

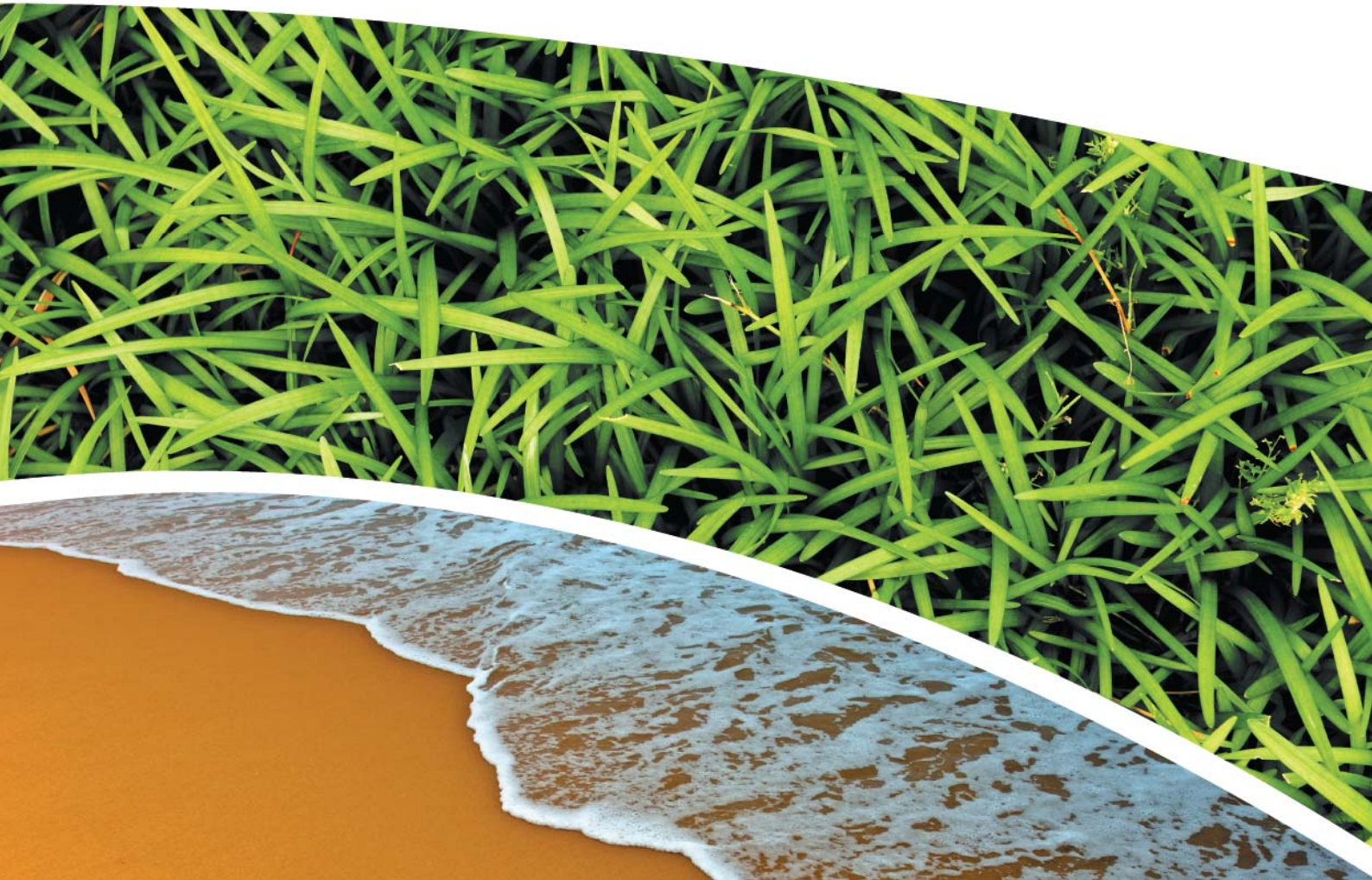
**SURFACE WATER, DEPOSITIONAL DUST,  
HVAS AND METEOROLOGICAL MONITORING**

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

**Prepared by RCA Australia**

**RCA ref 6880-1718/0**

**July 2016**



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RCA LE ref 6880-1718/0



16 August 2016

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  
JULY 2016**

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## 1 GENERAL COMMENTS

Job Number: 6880.

Date Samples Received: During the month of July 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 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 <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 July 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 – Monthly Monitoring

| ANALYSIS                                    | UNITS | P6          | P7          |
|---------------------------------------------|-------|-------------|-------------|
| Sample Number                               | -     | 07166880009 | 07166880010 |
| Date Sampled                                | -     | 07/07/16    | 7/07/16     |
| Time Sampled                                | -     | 14:56       | 15:28       |
| Depth to Water from Surface                 | m     | 24.80       | 6.65        |
| Water Level (AHD)                           | m     | 892.15      | 887.75      |
| Temperature                                 | °C    | 13.0        | 13.0        |
| pH                                          | pH    | 6.30        | 6.43        |
| Conductivity                                | µS/cm | 1091        | 770         |
| Turbidity                                   | NTU   | 25          |             |
| Dissolved Oxygen                            | mg/L  | 4.7         |             |
| TSS                                         | mg/L  | 31          |             |
| Oil and Grease                              | mg/L  | <2          |             |
| Bicarbonate Alkalinity (CaCO <sub>3</sub> ) | mg/L  | 50          |             |
| Total Alkalinity (CaCO <sub>3</sub> )       | mg/L  | 50          |             |
| Sulfate (as SO <sub>4</sub> )               | mg/L  | 612         |             |
| Chloride                                    | mg/L  | 36          |             |
| Calcium                                     | mg/L  | 124         |             |
| Magnesium                                   | mg/L  | 58          |             |
| Sodium                                      | mg/L  | 55          |             |
| Potassium                                   | mg/L  | 18          |             |
| Cobalt (dissolved)                          | mg/L  | 0.052       |             |
| Manganese (dissolved)                       | mg/L  | 2.32        |             |
| Nickel (dissolved)                          | mg/L  | 0.098       |             |
| Zinc (dissolved)                            | mg/L  | 0.66        |             |
| Iron (dissolved)                            | mg/L  | 20.4        |             |
| <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 surface water monitoring was not required to be undertaken during the month of July 2016. The next EPA quarterly surface monitoring round will be undertaken during August 2016.

## 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 |
|-----------|----------------------------------|---------------|---------------|-----------------|-----------------|------------|-----------|
| 04-Jul-16 | 8                                | 07166880028   | 9208878       | 05-Jul-16       | 14:40           | Client     | 24.00     |
| 10-Jul-16 | 7                                | 07166880030   | 9208880       | 11-Jul-16       | 13:00           | Client     | 24.11     |
| 16-Jul-16 | 8                                | 07166880032   | 9208882       | 19-Jul-16       | 15:13           | Client     | 24.00     |
| 22-Jul-16 | 10                               | 07166880034   | 9208884       | 27-Jul-16       | 17:25           | Client     | 24.00     |
| 28-Jul-16 | 6                                | 07166880036   | 9208886       | 01-Aug-16       | 15:15           | 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 |
|-----------|-----------------------------------------------|---------------|---------------|-----------------|-----------------|------------|-----------|
| 04-Jul-16 | 2                                             | 07166880029   | 9208879       | 05-Jul-16       | 14:45           | Client     | 24.00     |
| 10-Jul-16 | 5                                             | 07166880031   | 9208881       | 11-Jul-16       | 13:05           | Client     | 24.06     |
| 16-Jul-16 | 4                                             | 07166880033   | 9208883       | 19-Jul-16       | 15:18           | Client     | 24.00     |
| 22-Jul-16 | 4                                             | 07166880035   | 9208885       | 27-Jul-16       | 17:30           | Client     | 24.00     |
| 28-Jul-16 | 1                                             | 07166880037   | 9269619       | 01-Aug-16       | 15:21           | 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 August 2015 to July 2016) for the TSP unit is  $18.9\mu\text{g}/\text{m}^3$ , 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  $50\mu\text{g}/\text{m}^3$ . The EPA Annual Mean PM<sub>10</sub> allowable limit is  $30\mu\text{g}/\text{m}^3$ . 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  $9.4\mu\text{g}/\text{m}^3$ , 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 July 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 – July 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) |
|---------------|---------------|---------------------|-----------------------|----------------|-------|--------------------------------------------|-------------------------------|----------------------------------------------|
| 07166880018   | D1            | 6/06/2016           | 7/07/2016             | 31             | I     | 0.2                                        | < 0.1                         | 0.2                                          |
| 07166880019   | D2            | 6/06/2016           | 7/07/2016             | 31             | I     | 0.1                                        | < 0.1                         | < 0.1                                        |
| 07166880020   | D3            | 6/06/2016           | 7/07/2016             | 31             | I     | 0.1                                        | < 0.1                         | < 0.1                                        |
| 07166880021   | D4            | 6/06/2016           | 7/07/2016             | 31             | I     | < 0.1                                      | < 0.1                         | < 0.1                                        |
| 07166880022   | D5            | 6/06/2016           | 7/07/2016             | 31             | I     | < 0.1                                      | < 0.1                         | < 0.1                                        |
| 07166880023   | D6            | 6/06/2016           | 7/07/2016             | 31             | IT    | 0.1                                        | < 0.1                         | < 0.1                                        |

Glossary of Terms Used in Notes:

I Insects (eg, Ants, Spiders)

IT Insects and Tree Litter

### 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 1.4g/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 undertaken this month. The quarterly round of monitoring (quarter 3) was scheduled to be undertaken during July 2016; however due to inclement weather conditions noise monitoring was rescheduled for September 2016.

## 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 July 2016 environmental monitoring constituents were found to be generally in compliance with EPL 4911.

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



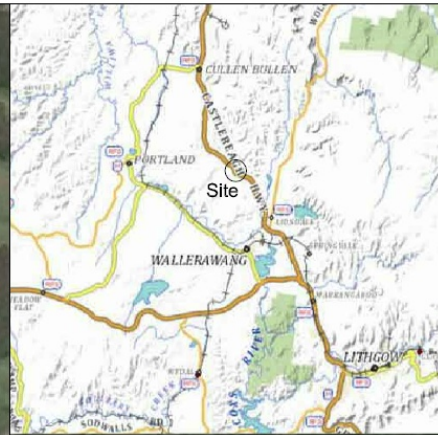
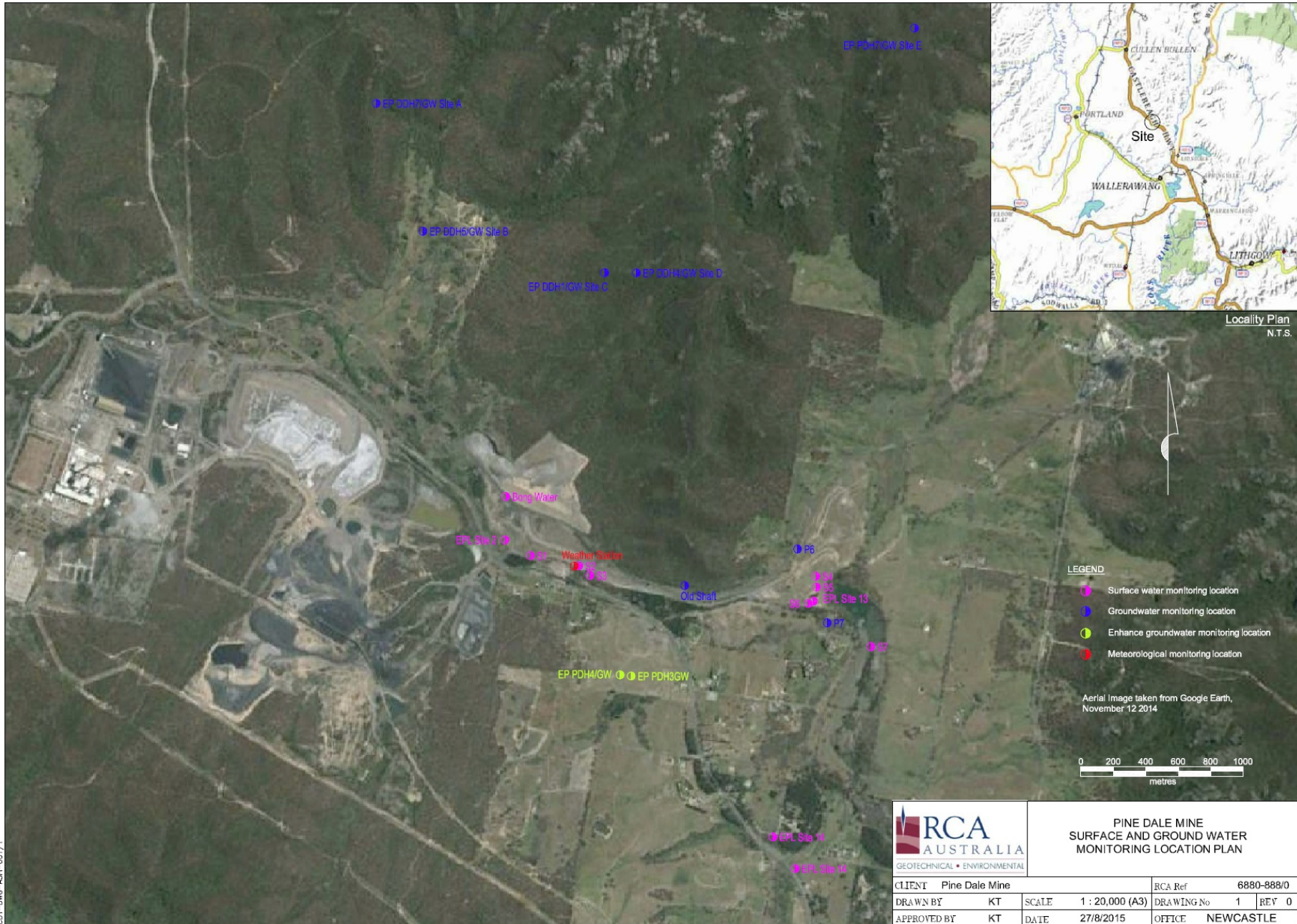
Karen Tripp  
Senior Environmental Scientist/Hygienist  
RCA Australia Pty Ltd trading as  
RCA Laboratories – Environmental



# Appendix 1

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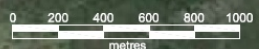
## Surface Water Groundwater and Air Quality Monitoring Locations



Locality Plan  
N.T.S.

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

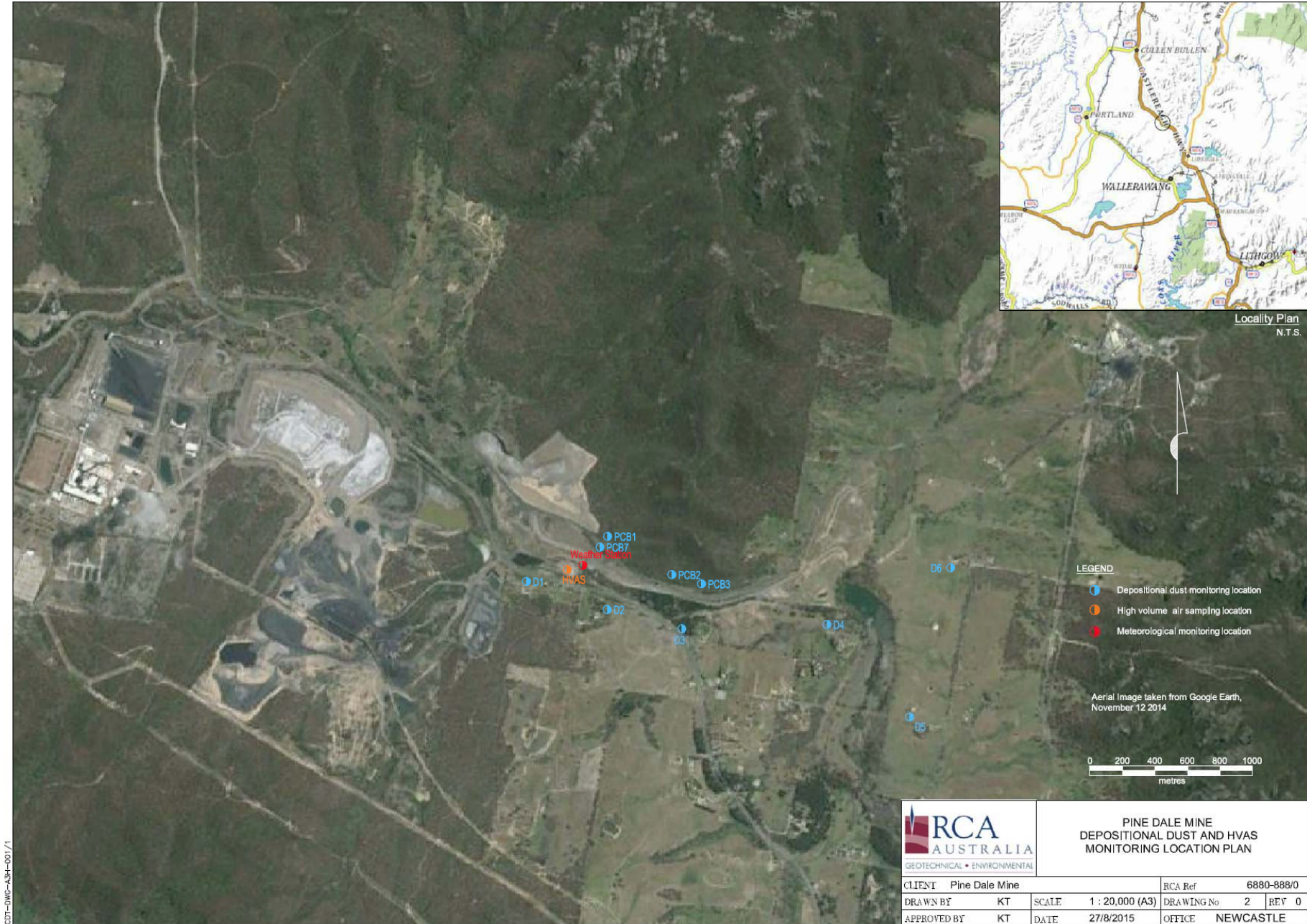
Aerial Image taken from Google Earth,  
November 12 2014



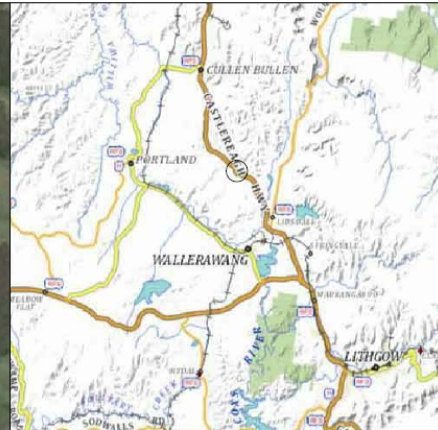
**PINE DALE MINE  
SURFACE AND GROUND WATER  
MONITORING LOCATION PLAN**

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

G:\Projects\2015\20150827\_Pine Dale Mine\20150827\_Pine Dale Mine.dwg



COT-DWC-ASH-001/1




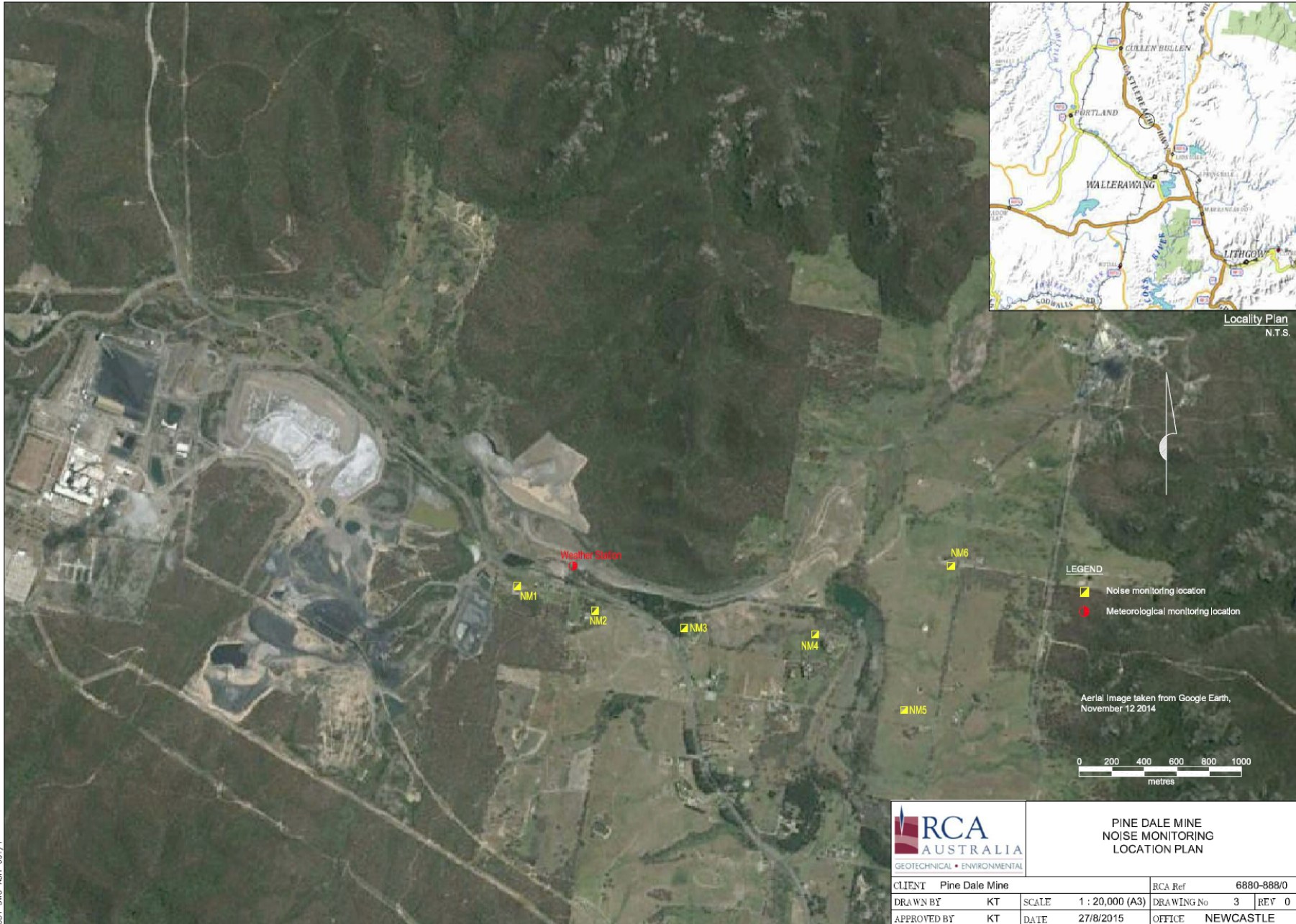
Locality Plan  
N.T.S.

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

Aerial Image taken from Google Earth,  
November 12 2014



|                                                                                                                       |    |                                                                                   |                 |            |            |
|-----------------------------------------------------------------------------------------------------------------------|----|-----------------------------------------------------------------------------------|-----------------|------------|------------|
| <br>GEOTECHNICAL • ENVIRONMENTAL |    | <b>PINE DALE MINE<br/>DEPOSITIONAL DUST AND HVAS<br/>MONITORING LOCATION PLAN</b> |                 |            |            |
|                                                                                                                       |    | CLIENT                                                                            | Pine Dale Mine  | RCA Ref    | 6880-888/0 |
| DRAWN BY                                                                                                              | KT | SCALE                                                                             | 1 : 20,000 (A3) | DRAWING No | 2          |
| APPROVED BY                                                                                                           | KT | DATE                                                                              | 27/8/2015       | OFFICE     | NEWCASTLE  |
|                                                                                                                       |    |                                                                                   |                 | REV        | 0          |



**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  |

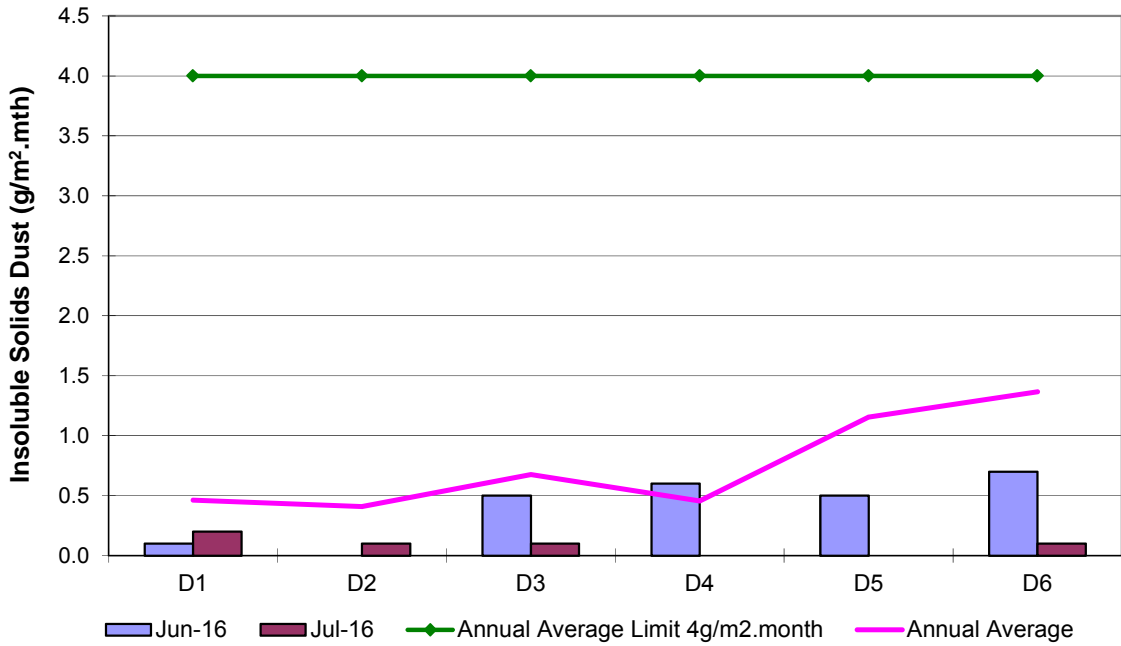
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# Appendix 2

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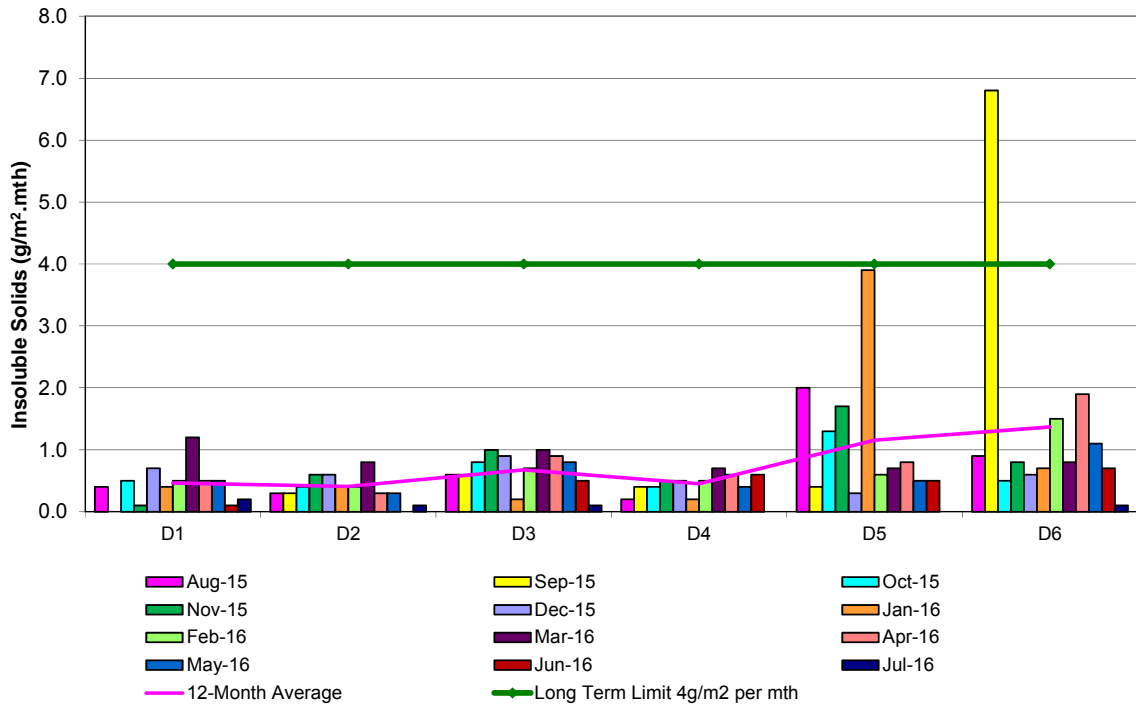
Depositional Dust and HVAS Graphs

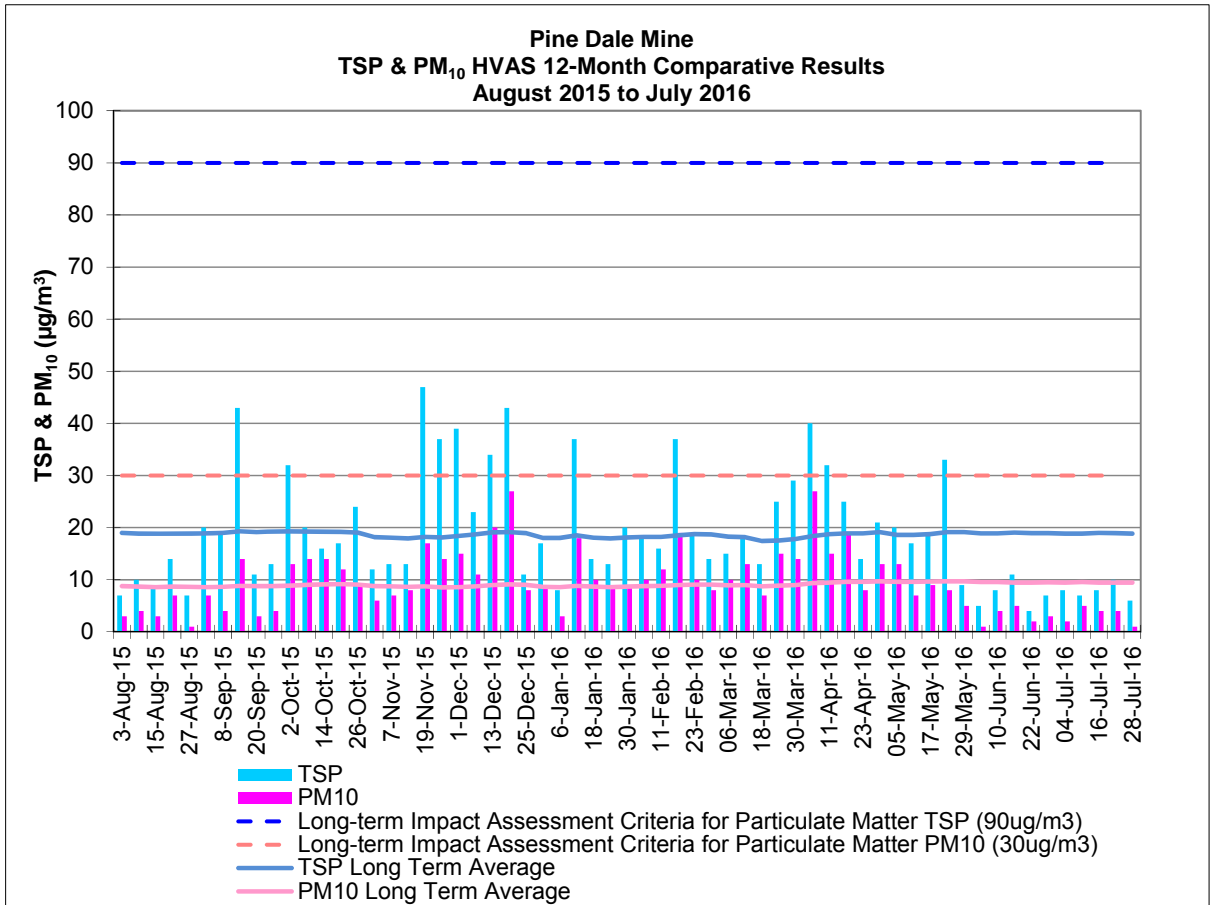
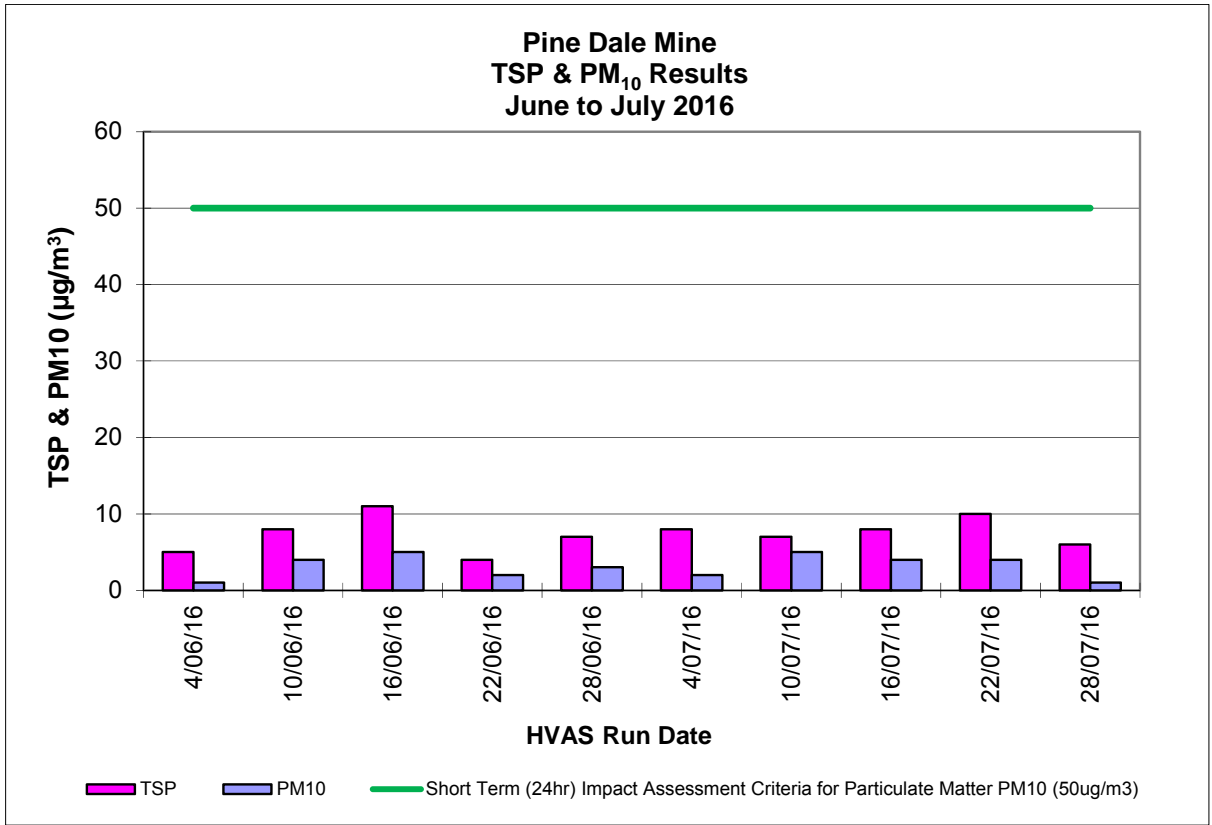
**Pine Dale Mine  
Depositional Dust Gauge Comparative Results  
June to July 2016**



Note – data gaps on the graph indicate the dust result was less than laboratory detection limits.

**Pine Dale Mine  
Deposited Matter - Insoluble Solids 12 Months Comparative Results  
August 2015 to July 2016**



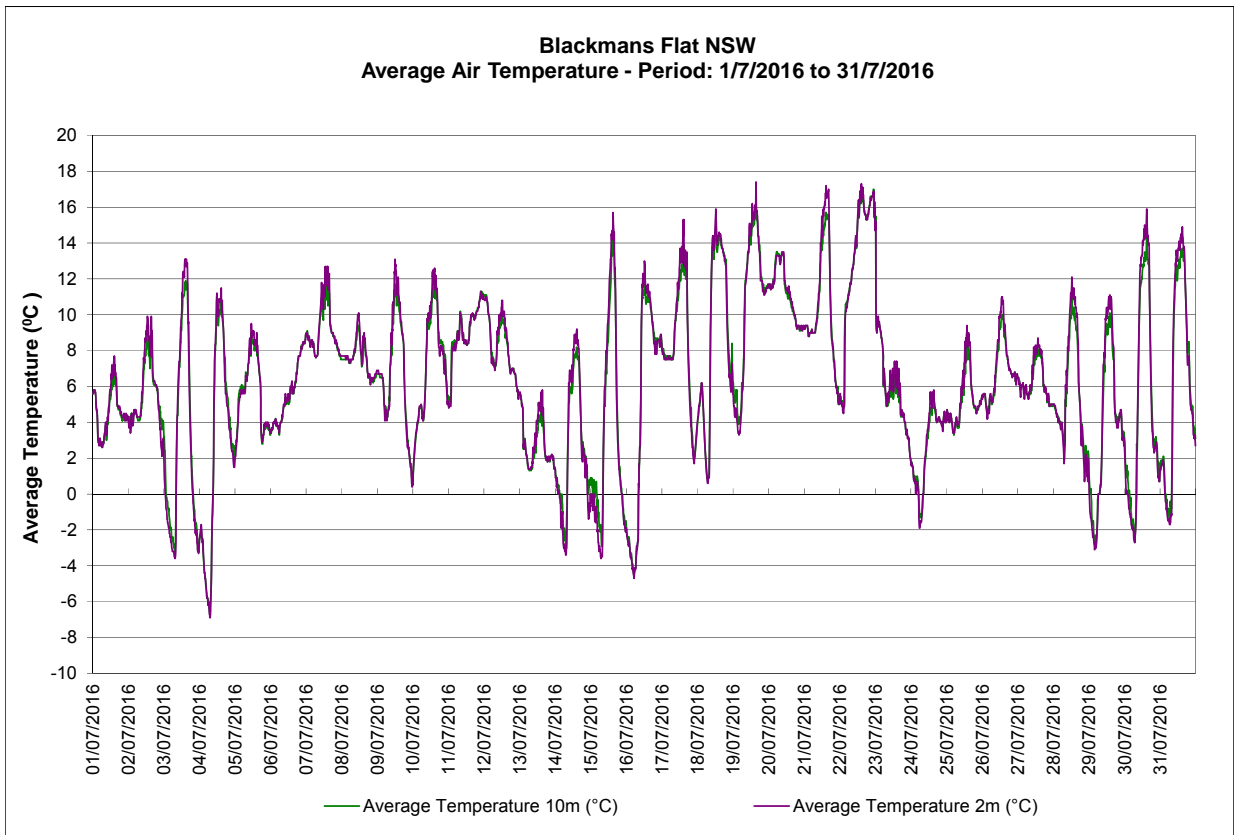
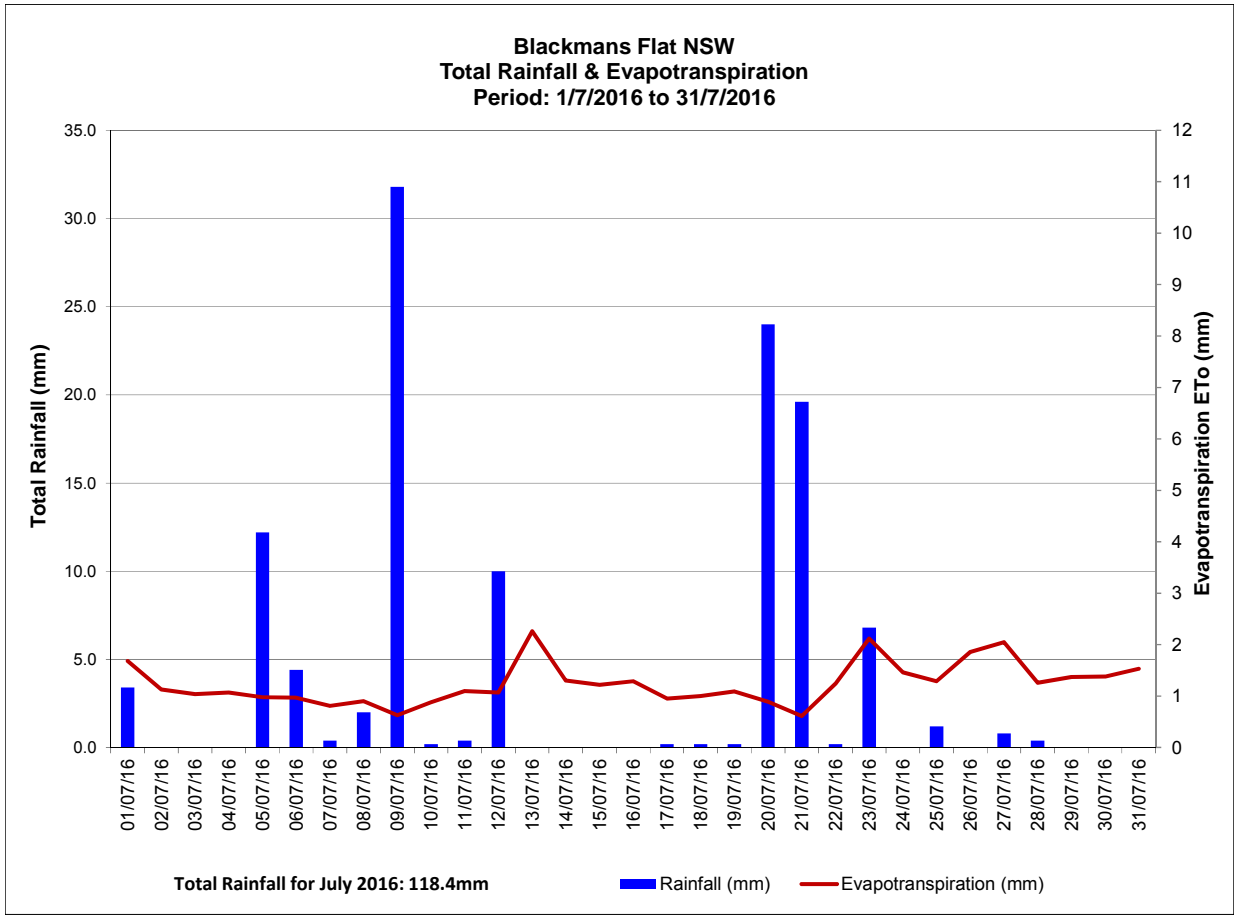


# Appendix 3

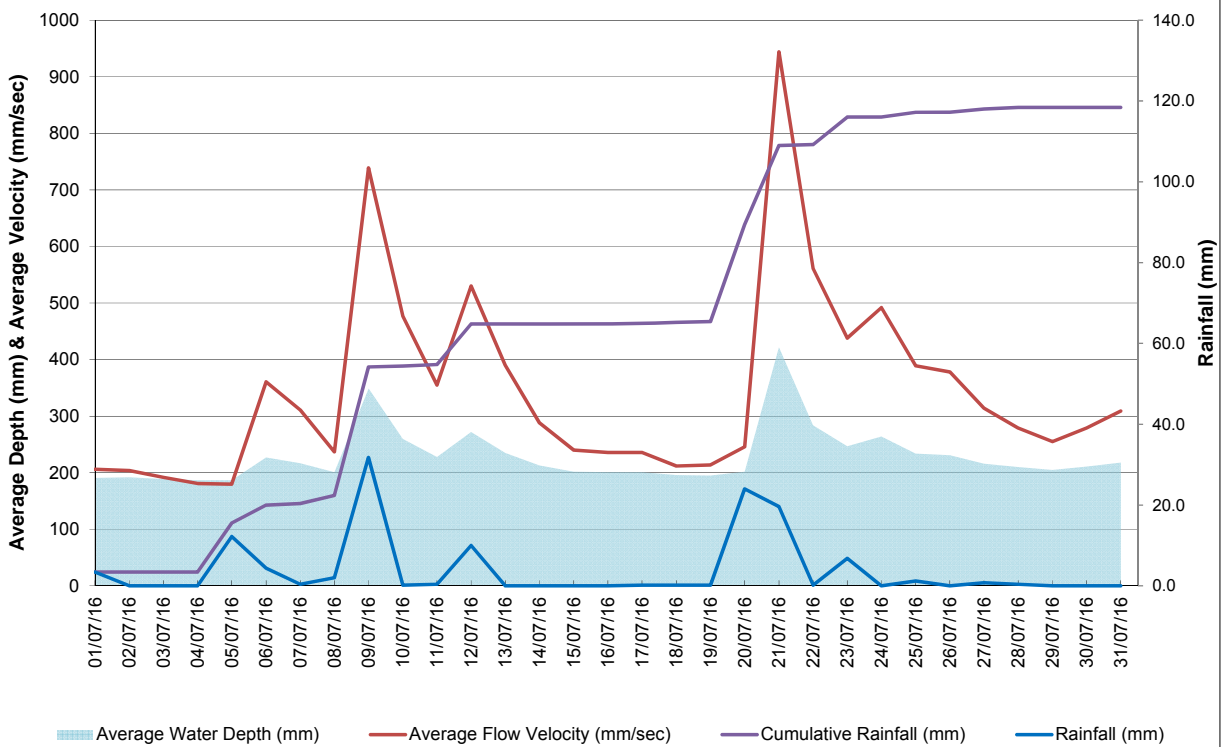
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Meteorological Data

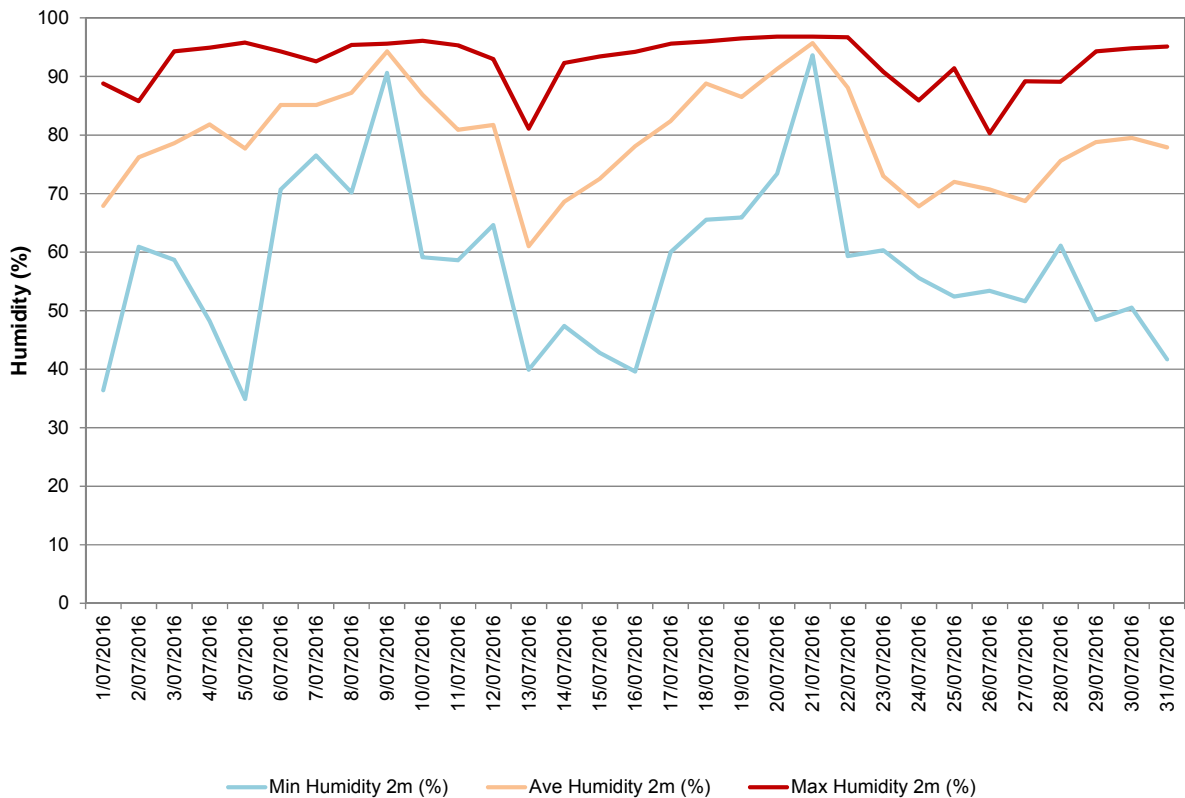




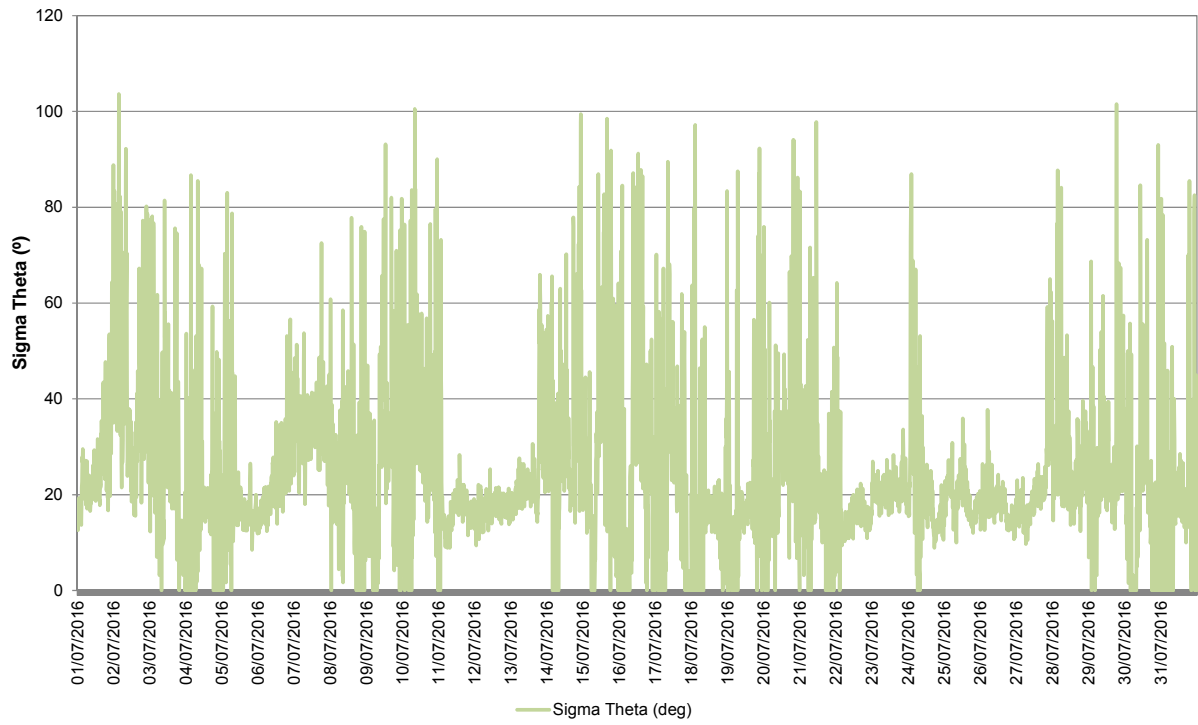
**Neubecks Creek - Blackmans Flat NSW**  
**Average Depth & Velocity vs. Rainfall- Period: 1/7/2016 to 31/7/2016**



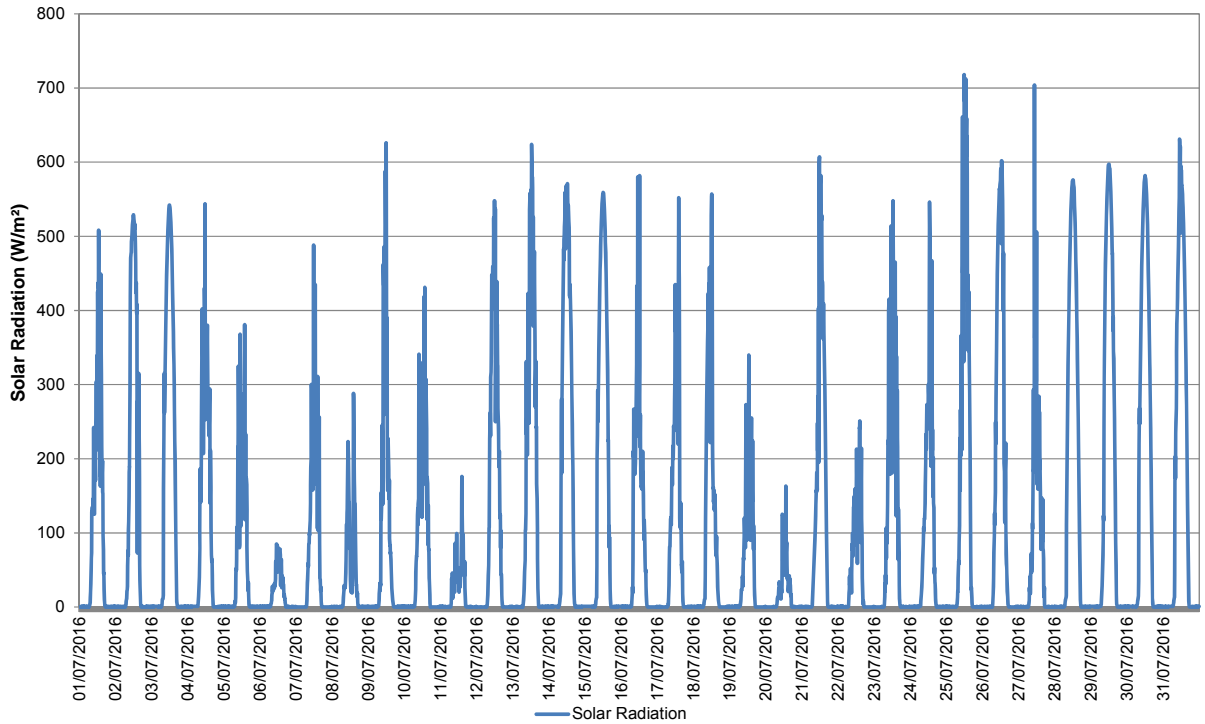
**Blackmans Flat NSW**  
**Daily Humidity Variations - Period: 1/7/2016 to 31/7/2016**



**Blackmans Flat NSW**  
**Sigma Theta Variations - Period: 1/7/2016 to 31/7/2016**



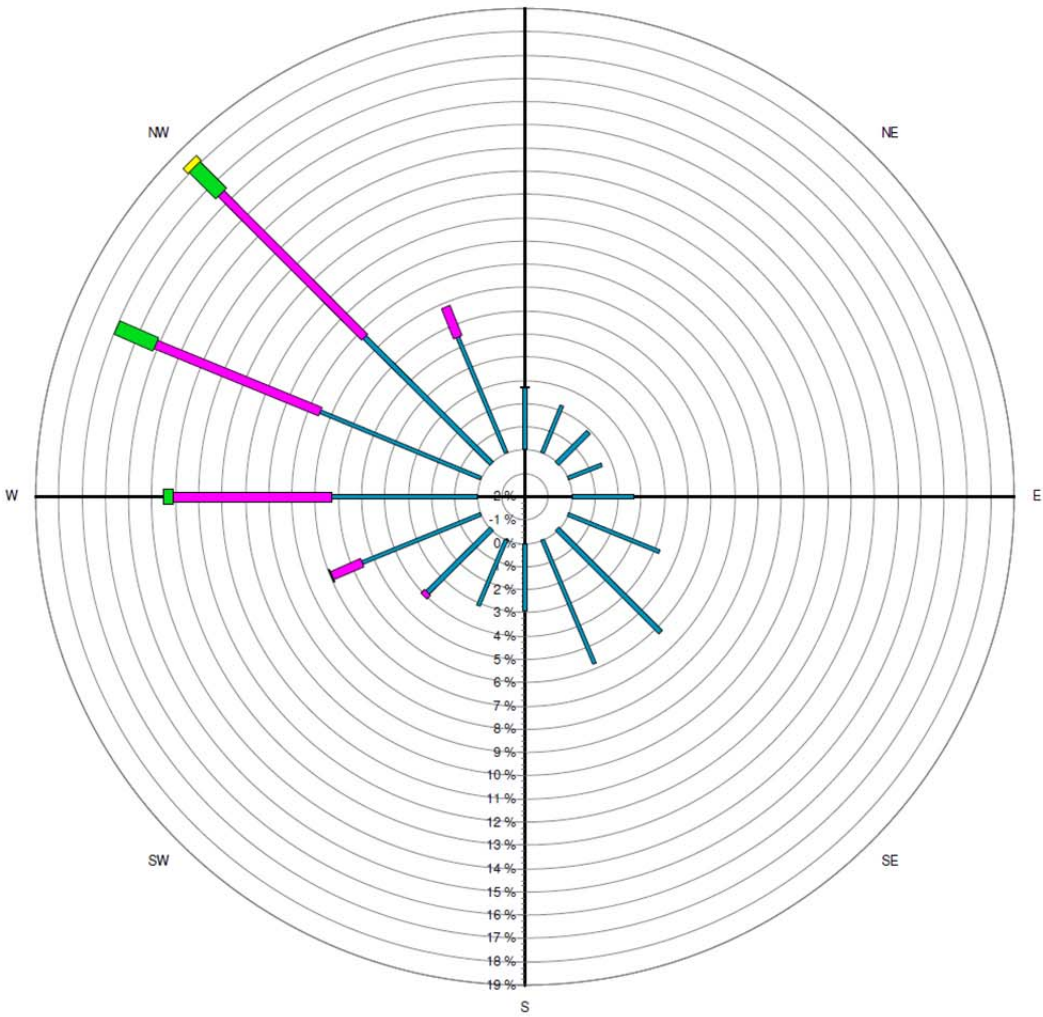
**Blackmans Flat NSW**  
**Average Solar Radiation- Period: 1/7/2016 to 31/7/2016**



# Blackmans Flat Windrose

1/07/2016 to 31/07/2016

N



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