA SURFACE WATER MONITORING

Routine quarterly EPA surface water monitoring not required to be undertaken during December 2016. The next scheduled monitoring round is due to be undertaken in February 2017.

## 4 AIR QUALITY MONITORING RESULTS

### 4.1 HIGH VOLUME AIR SAMPLERS (HVAS)

HVAS at this facility conform to AS/NZS 3580.9.3:2015, AS/NZS 3580.9.6:2003 and AS/NZS 3580.1.1:2007.

HVAS Total Suspended Particulate analysis results are shown in **Table 3**. PM<sub>10</sub> 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
01-Dec-16	38	12166880029	9326401	06-Dec-16	1:25	Client	24.00
07-Dec-16	15	12166880031	9326403	09-Dec-16	18:30	Client	24.00
13-Dec-16	37	12166880033	9326405	17-Dec-16	11:40	Client	24.00
19-Dec-16	15	12166880035	9326407	20-Dec-16	6:50	Client	24.00
25-Dec-16	14	12166880037	9269524	29-Dec-16	17:45	Client	24.00
31-Dec-16	15	12166880039	9269532	01-Jan-17	18:30	Client	24.00

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

RUN DATE	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	SAMPLE NUMBER	FILTER NUMBER	DATE FILTER OFF	TIME FILTER OFF	FIELD TECH	HOURS RUN
01-Dec-16	14	12166880030	9326402	06-Dec-16	1:30	Client	24.00
07-Dec-16	9	12166880032	9326404	09-Dec-16	18:35	Client	24.00
13-Dec-16	18	12166880034	9326406	17-Dec-16	11:45	Client	24.00
19-Dec-16	9	12166880036	9326408	20-Dec-16	6:55	Client	24.00
25-Dec-16	9	12166880038	9269525	29-Dec-16	17:50	Client	24.00
31-Dec-16	10	12166880040	9269533	01-Jan-17	18:35	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 January to December 2016) for the TSP unit is  $18.7\mu\text{g}/\text{m}^3$ , which is well below the allowable limit of  $90\mu\text{g}/\text{m}^3$ .

#### 4.1.2 *PM*<sub>10</sub> Summary

The EPA 24h Maximum *PM*<sub>10</sub> allowable limit is 50µg/m<sup>3</sup>. The EPA Annual Mean *PM*<sub>10</sub> allowable limit is 30µg/m<sup>3</sup>. All *PM*<sub>10</sub> HVAS results recorded during this monitoring period conform to consent conditions, as the *current rolling annual mean* for the *PM*<sub>10</sub> unit is 8.8µg/m<sup>3</sup>, which is below the allowable limit of 30µg/m<sup>3</sup>. The 24 hour maximum allowable limit of 50µg/m<sup>3</sup> was not exceeded during the month of December 2016.

#### 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 – December 2016*

SAMPLE NUMBER	DEPOSIT GAUGE	DATE SAMPLE STARTED	DATE SAMPLE COMPLETED	NUMBER OF DAYS	NOTES	INSOLUBLE SOLIDS (g/m <sup>2</sup> .month)	ASH (g/m <sup>2</sup> .month)	COMBUSTIBLE MATTER (g/m <sup>2</sup> .month)
12166880019	D1	7/11/2016	8/12/2016	31	I	1.1	0.6	0.5
12166880020	D2	7/11/2016	8/12/2016	31	I	1.2	0.4	0.8
12166880021	D3	7/11/2016	8/12/2016	31	I	1.1	0.5	0.6
12166880022	D4	7/11/2016	8/12/2016	31	IT	1.2	0.3	0.9
12166880023	D5	7/11/2016	8/12/2016	31	I	0.8	0.2	0.6
12166880024	D6	7/11/2016	8/12/2016	31	I	1.7	0.5	1.2

Glossary of Terms Used in Notes:

I Insects (eg, Ants, Spiders)

IT Insects and bird droppings

### 4.2.1 Allowable Depositional Dust Limits

The EPA Long Term (Annual Average) Dust Limit is 4g/m<sup>2</sup> 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 1.1g/m<sup>2</sup> per month, which is below the allowable Annual Average Long Term Limit of 4g/m<sup>2</sup> per month.

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



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## 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 required to be undertaken this month. The next round of quarterly noise monitoring is due to be undertaken January 2017.

## 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 April 2014.

## 8 SUMMARY

During the month of December 2016 environmental monitoring constituents were found to be generally in compliance with EPL 4911.

Standing water levels within the site groundwater bores were compliant with their respective trigger levels. The pH at both site groundwater bores were below the respective lower pH trigger level criteria. The electrical conductivity recorded at P6 exceeded the respective trigger level.

The EPA quarterly surface water monitoring was not required to be undertaken during December 2016. The next scheduled quarterly monitoring round is due in February 2017.

Rolling annual averages from both the TSP and PM<sub>10</sub> High Volume Air Samplers are currently well below the EPA Annual Mean TSP and PM<sub>10</sub> criterion of 90µg/m<sup>3</sup> and 30µg/m<sup>3</sup> respectively.

Currently there are no depositional dust gauge results which are greater than the EPA Long Term (annual average) criteria of 4g/m<sup>2</sup>.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

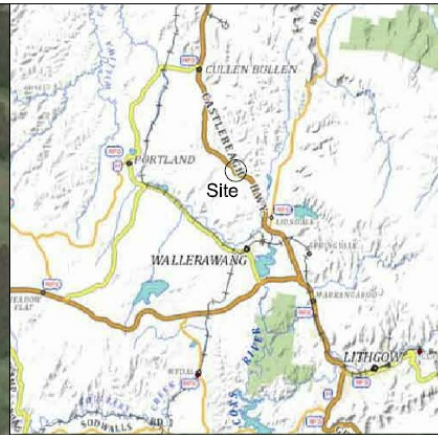
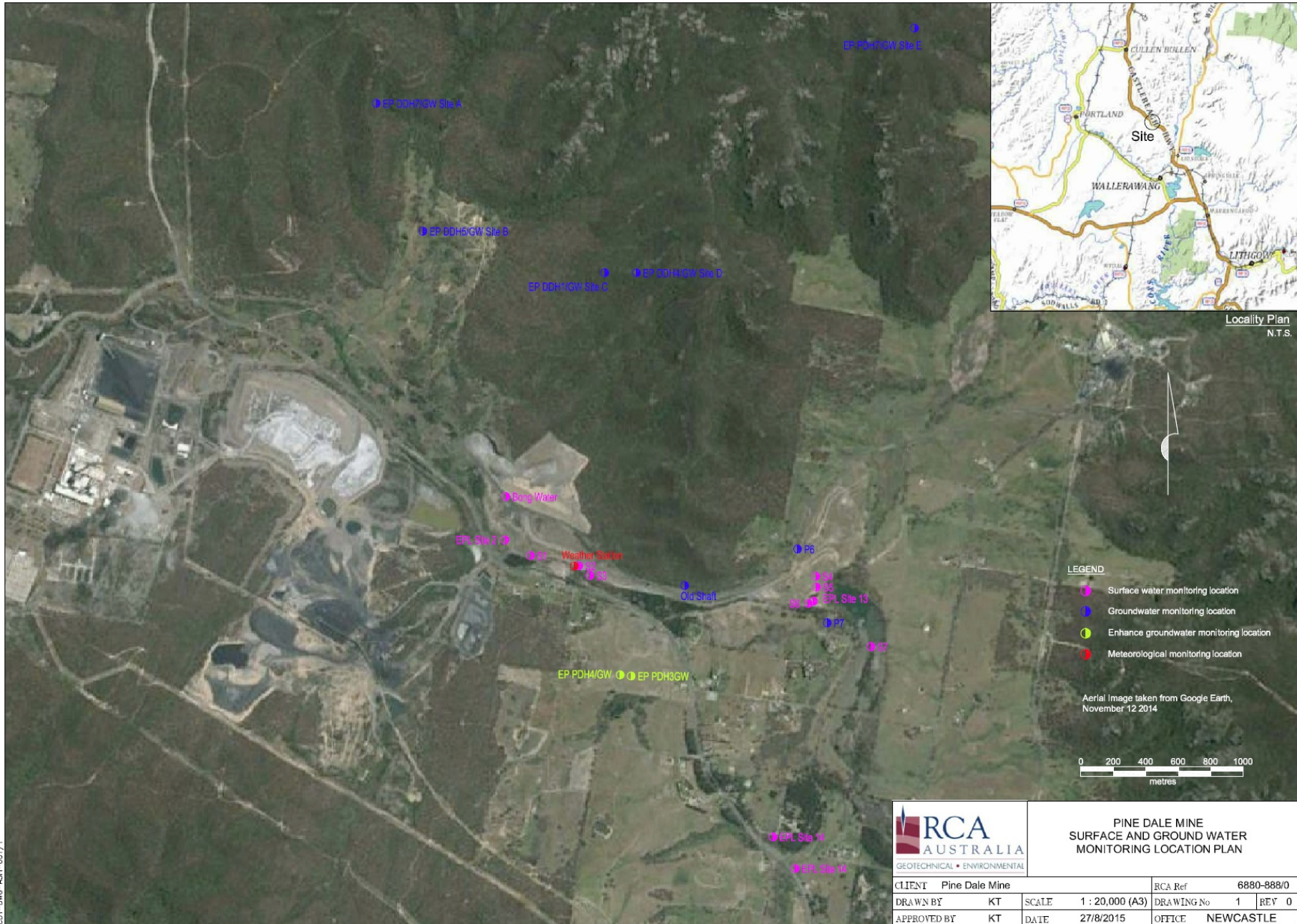


Karen Tripp  
Senior Environmental Scientist/Hygienist  
RCA Australia Pty Ltd trading as  
RCA Laboratories – Environmental

# Appendix 1

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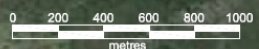
## Surface Water Groundwater and Air Quality Monitoring Locations



Locality Plan  
N.T.S.

- LEGEND**
- Surface water monitoring location
  - Groundwater monitoring location
  - Enhance groundwater monitoring location
  - Meteorological monitoring location

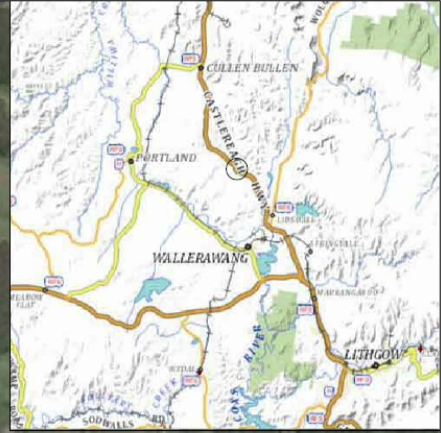
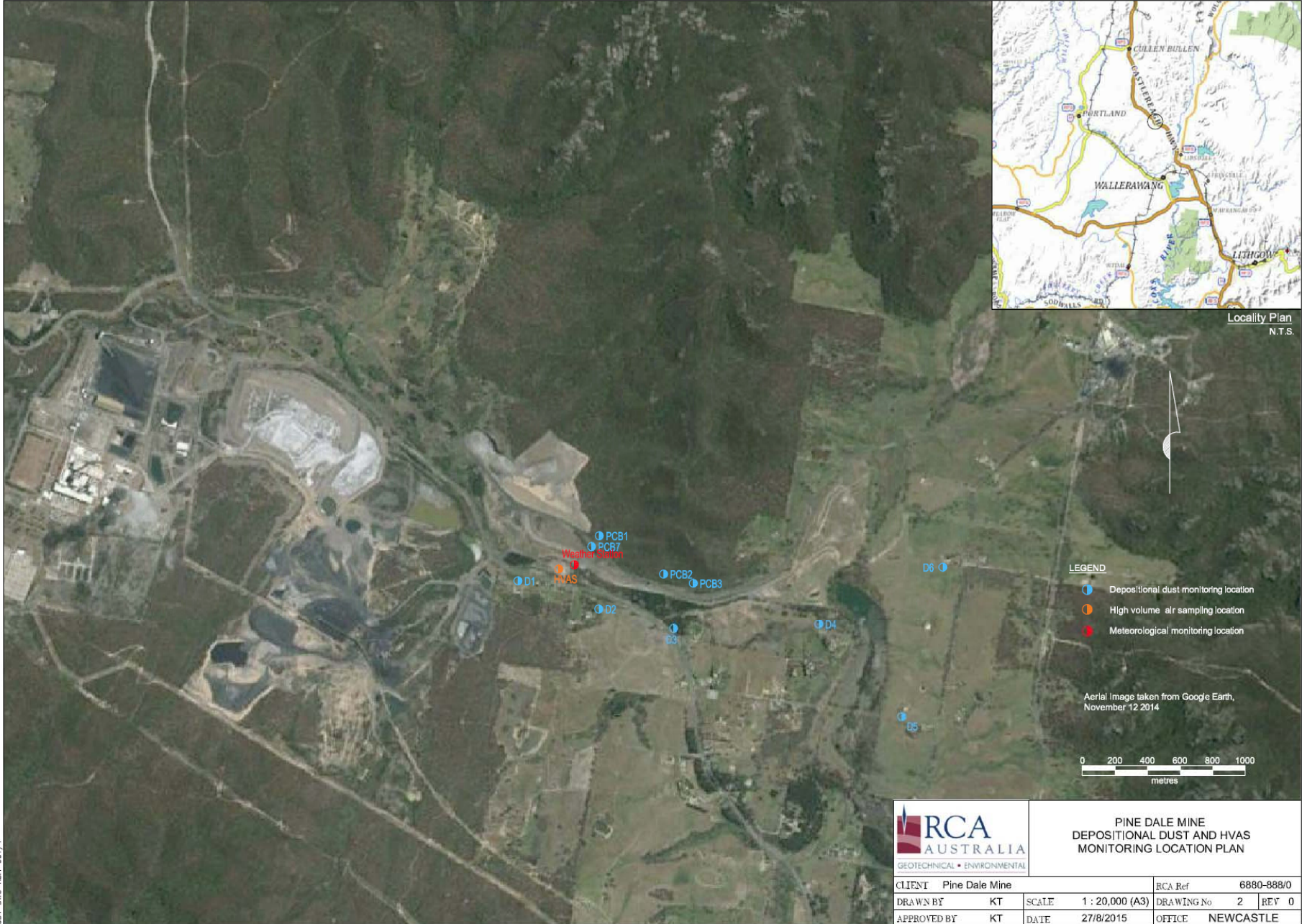
Aerial Image taken from Google Earth, November 12 2014



**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)
APPROVED BY	KT	DATE	27/8/2015
		DRAWING No	1
		REV	0
		OFFICE	NEWCASTLE

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Locality Plan  
N.T.S.

- LEGEND**
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  - High volume air sampling location
  - Meteorological monitoring location

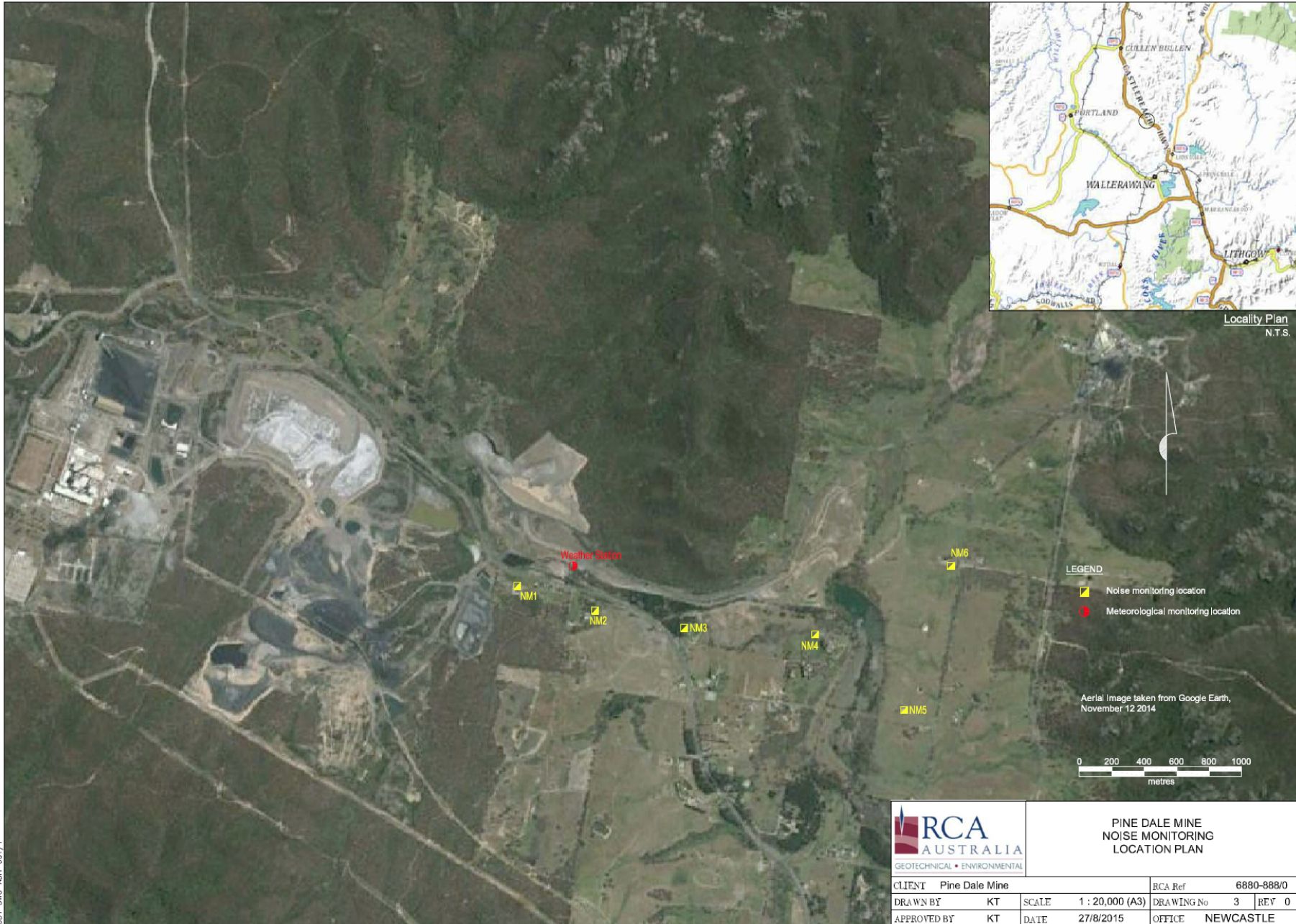
Aerial Image taken from Google Earth,  
November 12 2014



**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)
APPROVED BY	KT	DATE	27/8/2015
		DRAWING No	2
		REV	0
		OFFICE	NEWCASTLE

COT-DWC-ASH-001/1



**PINE DALE MINE  
NOISE MONITORING  
LOCATION PLAN**

CLIENT	Pine Dale Mine			RCA Ref	6880-888/0
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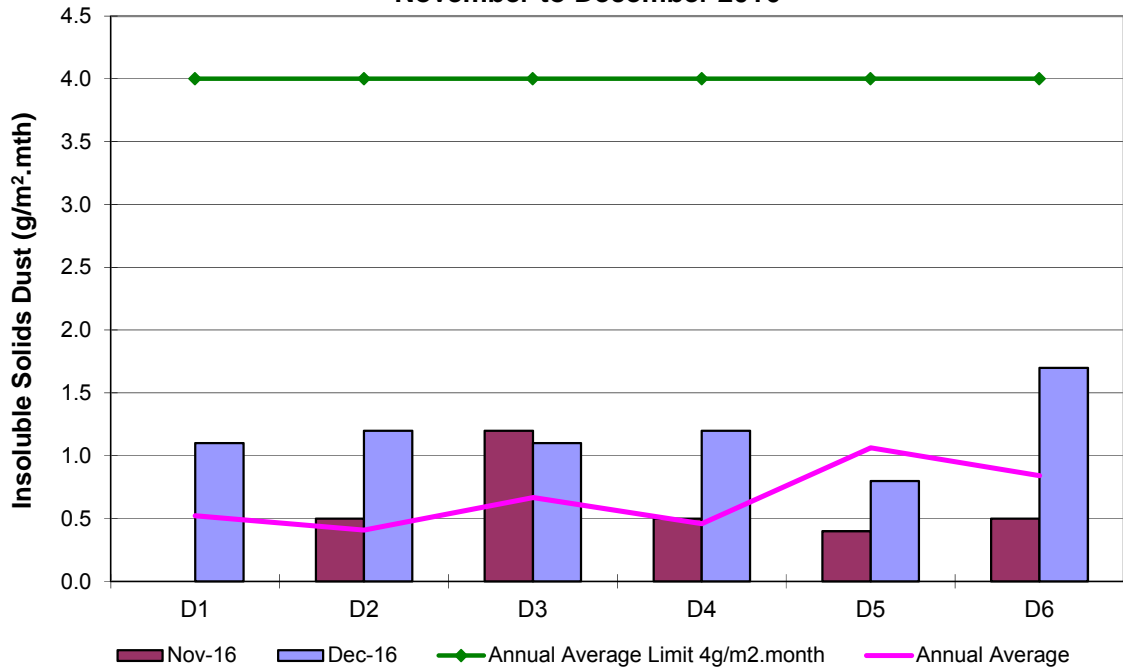
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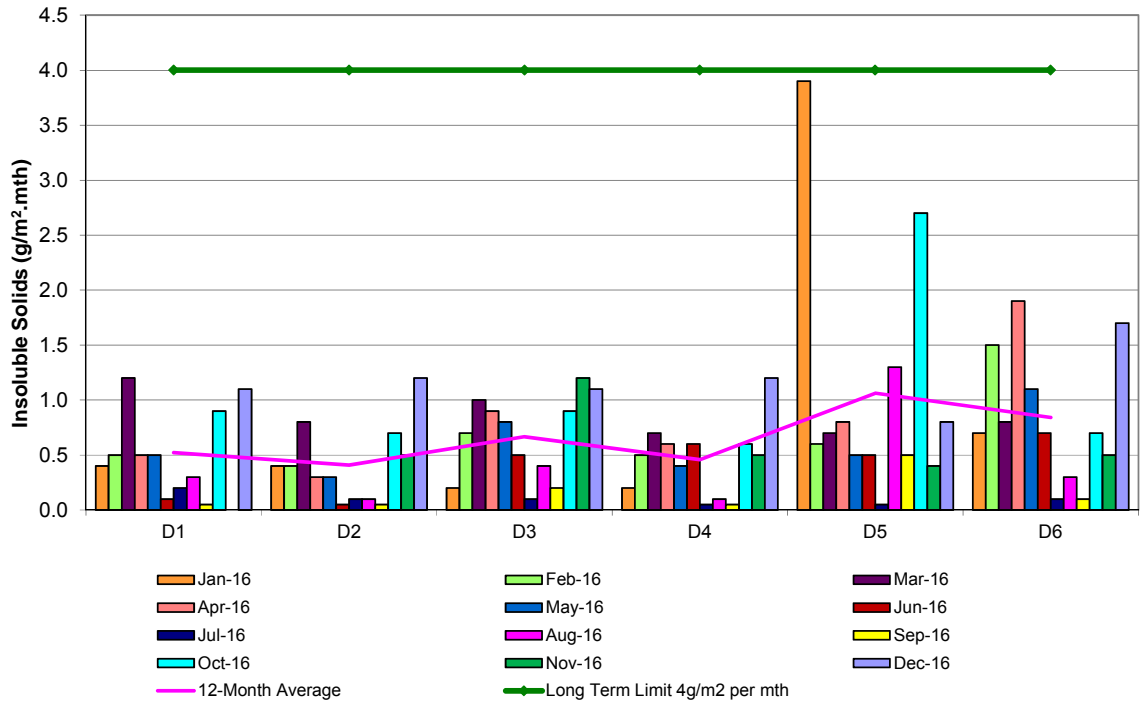
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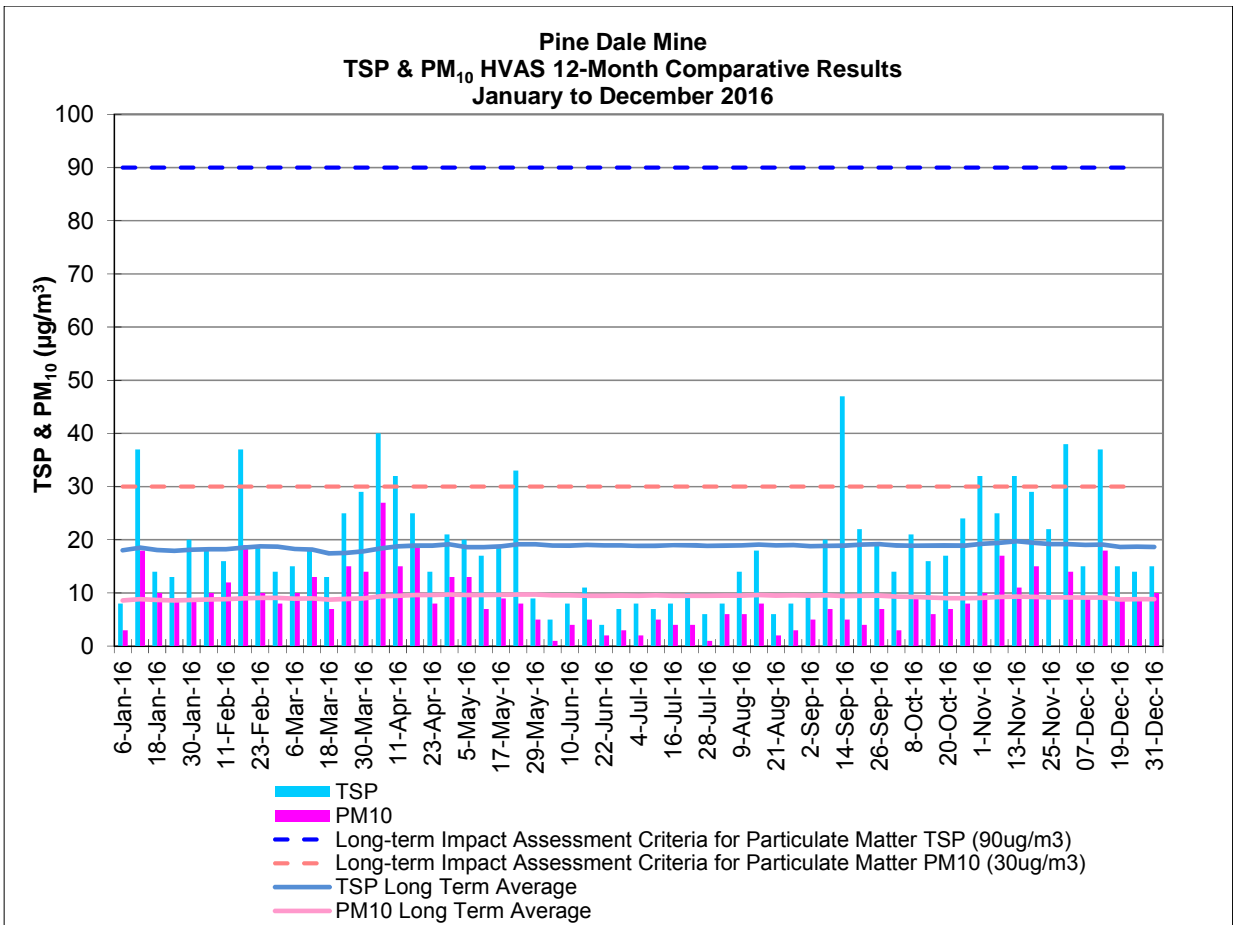
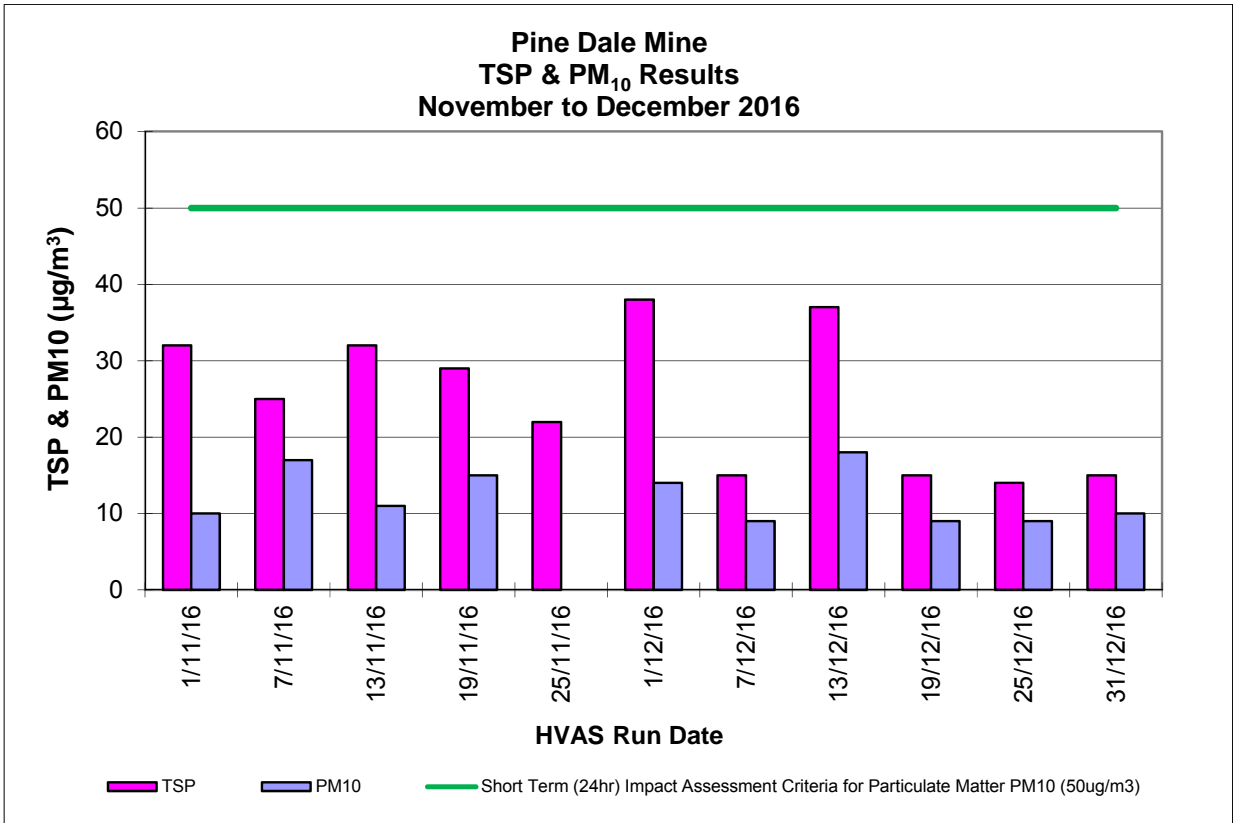
Depositional Dust and HVAS Graphs

**Pine Dale Mine  
Depositional Dust Gauge Comparative Results  
November to December 2016**



**Pine Dale Mine  
Deposited Matter - Insoluble Solids 12 Months Comparative Results  
January to December 2016**



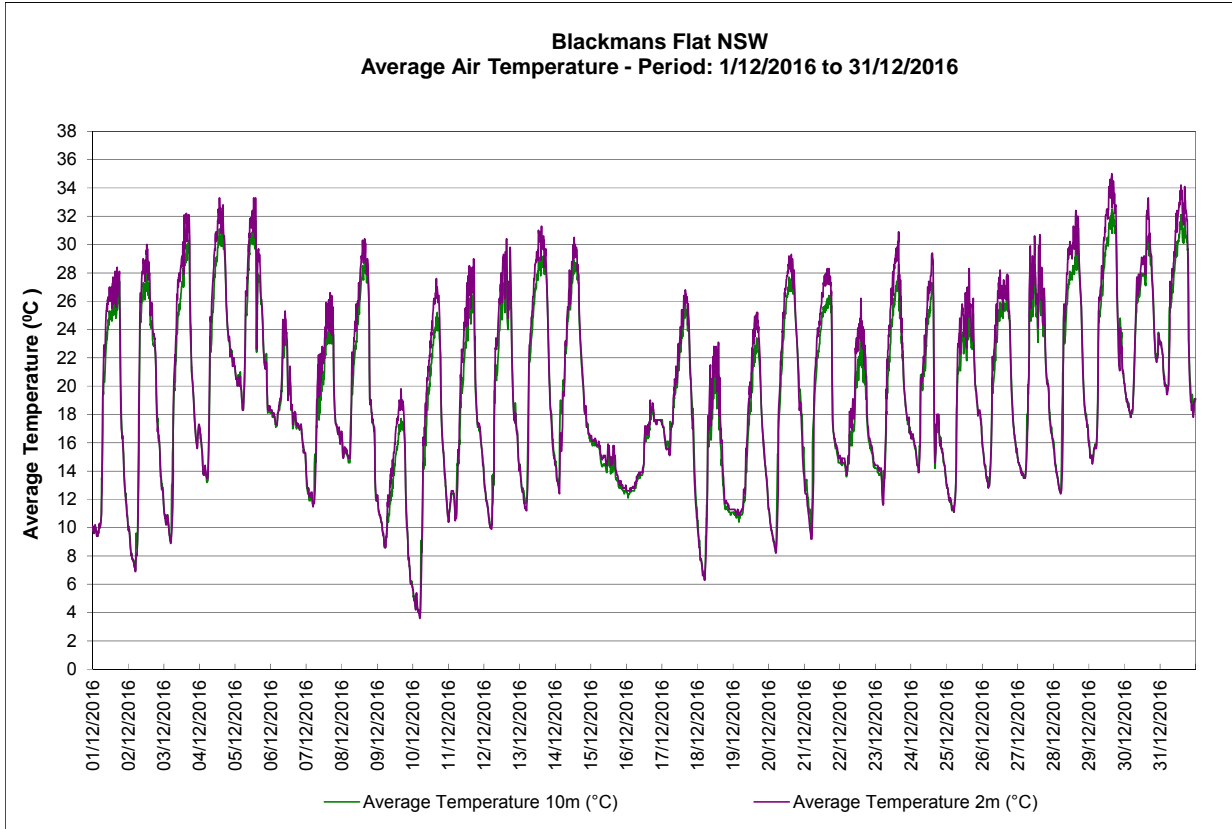
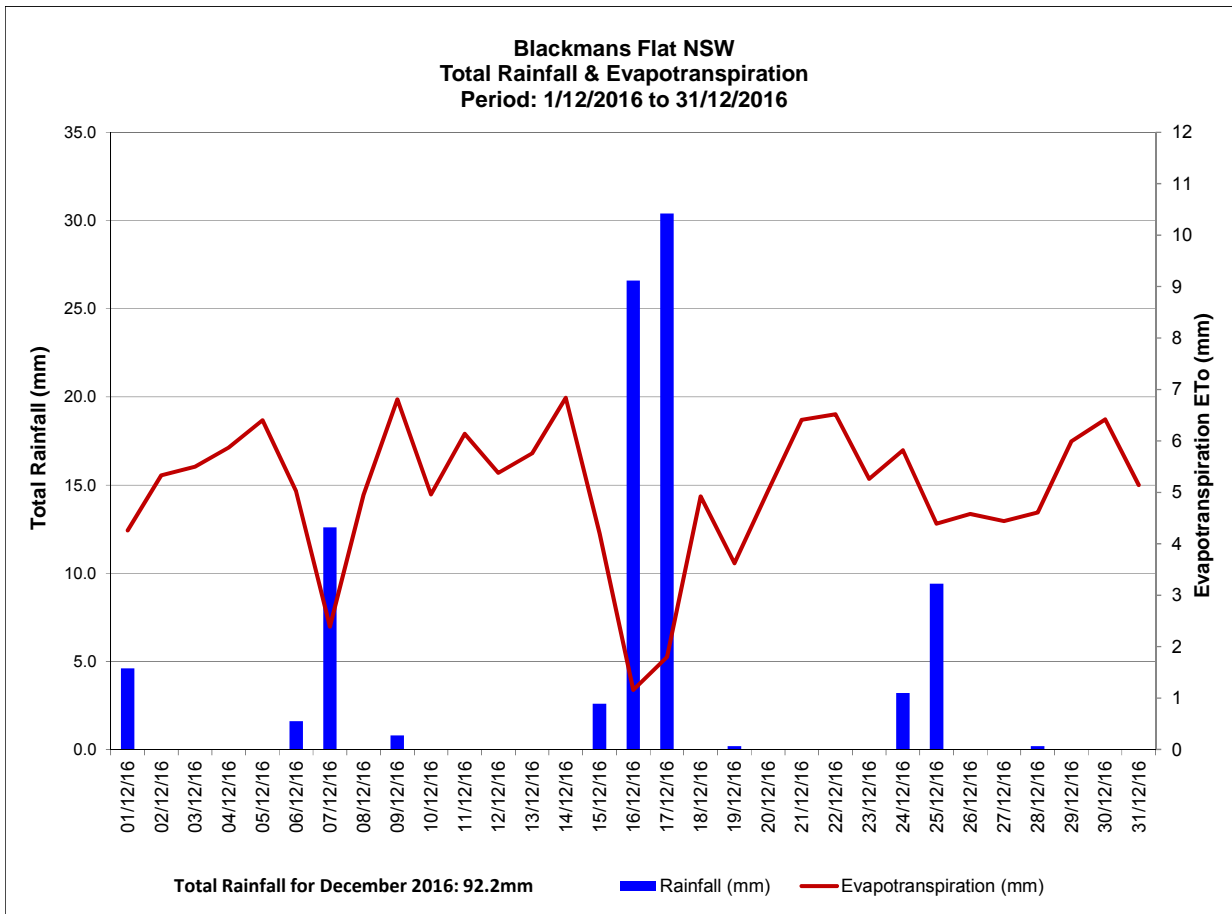




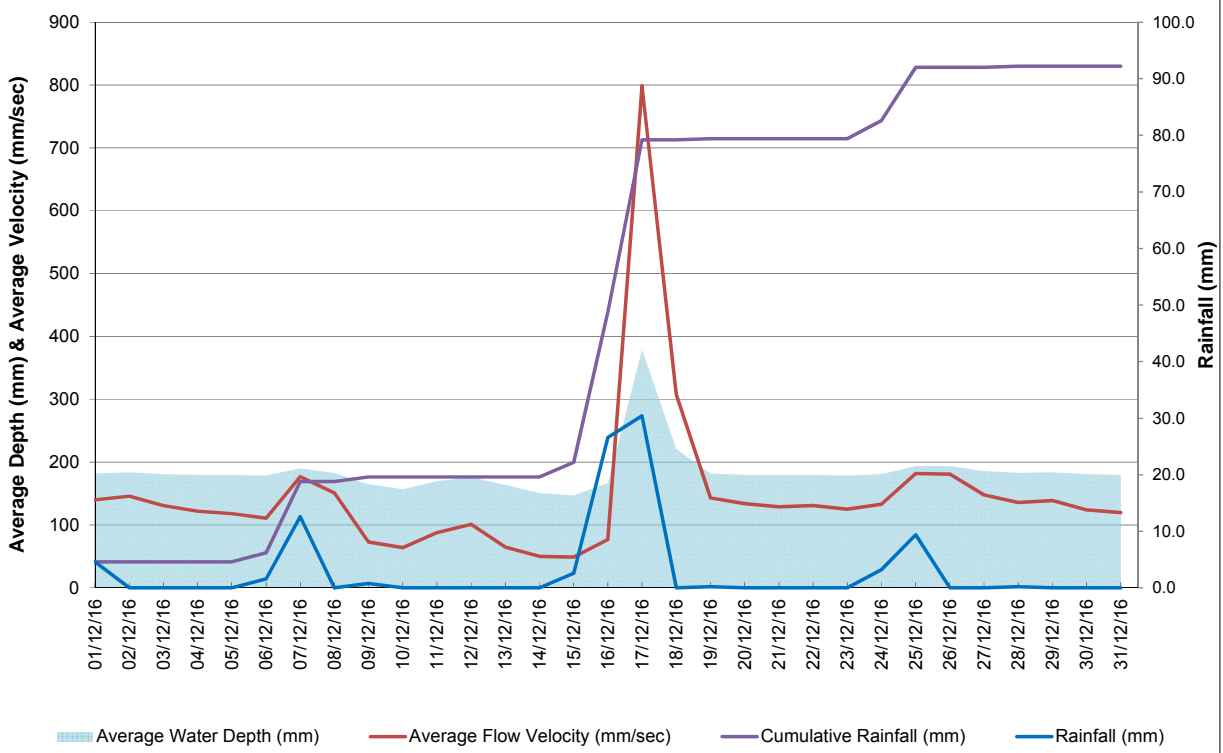
# Appendix 3

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Meteorological Data

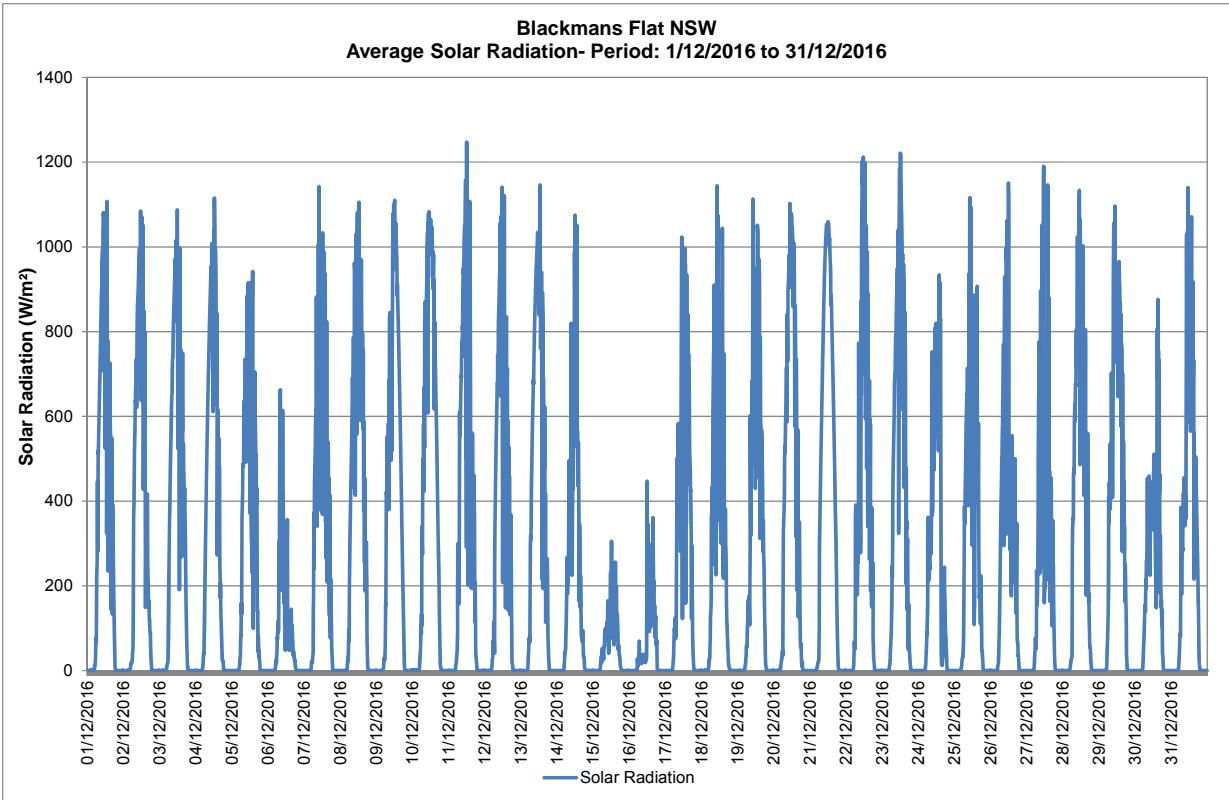
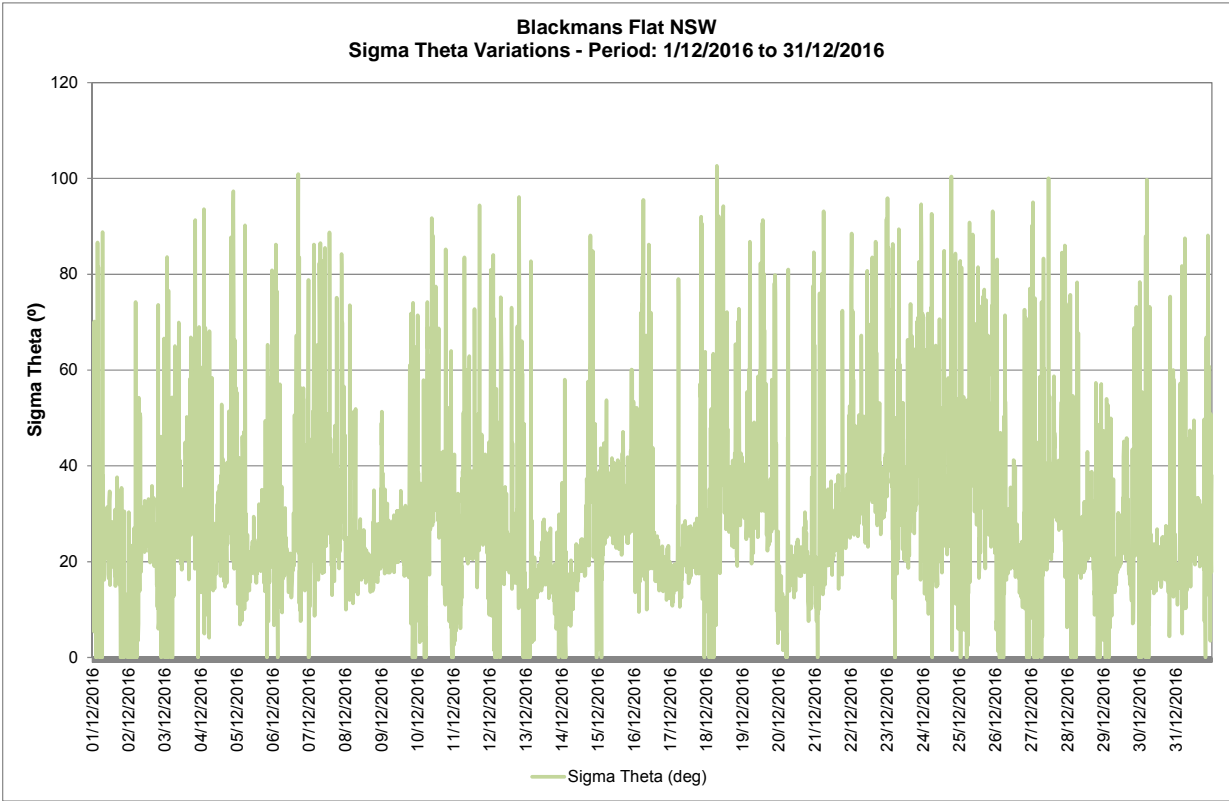


**Neubecks Creek - Blackmans Flat NSW**  
**Average Depth & Velocity vs. Rainfall- Period: 1/12/2016 to 31/12/2016**



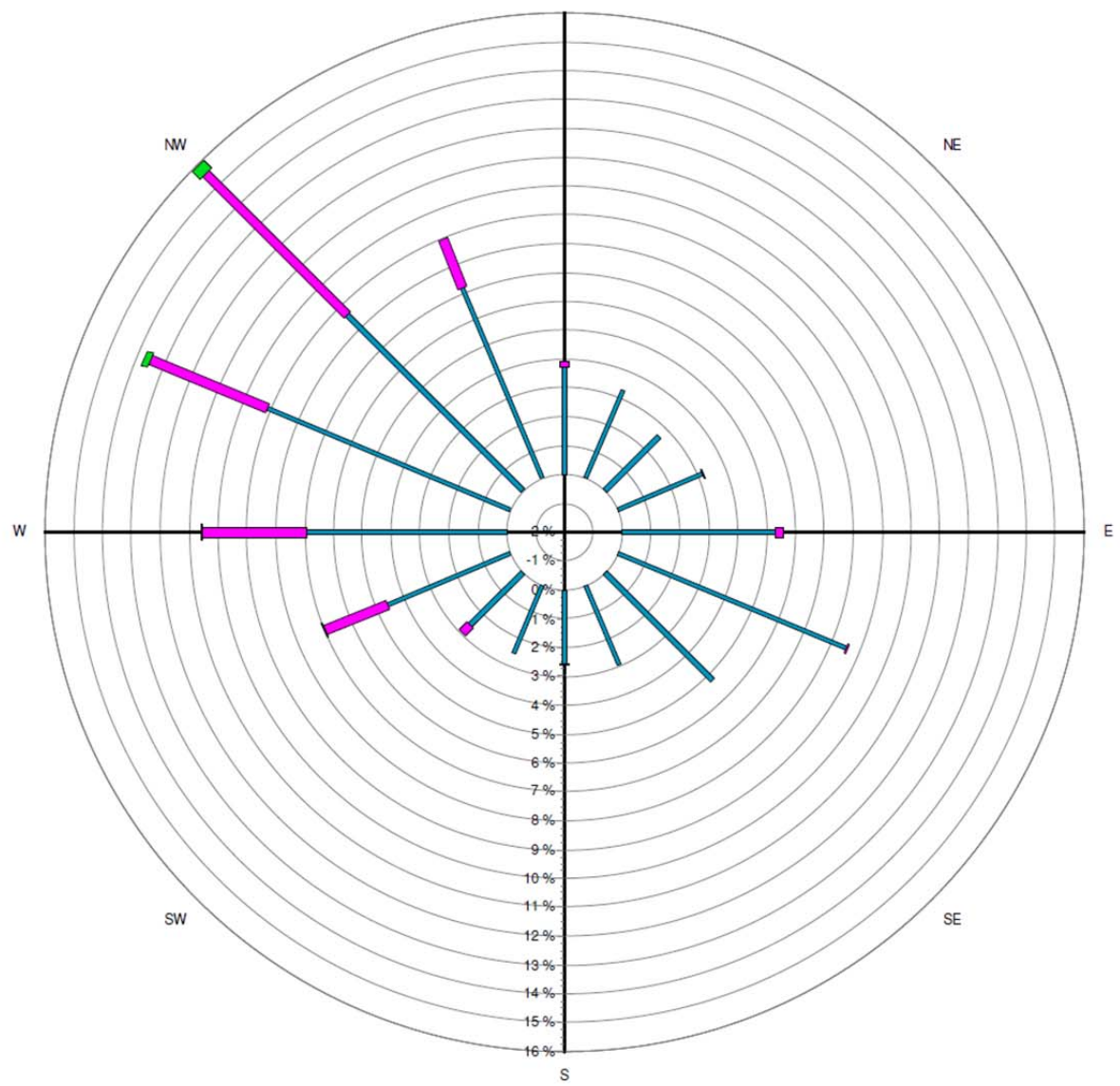
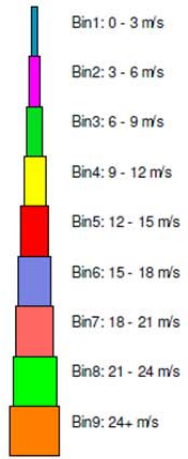
**Blackmans Flat NSW**  
**Daily Humidity Variations - Period: 1/12/2016 to 31/12/2016**





# Blackmans Flat Windrose

1/12/2016 to 31/12/2016



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