Carbon Based Environmental
Pty Limited
ABN 74 102 920 285

Rocla Quarry Products
Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

September 2010

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Executive Summary

Carbon Based Environmental is contracted by Rocla Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes;

- Dust Deposition Gauges;
- Surface Waters;
- Groundwaters; and
- Meteorological Station.

This report was prepared by Carbon Based Environmental and includes the following;

- Dust Deposition results for September 2010;
- Surface Water quality results for September 2010;
- Groundwater depth and quality results for September 2010; and
- Meteorological report for September 2010.

The September 2010 dust deposition results were generally similar to August 2010. All sites, on a year to date average basis, are currently below the Air Quality Management Plan exceedence level of 3.7g/m^2.month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected for the normal monthly sampling event on the 1 October 2010 at sites A, C and F. Site B and D were dry. At the time of sample collection, there was no water discharge observed from the site. Results show generally good quality water with most sites sampled maintaining low Electrical Conductivity, low Total Dissolved Solids, low Total Suspended Solids and no detectable Oil and Grease. pH levels remained stable and were within the slightly acidic range.

Groundwaters were sampled for normal monthly monitoring on 1 October 2010. Groundwater depths increased at the majority of monitoring bores this month, indicating water moving away from the surface. pH and EC levels remained relatively steady.

The meteorological station data recovery for the month was approximately 91%. The predominant winds were from the WSW - WNW, with strongest winds from the W and WSW. Recorded rainfall on site for September was 36.4mm, which was below that recorded at the BOM Peats Ridge Station and below the Peats Ridge long-term average for September. Results are detailed below:

Rocla Calga Quarry	36.4mm
BOM Peats Ridge*	40.6mm
BOM Gosford*	38.8mm
BOM Peats Ridge Long term mean for September*	73.1mm

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au)
Note: Differences in the daily rainfall readings between BOM and the Rocla station may occur due to BOM stations reporting rainfall at 9am and the Rocla station recording rainfall at midnight.

1.0 Sampling Program

Rocla Calga Quarry conducts environmental monitoring in accordance to Development Consent, DEC (EPA) licence and Environmental Management Plans. Carbon Based Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. Carbon Based Environmental commenced monitoring from the April 2006 monitoring period.

Dust deposition gauges are operated to the Australian Standard AS3580.10.1 "Methods for Sampling and Analysis of Ambient Air Method 10.1 Determination of Particulates—Deposited Matter—Gravimetric Method". Sampling is undertaken every 30 +/- 2 days and each gauge is analysed for insoluble solids and ash residue. The results are reported as g/m^2.month.

Surface waters are sampled in accordance with Australian Standards AS5667.1 "Guidance on the Design of Sample Programs, Sampling Techniques and the Preservation and Handling of Samples", AS5667.6 "Water Quality Sampling—Guidance on sampling of rivers and streams" and AS5667.4 "Water Quality Sampling—Guidance on sampling from lakes, natural and man-made". Surface water monitoring sites include local streams and dams. Basic analysis including pH, Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids and Total Oil and Grease is conducted monthly at Sites A and F (dams) and when Sites B, C and D are flowing. Additional samples are collected when daily rainfall exceeds 50mm.

Groundwaters are sampled in accordance with Australian Standards AS5667.1 "Guidance on the Design of Sample Programs, Sampling Techniques and the Preservation and Handling of Samples" and AS5667.11 "Water Quality Sampling—Guidance on sampling of ground waters". Groundwater monitoring sites are sampled at least bi-monthly for water quality and at least quarterly for water level. Groundwater monitoring loggers continuously record water levels in a selection of bores.

Meteorological monitoring is conducted at the quarry and displayed on the site computer with a real time display. Wind parameters are measured according to Australian Standard AS 2923 "Ambient Air— Guide for Measurement of Horizontal Wind for Air Quality Applications".

The weather stations have the following sensor configuration;

- Air temperature
- Humidity
- Rainfall
- Atmospheric pressure
- Evaporation
- Solar radiation
- Wind speed
- Wind direction

Carbon Based Environmental continued to operate the monitoring equipment and utilise site collections at their existing locations.

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for September 2010 and the project average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 1-Sep-2010 to 1-Oct-2010

Site	Monthly Insoluble Solids g/m^2.month	Monthly Ash Residue g/m^2.month	Monthly Combustible Matter g/m^2.month	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids g/m^2.month
CD1	1.2	0.9	0.3	75	1.5
CD2c	1.0	0.6	0.4	60	1.3
CD3	0.4	0.2	0.2	50	0.8
CD4	0.8	0.5	0.3	63	0.8
CD5	0.2	0.2	<0.1	100	0.8
CD6	0.2	0.2	<0.1	100	1.1

Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month, the Development Consent annual average amenity criteria at residential locations. The current rolling annual average is calculated from October 2009 to September 2010.

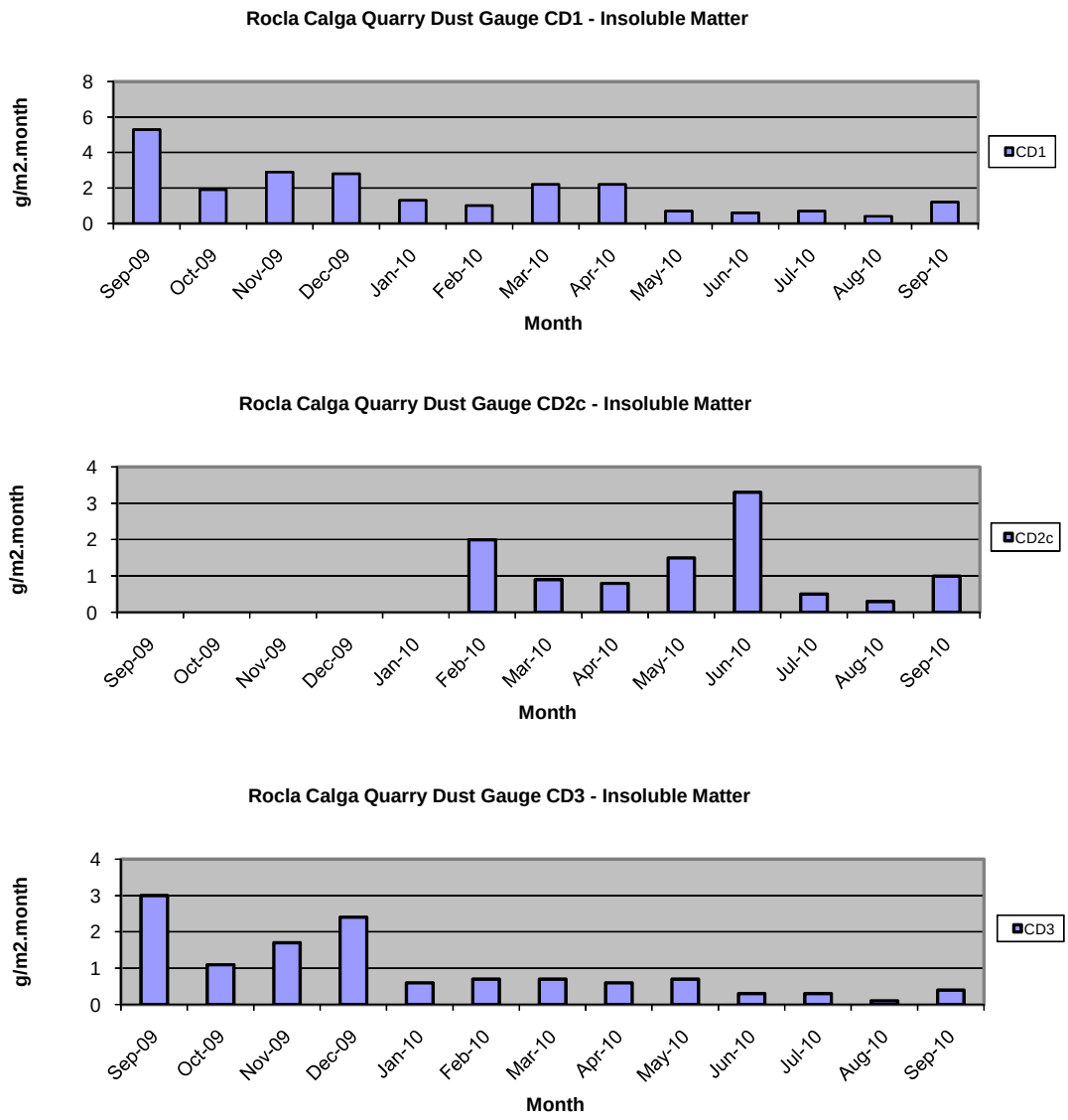
NA= Not Available.

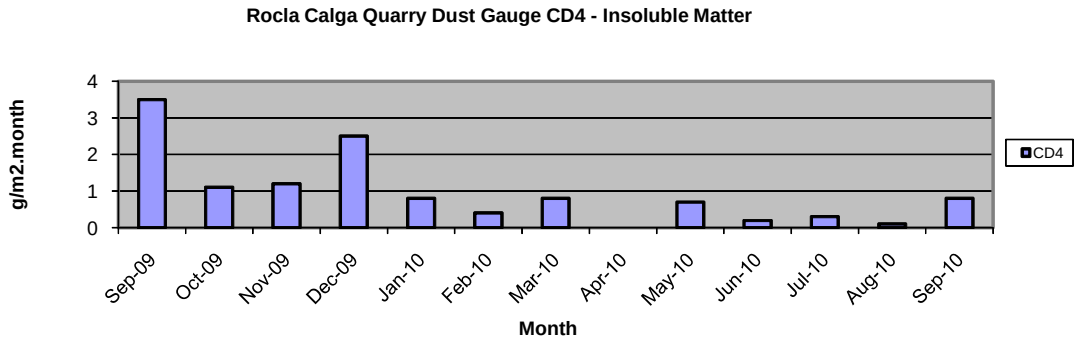
CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air Quality Management Plan. CD4 was installed on 3 October 2006, to gauge air quality impacts to the south of the site operations, as were CD5 and CD6 which were installed on the 14 December 2006. CD2b was discontinued at the end of January 2010 due to contamination of the gauge by non-quarry related vehicle movements on a track adjacent to the gauge. The replacement gauge, CD2c, was located on a rehabilitated section of land between the extraction area and adjacent resident.

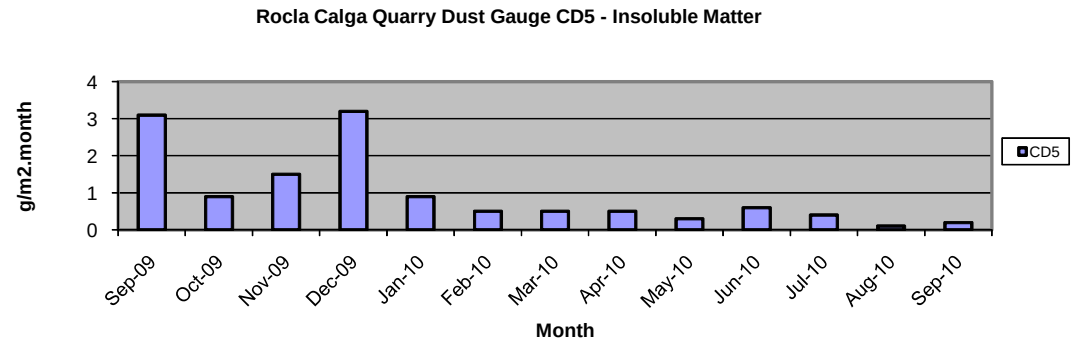
Dust deposition charts for all dust gauge sites appear in **Figure 1** below. The laboratory analysis is provided in **Appendix 1.**

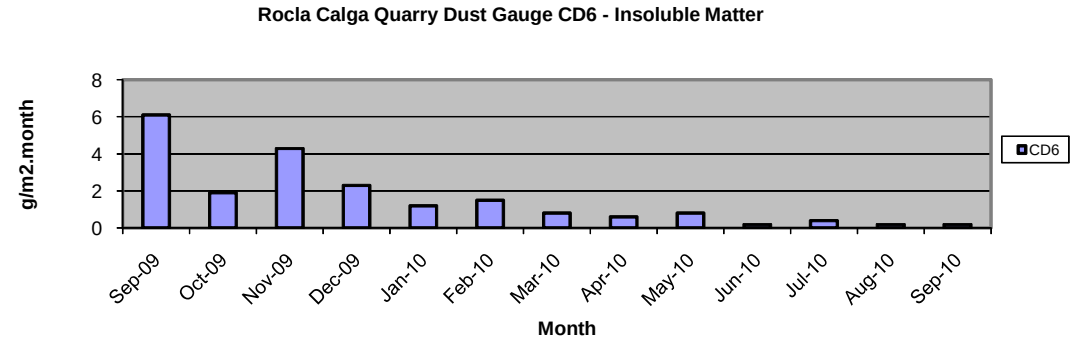
The predominant winds were from the WSW - WNW, with strongest winds from the W and WSW.

Figure 1: Dust Deposition Charts




Rocla Calga Quarry Dust Gauge CD4 - Insoluble Matter
g/m2.month
4
3
2
1
0
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Month
CD4


Rocla Calga Quarry Dust Gauge CD5 - Insoluble Matter
g/m2.month
4
3
2
1
0
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Month
CD5


Rocla Calga Quarry Dust Gauge CD6 - Insoluble Matter
g/m2.month
8
6
4
2
0
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Month
CD6

2.2 Water Monitoring

2.2.1 Surface Waters

Monthly surface water monitoring was conducted on the 1 October 2010 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – September grab sample results

Site	Observed Flow Rate	Water Colour	Turbidity	pH	EC (µS/cm)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
A	Still	Clear	Clear	5.23	98	89	6	<5
B	Dry	---	---	---	---	---	---	---
C	Still	Light Brown	Clear	6.40	105	99	16	<5
D	Dry	---	---	---	---	---	---	---
F	Still	Clear	Clear	6.23	81	78	2	<5

At the time of sampling, there were no water discharges off site from any sampling location. Site B and D were dry at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show generally good water quality with pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids, low Total Suspended Solids and no detectable Oil and Grease.

2.2.2 Groundwaters

Groundwaters were sampled on 1 October 2010. Water quality tests for pH and electrical conductivity were conducted by Carbon Based Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (+/- 0.1 pH units) and Electrical Conductivity (+/- 5%) was obtained between samples. Data is displayed in **Table 3** and **Figures 2 to 5.**

Groundwater depths increased at the majority of monitoring bores this month, indicating water moving away from the surface. The CP series of bores generally show larger increases and decreases in depth to water due to pumping from the bores. Longer term monitoring is required to fully evaluate groundwater depth trends.

pH and EC remained relatively steady at all sites. Detailed biannual water quality monitoring was conducted during October 2010 and is next due in April 2010.

Table 3: Groundwater Quality Data

Reference	Bore	Type	Depth to water TOC (m) April 06	Depth to water TOC (m) This report	pH This report	Electrical Conductivity (uS/cm) This report
CQ1	Voutos	* Monitor	20.59	19.86	5.1	120
CQ3	Voutos	* Monitor	10.53	10.68	5.7	110
CQ4	Voutos	* Monitor	8.78	8.30	4.5	80
CQ5	Gazzana	DIP Only	8.69	6.71	4.1	150
CQ6	Gazzana	DIP Only	16.00	11.09	4.7	160
CQ7	Gazzana	* Monitor	6.89	7.05	4.2	90
CQ8	Gazzana	* Monitor	11.03	6.23	4.1	150
CQ9	Gazzana	DIP Only	10.10	9.49	4.2	110
CQ10	Voutos	* Monitor	NI	22.73	6.0	150
CQ11S	Gazzana	* Monitor	NI	9.83	4.4	150
CQ11D	Gazzana	* Monitor	NI	10.96	5.0	130
CQ12	Gazzana	* Monitor	NI	4.47	4.3	140
CQ13	Kashouli	* Monitor	NI	13.70	5.3	190
CP3	Gazzana	Domestic	10.40	9.62	4.4	150
CP4	Kashouli	Domestic	13.63	10.73	4.8	210
CP5	Kashouli	Domestic	16.61	8.55	4.4	250
CP6	Kashouli	Domestic	16.27	10.73	4.2	210
CP7	Kashouli	Production	8.56	2.62	4.3	170
CP8	Rozmanec	Domestic	22.17	20.51	4.1	150
MW7	Rocla Bore	* Monitor	15.76	16.52	4.1	120
MW8	Rocla Bore	* Monitor	9.82	8.00	4.3	80
MW9	Rocla Bore	* Monitor	22.44	21.89	4.3	90
MW10	Rocla Bore	* Monitor	15.41	13.88	4.1	130
MW13	Rocla Bore	DIP Only	NI	8.04	4.4	100
MW16	Rocla Bore	DIP Only	NI	8.67	4.2	110

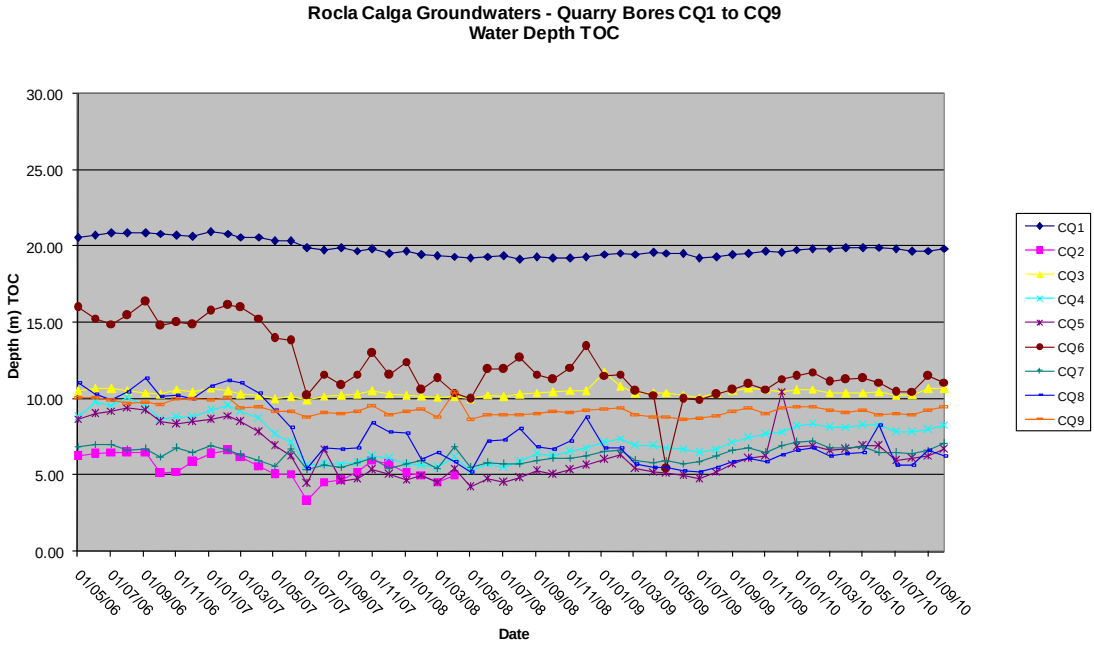
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to access restrictions.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

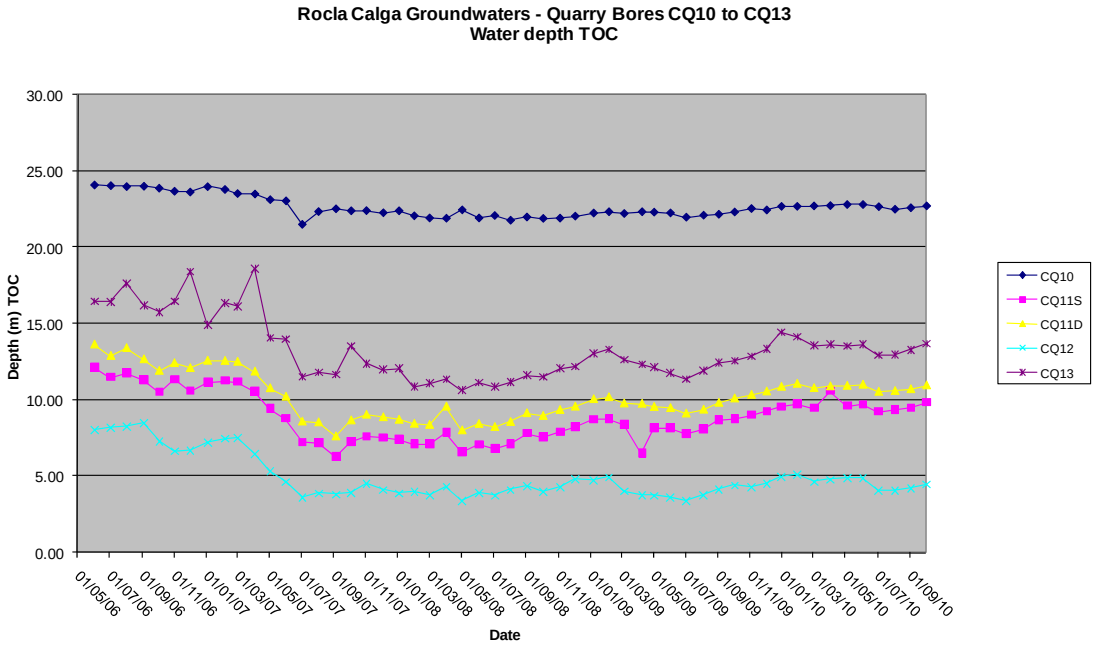
Shading is used to indicate the following trends in water depth (compared to the last reading):

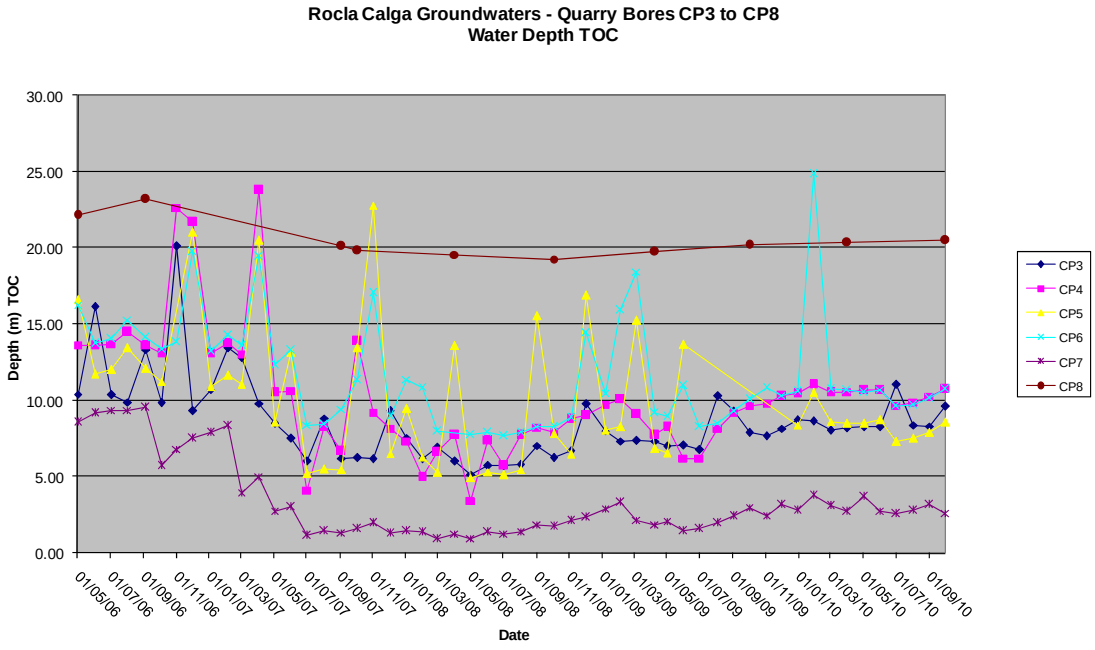
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

Available groundwater loggers were downloaded and will be forwarded to the Rocla Calga Quarry groundwater consultant.

Figures 2 to 5: Groundwater Depth Charts.






Rocla Calga Groundwaters - Quarry Bores CP3 to CP8
Water Depth TOC
Depth (m) TOC
30.00
25.00
20.00
15.00
10.00
5.00
0.00
01/05/06
01/07/06
01/09/06
01/11/06
01/01/07
01/03/07
01/05/07
01/07/07
01/09/07
01/11/07
01/01/08
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01/05/09
01/07/09
01/09/09
01/11/09
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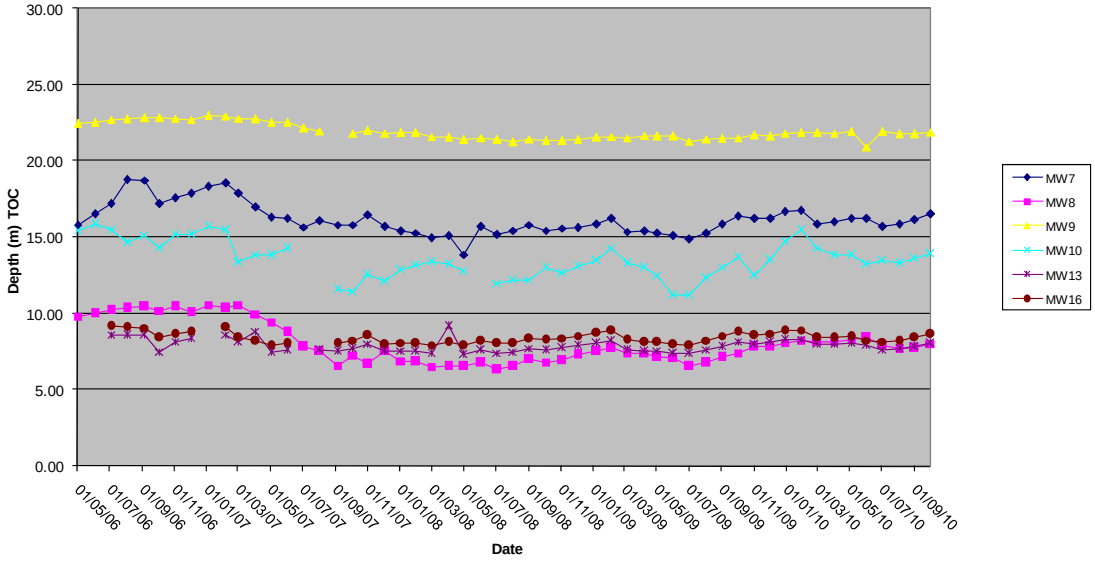
01/09/10
Date
CP3
CP4
CP5
CP6
CP7
CP8


Rocla Calga Groundwaters - Quarry Bores MW7 to MW16
Water Depth TOC
Depth (m) TOC
30.00
25.00
20.00
15.00
10.00
5.00
0.00
01/05/06
01/07/06
01/09/06
01/11/06
01/01/07
01/03/07
01/05/07
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01/07/09
01/09/09
01/11/09
01/01/10
01/03/10
01/05/10
01/07/10
01/09/10
Date
MW7
MW8
MW9
MW10
MW13
MW16

2.3 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in September was approximately 91%. Some data was lost between the 26 to 30 September due to a battery fault. The faulty battery has since been replaced. The weather station data follows and includes;

- Monthly data numerical summary;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception; and
- Wind rose (frequency distribution diagram of wind speed and direction).

Monthly weather statistics from two nearby Bureau of Meteorology (BOM) stations, Peats Ridge and Gosford are included in **Appendix 2** for comparison purposes.

Data for September 2010 shows rainfall at the Rocla Calga Quarry below that which was recorded at nearby Peats Ridge BOM station and below that which was recorded at nearby Gosford BOM station. The rainfall comparison is provided below:

Rocla Calga Quarry	36.4mm
BOM Peats Ridge*	40.6mm
BOM Gosford*	38.8mm
BOM Peats Ridge Long term mean for September*	73.1mm

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au)

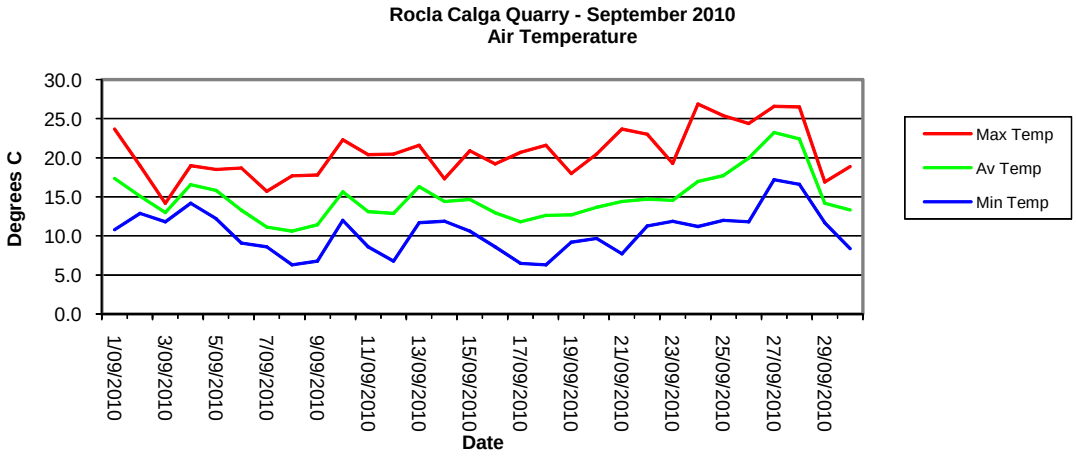
Results are displayed in the following table and figures.

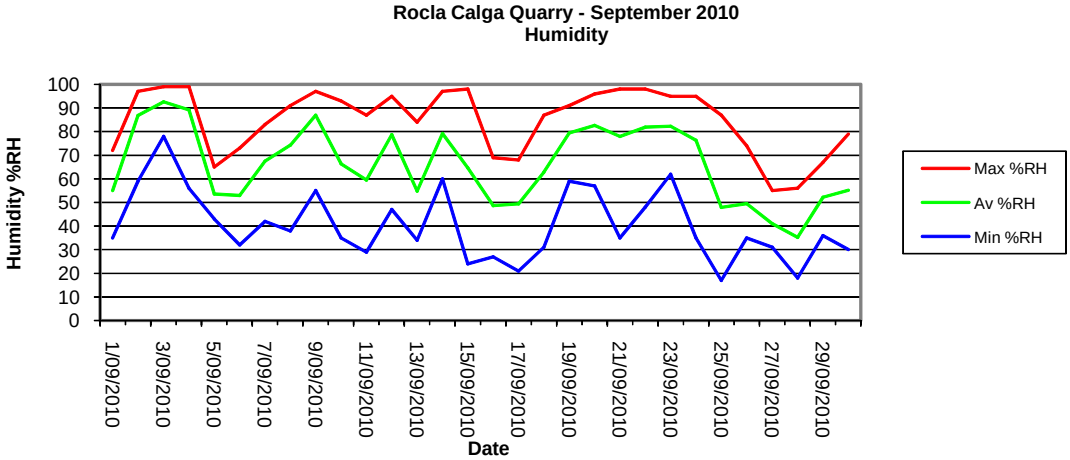
2.3.1 Monthly Meteorological Data Summary

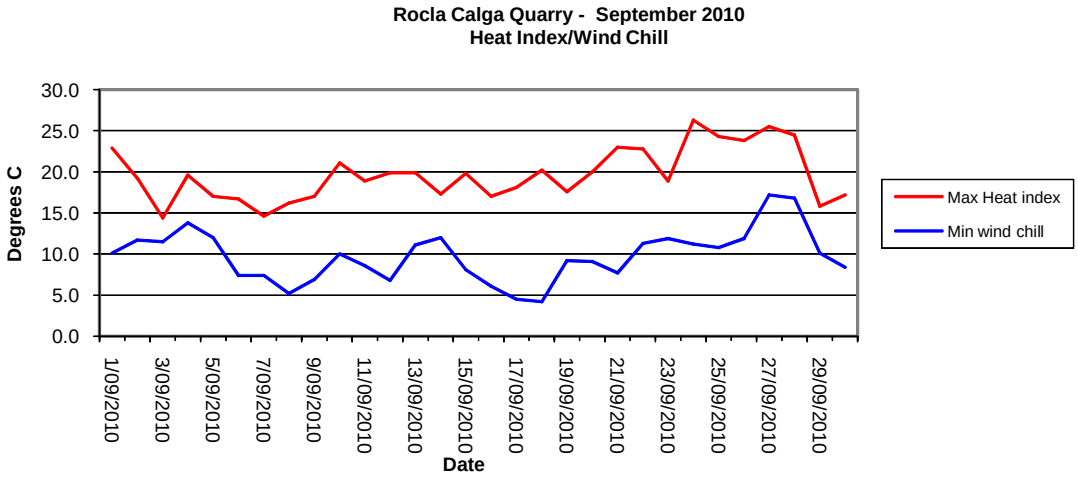
Summary **Sep-10** **Rocla - Calga**

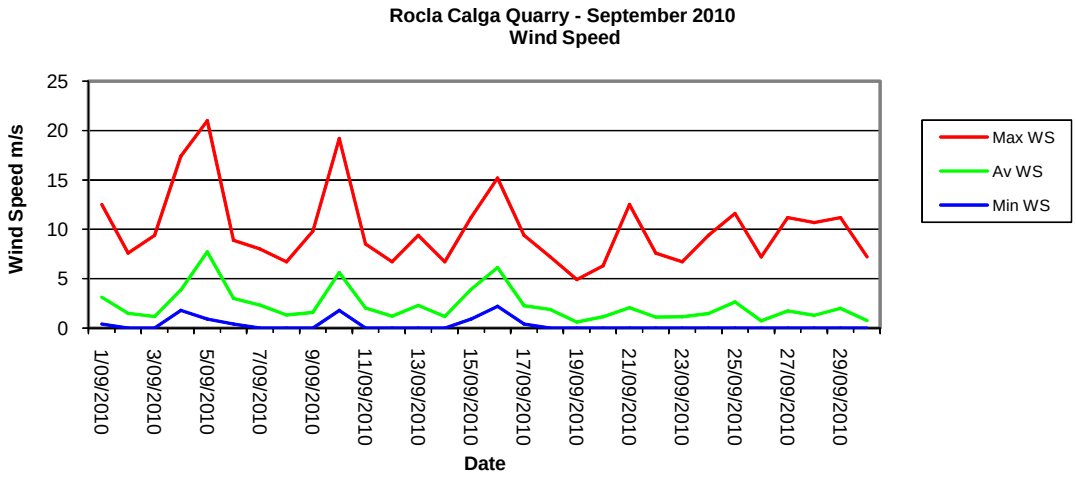
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/09/2010	10.8	17.3	23.7	35	55	72	0.0	3.8	0.4	3.1	12.5	10.1	22.9	1012.2	1015.3	1018.3	0	125.6	844	91.5	99.1	100
2/09/2010	12.9	15.1	19.0	59	87	97	5.8	1.3	0	1.5	7.6	11.7	19.2	1012.9	1015.1	1020.3	0	66.0	390	75.4	95.0	100
3/09/2010	11.8	13.0	14.2	78	93	99	4.8	0.6	0	1.2	9.4	11.5	14.4	1019.9	1022.8	1025.4	0	38.8	200	59.6	89.5	100
4/09/2010	14.2	16.6	19.0	56	89	99	11.0	1.2	1.8	3.8	17.4	13.8	19.6	1003.7	1010.4	1019.5	0	49.4	234	69.9	92.1	100
5/09/2010	12.2	15.8	18.5	43	54	65	0.0	6.8	0.9	7.7	21	12.0	17.0	1005.7	1010.1	1016.6	0	210.3	755	83	89.9	95.6
6/09/2010	9.1	13.3	18.7	32	53	73	0.0	4.2	0.4	3.0	8.9	7.4	16.7	1015.7	1017.8	1020.7	0	188.3	807	79.2	93.2	100
7/09/2010	8.6	11.1	15.7	42	68	83	0.0	3.2	0	2.3	8	7.4	14.6	1019.9	1022.8	1026.4	0	175.0	807	80.4	96.2	100
8/09/2010	6.3	10.6	17.7	38	74	91	0.0	3.1	0	1.3	6.7	5.2	16.2	1021.8	1024.6	1027.1	0	206.5	832	78.9	94.0	100
9/09/2010	6.8	11.5	17.8	55	87	97	4.4	1.6	0	1.6	9.8	6.9	17.0	1006.0	1014.1	1021.4	0	103.6	700	70.8	92.6	100
10/09/2010	12.0	15.7	22.3	35	66	93	1.4	4.6	1.8	5.6	19.2	10.0	21.1	999.4	1004.7	1010.8	0	178.1	823	56.7	89.2	100
11/09/2010	8.6	13.1	20.4	29	59	87	0.0	4.2	0	2.0	8.5	8.6	18.9	1010.8	1016.1	1020.2	0	228.5	814	55	81.2	100
12/09/2010	6.8	12.9	20.5	47	79	95	0.0	2.8	0	1.2	6.7	6.8	19.9	1016.1	1019.0	1022.2	0	177.1	919	51.5	75.6	98
13/09/2010	11.7	16.3	21.6	34	55	84	0.0	3.9	0	2.3	9.4	11.1	19.9	1011.4	1014.1	1016.0	0	162.3	794	66.7	87.8	100
14/09/2010	11.9	14.4	17.3	60	79	97	5.8	1.7	0	1.2	6.7	12.0	17.3	1006.9	1012.1	1015.7	0	96.0	618	73.1	94.0	100
15/09/2010	10.6	14.7	20.9	24	65	98	0.0	4.2	0.9	3.9	11.2	8.1	19.8	1005.6	1009.6	1014.2	0	184.3	884	70.8	87.8	100
16/09/2010	8.6	13.0	19.2	27	49	69	0.0	6.4	2.2	6.1	15.2	6.1	17.0	1010.6	1013.7	1017.5	0	228.7	925	76	92.6	100
17/09/2010	6.5	11.8	20.7	21	49	68	0.0	4.4	0.4	2.3	9.4	4.5	18.1	1016.6	1018.3	1020.8	0	246.6	866	90.1	98.0	100
18/09/2010	6.3	12.6	21.6	31	63	87	0.0	4.2	0	1.9	7.2	4.2	20.2	1012.5	1015.9	1018.1	0	241.6	857	93.9	99.0	100
19/09/2010	9.2	12.7	18.0	59	79	91	0.0	1.6	0	0.6	4.9	9.2	17.6	1017.9	1019.6	1021.7	0	113.2	697	90.4	99.0	100
20/09/2010	9.7	13.7	20.5	57	83	96	0.2	2.4	0	1.1	6.3	9.1	20.0	1019.9	1022.3	1023.8	0	163.3	956	76.3	92.6	100
21/09/2010	7.7	14.4	23.7	35	78	98	0.2	4.0	0	2.1	12.5	7.7	23.0	1019.6	1023.0	1027.5	0	243.6	859	45.9	90.1	100
22/09/2010	11.3	14.7	23.0	48	82	98	2.8	3.2	0	1.1	7.6	11.3	22.8	1018.7	1023.2	1026.7	0	204.2	859	40.1	92.6	100
23/09/2010	11.9	14.6	19.3	62	82	95	0.0	2.1	0	1.1	6.7	11.9	18.9	1020.8	1022.2	1023.8	0	122.0	686	45.3	84.5	100
24/09/2010	11.2	17.0	26.9	35	76	95	0.0	4.0	0	1.4	9.4	11.2	26.3	1015.8	1019.2	1022.7	0	245.7	860	48.8	88.6	100
25/09/2010	12.0	17.7	25.4	17	48	87	0.0	5.6	0	2.6	11.6	10.8	24.3	1012.1	1014.9	1017.3	0	231.0	974	62	82.4	100
26/09/2010	11.8	20.0	24.4	35	50	74	0.0	3.8	0	0.7	7.2	11.9	23.8	1015.2	1016.9	1019.5	0	466.9	867	0	36.8	99.7
27/09/2010	17.2	23.2	26.6	31	41	55	0.0	3.6	0	1.7	11.2	17.2	25.5	1006.9	1011.5	1016.0	12	391.3	864	0	38.7	100
28/09/2010	16.6	22.4	26.5	18	35	56	0.0	4.7	0	1.3	10.7	16.8	24.5	1007.1	1010.6	1013.1	12	590.9	888	0	40.9	100
29/09/2010	11.7	14.2	16.9	36	52	67	0.0	3.4	0	2.0	11.2	10.1	15.8	1011.4	1016.2	1021.5	0	474.2	1077	0	39.4	100
30/09/2010	8.4	13.3	18.9	30	55	79	0.0	3.8	0	0.8	7.2	8.4	17.2	1021.2	1023.2	1026.2	0	374.1	968	0	64.8	100
Monthly	6.3	14.9	26.9	17	66	99	36.4	104.3	0	2.3	21	4.2	26.3	999.4	1016.6	1027.5	0	217.6	1077	0	83.2	100

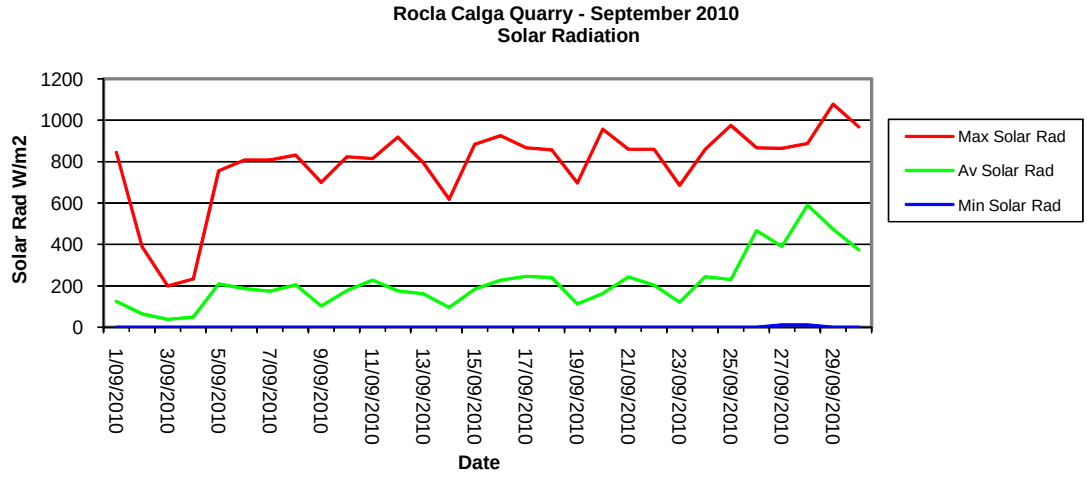
2.3.2 Monthly Weather Charts

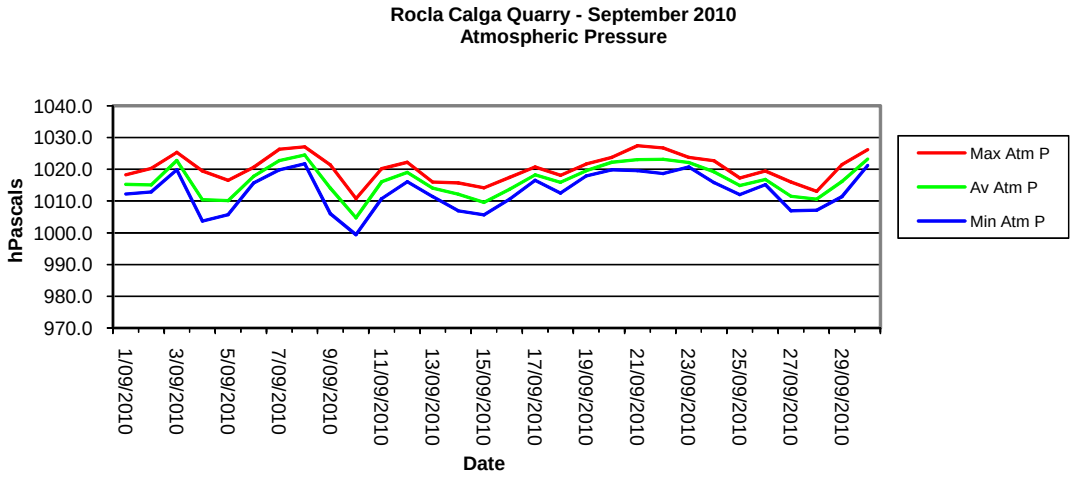


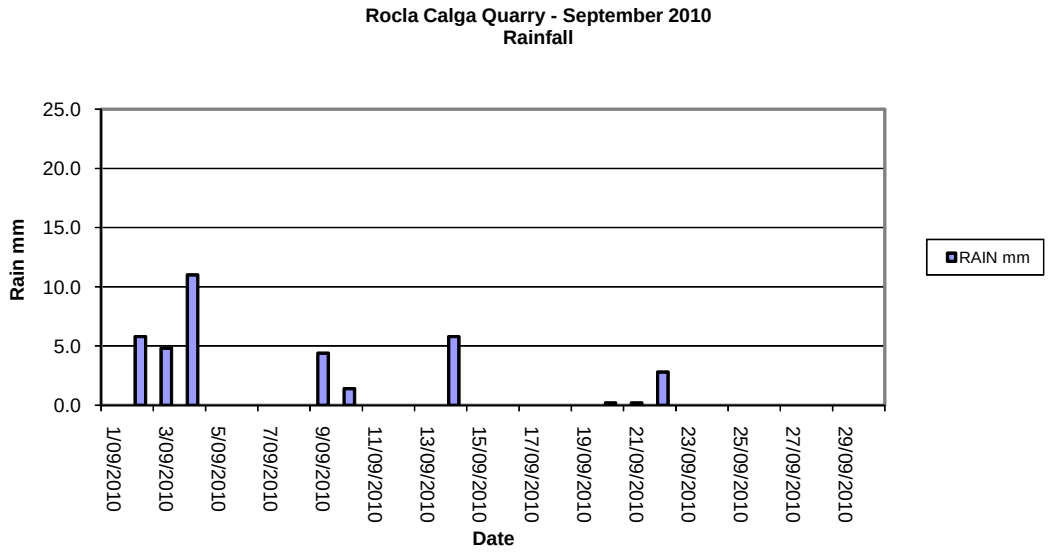


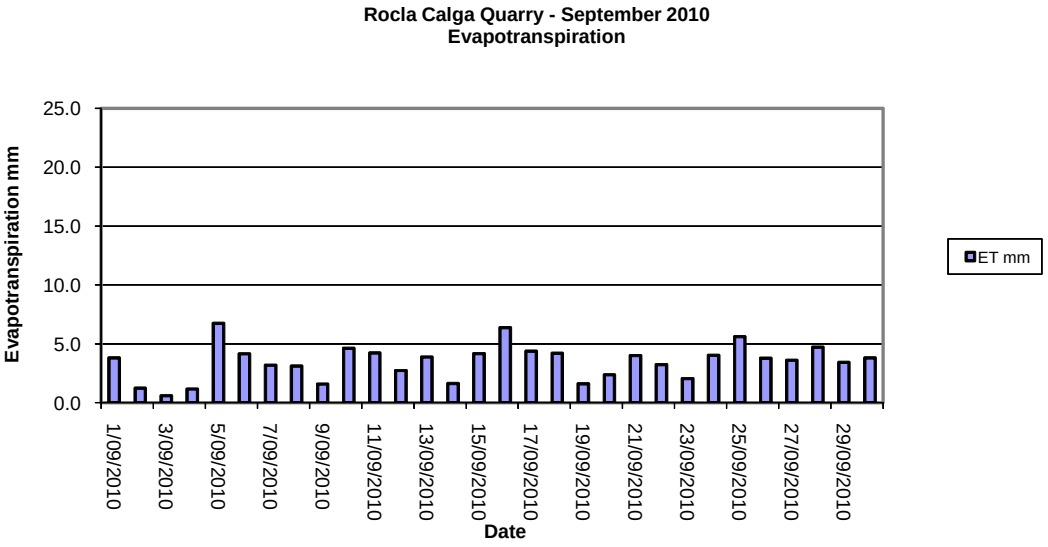


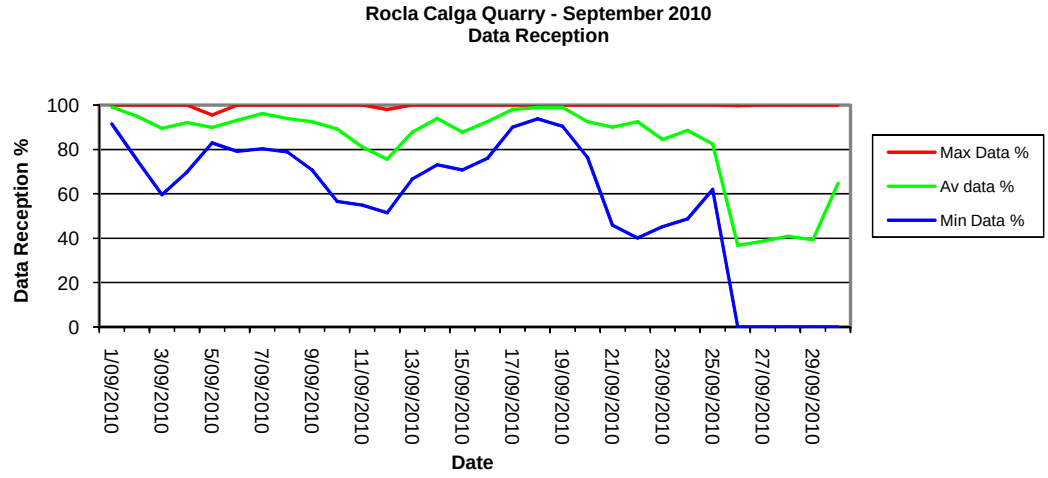

Rocla Calga Quarry - September 2010
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
Max WS
Av WS
Min WS


Rocla Calga Quarry - September 2010
Solar Radiation
Solar Rad W/m2
1200
1000
800
600
400
200
0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - September 2010
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
970.0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
Max Atm P
Av Atm P
Min Atm P


Rocla Calga Quarry - September 2010
Rainfall
Rain mm
25.0
20.0
15.0
10.0
5.0
0.0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
RAIN mm

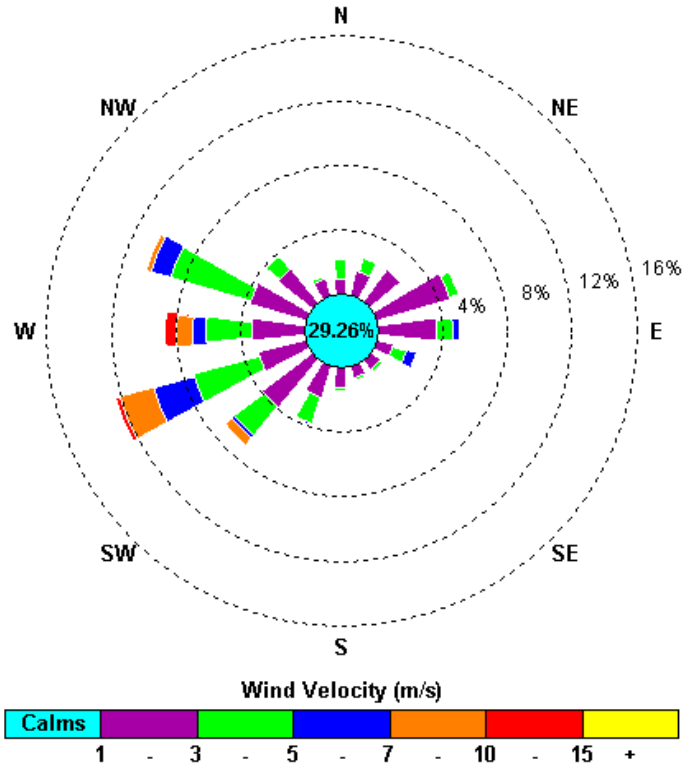

Rocla Calga Quarry - September 2010
Evapotranspiration
Evapotranspiration mm
25.0
20.0
15.0
10.0
5.0
0.0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
ET mm


Rocla Calga Quarry - September 2010
Data Reception
Data Reception %
100
80
60
40
20
0
1/09/2010
3/09/2010
5/09/2010
7/09/2010
9/09/2010
11/09/2010
13/09/2010
15/09/2010
17/09/2010
19/09/2010
21/09/2010
23/09/2010
25/09/2010
27/09/2010
29/09/2010
Date
Max Data %
Av data %
Min Data %

2.3.3 Monthly Windrose Plot

Frequency plot of the average wind speed and average direction over each 15 minute sampling period. Wind is considered calm when less than a 15 minute average of 1m/s.

00:00, 1 September 2010 – 23:45, 30 September 2010



The predominant winds were from the WSW - WNW, with strongest winds from the W and WSW. The maximum wind speed was 21.0m/s from the W.

Appendix 1

Laboratory Certificates

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EN1002368**	Page	: 1 of 4
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Newcastle
Contact	: MS RENAE MIKKA	Contact	: Peter Keyte
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 5 Rosegum Road Warabrook NSW Australia 2304
E-mail	: cbased1@bigpond.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 49904443	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49904442	Facsimile	: +61-2-4968 0349
Project	: ROCLA CALGA DUSTS	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-OCT-2010
Sampler	: ----	Issue Date	: 11-OCT-2010
Site	: ----		
		No. of samples received	: 6
Quote number	: SY/269/10	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Peter Keyte	Newcastle Manager	Newcastle

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth. Period sampled: 01/09/2010 - 01/10/2010.**

Analytical Results

Sub-Matrix: **DUST**

Compound	CAS Number	LOR	Unit	Client sample ID: CD1	CD2C	CD3	CD4	CD5
				Client sampling date / time: 01-OCT-2010 15:00	01-OCT-2010 15:00	01-OCT-2010 15:00	01-OCT-2010 15:00	01-OCT-2010 15:00
				EN1002368-001	EN1002368-002	EN1002368-003	EN1002368-004	EN1002368-005
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	0.9	0.6	0.2	0.5	0.2
Ash Content (mg)	----	1	mg	16	10	4	8	4
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	0.3	0.4	0.2	0.3	<0.1
Combustible Matter (mg)	----	1	mg	5	7	3	6	<1
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	1.2	1.0	0.4	0.8	0.2
Total Insoluble Matter (mg)	----	1	mg	21	17	7	14	4

Analytical Results

Sub-Matrix: DUST			Client sample ID	CD6	----	----	----	----
			Client sampling date / time	01-OCT-2010 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EN1002368-006	----	----	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	0.2	----	----	----	----
Ash Content (mg)	----	1	mg	4	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	<0.1	----	----	----	----
Combustible Matter (mg)	----	1	mg	<1	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	0.2	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	4	----	----	----	----

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1019638**	Page	: 1 of 3
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MS RENAE MIKKA	Contact	: Charlie Pierce
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased1@bigpond.com	E-mail	: sydney.enviro.services@alsglobal.com
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-OCT-2010
Sampler	: CARBON BASED	Issue Date	: 08-OCT-2010
Site	: ----		
		No. of samples received	: 3
Quote number	: SY/269/10	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Inorganics
Sarah Millington	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

Analytical Results

Sub-Matrix: WATER				Client sample ID	A	C	F	----	----
				Client sampling date / time	[01-OCT-2010]	[01-OCT-2010]	[01-OCT-2010]	----	----
Compound	CAS Number	LOR	Unit		ES1019638-001	ES1019638-002	ES1019638-003	----	----
EA005: pH									
pH Value	----	0.01	pH Unit		5.23	6.40	6.23	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		98	105	81	----	----
EA015: Total Dissolved Solids									
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		89	99	78	----	----
EA025: Suspended Solids									
^ Suspended Solids (SS)	----	1	mg/L		6	16	2	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	----	----

Appendix 2

Additional Bureau of Meteorology Data from Peats Ridge and Gosford Monitoring Stations

Peats Ridge, New South Wales
September 2010 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	9.6	24.3	0	2.8					16.2	59	7	SW	9		23.5	38	7	NE	4	
2	Th	13.9	20.0	0.6	2.2					16.6	82	8	S	4		15.9	90	8	SE	4	
3	Fr	11.2	15.6	5.8	1.6					12.4	97	8	E	4		14.0	79	8	ENE	4	
4	Sa	12.0	18.2	14.4	0.8					15.5	97	8	NE	4		18.0	88	8	NE	4	
5	Su	14.2	19.2	0.4	2.6					16.3	50	1	NW	56		18.0	44	5	WNW		
6	Mo	5.4	19.1	0	4.2					13.7	60	0	NW	4		18.7	39	2	N	4	
7	Tu	6.4	16.6	0	2.6					11.7	70	2	SW	4		13.5	66	4	S	4	
8	We	4.7	17.7	0	2.8					11.2	70	1	SW	4							
9	Th	5.7	18.8	0	3.4					10.9	90	7	NW	4		15.8	67	8	NNW	9	
10	Fr	10.3	24.0	9.2	2.0					18.5	72	0	NW	4		19.2	45	7	S	28	
11	Sa	6.9	20.0	0.6	4.4					11.1	72	0	W	4		19.0	34	0	S	4	
12	Su	5.3	20.1	0	3.6					14.2	78	6	W	4		17.3	71	6	WNW	9	
13	Mo	10.9	22.6	0	2.4					15.6	62	6	NW	4							
14	Tu	11.3	17.6	0	2.8					14.5	75	7	SW	4		15.2	89	8	E	4	
15	We	9.9	21.5	7.6	1.4					14.9	73	6	SW	9		20.7	33	2	SE	4	
16	Th	6.9	19.8	0	3.4					13.3	60	6	SW	9		17.7	41	5	NW	9	
17	Fr	4.3	19.5	0	3.8					12.0	54	3	WSW	9		18.6	31	3	NW	4	
18	Sa	4.9	22.2	0	4.0					10.5	67	0	WNW	9		19.6	51	3	NE	4	
19	Su	7.6	17.6	0	2.8					12.4	71	8	SW	4		15.8	73	8	ENE	4	
20	Mo	8.3	19.2	0	2.2					14.3	70	2	SW	4		17.1	70	7	NE	4	
21	Tu	8.2	23.7	0	2.0					14.8	82	0	NW	4		21.9	48	0	E	4	
22	We	11.2	22.0	2.0	3.8					13.7	89	6	NW	4		19.0	66	0	E	4	
23	Th	10.7	18.1	0	2.4					14.2	88	8	E	4		16.4	74	2	E	4	
24	Fr	9.2	25.8	0	2.4					18.1	73	1	NE	4		25.3	39	0	NE	4	
25	Sa	11.7	26.4	0	3.2					17.7	50	2	WSW	19		23.9	27	8	WNW	9	
26	Su	9.6	24.2	0	4.8					18.8	54	0	E	4		21.4	51	4	NE	4	
27	Mo	10.6	27.0	0	5.0					20.6	42	6	WNW	19		25.5	37	7	NW	4	
28	Tu	9.4	26.7	0	3.8					19.0	55	4	NNW	9		25.7	24	0	SE	4	
29	We	8.8	17.1	0	5.2					15.1	43	3	SW	9		14.0	62	4	N	4	
30	Th	3.2	18.5	0	3.6					12.2	64	0	WNW	4		16.3	52	0	E	4	
Statistics for September 2010																					
Mean		8.7	20.8		3.1					14.7	68	3		7		18.8	54	4		5	
Lowest		3.2	15.6		0.8					10.5	42	0	#	4		13.5	24	0	#	4	
Highest		14.2	27.0	14.4	5.2					20.6	97	8	NW	56		25.7	90	8	S	28	
Total				40.6	92.0																

Gosford, New South Wales
September 2010 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	6.9	25.5	0.6			N	33	14:39	14.5	82			Calm		24.9	33		NW	11	
2	Th	13.6	20.6	2.0			SE	26	18:27	16.4	99			Calm		16.5	86		SSE	7	
3	Fr	13.0	17.1	8.8			S	28	00:09	13.8	99			Calm		16.1	67		SE	4	
4	Sa	13.8	20.4	11.8			NNE	46	23:07	17.1	98		N	11		19.4	85		N	9	
5	Su	15.0	21.2	0			NNW	61	09:09	18.3	43		WNW	24		20.1	37		NNW	13	
6	Mo	5.5	20.4	0			N	28	09:41	15.8	45		NNW	11		19.8	30		NW	7	
7	Tu	4.7	17.7	0			S	31	09:37	14.3	53		WNW	11		15.3	55		SSE	13	
8	We	5.4	18.2	0			S	22	14:39	13.5	55		W	9		16.6	49		SSE	9	
9	Th	4.5	20.2	0			N	24	11:19	12.4	98			Calm		17.1	60		N	7	
10	Fr	11.6	24.5	4.8			SW	43	14:57	20.0	63		NNW	13		21.5	36		W	17	
11	Sa	5.4	20.2	2.8			SE	26	09:40	16.2	44		W	9		18.5	41		ESE	7	
12	Su	4.0	20.5	0			SE	20	13:43	15.5	71		SE	4		18.5	61		ENE	7	
13	Mo	10.5	23.2	0			W	24	09:37	17.0	59		N	6		21.6	38		S	6	
14	Tu	9.4	19.0	0			E	19	13:33	18.2	66			Calm		17.4	79		ESE	2	
15	We	11.0	21.5	7.4			SW	28	10:12	15.3	72		WNW	7		19.5	60		SE	9	
16	Th	5.8	21.5	0			SSW	41	14:05	15.8	46		NW	11		20.8	27		WNW	9	
17	Fr	4.8	19.8	0			NW	26	02:22	14.5	40		NW	7		18.7	29		E	9	
18	Sa	2.8	22.5	0			SSW	30	12:38	14.9	48		N	9		19.5	44		ESE	7	
19	Su	6.9	18.7	0			N	17	13:19	14.6	63			Calm		18.3	60		NE	6	
20	Mo	8.6	20.4	0			SSE	22	10:02	17.3	64		SE	7		18.7	63		SE	11	
21	Tu	6.3	24.6	0			SSE	37	17:41	19.0	64		N	9		20.5	58		SSE	15	
22	We	12.3	21.3	0.2			E	22	13:38	17.3	69		NNW	7		19.5	61		ESE	9	
23	Th	11.1	18.8	0			ESE	17	15:06	16.1	79		SE	6		17.8	65		ESE	7	
24	Fr	9.9	25.4	0			N	26	12:00	18.4	69		N	9		23.1	58		E	7	
25	Sa	7.6	27.9	0.2			N	30	10:02	20.8	35		NNW	15		26.0	17		WNW	9	
26	Su	6.6	23.9	0			NE	20	15:00	19.8	53		SE	7		23.0	38		ENE	9	
27	Mo	7.1	28.5	0			NNW	30	12:08	21.9	44		ENE	6		27.6	28		NW	9	
28	Tu	8.3	27.2	0			N	30	11:48	21.7	36		NNW	11		23.5	38		E	9	
29	We	10.1	19.1	0			SE	37	12:59	16.2	37		SSE	7		15.8	52		SSE	15	
30	Th	4.0	18.1	0.2			ESE	24	12:19	14.7	43		W	7		17.0	46		ESE	9	
Statistics for September 2010																					
Mean		8.2	21.6							16.7	61			7		19.8	50			8	
Lowest		2.8	17.1							12.4	35			Calm		15.3	17		ESE	2	
Highest		15.0	28.5	11.8			NNW	61		21.9	99		WNW	24		27.6	86		W	17	
Total				38.8																	