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

May 2011

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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 May 2011;
- Surface Water quality results for May 2011;
- Groundwater depth and quality results for May 2011; and
- Meteorological report for May 2011.

The May 2011 dust deposition results were generally lower than or similar to April 2011 with the exception of CD6 which increased. 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 June 2011 at sites A, B, D and F. There was no access to site C. At the time of sample collection, there was no water discharge observed from the site. Results show generally good quality water with both 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. An additional high rainfall sampling event was undertaken on the 30 May 2011. Results are provided in Appendix 1.

Groundwaters were sampled for normal monthly monitoring on 1 June 2011. Groundwater depths decreased at most monitoring bores this month, indicating water toward the surface. Exceptions were CQ7, CQ8, CQ9, MW7 and MW13 where depths increased. pH increased at all sites this month. EC decreased at all sites with the exception of CQ3 which decreased.

The meteorological station data recovery for the month was 100% with the exception of wind speed which was unavailable from 1 May through to the 5 May due to wind sensor damage. The wind sensor has since been repaired. Recorded rainfall on site for May was 146.6 mm, which was higher than that recorded at the BOM Peats Ridge Station and higher than the Peats Ridge long-term average for May. Results are detailed below:

Rocla Calga Quarry	146.6 mm
BOM Peats Ridge*	108.8 mm
BOM Gosford*	186.8 mm
BOM Peats Ridge Long term mean for May*	98.3 mm

*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 May 2011 and the project average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 2-May 2011 to 1-June 2011

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	1.6	1.2	0.4	75	1.9
CD2c	0.6	0.5	0.1	83	1.1
CD3	0.2	0.2	<0.1	100	0.4
CD4	0.1	0.1	<0.1	100	0.4
CD5	0.1	0.1	<0.1	100	0.4
CD6	0.6	0.2	0.4	33	0.5

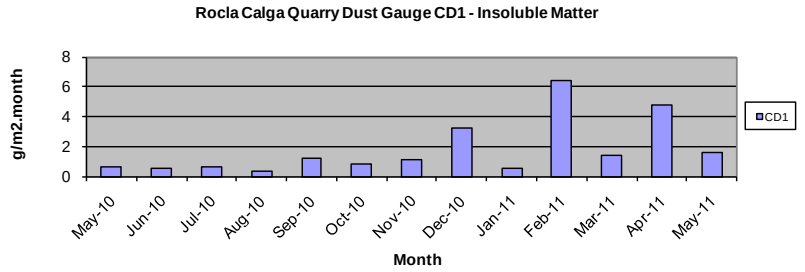
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from June 2010 to May 2011.

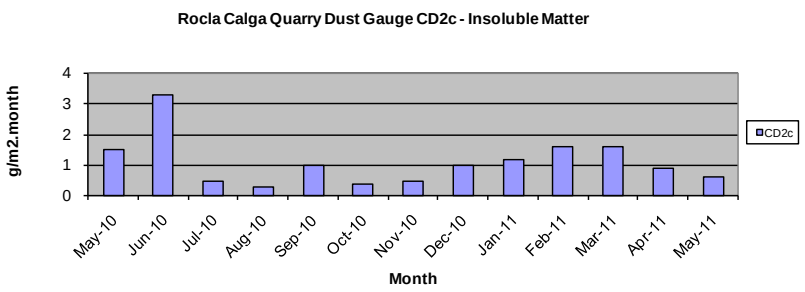
NA= Not Available.

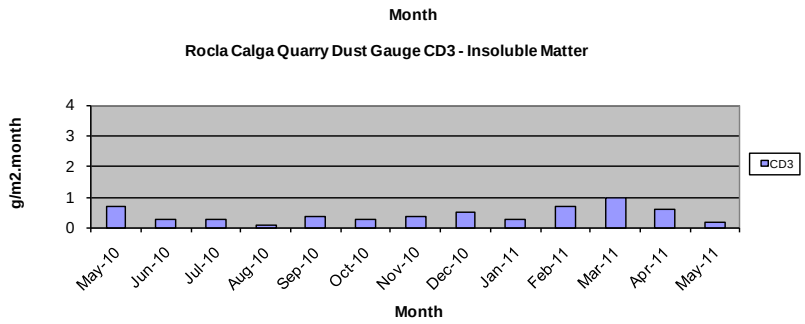
CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air 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.

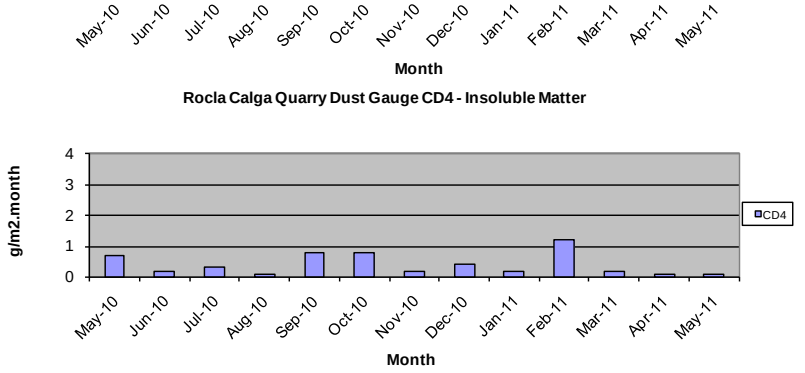
Dust deposition charts for all dust gauge sites appear in **Figure 1** below. The laboratory analysis is provided in **Appendix 1.**

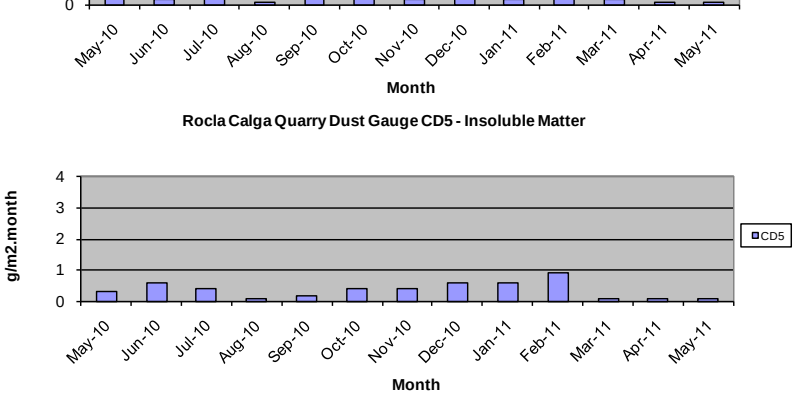
Figure 1: Dust Deposition Charts

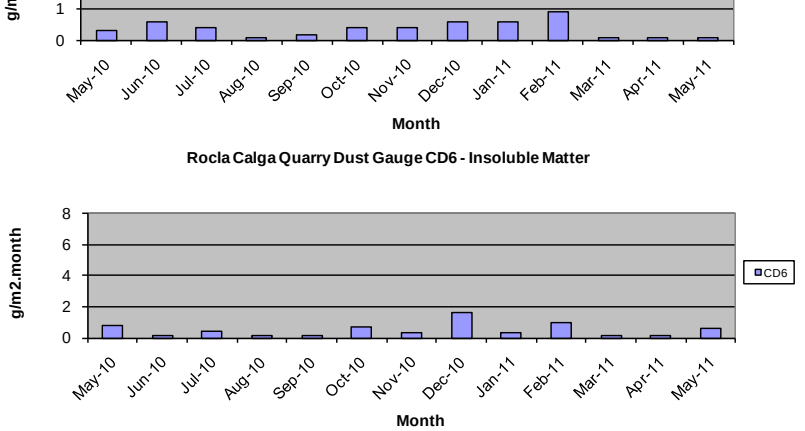












2.2 Water Monitoring

2.2.1 Surface Waters

Monthly surface water monitoring was conducted on the 1 June 2011 and results are listed in **Table 2**. The laboratory analysis sheets for both sampling events are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – May 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	6.46	73	57	14	<5
B	Steady	Clear	Clear	6.58	98	90	12	<5
C	NO ACCESS							
D	Slow	Clear	Clear	6.29	78	84	<5	<5
F	Still	Clear	Clear	5.83	65	55	26	<5

At the time of sampling, there were no water discharges off site from any sampling location. Samples were collected at sites A, B, D and F. There was no access to site C. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids, low Total Suspended Solids and no detectable Oil and Grease.

An additional high rainfall surface water sampling event was undertaken on 30 May 2011 at sites A, B, D, F and Inflow dam. Results are provided in **Appendix 1**.

2.2.2 Groundwaters

Groundwaters were sampled on 1 June 2011. 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 decreased at most monitoring bores this month, indicating water moving toward the surface. Exceptions were CQ7, CQ8, CQ9, MW7 and MW13 where depths increased. Longer term monitoring is required to fully evaluate groundwater depth trends.

pH increased at all sites this month. EC decreased at all sites with the exception of CQ3 which increased. Detailed biannual water quality monitoring was conducted in April 2011 and is next due in October 2011.

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 (µS/cm) This report
CQ1	Voutos	* Monitor	20.59	19.81	7.93	130
CQ3	Voutos	* Monitor	10.53	10.25	8.62	130
CQ4	Voutos	* Monitor	8.78	7.90	7.96	90
CQ5	Gazzana	DIP Only	8.69	5.80	7.00	130
CQ6	Gazzana	DIP Only	16.00	10.10	7.35	170
CQ7	Gazzana	* Monitor	6.89	6.00	7.15	90
CQ8	Gazzana	* Monitor	11.03	9.37	7.50	150
CQ9	Gazzana	DIP Only	10.10	8.73	7.72	110
CQ10	Voutos	* Monitor	NI	22.56	7.56	160
CQ11S	Gazzana	* Monitor	NI	9.21	7.62	160
CQ11D	Gazzana	* Monitor	NI	10.40	7.95	140
CQ12	Gazzana	* Monitor	NI	3.92	6.45	130
CQ13	Kashouli	* Monitor	NI	12.40	8.53	190
CP3	Gazzana	Domestic	10.40	7.83	7.67	140
CP4	Kashouli	Domestic	13.63	3.65	8.18	200
CP5	Kashouli	Domestic	16.61	6.99	6.32	230
CP6	Kashouli	Domestic	16.27	9.41	7.05	200
CP7	Kashouli	Production	8.56	1.15	7.84	120
CP8	Rozmanec	Domestic	22.17	NR	NR	NR
MW7	Rocla Bore	* Monitor	15.76	15.53	7.14	110
MW8	Rocla Bore	* Monitor	9.82	7.40	8.04	80
MW9	Rocla Bore	* Monitor	22.44	21.88	8.06	80
MW10	Rocla Bore	* Monitor	15.41	NM	NM	NM
MW13	Rocla Bore	DIP Only	NI	7.39	6.83	100
MW16	Rocla Bore	DIP Only	NI	NM	NM	NM

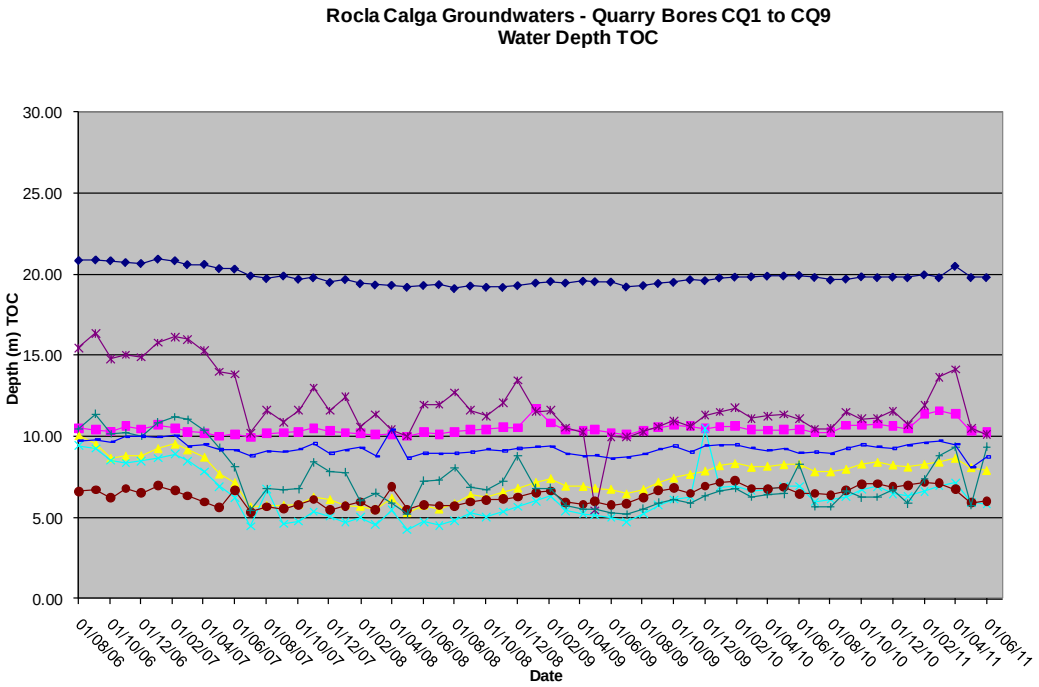
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to access restrictions.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements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

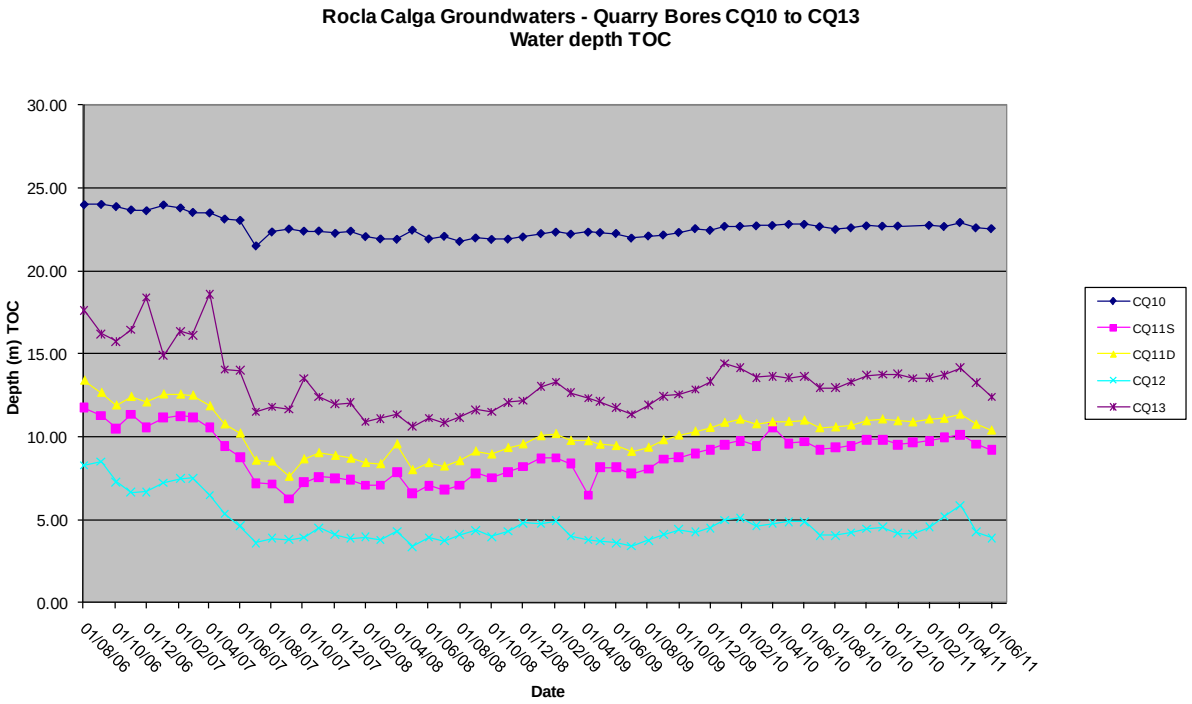
Shading is used to indicate the following trends in water depth (compared to the last reading):

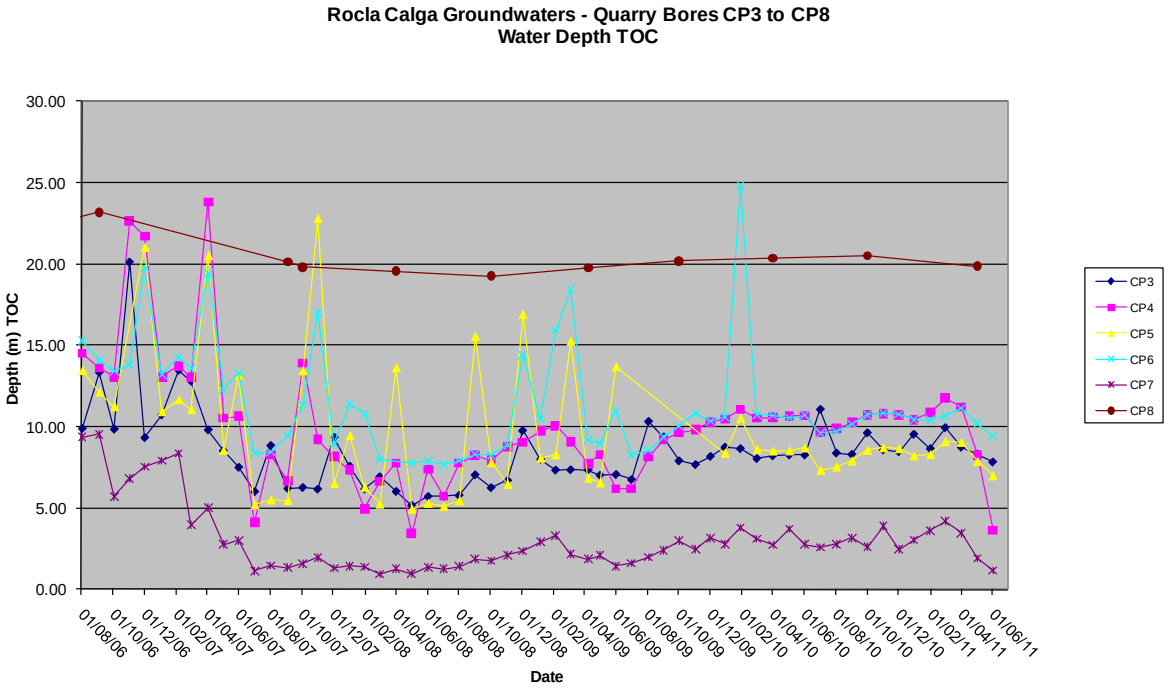
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

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
01/08/06
01/10/06
01/12/06
01/02/07
01/04/07
01/06/07
01/08/07
01/10/07
01/12/07
01/02/08
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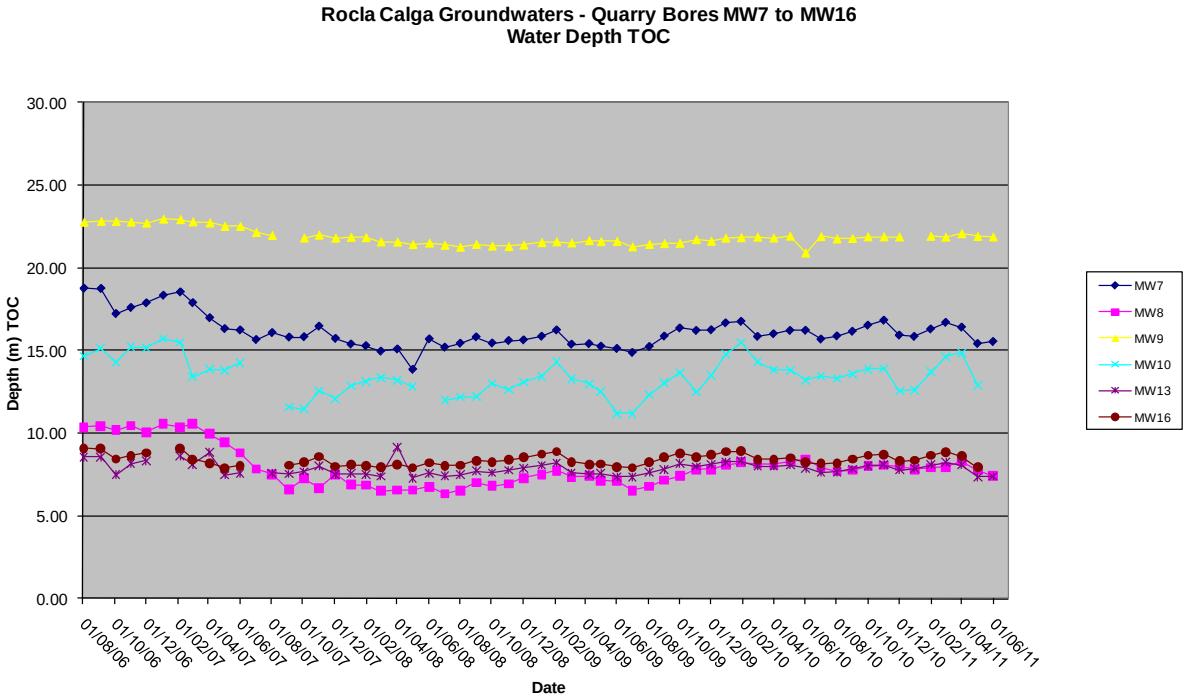
Date
CP3
CP4
CP5
CP6
CP7
CP8


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
01/08/06
01/10/06
01/12/06
01/02/07
01/04/07
01/06/07
01/08/07
01/10/07
01/12/07
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01/08/10
01/10/10
01/12/10
01/02/11
01/04/11
01/06/11
Date
MW7
MW8
MW9
MW10
MW13
MW16

2.3 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in May was 100% with the exception of wind speed which was unavailable from 1 May through 5 May due to wind sensor damage. 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 May 2011 shows rainfall recorded at the Rocla Calga Quarry was higher than that recorded at nearby Peats Ridge and lower than Gosford BOM stations. Recorded rainfall at Rocla Calga Quarry was higher than the Peats Ridge long term mean rainfall for May. The rainfall comparison is provided below:

Rocla Calga Quarry	146.6 mm
BOM Peats Ridge*	108.8 mm
BOM Gosford*	186.8 mm
BOM Peats Ridge Long term mean for May*	98.3 mm

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

Results are displayed in the following table and figures.

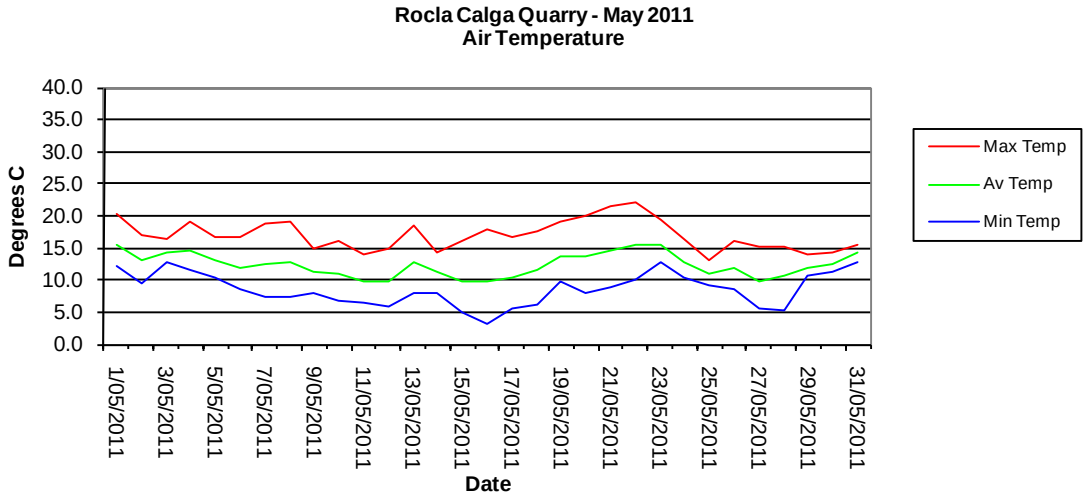
2.3.1 Monthly Meteorological Data Summary

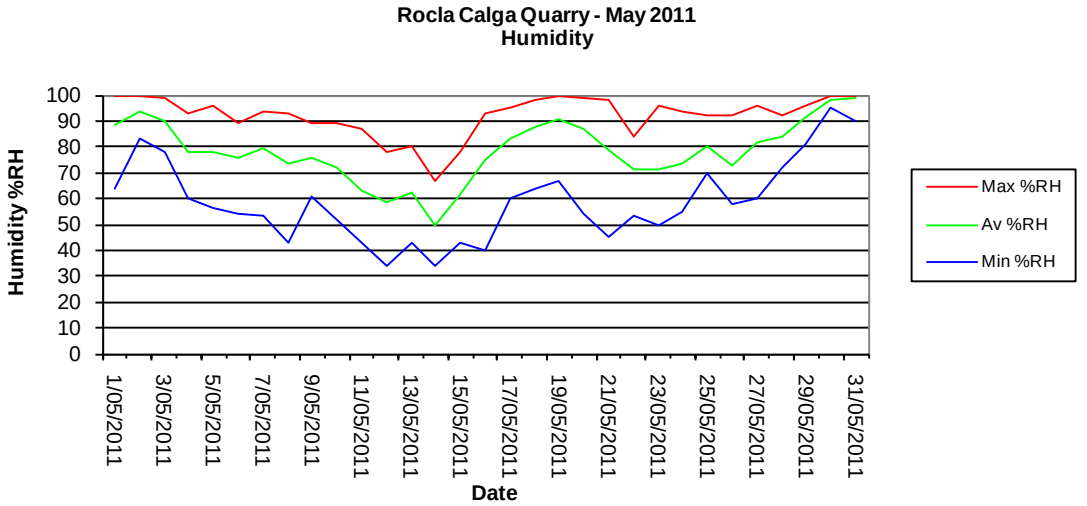
Summary **May-11** **Rocla - Calga**

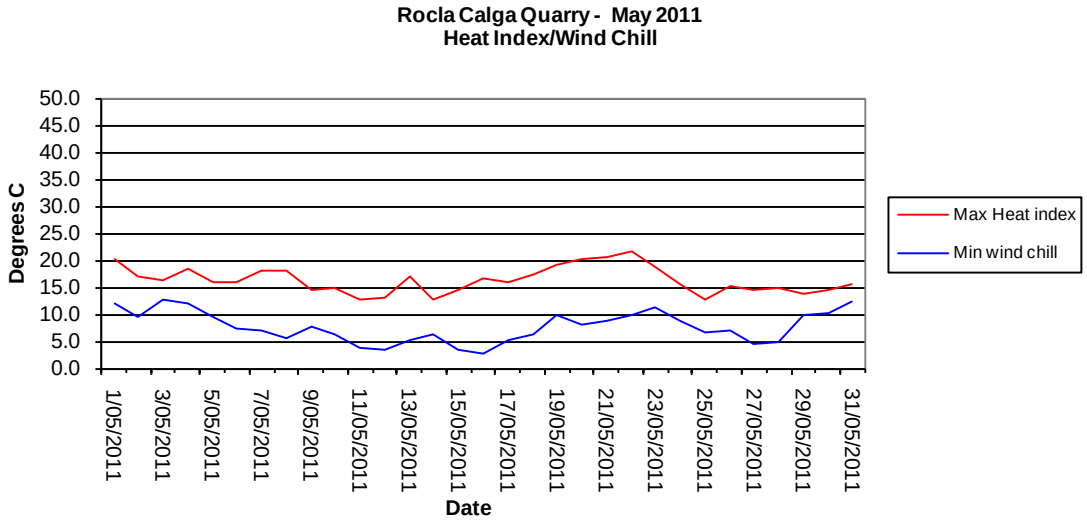
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/05/2011	12.1	15.5	20.2	64	88	100	0.6	0.8				12.1	20.3	1014.8	1016.7	1019.2	0	58.4	645	72.2	93.9	100
2/05/2011	9.4	13.1	16.9	83	94	100	0.2	0.8				9.5	17.1	1014.2	1015.1	1016.5	0	61.0	376	87.4	98.4	100
3/05/2011	12.7	14.3	16.3	78	90	99	0.0	0.7				12.7	16.3	1012.7	1014.0	1015.2	0	51.6	285	90.6	98.5	100
4/05/2011	11.7	14.5	19.0	60	78	93	0.0	0.7				11.8	18.4	1014.2	1015.8	1017.9	0	48.9	274	88	97.7	100
5/05/2011	10.3	13.0	16.8	56	78	96	2.0	1.4	0	1.4	9.4	9.6	16.0	1017.7	1020.7	1023.3	0	54.3	687	88.9	98.7	100
6/05/2011	8.6	12.0	16.8	54	76	89	0.0	1.2	0	1.8	6.7	7.2	15.9	1019.5	1021.7	1023.7	0	48.2	512	91.5	98.1	100
7/05/2011	7.3	12.4	18.8	53	79	94	0.0	0.8	0	1.5	4.9	6.8	18.1	1014.2	1017.1	1020.1	0	40.4	621	88.9	98.8	100
8/05/2011	7.4	12.8	19.2	43	73	93	0.0	1.0	0	1.5	7.2	5.7	17.9	1009.9	1012.4	1014.2	0	42.0	596	92.7	99.0	100
9/05/2011	8.1	11.3	14.8	61	76	89	0.6	1.4	0.4	2.6	10.3	7.6	14.3	1012.3	1013.8	1015.5	0	54.6	268	96.2	99.5	100
10/05/2011	6.9	10.9	16.1	52	72	89	0.4	1.6	0	3.4	11.6	6.3	15.0	1012.5	1013.8	1015.1	0	47.8	608	91.8	98.3	100
11/05/2011	6.4	9.6	13.9	43	63	87	0.0	2.5	0.9	4.8	14.8	3.7	12.7	1006.5	1009.1	1012.4	0	53.2	284	90.6	97.0	100
12/05/2011	5.9	9.8	14.8	34	59	78	0.0	2.3	2.7	4.4	10.7	3.5	13.1	1007.8	1010.1	1012.6	0	31.5	615	78.9	95.1	100
13/05/2011	8.1	12.7	18.4	43	62	80	0.0	2.5	2.7	4.9	13.9	5.3	17.1	1008.0	1010.3	1012.4	0	37.7	603	83.6	93.0	100
14/05/2011	7.9	11.4	14.3	34	50	67	0.0	2.9	2.2	4.5	12.1	6.3	12.6	1010.4	1016.8	1024.7	0	36.6	608	87.7	94.0	100
15/05/2011	5.1	9.7	16.0	43	61	78	0.0	1.3	0	1.9	6.3	3.4	14.6	1024.7	1027.7	1029.6	0	28.2	542	88.9	96.2	100
16/05/2011	3.3	9.7	17.9	40	75	93	0.0	0.8	0	1.1	5.8	2.8	16.5	1025.6	1028.1	1029.8	0	29.5	511	67	93.0	100
17/05/2011	5.6	10.4	16.8	60	83	95	0.0	0.7	0	1.1	4.5	5.1	16.0	1027.4	1028.8	1030.5	0	33.1	523	78.1	95.4	100
18/05/2011	6.1	11.6	17.7	64	88	98	0.4	0.5	0	0.7	4.5	6.1	17.2	1029.1	1030.5	1032.4	0	30.1	368	82.5	96.5	100
19/05/2011	9.8	13.6	19.1	67	90	100	1.0	0.7	0	0.8	10.7	9.8	19.2	1027.4	1029.0	1031.0	0	45.3	357	87.1	98.6	100
20/05/2011	8.1	13.6	20.1	54	87	99	0.2	0.6	0	1.1	6.3	8.1	20.3	1023.6	1025.8	1028.2	0	30.0	482	70.8	97.4	100
21/05/2011	8.9	14.5	21.6	45	78	98	0.2	0.8	0	1.1	4.9	8.9	20.6	1020.8	1022.9	1025.3	0	26.7	356	83.9	97.9	100
22/05/2011	10.1	15.4	22.0	53	72	84	0.0	1.2	0	1.2	5.8	10.0	21.5	1010.0	1017.0	1021.4	0	51.8	388	90.1	97.8	100
23/05/2011	12.7	15.4	19.4	50	71	96	3.2	2.1	0.4	4.5	14.3	11.4	18.7	1001.2	1004.8	1009.6	0	27.0	179	91.2	98.0	100
24/05/2011	10.5	12.7	16.5	55	74	94	0.4	1.4	0.4	2.8	10.3	8.7	15.6	1003.1	1005.0	1007.6	0	34.4	400	86	94.5	100
25/05/2011	9.2	10.9	13.1	70	80	92	2.8	1.7	4	5.8	13.9	6.5	12.6	1006.3	1010.4	1014.1	0	42.2	222	88	97.3	100
26/05/2011	8.6	11.8	16.1	58	73	92	0.0	1.6	0	3.2	11.6	6.9	15.3	1013.7	1015.6	1017.6	0	46.2	222	69.9	92.1	99.7
27/05/2011	5.5	9.7	15.2	60	82	96	0.0	0.7	0	1.4	6.7	4.3	14.3	1016.6	1018.5	1021.4	0	27.9	376	86.3	95.2	100
28/05/2011	5.4	10.7	15.2	72	84	92	0.4	0.7	0	1.2	4.9	4.7	14.9	1020.9	1022.7	1024.7	0	43.2	268	73.1	92.7	100
29/05/2011	10.7	11.9	14.1	81	92	96	5.0	0.7	1.3	2.1	5.8	9.8	13.9	1021.5	1023.0	1024.7	0	43.6	239	83	98.1	100
30/05/2011	11.3	12.6	14.2	95	98	100	93.4	0.3	0.4	2.3	10.3	10.1	14.4	1016.7	1018.8	1021.3	0	18.1	153	80.1	96.3	100
31/05/2011	12.8	14.3	15.4	90	99	100	35.8	0.3	0.4	2.8	13.9	12.4	15.6	1015.3	1018.4	1022.0	5	29.7	156	81	96.5	100
Monthly	3.3	12.3	22	34	78	100	146.6	36.5	0	2.4	14.8	2.8	21.5	1001.2	1017.9	1032.4	0	40.4	687	67	96.6	100

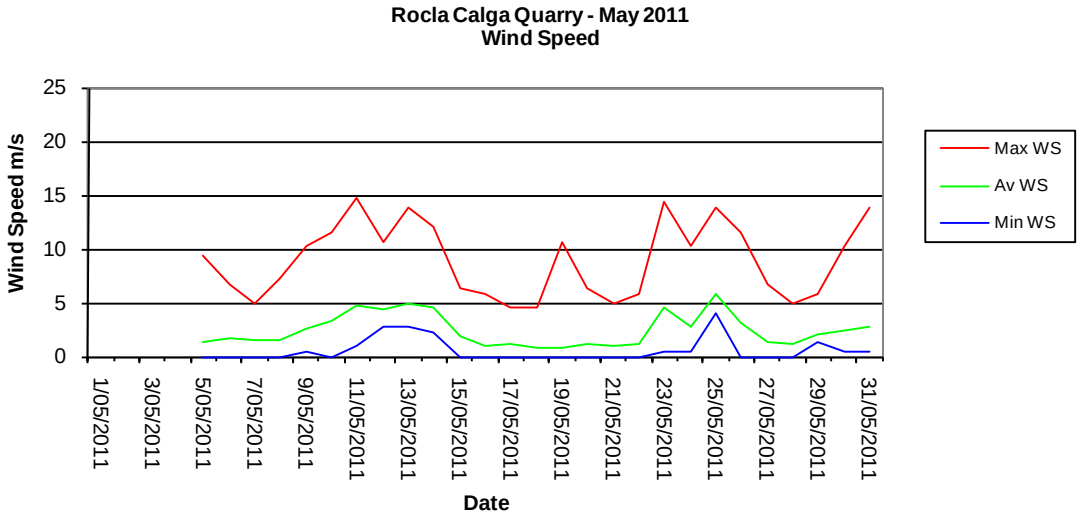
no data

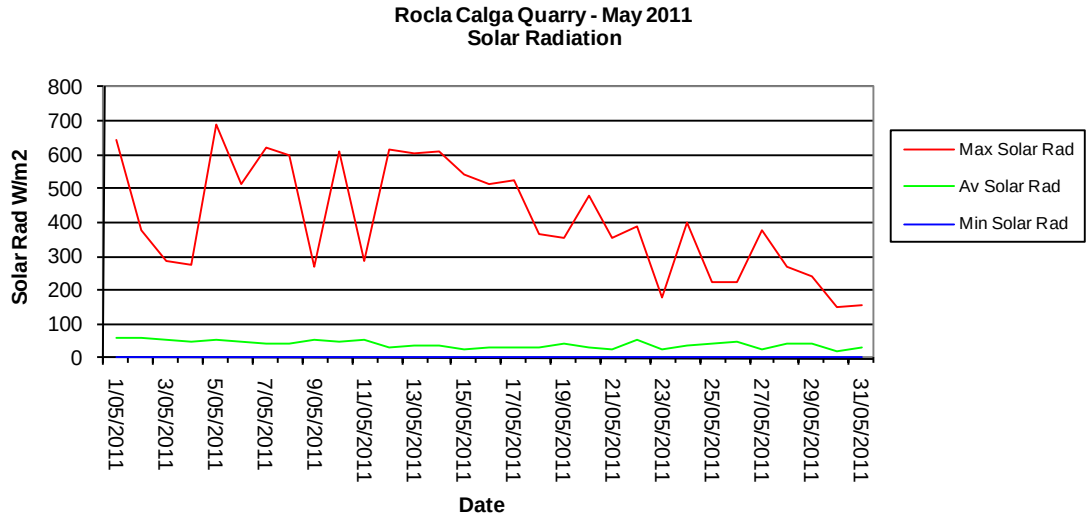
2.3.2 Monthly Weather Charts

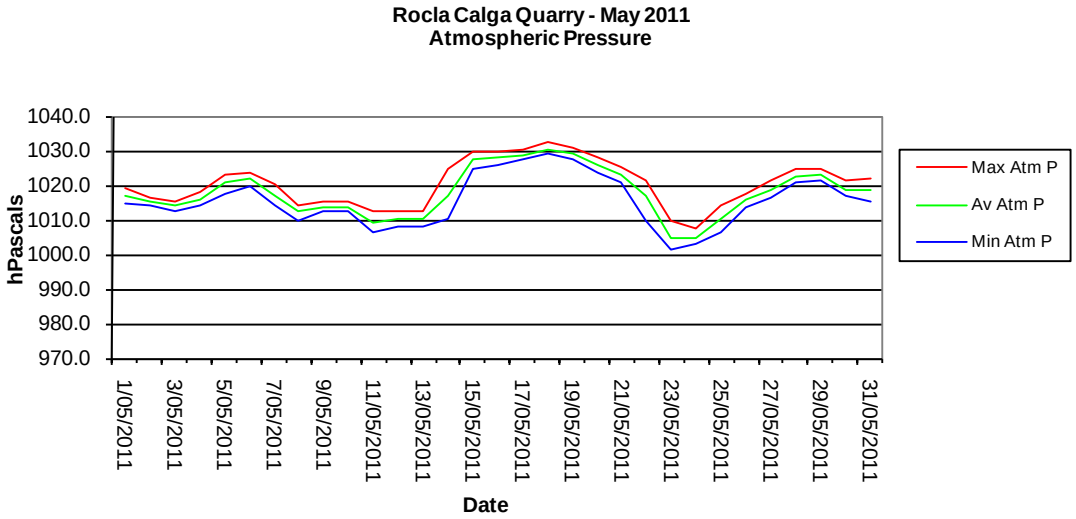


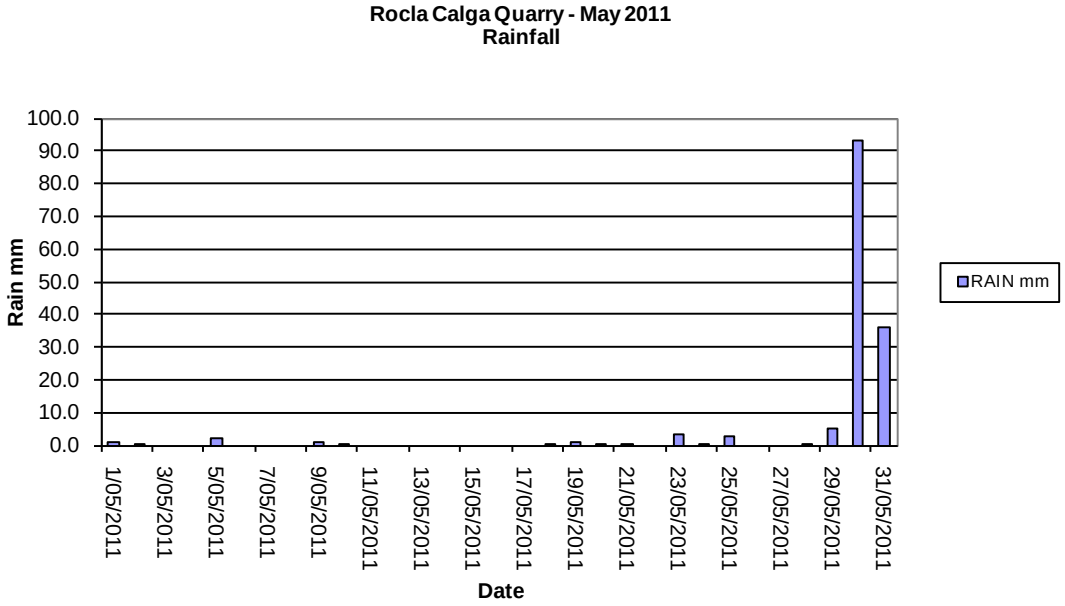


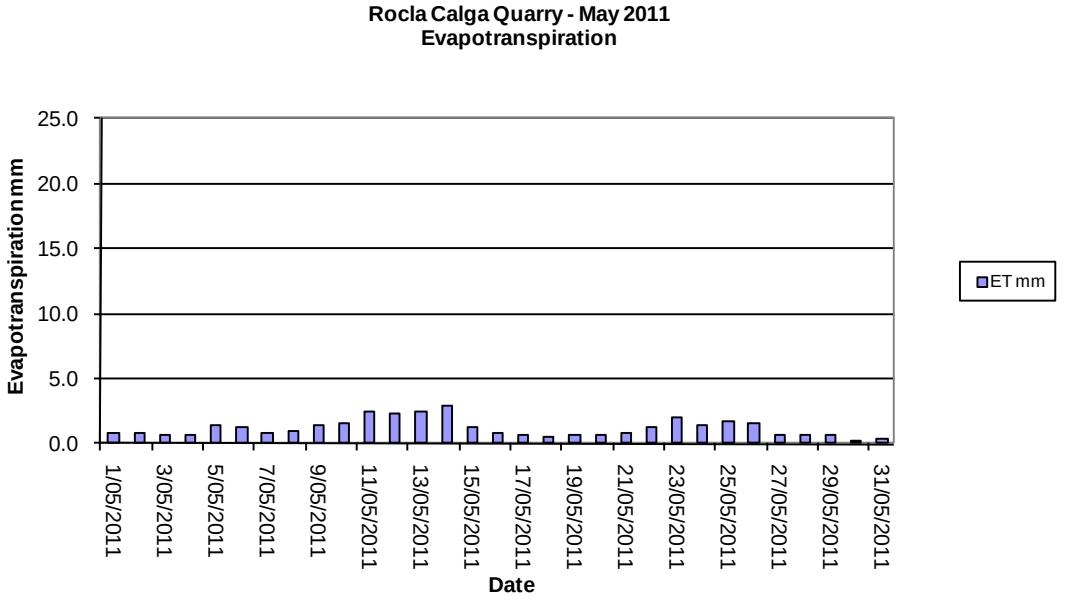


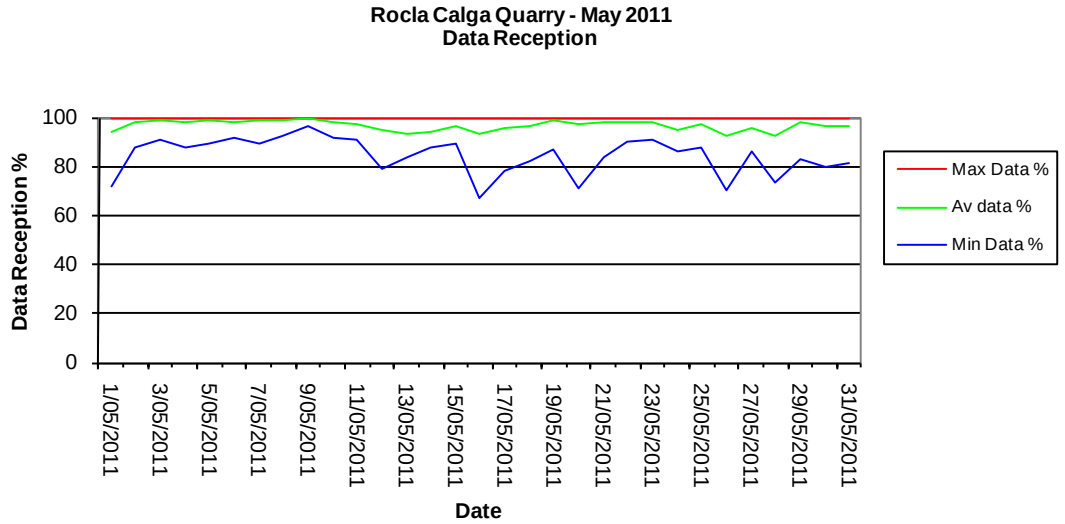

Rocla Calga Quarry - May 2011
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
Date
Max WS
Av WS
Min WS


Rocla Calga Quarry - May 2011
Solar Radiation
Solar Rad W/m2
800
700
600
500
400
300
200
100
0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - May 2011
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
970.0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
Date
Max Atm P
Av Atm P
Min Atm P


Rocla Calga Quarry - May 2011
Rainfall
Rain mm
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
Date
RAIN mm

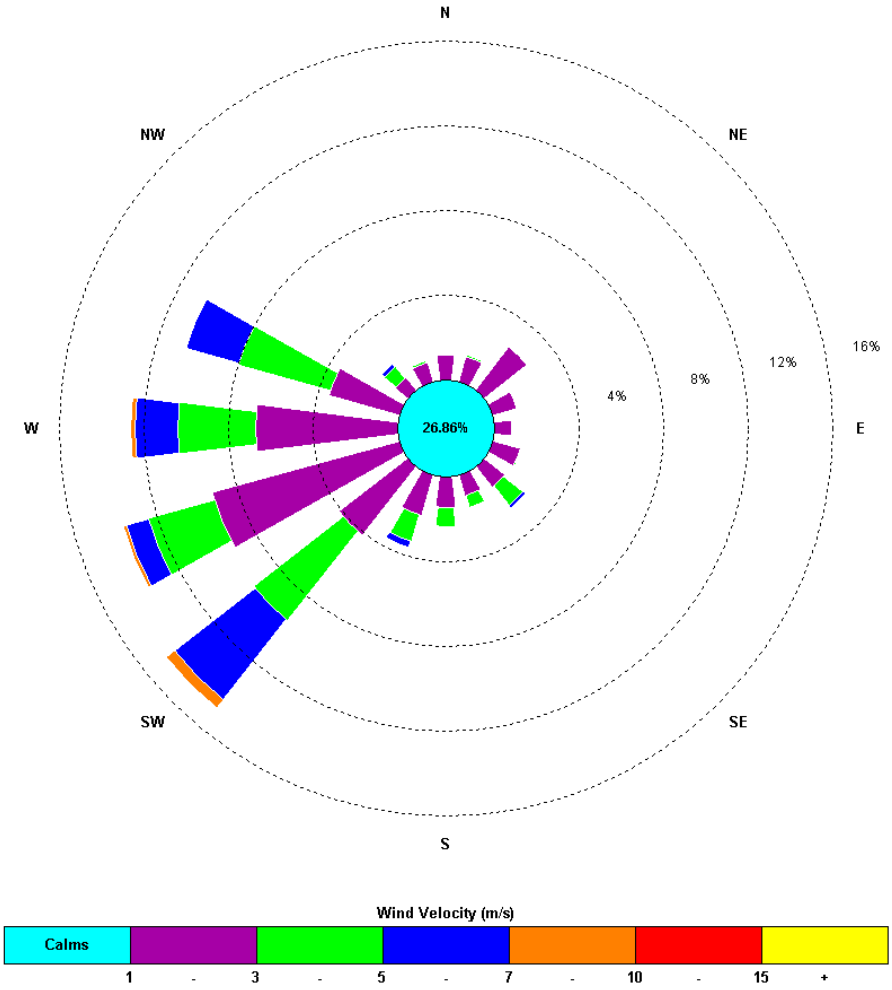

Rocla Calga Quarry - May 2011
Evapotranspiration
Evapotranspiration mm
25.0
20.0
15.0
10.0
5.0
0.0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
Date
ET mm


Rocla Calga Quarry - May 2011
Data Reception
Data Reception %
100
80
60
40
20
0
1/05/2011
3/05/2011
5/05/2011
7/05/2011
9/05/2011
11/05/2011
13/05/2011
15/05/2011
17/05/2011
19/05/2011
21/05/2011
23/05/2011
25/05/2011
27/05/2011
29/05/2011
31/05/2011
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 to be calm when less than a 15 minute average of 1m/s.

09:45, 5 May 2011 – 23:45, 31 May 2011



The predominant winds were from the SW, with strongest winds from the SW, WSW and W. The maximum wind speed was 14.8m/s from the WSW.

Appendix 1

Laboratory Certificates

CARBON BASED ENVIRONMENTAL

Todays Collection			
Installed date:	2·5·11	Time Start:	9.05
Collection date:	1·6·11	Time Finish:	1·15

Client : Rocla
Project : Calga Quarry

DUST DEPOSITION GAUGES

Gauge No	Water Level (mL)	Insects	Bird droppings	Vegetation	Dust	Water Turbidity	Water Colour	Funnel Diameter (mm)	Comments
		Tick if in the bottle ✓ = slight ✓✓ =mod etc							
CD1	1999	✓		✓	✓	(C) S T	(C) LO O B G		
CD2C	1999				✓	(C) S T	(C) LO O B G		
CD3	1999	✓		✓	✓	(C) S T	(C) LO O B G		
CD4	1999				✓	(C) S T	(C) LO O B G		
CD5	1999				✓	(C) S T	(C) LO O B G		
CD6	1999				✓	(C) S T	(C) LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		
						C S T	C LO O B G		

Report broken funnels and replacement diameters

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)
Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

Signed: LKing

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: Carbon Based Environmental Pty Ltd

POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325

SEND REPORT TO: Colin Davies, Renae Mikka SEND INVOICE TO: Carbon Based Environmental

DATA NEEDED BY: 7 working days REPORT NEEDED BY: 7 working days

PROJECT ID: Rocla Calga Dusts QUOTE NO.: SY/269/10

P.O. NO.: COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact ...
COOLER TEMP: deg.C

also email cbased1@bigpond.com

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS:Carbon Based Environmental Pty Ltd

PHONE: 0439604443 FAX: 0249904442 E-MAIL: cbased@bigpond.com, cbased1@bigpond.com

REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

Australian Laboratory Services Pty Ltd

SAMPLE DATA				CONTAINER DATA		ANALYSIS REQUIRED				
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	Insoluable Solids	Ash Residue	Combustable Matte		NOTES
CD1	Dust	1·6·11								
CD2c	Dust	↓				x	x	x		
CD3	Dust					x	x	x		
CD4	Dust					x	x	x		
CD5	Dust					x	x	x		
CD6	Dust	↓				x	x	x		

RELINQUISHED BY:

NAME : Colin Davies DATE: 1·6·11

OF: Carbon Based Environmental TIME: 2·50

NAME : DATE:

OF: TIME:

RECEIVED BY

NAME : DATE: 1/6/11

OF: TIME: 4.50

NAME : DATE:

OF: TIME:

METHOD OF SHIPMENT

CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Sydney
Work Order
ES1111403

Telephone : +61-2-8784 8555

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EN1101277**	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-JUN-2011
Sampler	: CBE	Issue Date	: 10-JUN-2011
Site	: ----		
		No. of samples received	: 6
Quote number	: SY/269/10 V2	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.

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: 02/05/2011 - 01/06/2011.**

Analytical Results

Sub-Matrix: DUST

Compound	CAS Number	LOR	Unit	Client sample ID: CD1	CD2C	CD3	CD4	CD5
				Client sampling date / time: 01-JUN-2011 14:50	01-JUN-2011 14:50	01-JUN-2011 14:50	01-JUN-2011 14:50	01-JUN-2011 14:50
				EN1101277-001	EN1101277-002	EN1101277-003	EN1101277-004	EN1101277-005
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	1.2	0.5	0.2	0.1	0.1
Ash Content (mg)	----	1	mg	21	9	3	2	2
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	0.4	0.1	<0.1	<0.1	<0.1
Combustible Matter (mg)	----	1	mg	7	1	1	<1	<1
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	1.6	0.6	0.2	0.1	0.1
Total Insoluble Matter (mg)	----	1	mg	28	10	4	2	2

Analytical Results

Sub-Matrix: DUST			Client sample ID	CD6	----	----	----	----
			Client sampling date / time	01-JUN-2011 14:50	----	----	----	----
Compound	CAS Number	LOR	Unit	EN1101277-006	----	----	----	----
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	0.4	----	----	----	----
Combustible Matter (mg)	----	1	mg	6	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	0.6	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	10	----	----	----	----

Carbon Based Environmental Pty Limited

Todays Collection	
Time Start:	9.45
Time Finish:	11.10

Client : Rocla Calga

Project :

SURFACE WATERS

Date: 1.6.11

Site	Flow Rate	Odour	Sampling Time	Water Turbidity	Water Colour	Comments
A	STILL	NIL	10.00	(C) S T	(C) LO O B G	
B	STEADY	NIL	10.15	(C) S T	(C) LO O B G	
C				~~C S T~~	~~C LO O B G~~	NO ACCESS
D	SLOW	NIL	11.10	(C) S T	(C) LO O B G	
F	STILL	NIL	9.45	(C) S T	(C) LO O B G	
				C S T	C LO O B G	
				C S T	C LO O B G	
				C S T	C LO O B G	
				C S T	C LO O B G	
				C S T	C LO O B G	

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Signed: [signature]

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

Sampled by: Leesa & Paul

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: Carbon Based Environmental Pty Ltd

POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325

SEND REPORT TO: Colin Davies, Renae Mikka SEND INVOICE TO: Carbon Based Environmental

DATA NEEDED BY: 7 working days REPORT NEEDED BY: 7 working days

PROJECT ID: Rocla Quarry QUOTE NO.: SY/ 269/10

P.O. NO.: COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact ...
COOLER TEMP: deg.C

also email results to cbased1@bigpond.com

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS:Carbon Based Environmental Pty Ltd

PHONE: 0439604443 FAX: 0249904442 E-MAIL: cbased@bigpond.com, cbased1@bigpond.com

REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

Australian Laboratory Services Pty Ltd

SAMPLE DATA				CONTAINER DATA		ANALYSIS REQUIRED																							
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	Ph	EC	TSS	TDS	O + G																			NOTES
A	Water	1-6-11																											
B	Water	1-6-11				x	x	x	x	x																			
~~C~~	~~Water~~					x	x	x	x	x																			
D	Water	1-6-11				x	x	x	x	x																			
F	Water	1-6-11				x	x	x	x	x																			

RELINQUISHED BY:

NAME : Colin Davies DATE: 1-6-11

OF: Carbon Based Environmental TIME:

NAME : DATE:

OF: TIME:

RECEIVED BY

NAME DATE: 1/6/11

OF: TIME: 4:50

NAME : DATE:

OF: TIME:

METHOD OF SHIPMENT

CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Sydney
Work Order

ES1111404

Telephone : +61-2-8784 8555

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1111404**	Page	: 1 of 3
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MS RENAE MIKKA	Contact	: Client Services
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@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-JUN-2011
Sampler	: CBE	Issue Date	: 08-JUN-2011
Site	: ----		
Quote number	: SY/269/10 V2	No. of samples received	: 4
		No. of samples analysed	: 4

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	Sydney Inorganics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney 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

- **TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID	A	B	D	F	----
				Client sampling date / time	01-JUN-2011 14:50	01-JUN-2011 14:50	01-JUN-2011 14:50	01-JUN-2011 14:50	----
					ES1111404-001	ES1111404-002	ES1111404-003	ES1111404-004	----
EA005: pH									
pH Value	----	0.01	pH Unit		6.46	6.58	6.29	5.83	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		73	98	78	65	----
EA015: Total Dissolved Solids									
^ Total Dissolved Solids @180°C	GIS-210-010	5	mg/L		57	90	84	55	----
EA025: Suspended Solids									
^ Suspended Solids (SS)	----	5	mg/L		14	12	<5	26	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	----

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: Carbon Based Environmental Pty Ltd
POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325
SEND REPORT TO: Colin Davies, Renae Mikka
SEND INVOICE TO: Carbon Based Environmental
DATA NEEDED BY: 7 working days
REPORT NEEDED BY: 7 working days
PROJECT ID: Rocla Quarry Rain Event
QUOTE NO.: SY/ 269/10
P.O. NO.:
COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact .....
COOLER TEMP deg C

LABORATORY BATCH NO.:
SAMPLERS: Carbon Based Environmental Pty Ltd
PHONE: 0439604443 FAX: 0249904442 E-MAIL: cbased@bigpond.com, cbased1@bigpond.com
REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes
QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

ANALYSIS REQUIRED

	SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	pH	EC	TSS	TDS	O + G	NOTES
1	A	Water	30/05/11	4.00pm			x	x	x	x	x	
2	B	Water	30/05/11	4.00pm			x	x	x	x	x	
3	D	Water	30/05/11	4.00pm			x	x	x	x	x	
4	F	Water	30/05/11	4.00pm			x	x	x	x	x	
5	Inflow	Water	30/05/11	4.00pm			x	x	x	x	x	

RELINQUISHED BY:
NAME: Colin Davies DATE:
OF: Carbon Based Environmental TIME:
NAME: DATE:
OF: TIME:

RECEIVED BY
NAME: [signature] DATE: 1/6/11
OF: [illegible] TIME: 12:15
NAME: [illegible] DATE: 1-6-11
OF: ALS TIME: [illegible]

METHOD OF SHIPMENT
CONSIGNMENT NOTE NO.
TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Sydney
Work Order
ES1111320

Telephone : + 61-2-8784 8555

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1111320**	Page	: 1 of 3
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MS RENAE MIKKA	Contact	: Client Services
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@alsglobal.com
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY RAIN EVENT	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-JUN-2011
Sampler	: CBE	Issue Date	: 08-JUN-2011
Site	: ----		
		No. of samples received	: 5
Quote number	: SY/269/10 V2	No. of samples analysed	: 5

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	Sydney Inorganics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney 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

- **TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**

Analytical Results

Sub-Matrix: WATER

Compound	CAS Number	LOR	Unit	Client sample ID: A	B	D	F	INFLOW
Client sampling date / time				30-MAY-2011 16:00	30-MAY-2011 16:00	30-MAY-2011 16:00	30-MAY-2011 16:00	30-MAY-2011 16:00
				ES1111320-001	ES1111320-002	ES1111320-003	ES1111320-004	ES1111320-005
EA005: pH								
pH Value	----	0.01	pH Unit	5.85	6.14	6.26	5.59	6.15
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	71	55	34	65	41
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	5	mg/L	68	72	66	66	78
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	5	mg/L	24	62	17	15	188
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

Carbon Based Environmental Pty Limited

Todays Collection	
Time Start:	9.05
Time Finish:	1.20

Date: 1.6.11

Client : Rocla Calga

Project :

GROUNDWATERS

Site	DEPTH	Odour	Water Turbidity	Water Colour	1		2		Downloaded Logger? (Y/N)
					pH	EC	pH	EC	
CQ1	19.81	NIL	(C) S T	(C) LO O B G	9.17	151.2us	7.93	127.4us	
CQ3	10.25	NIL	(C) S T	(C) LO O B G	8.96	137.1us	8.62	134.9us	
CQ4	7.90	NIL	(C) S T	(C) LO O B G	8.18	90.6us	7.96	89.7us	
CQ5	5.80	NIL	(C) S T	(C) LO O B G	7.16	129.5us	7.00	131.0us	
CQ6	10.10	NIL	(C) S T	(C) LO O B G	7.45	163.9us	7.35	166.1us	
CQ7	6.00	NIL	(C) S T	(C) LO O B G	7.29	94.3us	7.15	93.6us	
CQ8	9.37	NIL	(C) S T	(C) LO O B G	7.53	146.0us	7.50	146.5us	
CQ9	8.73	NIL	(C) S T	(C) LO O B G	6.90	107.7us	7.72	108.1us	
CQ10	22.56	NIL	(C) S T	(C) LO O B G	7.81	161.8us	7.56	160.7us	
CQ11S	9.21	NIL	(C) S T	(C) LO O B G	7.78	153.5us	7.62	155.7us	
CQ11D	10.40	NIL	(C) S T	(C) LO O B G	8.24	137.7us	7.95	137.9us	
CQ12	3.92	NIL	(C) S T	(C) LO O B G	6.49	129.4us	6.45	131.4us	
CQ13	12.40	NIL	(C) S T	(C) LO O B G	7.93	193.7us	8.53	191.1us	
CP3	7.83	NIL	(C) S T	(C) LO O B G	7.72	140.3us	7.67	139.3us	
CP4	3.65	NIL	(C) S T	(C) LO O B G	8.37	200.7us	8.18	201.9us	
CP5	6.99	NIL	(C) S T	(C) LO O B G	6.28	233.6us	6.32	234.8us	
CP6	9.41	NIL	(C) S T	(C) LO O B G	6.82	193.1us	7.05	195.8us	
CP7	1.15	NIL	(C) S T	(C) LO O B G	6.85	119.5us	7.84	119.9us	
CP8			(C) S T	(C) LO O B G					
MW7	15.53	NIL	(C) S T	(C) LO O B G	7.07	108.3us	7.17	107.4us	
MW8	7.40	NIL	(C) S T	(C) LO O B G	8.18	84.0us	8.04	84.8us	
MW9	21.88	NIL	(C) S T	(C) LO O B G	8.29	85.1us	8.06	83.3us	
MW10			(C) S T	(C) LO O B G					TO WET
MW13	7.39	NIL	(C) S T	(C) LO O B G	6.85	99.9us	6.83	99.7us	
MW16			(C) S T	(C) LO O B G					TO WET

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

pH/EC meter #: 5

Signed: L King

Sampled by: Leesa & Paul

Appendix 2

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

Peats Ridge, New South Wales
May 2011 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	Su	12.6	20.7	6.8	1.0					15.0	98	3	SW	4		19.6	67	5	SW	4	
2	Mo	9.8	16.8	0.2	2.0					12.8	97	7	WNW	4		16.6	95	8	WSW	4	
3	Tu	12.2	16.7	0.6	0.4					14.8	97	7	W	4		16.6	82	7	S	4	
4	We	11.6	19.3	0	1.0					14.0	79	4	SW	4		17.1	76	4	SW	4	
5	Th	9.8	17.1	0	1.2					13.7	74	1	SW	9		15.2	68	2	S	9	
6	Fr	7.9	16.9	0	2.0					11.9	79	2	SW	9		15.8	59	6	S	4	
7	Sa	7.1	19.5	0	2.2					9.8	89	0	W	4		17.0	65	2	ENE	4	
8	Su	8.5	19.5	0	1.0					13.8	68	4	WNW	4		19.2	46	3	W	4	
9	Mo	7.0	14.1	0	1.8					13.0	67	6	SW	19		13.0	69	6	S	9	
10	Tu	8.1	15.6	1.2	1.6					9.9	74	3	SW	19		15.2	53	2	NW	4	
11	We	5.6	14.1	0	1.2					10.6	65	6	NW	9		12.4	61	8	SW	28	
12	Th	4.8	15.0	0	1.6					9.1	67	0	SW	19		13.3	39	1	SW	9	
13	Fr	6.9	19.3	0	2.2					12.9	69	1	NW	19		17.9	47	2	SW	9	
14	Sa	8.4	14.9	0	1.4					10.6	48	0	WSW	4		13.3	39	4	S	9	
15	Su	3.8	16.7	0	2.4					9.8	60	0	W	4		16.2	45	0	N	4	
16	Mo	3.4	19.6	0	1.4					10.3	69	0	NW	4		18.8	46	0	NW	4	
17	Tu	3.9	18.1	0	1.6					10.8	73	0	W	4		16.1	71	1	SE	4	
18	We	5.1	19.6	0	1.0					12.2	85	1	SW	4		17.3	66	1	SE	9	
19	Th	9.1	20.0	0.2	1.2					12.2	96	8	SE	4		18.1	69	3	NE	4	
20	Fr	12.2	21.8	0.2	0.6					13.5	91	0	W	4		20.5	57	0	E	4	
21	Sa	8.7	22.8	0	1.0					17.2	69	0	NW	4		22.2	47	0	W	4	
22	Su	11.6	21.9	0	2.0					17.0	63	6	W	4		19.6	67	7	E	4	
23	Mo	12.3	20.0	4.8	2.4					14.1	92	6	NNE	4		19.4	48	0	NE	4	
24	Tu	8.6	17.2	0	0.6					15.0	62	2	WSW	4							
25	We	8.6	12.7	5.0	3.0					9.3	91	8	S	37		11.9	76	8	SE	19	
26	Th	8.7	15.2	1.8	1.4					11.7	68	5	SE	9		15.2	61	1	NE	9	
27	Fr	4.9	15.1	0.2	1.2					10.2	77	0	W	4		14.6	59	2	SW	4	
28	Sa	4.7	15.2	0	1.6					10.2	74	2	NW	4		14.6	78	8	S	4	
29	Su	9.9	14.2	4.2	1.2					12.1	93	7	SW	9		12.7	93	8	NNW	4	
30	Mo	10.7	14.6	10.6	0.8					12.2	96	8	SW	4		12.9	91	8	SE	4	
31	Tu	11.7	15.2	73.0						14.6	96	8	E	9		14.9	98	8	SSE	4	
Statistics for May 2011																					
Mean		8.3	17.4		1.5					12.4	78	3		7		16.2	64	3		6	
Lowest		3.4	12.7		0.4					9.1	48	0	#	4		11.9	39	0	#	4	
Highest		12.6	22.8	73.0	3.0					17.2	98	8	S	37		22.2	98	8	SW	28	
Total				108.8	44.0																

Gosford, New South Wales
May 2011 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	Su	13.2	22.0	5.8			SE	24	12:42	18.3	85		NNW	7		20.9	60		SSE	11	
2	Mo	8.7	18.9	0			NW	19	11:49	14.0	99		ENE	4		18.6	77			Calm	
3	Tu	11.9	18.6	0.2			NNW	19	23:38	15.0	100			Calm		17.8	84		WNW	4	
4	We	13.6	20.4	0			WNW	30	04:05	17.2	66		SSE	7		18.8	64		SSE	13	
5	Th	9.6	19.2	0.2			SE	31	12:58	16.6	65		SSE	7		17.3	55		SSE	9	
6	Fr	9.4	18.9	0			N	24	03:28	14.4	64		N	6		17.7	57		SSE	11	
7	Sa	6.9	20.9	0			NW	22	10:12	14.9	71		NNE	4		20.4	48		ENE	6	
8	Su	5.0	21.3	0.2			WNW	20	09:44	13.1	98			Calm		20.3	38		ESE	4	
9	Mo	5.7	16.9	0			SSW	28	16:34	13.8	67		WNW	7		16.4	63		SSE	11	
10	Tu	9.8	18.2	6.6			W	28	10:04	13.2	61		WNW	11		17.2	49		SE	11	
11	We	3.4	16.4	0			NNW	28	13:40	11.7	62		NE	4		14.6	44		NNW	9	
12	Th	5.7	16.7	0			NNW	44	16:16	11.4	55		NNW	9		15.6	36		WSW	7	
13	Fr	5.3	20.7	0			NW	28	15:28	15.1	60		N	11		20.2	39		W	7	
14	Sa	5.3	16.9	0			SW	28	11:54	13.4	39		WNW	11		15.9	31		W	9	
15	Su	5.1	18.5	0			WNW	24	05:06	12.5	51		NNE	6		17.8	36		WNW	7	
16	Mo	1.1	20.2	0			SSE	17	13:33	10.3	86			Calm		18.7	50		WSW	2	
17	Tu	3.1	19.6	0			SSE	17	15:06	12.5	78		NNE	6		18.3	52		SE	9	
18	We	4.7	20.5	0			ESE	17	15:27	13.5	98			Calm		19.1	63		ESE	7	
19	Th	9.2	21.1	9.8			E	19	15:18	14.4	99			Calm		20.7	63		ENE	7	
20	Fr	6.3	23.2	0			ESE	13	11:59	12.8	99			Calm		21.9	61		ENE	7	
21	Sa	6.6	24.2	0.2			SE	13	14:38	13.0	99			Calm		21.2	59		WSW	2	
22	Su	6.7	23.2	0			E	15	13:45	12.3	99			Calm		19.8	73			Calm	
23	Mo	10.3	22.2	4.6			N	39	12:24	15.8	96		N	13		21.3	43		NNW	13	
24	Tu	8.5	19.1	0			N	28	10:56	14.5	68			Calm		16.2	73		SSE	9	
25	We	10.8	14.9	8.6			SSW	35	12:33	11.7	88		NE	9		14.4	66		SE	11	
26	Th	10.5	17.6	4.0			NW	30	03:10	13.6	64		E	7		17.1	55			Calm	
27	Fr	3.6	17.3	0.2			NNW	22	10:13	11.4	90		WNW	2		16.8	52		NNW	2	
28	Sa	5.9	16.7	0			SSE	17	13:19	12.9	74		NNE	6		16.5	75			Calm	
29	Su	11.0	16.0	5.6			N	20	18:05	13.6	99		NE	4		15.4	92		NW	7	
30	Mo	12.4	17.6	26.6			SE	28	22:39	14.4	98		SSE	6		14.6	99		SE	7	
31	Tu	12.9	17.4	114.2			S	48	05:27	16.9	98		SSE	11		16.2	99		SW	4	
Statistics for May 2011																					
Mean		7.8	19.2							13.8	79			5		18.0	59			6	
Lowest		1.1	14.9							10.3	39			Calm		14.4	31			Calm	
Highest		13.6	24.2	114.2			S	48		18.3	100		N	13		21.9	99		#	13	
Total				186.8																	