Appendix 2*

Monthly Dust and Meteorological Reports

*This appendix is presented on the CD included on the inside back cover this report

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REPORT

DUST AND METEOROLOGICAL DATA - JUNE 2011

Donaldson Coal

Job No: 3003

8 August 2011

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA - JUNE 2011**
JOB NUMBER:	**3003**
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during June 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- rainfall.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during June 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2: HVAS data from Beresfield and Blackhill for June 2011

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
1/06/2011	13	13	23
7/06/2011	8	7	27
13/06/2011	6	4	16
19/06/2011	9	8	18
25/06/2011	13	11	21
Annual average	**12**	**10**	**24**

All measurements of PM_{10} for June are below the 24-hour OEH PM_{10} goal of 50 $\mu g/m^3$. The highest 24-hour average PM_{10} concentration was 13 $\mu g/m^3$, recorded at Beresfield on 1 June and 25 June 2011 and at Blackhill on 1 June 2011.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 12 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively for the 12 months to June 2011. These values are below the OEH annual average PM_{10} goal of 30 $\mu g/m^3$.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 $\mu g/m^3$. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to June 2011 was 24 $\mu g/m^3$.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring Data at Blackhill was available for June 2011 and is shown in **Figure 3**.

Of the available data, the measured 24-hour average PM_{10} concentrations did not exceed the OEH goal of 50 µg/m^3. A maximum 24-hour average PM_{10} concentration of 41 µg/m^3 was recorded on 26 June 2011.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was not available for June 2011. During the measurement period, the instrument failed due to saturation of by water caused by heavy rain in the area.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was carried out in June 2011. **Figure 5** presents the data and 24-hour average $PM_{2.5}$ concentration. The maximum 24-hour average concentration recorded was 26 µg/m^3 on the 26 June 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for June 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to June 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	DG12
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1^	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Annual Average	**0.7**	**1.7**	**2.0**	**0.9**	**0.7**	**0.7**	**0.7**	**1.3**	**0.8**	**0.7**	**0.9**	**0.9**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. ^Invalid. * No recording, funnel damaged. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in June 2011 was 1.7 g/m²/month at DG3.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in June 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during June. Total rainfall for the month was 144.8 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the West and East-South East.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 43% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

Dust deposition (g/m²/month)												
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1

- sample contaminated| + - sample invalid|*Broken funnel

[Note: Samples for October 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd September 2009.]

APPENDIX B

Figures

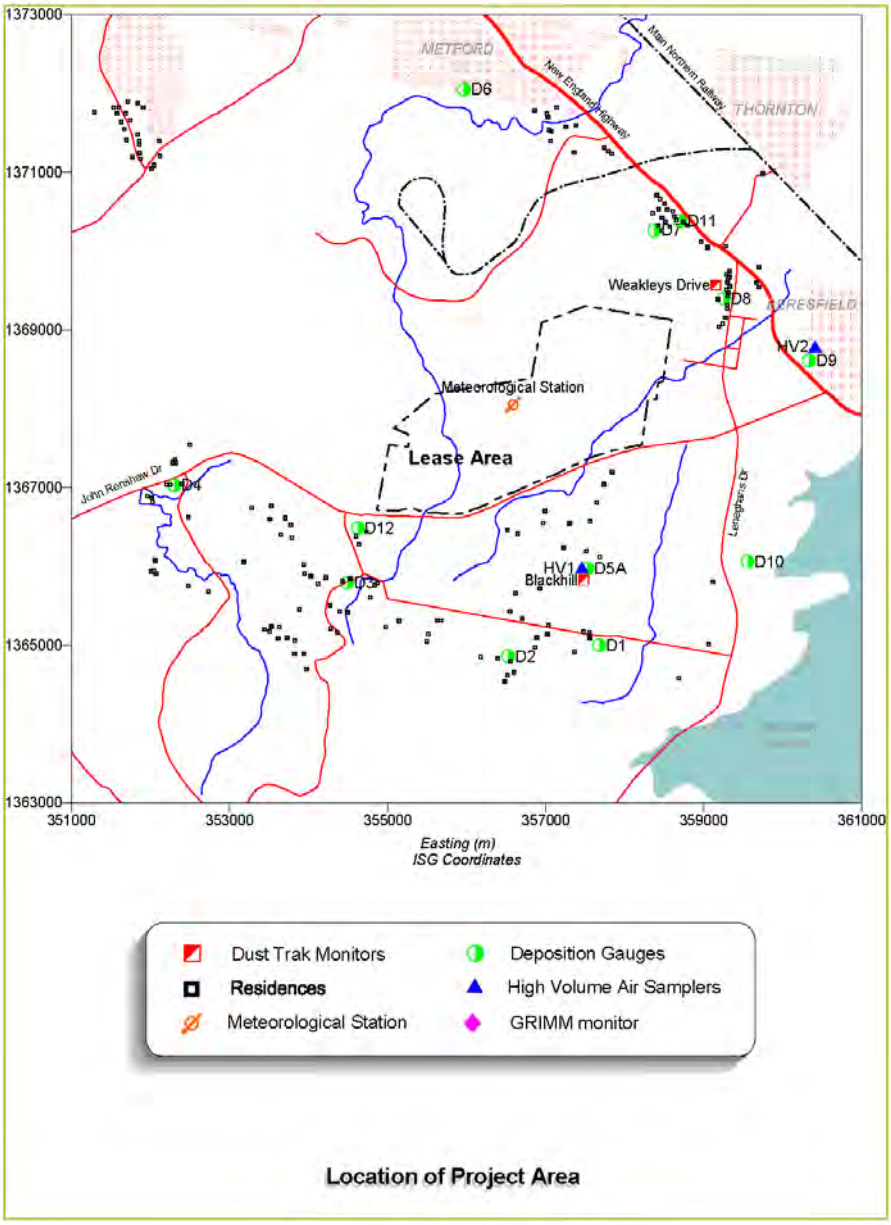

Figure 1: Project Location

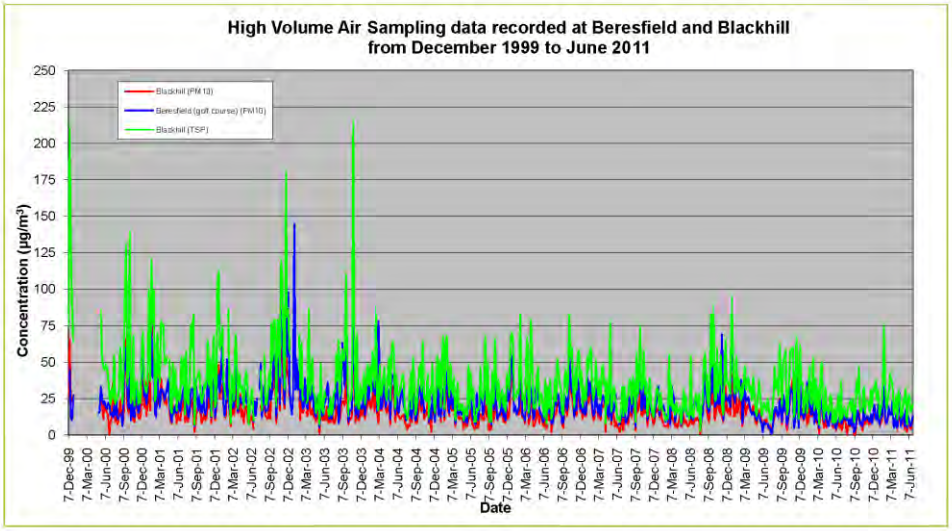

Figure 2: High Volume Air Sampling data

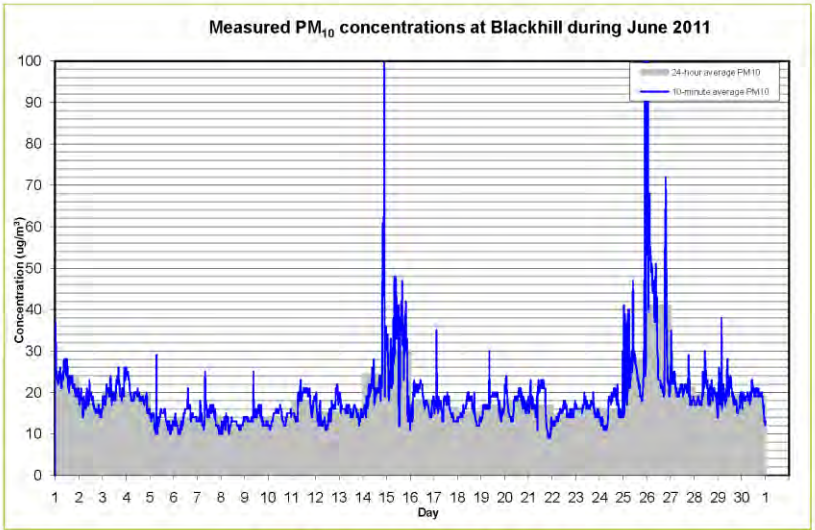

Figure 3: DustTrak sampling data - Blackhill site

No Monitoring was avaliable for this site in June 2011 due to equipment failure caused by water damage.

Figure 4: DustTrak sampling data - Weakleys Drive site

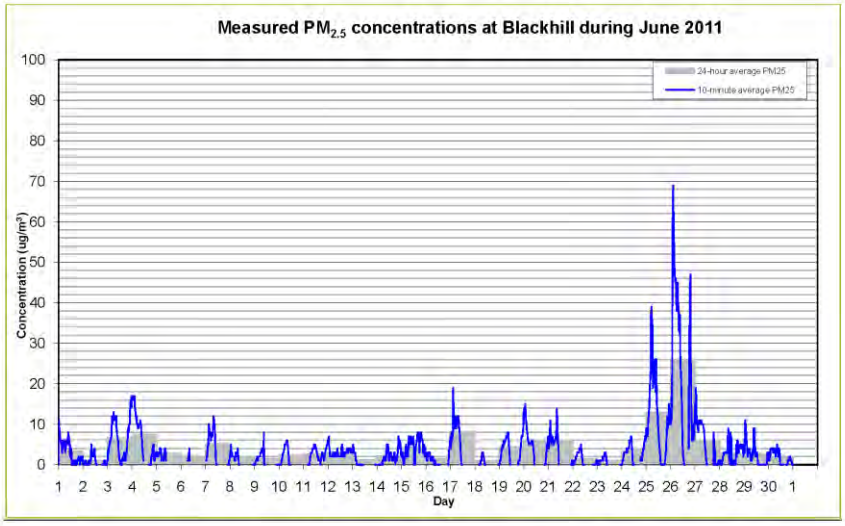

Figure 5: DustTrak $PM_{2.5}$ monitoring data

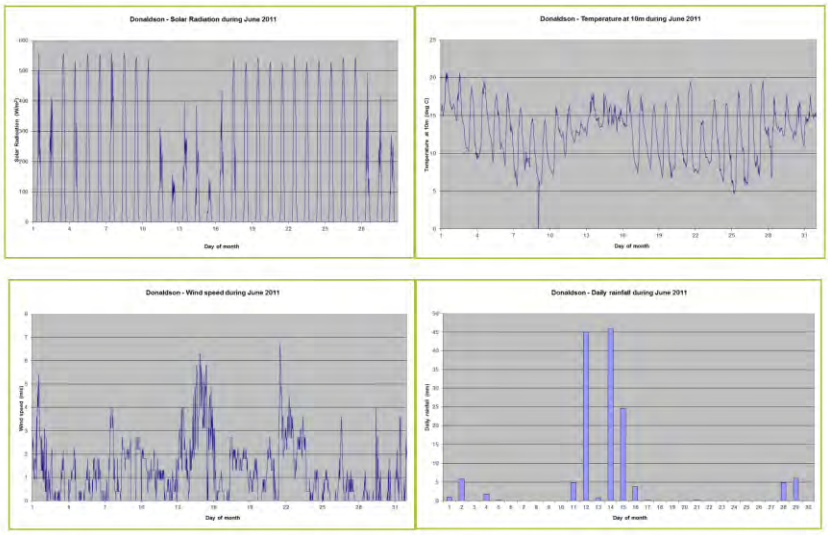

Figure 6: Meteorological conditions

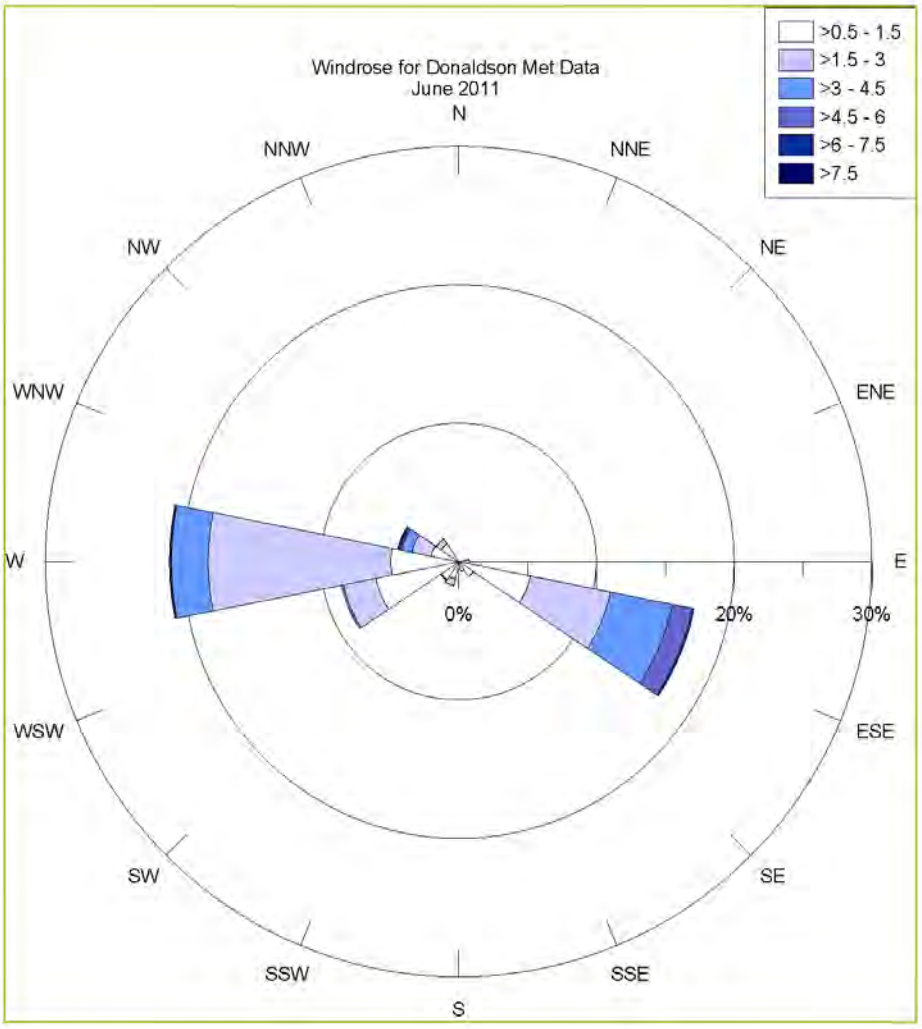

Figure 7: Windrose

REPORT

DUST AND METEOROLOGICAL DATA – JULY 2011

Donaldson Coal

Job No: 3003

29 September 2011

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA – JULY 2011**
JOB NUMBER:	**3003**
PREPARED FOR:	Phil Brown **DONALDSON COAL**
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during July 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- rainfall.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during July 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2: HVAS data from Beresfield and Blackhill for July 2011

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
1/07/2011	8	2	13
7/07/2011	21	8	26
13/07/2011	18	19	58
19/07/2011	4	4	17
25/07/2011	8	8	26
31/07/2011	16	12	22
Annual average	**12**	**10**	**25**

All measurements of PM_{10} for July are below the 24-hour OEH PM_{10} goal of 50 $\mu g/m^3$. The highest 24-hour average PM_{10} concentration was 21 $\mu g/m^3$, recorded at Beresfield on 7 July 2011.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 12 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively for the 12 months to July 2011. These values are below the OEH annual average PM_{10} goal of 30 $\mu g/m^3$.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 $\mu g/m^3$. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to July 2011 was 25 $\mu g/m^3$.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring Data at Blackhill was available for July 2011 and is shown in **Figure 3**.

Of the available data, the measured 24-hour average PM_{10} concentrations exceeded the OEH goal of 50 $\mu g/m^3$ on one day only. A maximum 24-hour average PM_{10} concentration of 68 $\mu g/m^3$ was recorded on 9 July 2011.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was not available for July 2011. During the measurement period, the instrument failed due to power failure.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was not carried out in July 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for July 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to July 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	**DG2**	**DG3**	**DG4**	**DG5A**	**DG6**	**DG7**	**DG8**	**DG9**	**DG10**	**DG11**	**DG12**
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul- 11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7
Annual Average	**0.7**	**1.7**	**2.0**	**0.9**	**0.7**	**0.7**	**0.7**	**1.4**	**0.8**	**0.8**	**0.9**	**0.9**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. +Invalid. * No recording, funnel damaged. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in July 2011 was 1.8 g/m²/month at DG8.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in July 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during July. Total rainfall for the month was 100.2 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the West.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 44% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

Dust deposition (g/m²/month)												
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

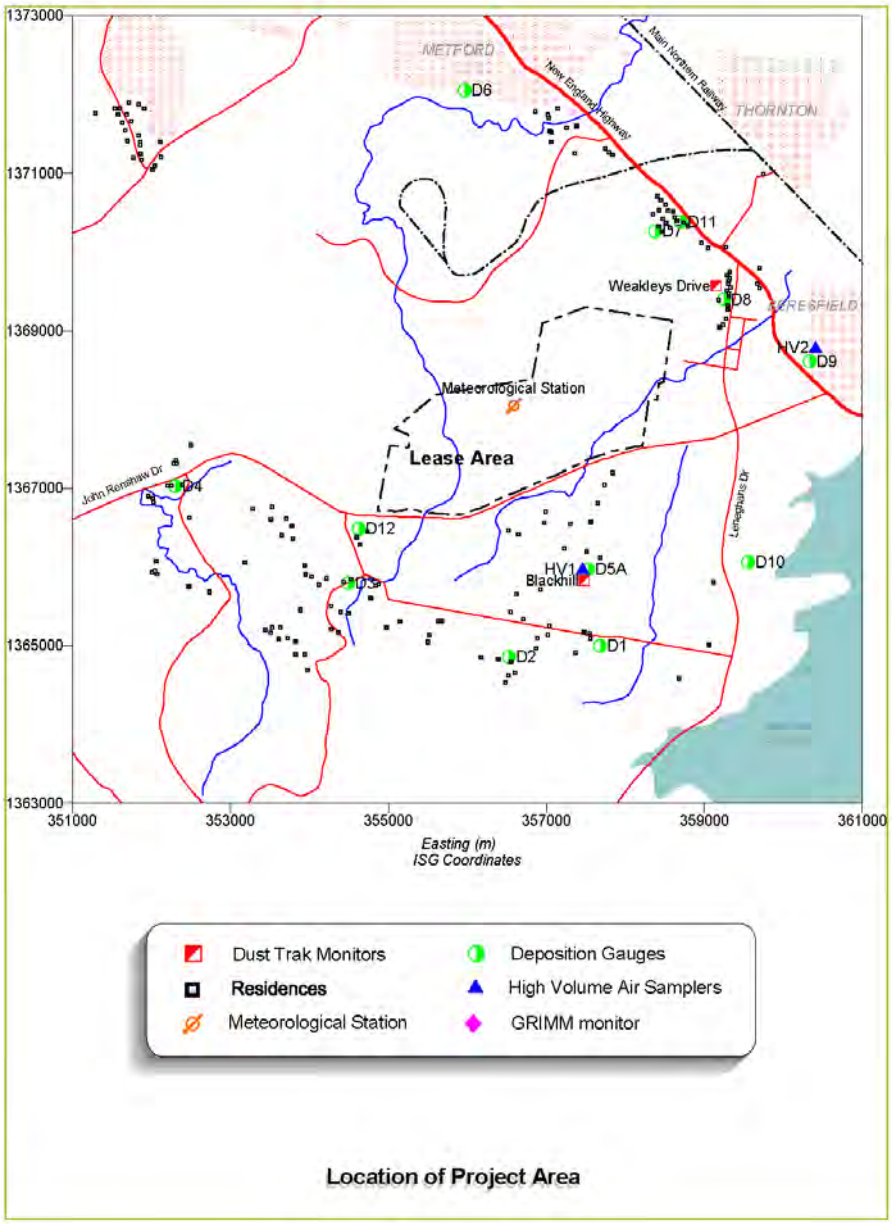
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul- 11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7

- sample contaminated| + - sample invalid|*Broken funnel

[Note: Samples for October 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd September 2009.]

APPENDIX B

Figures



Location of Project Area

Figure 1: Project Location

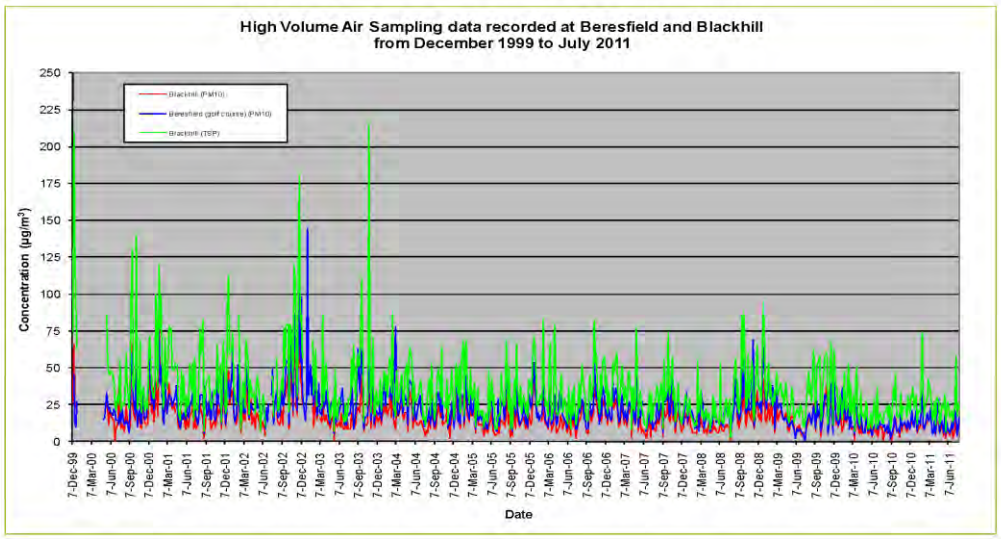


Figure 2: High Volume Air Sampling data

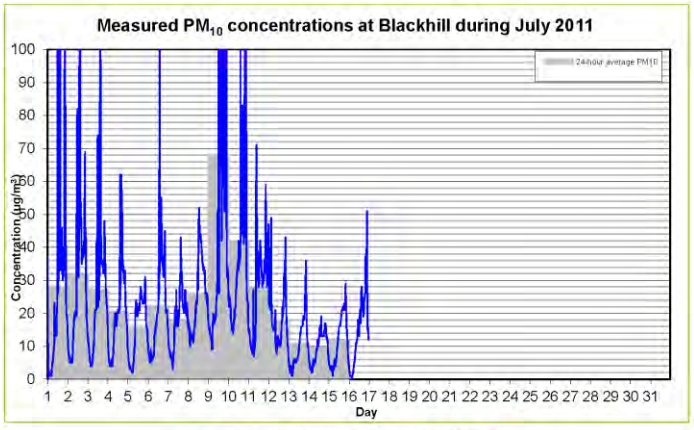


Figure 3: DustTrak sampling data - Blackhill site

No Monitoring was avaliable for this site in July 2011 due to equipment failure caused by power loss.

Figure 4: DustTrak sampling data - Weakleys Drive site

No Monitoring was undertaken for July 2011.

Figure 5: DustTrak $PM_{2.5}$ monitoring data

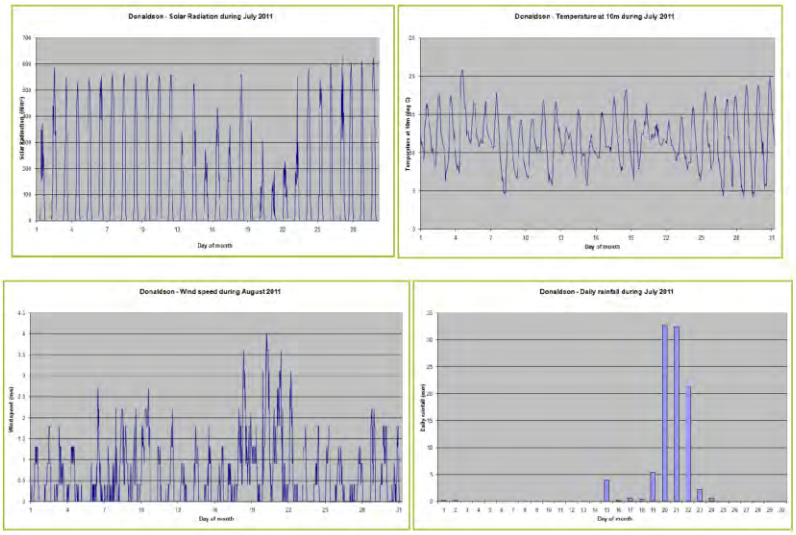


Figure 6: Meteorological conditions

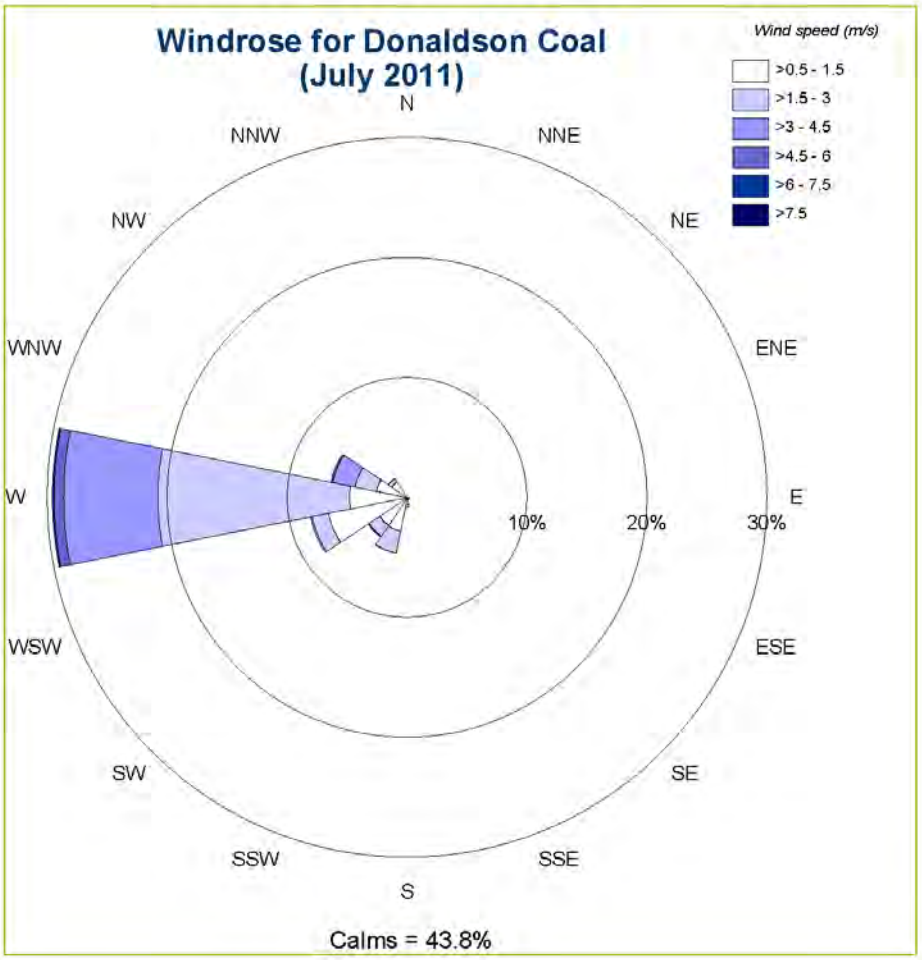


Figure 7: Windrose

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REPORT

DUST AND METEOROLOGICAL DATA - AUGUST 2011

Donaldson Coal

Job No: 3003

29 September 2011

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA - AUGUST 2011**
JOB NUMBER:	**3003**
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during August 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- rainfall.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during August 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2: HVAS data from Beresfield and Blackhill for August 2011

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
6/08/2011	19	16	35
12/08/2011	9	8	23
18/08/2011	7	7	18
24/08/2011	13	11	22
30/08/2011	14	12	21
Annual average	**12**	**10**	**25**

All measurements of PM_{10} for August are below the 24-hour OEH PM_{10} goal of 50 $\mu g/m^3$. The highest 24-hour average PM_{10} concentration was 19 $\mu g/m^3$, recorded at Beresfield on 6 August.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 12 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively for the 12 months to August 2011. These values are below the OEH annual average PM_{10} goal of 30 $\mu g/m^3$.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 $\mu g/m^3$. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to August 2011 was 25 $\mu g/m^3$.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring data was not available for August 2011. During the measurement period, the instrument failed due to power loss.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was not available for August 2011. During the measurement period, the instrument failed due to power loss.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was not carried out in August 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for August 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to August 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	DG12
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1†	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul- 11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Annual Average	**0.7**	**1.6**	**1.9**	**0.9**	**0.7**	**0.7**	**0.7**	**1.6**	**0.9**	**0.8**	**0.9**	**1.0**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. †Invalid. * No recording, funnel damaged. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in August 2011 was 2.4 g/m²/month at DG8.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in August 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during August. Total rainfall for the month was 45 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the West and East-South East.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 60.9% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

Dust deposition (g/m²/month)												
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8

- sample contaminated| + - sample invalid|*Broken funnel

[Note: Samples for October 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd September 2009.]

APPENDIX B

Figures

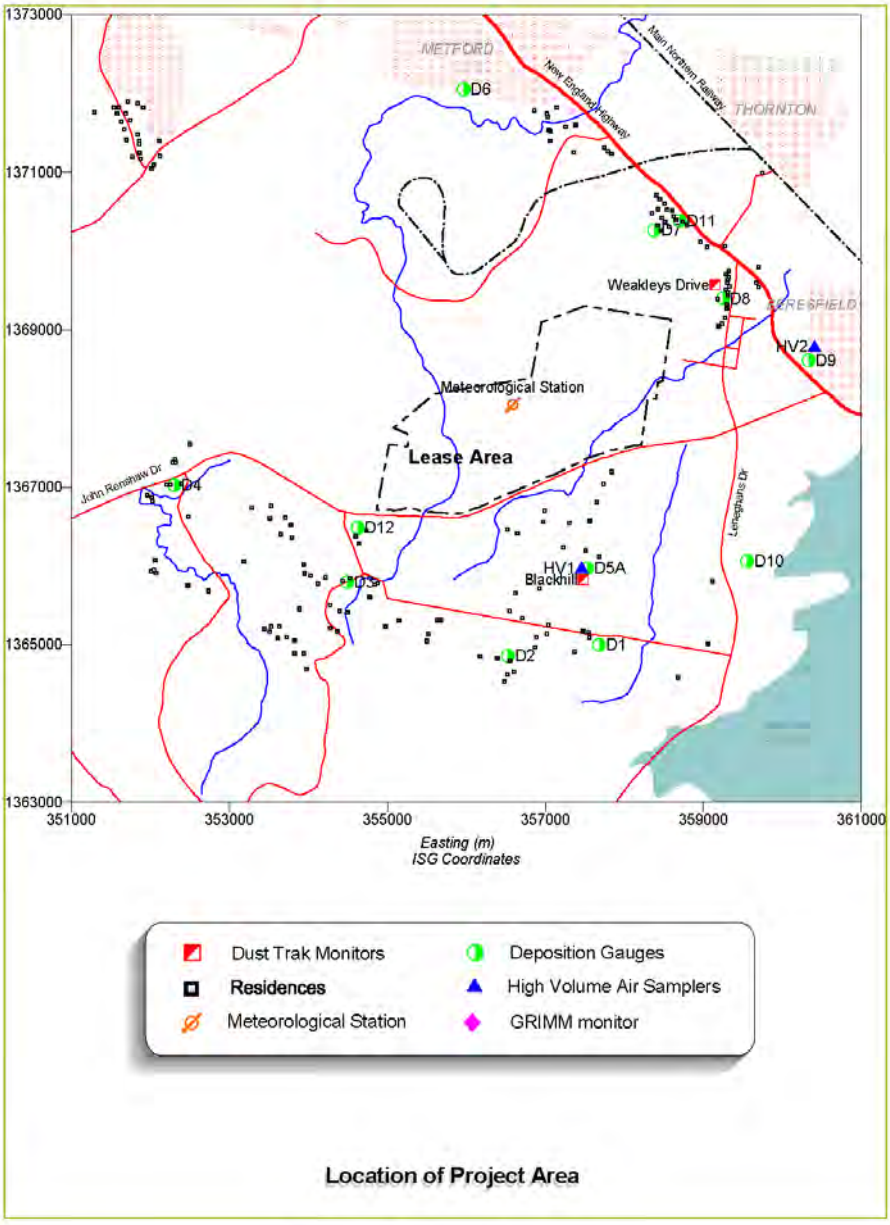

Figure 1: Project Location

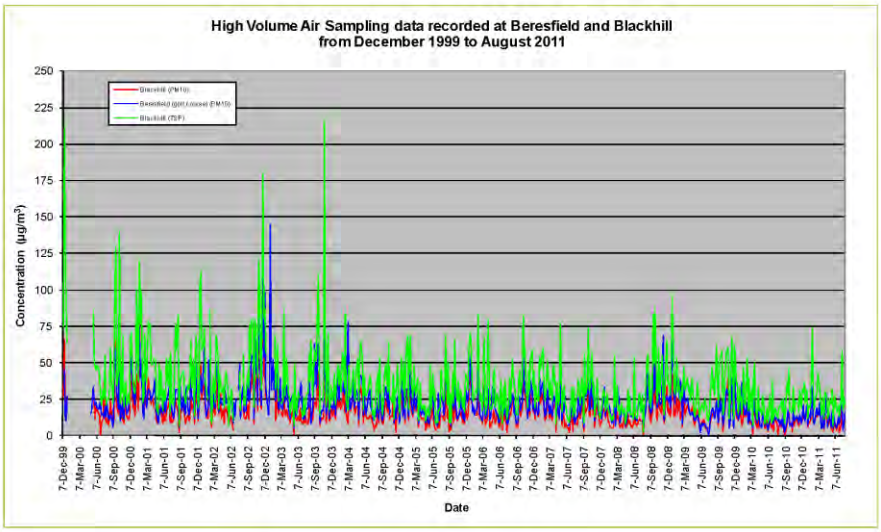

Figure 2: High Volume Air Sampling data

No Monitoring was avaliable for this site in August 2011 due to equipment failure caused by power loss.

Figure 3: DustTrak sampling data - Blackhill site

No Monitoring was avaliable for this site in August 2011 due to equipment failure caused by power loss.

Figure 4: DustTrak sampling data - Weakleys Drive site

No PM2.5 monitoring was conducted during this month

Figure 5: DustTrak $PM_{2.5}$ monitoring data

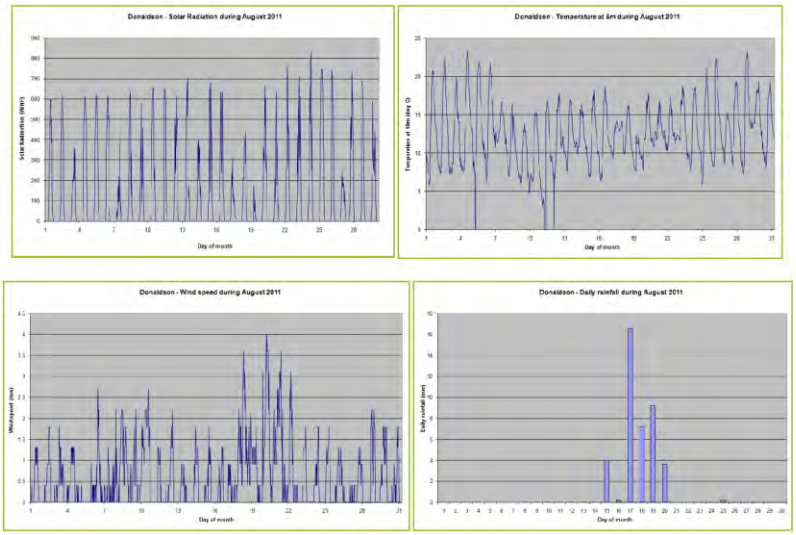

Figure 6: Meteorological conditions

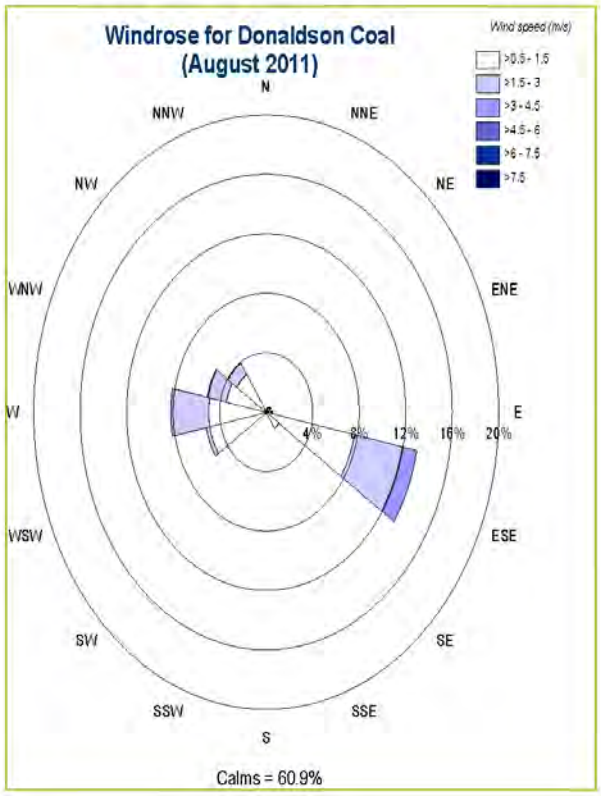

Figure 7: Windrose

REPORT

DUST AND METEOROLOGICAL DATA - SEPTEMBER 2011

Donaldson Coal

Job No: 3003

1 December 2011

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA - SEPTEMBER 2011**
JOB NUMBER:	**3003**
PREPARED FOR:	Phil Brown **DONALDSON COAL**
PREPARED BY:	Daniel Cullen
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during September 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- rainfall.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during September 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in

Figure 2.

Table 2: HVAS data from Beresfield and Blackhill for September 2011

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
5/09/2011	20	15	35
11/09/2011	9	10	23
17/09/2011	26	23	18
23/09/2011	38	34	22
29/09/2011	10	15	21
Annual average	**14**	**11**	**27**

All measurements of PM_{10} for September are below the 24-hour OEH PM_{10} goal of 50 µg/m³. The highest 24-hour average PM_{10} concentration was 38 µg/m³, recorded at Beresfield on 23 September.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 14 µg/m³ and 11 µg/m³ respectively for the 12 months to September 2011. These values are below the OEH annual average PM_{10} goal of 30 µg/m³.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 µg/m³. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to September 2011 was 27 µg/m³.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring data was not available for September 2011. During the measurement period, access to the site was unable to be obtained.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was available for September 2011 and is shown in **Figure 4**. Of the available data, the measured 24-hour average PM_{10} concentrations did not exceed the OEH goal of 50 $\mu g/m^3$. A maximum 24-hour average PM_{10} concentration of 17 $\mu g/m^3$ was recorded on 19 September 2011.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was not carried out in September 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for September 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to September 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	DG12
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul- 11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#
Annual Average	**0.7**	**1.5**	**2.0**	**0.9**	**0.7**	**0.6**	**0.7**	**1.6**	**0.9**	**0.8**	**0.9**	**1.0**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. +Invalid. * No recording, funnel damaged. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in September 2011 was 2.3 g/m²/month at DG10.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in September 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during September. Total rainfall for the month was 91.4 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the West and East-South East.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 54.1% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

Month	Dust deposition (g/m²/month)											
	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#

- sample contaminated| + - sample invalid|*Broken funnel

[Note: Samples for October 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd September 2009.]

APPENDIX B

Figures

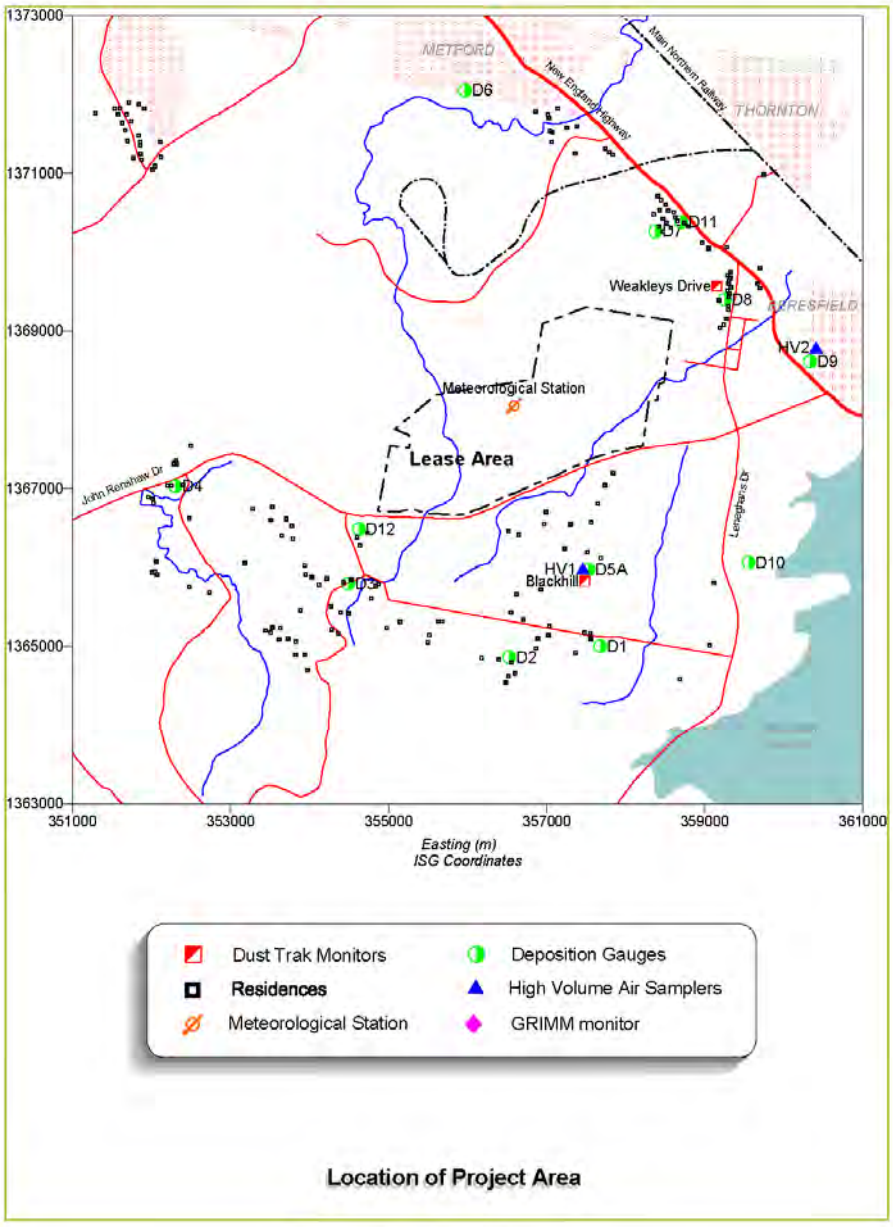

Figure 1: Project Location

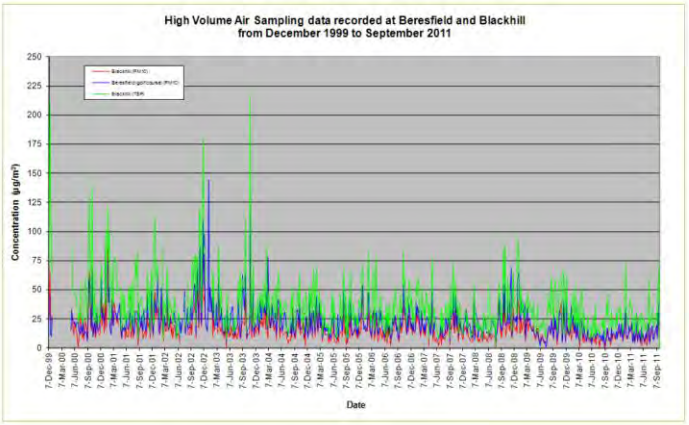

Figure 2: High Volume Air Sampling data

No Monitoring was avaliable for this site in September 2011 due to equipment failure caused by power loss.

Figure 3: DustTrak sampling data - Blackhill site

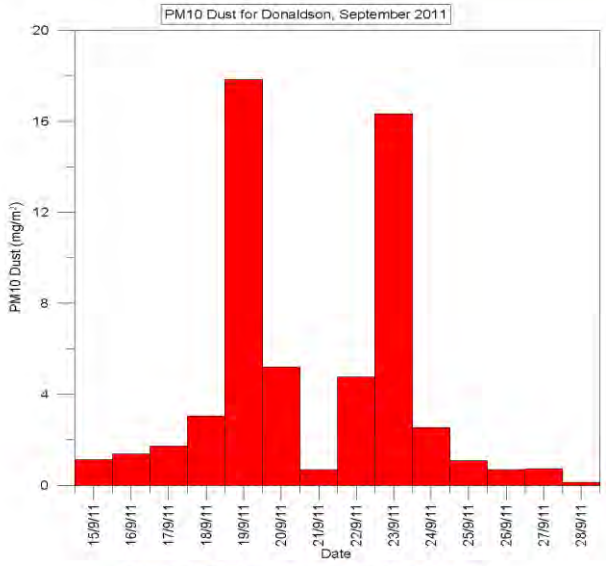

Figure 4: DustTrak sampling data - Weakleys Drive site

No PM2.5 monitoring was conducted during this month

Figure 5: DustTrak $PM_{2.5}$ monitoring data

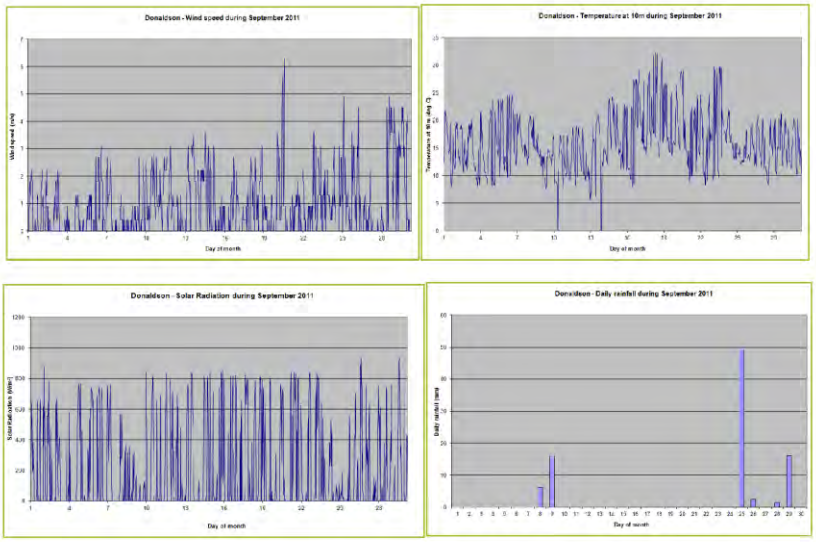

Figure 6: Meteorological conditions

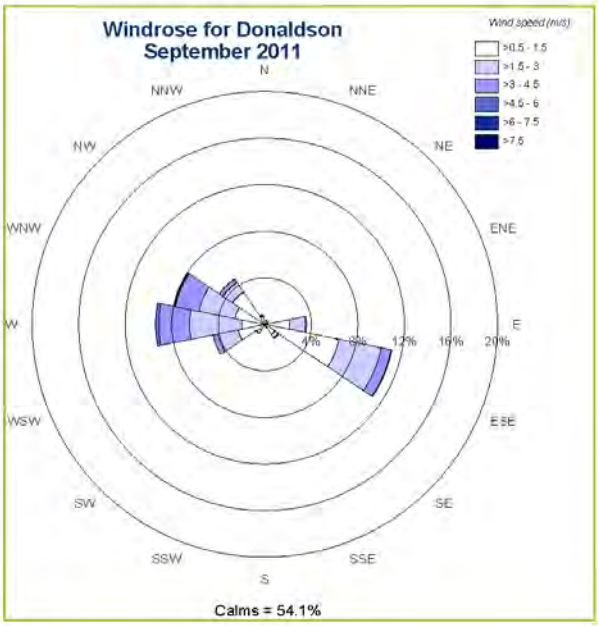

Figure 7: Windrose

REPORT

DUST AND METEOROLOGICAL DATA – OCTOBER 2011

Donaldson Coal

Job No: 3003

8 March 2012

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA – OCTOBER 2011**
JOB NUMBER:	**3003**
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during October 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- rainfall.

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during October 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in

Figure 2.

Table 2: HVAS data from Beresfield and Blackhill for October 2011

Date	Beresfield PM_{10} (µg/m³)	Blackhill PM_{10} (µg/m³)	Blackhill TSP (µg/m³)
5/10/2011	12	21	21
11/10/2011	14	30	30
17/10/2011	16	35	35
23/10/2011	26	32	32
29/10/2011	14	33	33
Annual average	**14**	**12**	**27**

All measurements of PM_{10} for October are below the 24-hour OEH PM_{10} goal of 50 µg/m³. The highest 24-hour average PM_{10} concentration was 35 µg/m³, recorded at Blackhill on 17 October.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 14 µg/m³ and 12 µg/m³ respectively for the 12 months to October 2011. These values are below the OEH annual average PM_{10} goal of 30 µg/m³.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 µg/m³. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to October 2011 was 27 µg/m³.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring data was not available for October 2011. During the measurement period, access to the site was unable to be obtained.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was not available for October 2011 due to equipment malfunction.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was not carried out in October 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for October 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to October 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	DG12
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1'	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul- 11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#
Oct-11	1	1.2	0.6	1.3		1	1.4	1.5	1.4	1.3	1.4	1.1
Annual Average	**0.7**	**1.5**	**1.9**	**1.0**	**0.8**	**0.7**	**0.8**	**1.7**	**0.9**	**0.8**	**1.0**	**1.0**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. 'Invalid. * No recording, funnel damaged. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in October 2011 was 1.5 g/m²/month at DG8.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in October 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during October. Total rainfall for the month was 98.8 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the Northwest and East-South East.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 50.9% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

Month	Dust deposition (g/m²/month)											
	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#
Oct-11	11	11.2	0.6	1.3	~	1	1.4	1.5	1.4	1.3	1.4	1.1

- sample contaminated| + - sample invalid|*-Broken funnel| ~ - Site inaccessible

[Note: Samples for October 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd October 2009.]

APPENDIX B

Figures

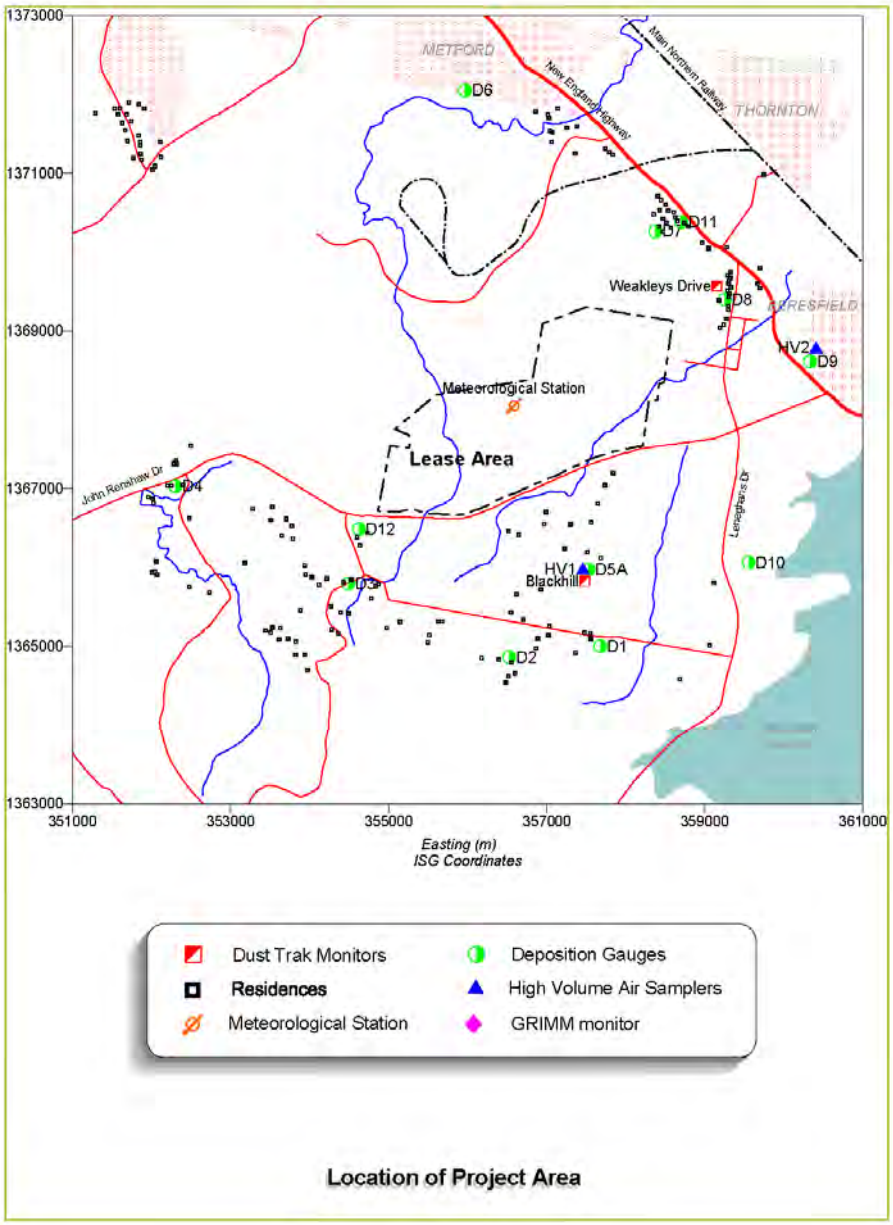


Figure 1: Project Location

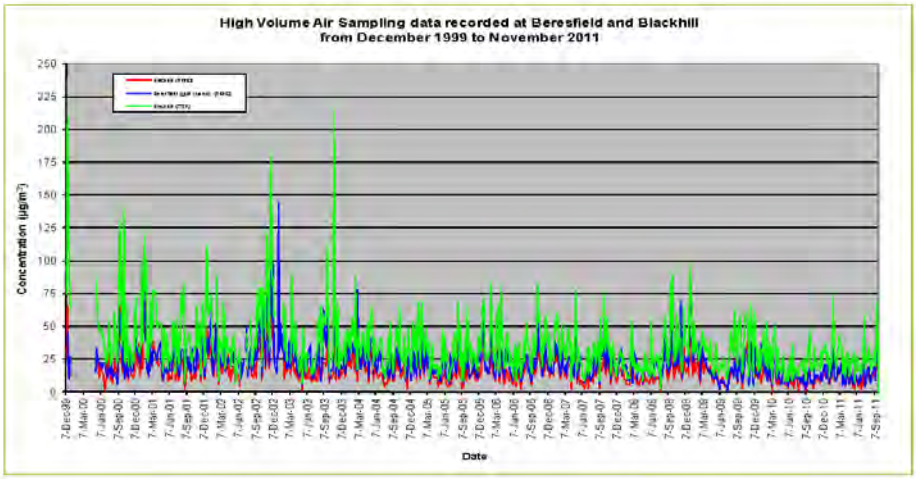


Figure 2: High Volume Air Sampling data

No Monitoring was avaliable for this site in October 2011 due to inability to access the site.

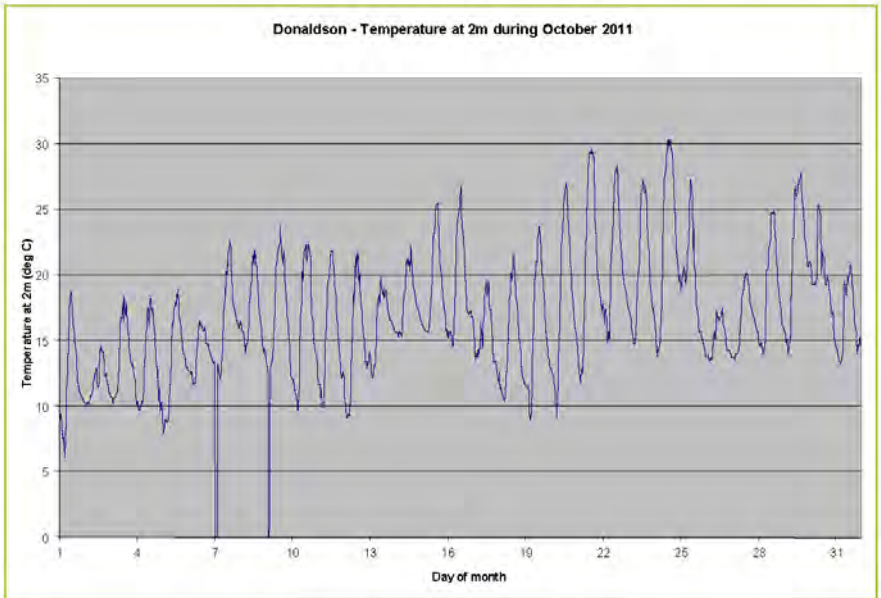
Figure 3: DustTrak sampling data - Blackhill site

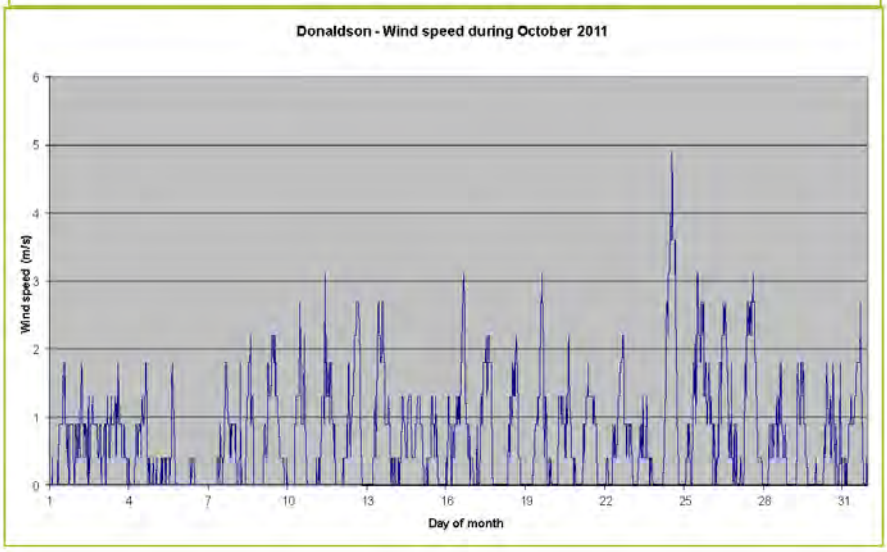
No Monitoring was avaliable for this site in October 2011 due to equipment malfunction

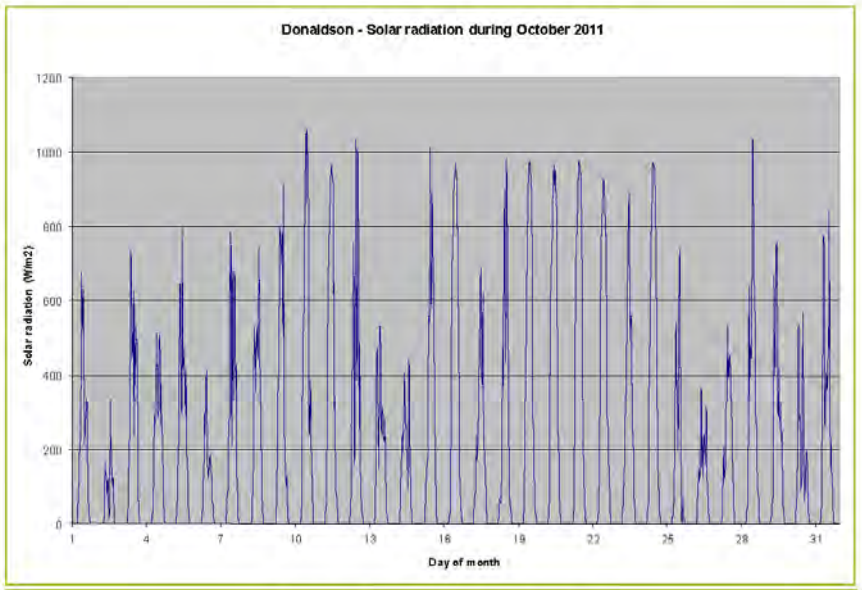
Figure 4: DustTrak sampling data - Weakleys Drive site

No PM2.5 monitoring was conducted during this month

Figure 5: DustTrak $PM_{2.5}$ monitoring data


Donaldson - Temperature at 2m during October 2011
Temperature at 2m (deg C)
0
5
10
15
20
25
30
35
1
4
7
10
13
16
19
22
25
28
31
Day of month


Donaldson - Wind speed during October 2011
Wind speed (m/s)
0
1
2
3
4
5
6
1
4
7
10
13
16
19
22
25
28
31
Day of month



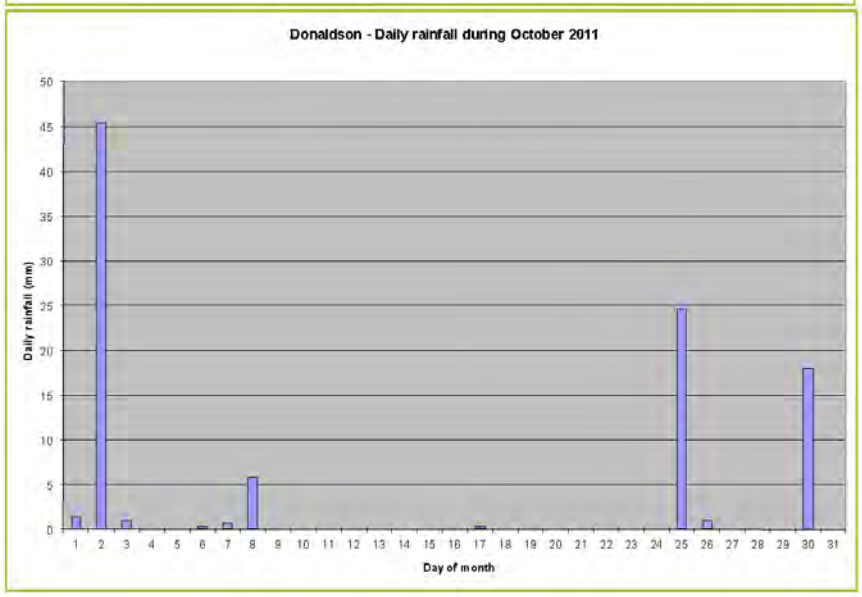


Figure 6: Meteorological conditions

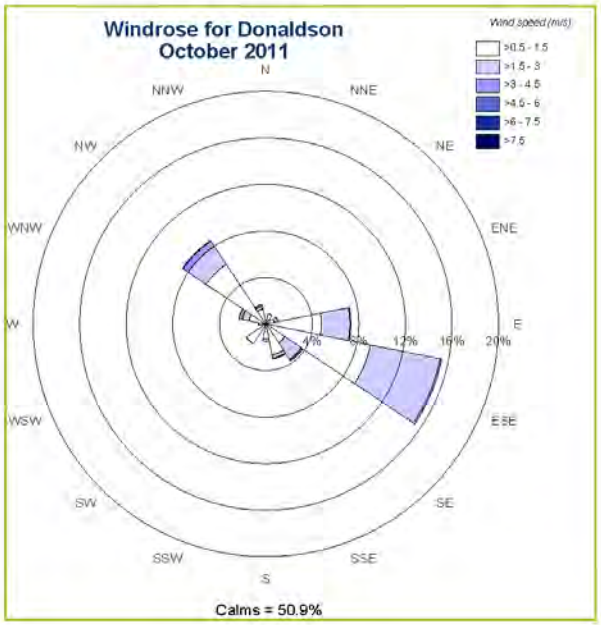


Figure 7: Windrose

REPORT

DUST AND METEOROLOGICAL DATA – NOVEMBER 2011

Donaldson Coal

Job No: 3003

8 March 2012

A PEL Company

PROJECT TITLE:	**DUST AND METEOROLOGICAL DATA – NOVEMBER 2011**
JOB NUMBER:	**3003**
PREPARED FOR:	Phil Brown **DONALDSON COAL**
PREPARED BY:	Daniel Cullen
APPROVED FOR RELEASE BY:	Jane Barnett
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1 INTRODUCTION

As part of their Air Quality Management Plan, Donaldson Coal operate an ambient air quality monitoring network, including dust monitoring in the vicinity of the mining lease and meteorological monitoring at a single station on-site. This report has been prepared as a summary of the data collected throughout the network during November 2011.

The dust monitoring network includes continuous monitoring using TSI DustTrak, high volume air sampling (HVAS) on a one-day-in-six run cycle and dust deposition monitoring.

The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and an additional DustTrak monitor used for one week each quarter to measure $PM_{2.5}$.

There are two HVAS locations used to determine ambient concentrations of PM_{10} and TSP. These operate on a one-day-in-six run cycle, in line with similar measurements made by the NSW Office of Environment and Heritage (OEH)[a] at other locations throughout the state.

Monthly levels of dust deposition are also measured using twelve gauges placed at various locations in the vicinity of the mine. The locations of each of these monitors and gauges are shown in **Figure 1**.

Table 1 lists the instruments used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM_{10}
Blackhill	HVAS	PM_{10}
	HVAS	TSP
	DustTrak	PM_{10}
	DustTrak (1 week per quarter)	$PM_{2.5}$
Weakleys Drive	DustTrak	PM_{10}
DG1 – DG12	Deposition Gauges	Dust Deposition

Meteorological data are downloaded monthly and forwarded to PAEHolmes for processing. The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- temperature
- solar radiation
- rainfall

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by RCA Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during November 2011 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2: HVAS data from Beresfield and Blackhill for November 2011

Date	Beresfield PM_{10} ($\mu g/m^3$)	Blackhill PM_{10} ($\mu g/m^3$)	Blackhill TSP ($\mu g/m^3$)
4/11/2011	16	13	17
10/11/2011	26	34	65
16/11/2011	28	27	31
22/11/2011	14	15	21
28/11/2011	13	20	29
Annual average	**15**	**13**	**28**

All measurements of PM_{10} for November are below the 24-hour OEH PM_{10} goal of 50 $\mu g/m^3$. The highest 24-hour average PM_{10} concentration was 34 $\mu g/m^3$, recorded at Blackhill on 17 November.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 15 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to November 2011. These values are below the OEH annual average PM_{10} goal of 30 $\mu g/m^3$.

TSP measurements from the Blackhill site show that concentrations were below the OEH annual average TSP goal of 90 $\mu g/m^3$. It should be noted that the goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to November 2011 was 28 $\mu g/m^3$.

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Monitoring data was not available for November 2011. During the measurement period, access to the site was unable to be obtained.

3.2 DustTrak Monitoring at Weakleys Drive

Monitoring data was not available for November 2011 due to equipment malfunction.

3.3 DustTrak $PM_{2.5}$ Monitoring at Blackhill

$PM_{2.5}$ monitoring was not carried out in November 2011.

4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of twelve (12) gauges. The results for November 2011 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period.

A summary of the complete data set from June 2000 is provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to November 2011

Month	Monthly dust deposition rate (g/m²/month)											
	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	DG12
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Jul-11	0.6	0.5	1.6	<0.1	0.4	0.3	0.3	1.8	0.8	0.5	0.9	0.7
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#
Oct-11	1	1.2	0.6	1.3	~	1	1.4	1.5	1.4	1.3	1.4	1.1
Nov-11	0.5	1	0.8	0.5	~	0.4	*	1.1	0.5	0.4	0.9	0.9
Annual Average	**0.7**	**1.3**	**2.0**	**0.9**	**0.8**	**0.6**	**0.8**	**1.6**	**0.8**	**0.7**	**1.0**	**1.0**

Data supplied by RCA Laboratories. # Insects/bird droppings reported. +Invalid. * No recording, funnel damaged. ~ Unable to access site. Readings considered invalid have been removed when calculating the annual average.

The highest dust deposition measurement recorded in November 2011 was 1.6 g/m²/month at DG8.

It is noted that the OEH goal for dust deposition is expressed as an annual average and the annual average deposition rates for the gauges in the network are all significantly below the goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in November 2011 are shown in **Figure 6** and a windrose plot is shown in **Figure 7**.

The graphs shown in **Figure 6** indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during November. Total rainfall for the month was 156.4 mm. This is consistent with permanent Bureau of Meteorology weather stations in the area.

A windrose (see **Figure 7**) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast and northwest.

The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 45.8% of the time. The relatively large fraction of calm winds is significantly higher than would be expected and may be as a result of the sheltered location of the weather station.

APPENDIX A

Dust Deposition Data

	Dust deposition (g/m²/month)											
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11	D12
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0	-
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5	-
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8	-
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9	-
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6	-
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7	-
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1	-
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7	-
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7	-
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3	-
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8	-
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5	-
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9	-
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7	-
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0	-
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0	-
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0	-
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0	-
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6	-
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0	-
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1	-
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9	-
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9	-
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6	-
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5	-
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5	-
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0	-
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2	-
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7	-
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7	-
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9	-
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3	-
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3	-
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3	-
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4	-
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7	-
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3	-
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1	-

Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1	-
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5	-
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8	-
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2	-
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0	-
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1	-
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8	-
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6	-
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5	-
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8	-
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3	-
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3	-
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9	-
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1	-
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9	-
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1	-
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9	-
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1	-
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3	-
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2	-
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9	-
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5	-
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8	-
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5	-
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5	-
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5	-
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9	-
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6	-
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9	-
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6	-
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9	-
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9	-
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9	-
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9	-
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7	-
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7	-
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9	-
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8	-
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3	-
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7	-
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	-
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	-
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	-
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	-
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	-
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	-
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	-

Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	-
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1#	1.7#	1.2	1.1#	1.1#	-
May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#	-
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2	-
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1	-
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4	-
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8	-
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8	-
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7	-
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2	-
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+	-
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2	-
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7	-
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9	-
May-09	0.6	1.6	0.8	2.4	0.9	5.6 +	1.4	1.1	1.3	0.7	1.5	-
Jun-09	0.4	1.3	0.8	0.5	0.5	3.3	0.9	0.6	1	3.4	0.7	-
Jul-09	0.2	1.0	0.6	0.4	0.3	3.8	0.5	0.6	0.6	0.3	0.6	-
Aug-09	0.8	3.6	0.8	1.2	1.0	1.8	0.8	1.8	1.3	0.8	1.0	-
Sep-09	1.0	1.8#	1.8	8.3 +	1	1.8	0.9#	1.8#	1.7#	0.7	1.4#	-
Oct-09+	4.3	9#	5.2#	11.3#	3.2	3.8#	2.4#	6.8#	3.0#	2.2	3.2#	5.7#
Nov-09	0.8#	1.7#	1.4#	1.3#	0.7#	2.1#	1.3#	8.0#	*	1.0#	*	2.3
Dec-09	1.4#	4.0#	1.6#	2.4#	1.7#	1.8	1.6	2.6#	1.7#	1.7#	2.2#	1.7
Jan-10	0.6#	0.8#	5.6#	1.2#	2.4#	1.2#	0.8#	1.4#	1.3#	0.8#	1.3#	1.1#
Feb-10	1.9#	11.3+	1.9#	1.4#	1.5#	1.1#	1.2#	1.6#	1.1#	0.8#	1.8#	1.3#
Mar-10	0.6#	0.6#	3.2#	1#	4.1#	0.6#	0.6#	1.2	0.6	0.2#	0.8#	1.1#
Apr-10	0.8#	1.8#	2.4#	0.7#	+	0.3	0.6#	0.9#	0.6#	0.4#	0.8#	0.8#
May-10	0.8	4.9#	3.0#	1.1	1.2	1.0	0.7	1.3	1.0#	0.5	1.1#	0.8
Jun-10	0.3	2.2#	3.0#	0.6#	0.2	1.2#	0.5	0.5#	0.6	0.7#	0.7#	0.4#
Jul-10	0.6#	1.1#	0.7#	0.7	0.5	0.3	0.5#	0.6#	0.7	0.2#	0.8	0.5
Aug-10	0.4	0.5#	1.9#	0.8#	0.2#	0.7#	0.5#	0.5#	0.6	0.5#	0.7#	0.4#
Sep-10	0.6#	2.6#	1.6#	1.0#	0.5#	1.1#	0.5#	1.0#	0.9#	0.6#	0.8#	0.9#
Oct-10	0.9#	1.6#	0.9#	0.5#	0.4#	0.5	1.0#	1.3#	1.2#	2.0#	1.2#	0.4#
Nov-10	0.9#	3.5#	0.9#	1.4#	1.1#	0.9	0.6#	0.9#	*	0.9#	0.8#	1.1#
Dec-10	1.0#	0.7#	0.9#	1.1#	0.5#	0.4#	0.6#	2.4#	1.0#	0.5	1.0#	1.4#
Jan-11	1.0#	0.7#	1.8#	1.2#	0.6#	0.7	0.9#	1.3#	1.0#	0.5#	1.5#	1.0
Feb-11	0.7	4.1+	0.9	1.0	0.7	0.7	1.0#	1.2	*	0.6	1.4	1.4
Mar-11	0.5	2.9#	+	0.9	1.7#	0.8	0.9#	1.9#	*	0.8#	1.2#	1.3#
Apr-11	0.7	0.6#	4.9#	0.8#	1.1#	0.7	0.9#	2.1#	0.8#	1.0#	0.3#	0.7#
May-11	0.4	1.1#	5.4#	0.7#	0.4	0.5#	0.6#	1.5#	0.4	0.4#	0.6#	0.7#
Jun-11	0.7	1.1	1.7	0.9	0.7	0.8	0.6	1.2	0.7	0.9	0.8	1.1
Aug-11	0.4	0.1	0.6	0.7	0.5	0.4	0.5	2.4	1	1	0.6	0.8
Sep-11	1.3#	0.4#	0.8#	0.5	0.6#	+	0.6#	1.5#	0.6#	2.3#	0.7#	0.7#
Oct-11	11	11.2	0.6	1.3	~	1	1.4	1.5	1.4	1.3	1.4	1.1
Nov-11	0.5	1	0.8	0.5	~	0.4	*	1.1	0.5	0.4	0.9	0.9

- sample contaminated| + - sample invalid|*-Broken funnel| ~ - Site inaccessible

[Note: Samples for November 2009 have been considered invalid, due to a widespread dust storm experienced on 23rd November 2009.]