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

April 2015

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 3 June 2015

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 April 2015;
- Surface Water quality results for April 2015;
- Bi monthly groundwater depth and quality results for April 2015; and
- Meteorological report for April 2015.

The April 2015 dust deposition results for insoluble solids were generally low and free of major contamination this month. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance 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 on 1 May 2015 at sites A, B D and F. Site C was inaccessible and was unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic to neutral range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was detected at site A in April 2015. An additional high rainfall sampling event was undertaken on 22 April 2015.

Data for April 2015 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM however higher the Peats Ridge long term, mean rainfall for April 2015. The rainfall comparison is provided below:

Rocla Calga Quarry	377.0 mm
BOM Peats Ridge*	NA
BOM Gosford*	462.6 mm
BOM Peats Ridge Long term mean for April*	127.0 mm

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au). No data was available from the BOM Peats Ridge station for April 2015

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.

Sampling Program

Rocla Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (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 bi-monthly for depth and water quality. 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.

The locations of monitoring points are provided in **Figure 1**.

Figure 1: Rocla Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for April 2015 and the project 12 month rolling average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 2 April 2015 – 1 May 2015 (29 days)

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	2.1	1.4	0.7	67	1.3
CD2c	2.5	1.2	1.3	48	1.5
CD3	1.7	0.6	1.1	35	1.5
CD4	1.4	0.2	1.2	14	0.8
CD5	1.1	0.2	0.9	18	0.6
CD6	1.2	0.3	0.9	25	0.8

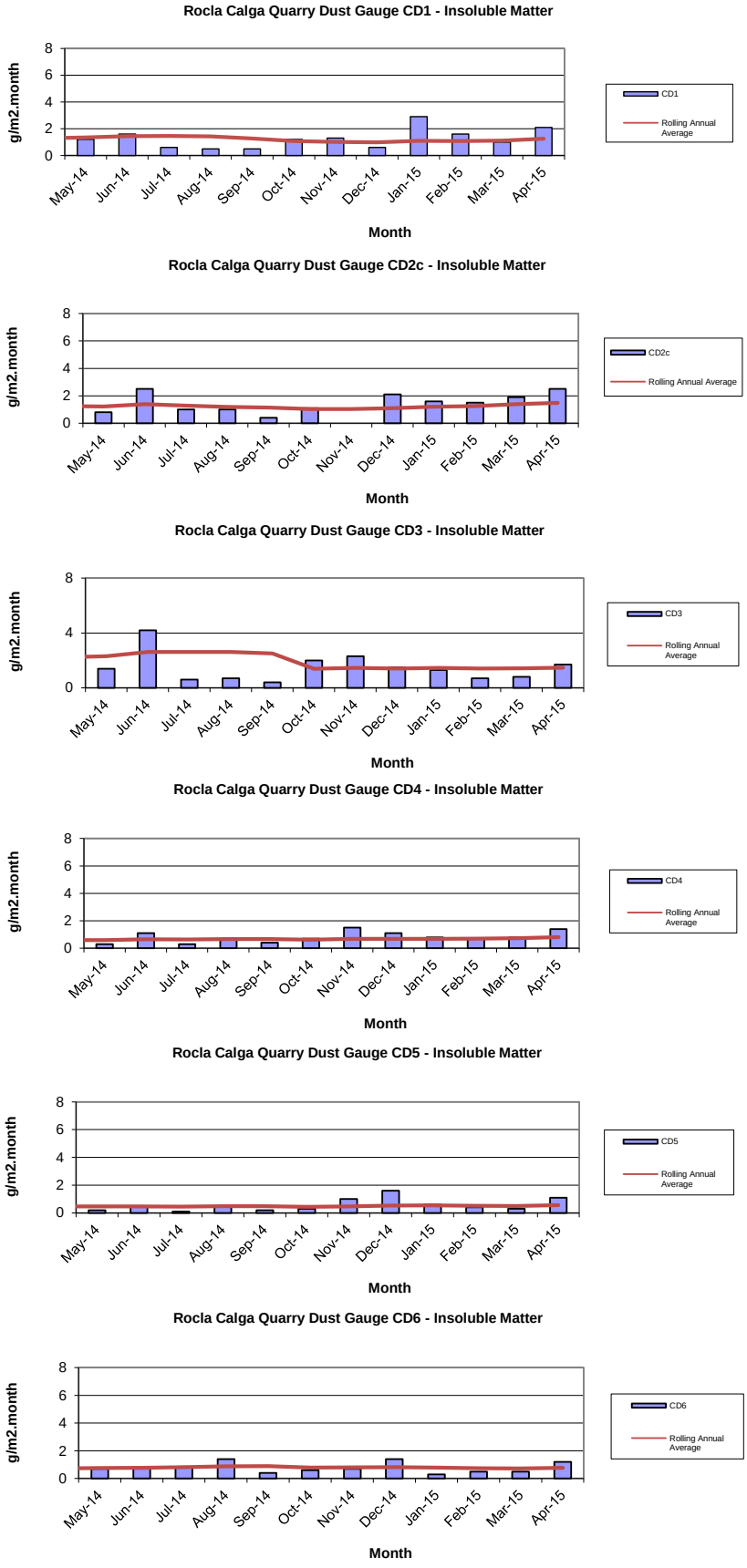
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from May 2014 to April 2015.

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 2** below. The laboratory analysis is provided in **Appendix 1.**

Figure 2: Dust Deposition Charts



2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 1 May 2015 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – April 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	Dam	Clear	Slight	5.15	52	42	34	14
B	Fast	Brown	Slight	5.09	52	35	65	<5
C	No access							
D	Fast	Brown	Slight	6.84	65	79	34	<5
F	Dam	Clear	Slight	5.32	52	48	68	<5

Samples were collected at sites A, B, D and F. Site C was inaccessible and was unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic to neutral range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was detected at site A in April 2015.

2.2.1 Non-Routine Surface Water Sampling

The following non routine sampling was undertaken during April 2015;

- Rainfall event sampled by site on the 22 April 2015.

Laboratory analysis certificates are provided in **Appendix 1.**

2.3 Groundwater Monitoring

Bi-monthly groundwater monitoring was conducted in March 2015 and are next scheduled for May 2015.

2.4 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in April 2015 was approximately 100%.

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 the nearby Bureau of Meteorology (BOM) at Peats Ridge station are no longer available. However, the long term rainfall mean is available via a link on the Gosford BOM Daily Weather Observation page.

Data for April 2015 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM however higher the Peats Ridge long term, mean rainfall for April 2015.

The rainfall comparison is provided below:

Rocla Calga Quarry	376.8 mm
BOM Peats Ridge*	NA
BOM Gosford*	462.6 mm
BOM Peats Ridge Long term mean for April*	128.2 mm

NA = Not Available
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

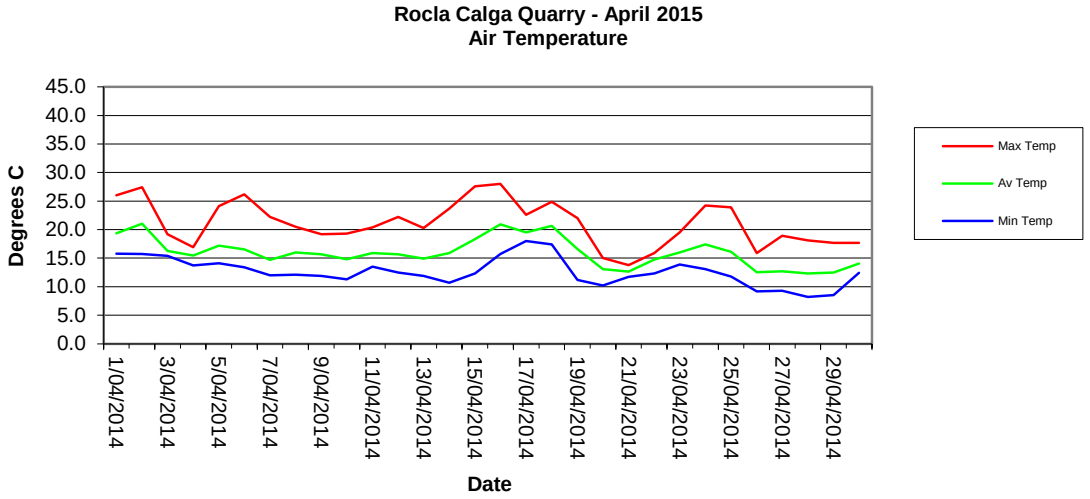
Results are displayed in the following table and figures.

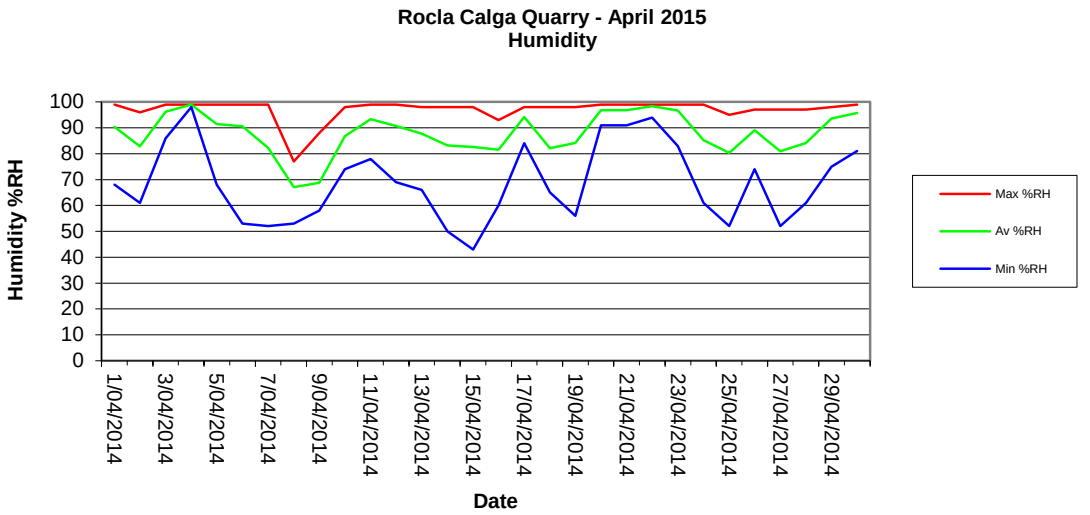
2.4.1 Monthly Meteorological Data Summary

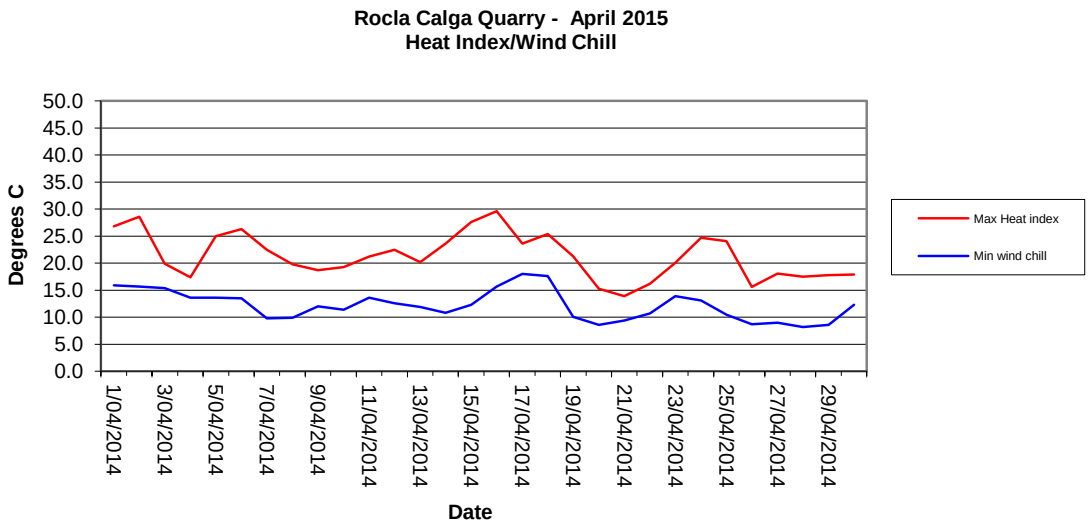
Summary **Apr-14** **Rocla - Calga**

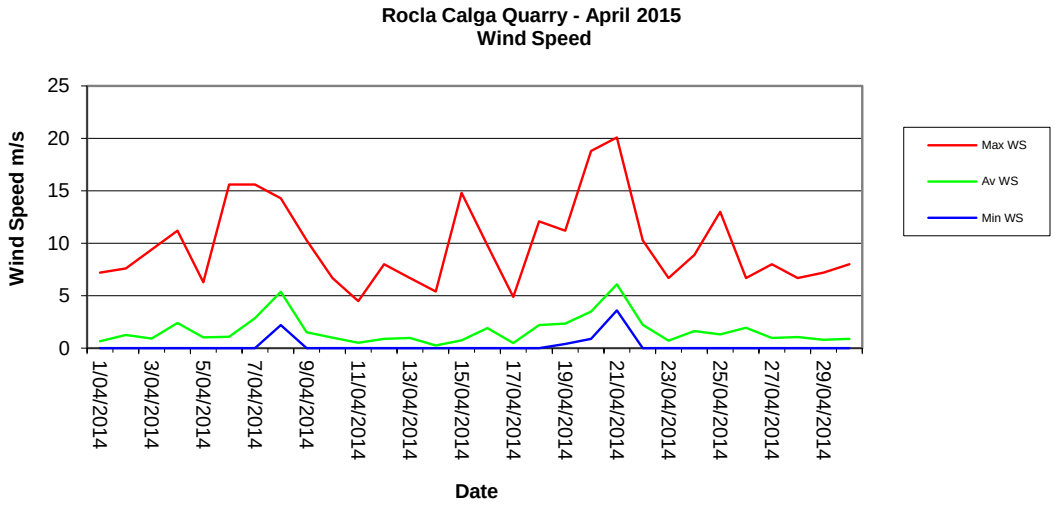
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/04/2014	15.8	19.4	26.0	68	90	99	0.5	1.6	0	0.7	7.2	15.9	26.8	1018.3	1021.0	1024.0	0	92.6	768	75.7	96.4	98
2/04/2014	15.7	21.0	27.4	61	83	96	0.0	2.0	0	1.3	7.6	15.7	28.6	1014.8	1016.9	1019.3	0	99.8	496	85.7	97.1	98
3/04/2014	15.4	16.3	19.2	86	96	99	21.3	0.3	0	0.9	9.4	15.4	19.9	1019.2	1021.5	1023.3	0	17.5	108	78.9	94.5	98
4/04/2014	13.7	15.5	16.9	98	99	99	70.3	0.2	0	2.4	11.2	13.6	17.4	1012.4	1016.5	1020.3	0	11.1	47	88.3	95.8	98
5/04/2014	14.1	17.2	24.1	68	91	99	0.8	1.4	0	1.0	6.3	13.6	25.0	1004.2	1007.5	1012.3	0	96.2	723	84.5	96.2	98
6/04/2014	13.4	16.5	26.2	53	91	99	11.4	1.1	0	1.1	15.6	13.5	26.3	1004.4	1005.9	1007.9	0	62.7	513	83.9	97.4	98
7/04/2014	12.0	14.7	22.2	52	82	99	0.8	2.2	0	2.9	15.6	9.8	22.5	1004.8	1007.3	1010.4	0	89.0	763	83	96.5	98
8/04/2014	12.1	16.0	20.5	53	67	77	0.0	3.1	2.2	5.4	14.3	9.9	19.8	1006.0	1011.3	1016.1	0	77.0	582	90.6	97.3	98
9/04/2014	11.9	15.7	19.2	58	69	88	0.0	1.9	0	1.5	10.3	12.0	18.7	1016.3	1019.5	1022.3	0	71.4	357	89.2	97.2	98
10/04/2014	11.3	14.8	19.3	74	87	98	1.3	1.3	0	1.0	6.7	11.4	19.3	1021.4	1022.8	1024.1	0	71.3	403	91.8	97.2	98
11/04/2014	13.5	15.9	20.4	78	93	99	1.8	0.9	0	0.5	4.5	13.6	21.2	1017.6	1020.0	1022.6	0	63.0	743	86.5	97.4	98
12/04/2014	12.5	15.7	22.2	69	91	99	0.3	1.4	0	0.9	8	12.6	22.5	1015.9	1017.7	1020.3	0	86.0	646	91.5	97.7	98
13/04/2014	11.9	14.9	20.3	66	88	98	0.0	1.4	0	1.0	6.7	11.9	20.2	1019.8	1021.3	1022.7	0	80.9	627	89.2	95.9	98
14/04/2014	10.7	15.9	23.7	50	83	98	0.0	1.7	0	0.3	5.4	10.8	23.6	1019.8	1021.8	1023.3	0	97.0	683	88	96.8	98
15/04/2014	12.3	18.3	27.6	43	83	98	5.1	1.8	0	0.7	14.8	12.3	27.6	1020.2	1022.3	1025.7	0	103.8	697	85.4	96.1	98
16/04/2014	15.7	20.9	28.0	60	82	93	0.0	1.8	0	1.9	9.8	15.7	29.6	1018.3	1020.4	1022.4	0	84.2	624	88.9	96.8	98
17/04/2014	18.0	19.5	22.6	84	94	98	1.3	0.8	0	0.5	4.9	18.0	23.6	1018.4	1021.0	1023.6	0	53.2	319	74	95.3	98
18/04/2014	17.4	20.6	24.9	65	82	98	0.8	1.6	0	2.2	12.1	17.6	25.4	1012.4	1015.0	1018.3	0	63.9	413	93.9	97.4	98
19/04/2014	11.2	16.6	22.0	56	84	98	0.5	1.8	0.4	2.3	11.2	10.1	21.3	1012.6	1017.9	1024.0	0	91.0	720	90.9	97.7	98
20/04/2014	10.2	13.1	15.0	91	97	99	88.9	0.4	0.9	3.5	18.8	8.6	15.3	1018.4	1020.8	1023.3	0	20.4	150	74	89.0	97.7
21/04/2014	11.7	12.7	13.8	91	97	99	116.3	0.2	3.6	6.1	20.1	9.4	13.9	1011.7	1015.8	1018.7	0	10.3	95	84.5	90.6	95.3
22/04/2014	12.3	14.7	15.9	94	98	99	30.2	0.5	0	2.2	10.3	10.7	16.2	1009.3	1010.8	1012.5	0	32.6	295	88.6	95.8	98
23/04/2014	13.9	16.0	19.5	83	97	99	1.0	0.8	0	0.7	6.7	13.9	20.1	1008.4	1009.9	1011.7	0	52.6	294	87.7	96.1	98
24/04/2014	13.1	17.4	24.2	61	85	99	0.0	1.8	0	1.6	8.9	13.1	24.7	1003.6	1006.0	1008.3	0	95.0	769	87.1	95.0	98
25/04/2014	11.8	16.1	23.9	52	80	95	1.8	1.8	0	1.3	13	10.5	24.1	1003.2	1005.8	1008.0	0	100.6	665	90.9	97.5	98
26/04/2014	9.2	12.5	15.9	74	89	97	8.1	1.0	0	2.0	6.7	8.7	15.6	1005.2	1009.3	1014.6	0	54.3	250	90.9	96.3	98
27/04/2014	9.3	12.7	18.9	52	81	97	0.0	1.6	0	1.0	8	9.0	18.1	1014.3	1018.2	1021.9	0	94.0	680	86.5	96.2	98
28/04/2014	8.2	12.3	18.1	61	84	97	0.0	1.3	0	1.1	6.7	8.2	17.5	1021.7	1024.4	1026.9	0	76.3	690	86.8	96.1	98
29/04/2014	8.5	12.5	17.7	75	94	98	7.3	1.1	0	0.8	7.2	8.6	17.8	1026.6	1028.4	1029.7	0	75.3	606	91.8	97.1	98
30/04/2014	12.4	14.0	17.7	81	96	99	7.6	0.7	0	0.9	8	12.3	17.9	1006.2	1028.3	1030.3	0	52.1	270	74.6	96.8	98
Monthly	8.2	16.0	28	43	88	99	377.0	39.3	0	1.7	20.1	8.2	29.6	1003.2	1016.8	1030.3	0	69.2	769	74	96.1	98

2.4.2 Monthly Weather Charts








Rocla Calga Quarry - April 2015
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/04/2014
3/04/2014
5/04/2014
7/04/2014
9/04/2014
11/04/2014
13/04/2014
15/04/2014
17/04/2014
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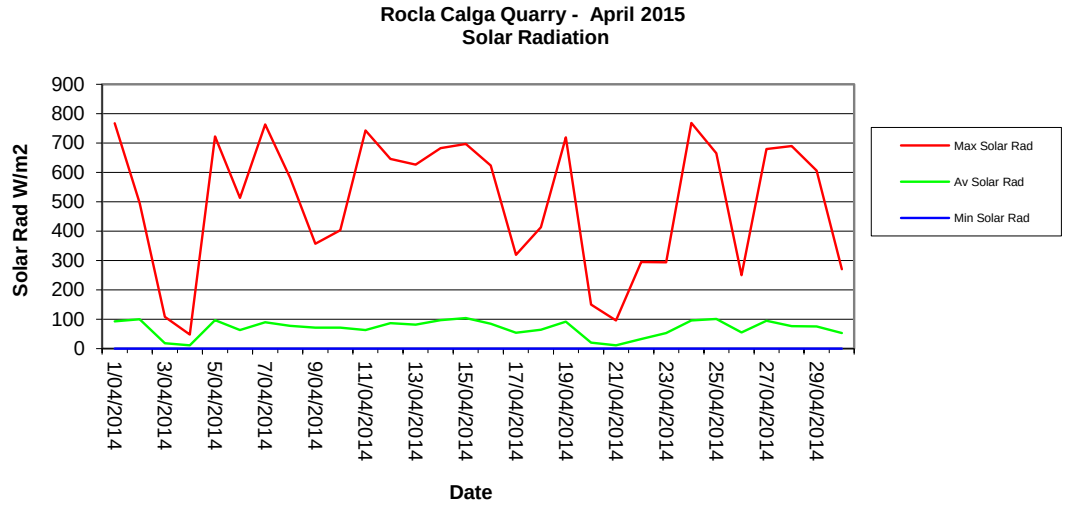
27/04/2014
29/04/2014
Date
Max WS
Av WS
Min WS


Rocla Calga Quarry - April 2015
Solar Radiation
Solar Rad W/m2
900
800
700
600
500
400
300
200
100
0
1/04/2014
3/04/2014
5/04/2014
7/04/2014
9/04/2014
11/04/2014
13/04/2014
15/04/2014
17/04/2014
19/04/2014
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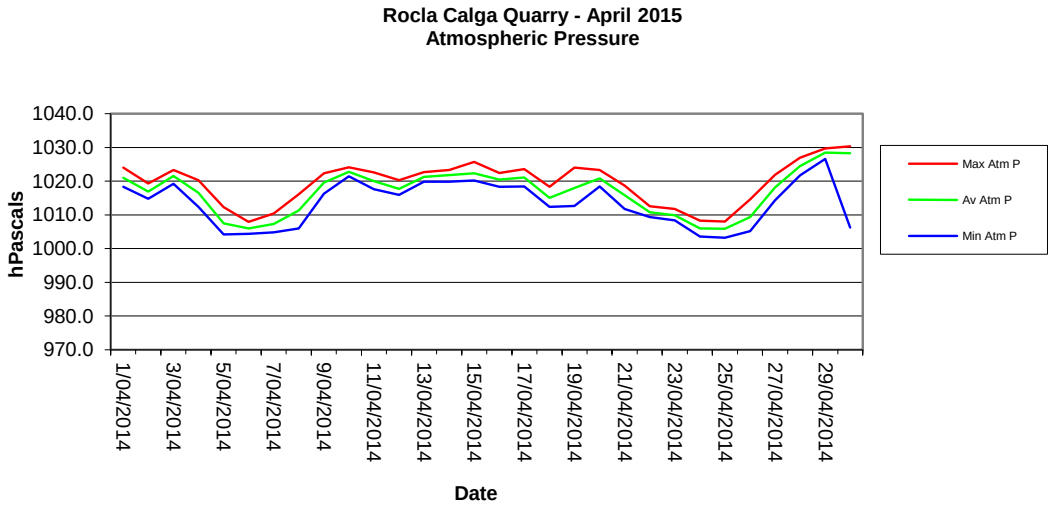
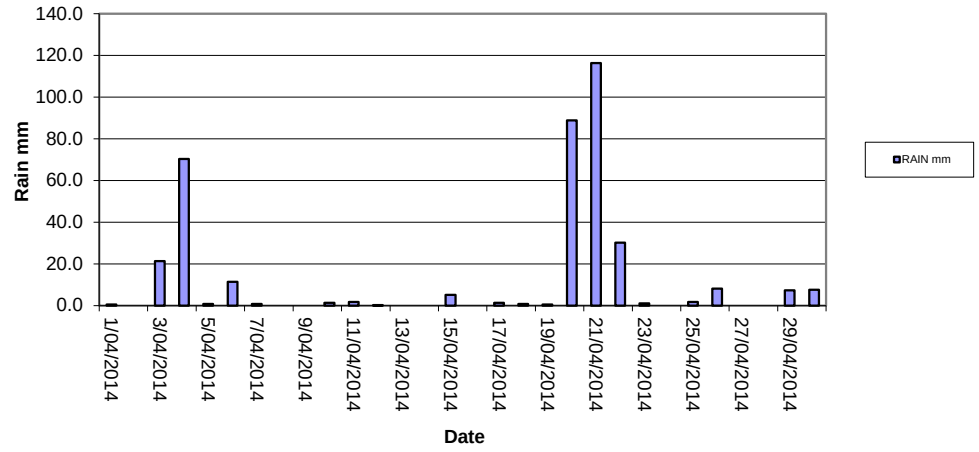
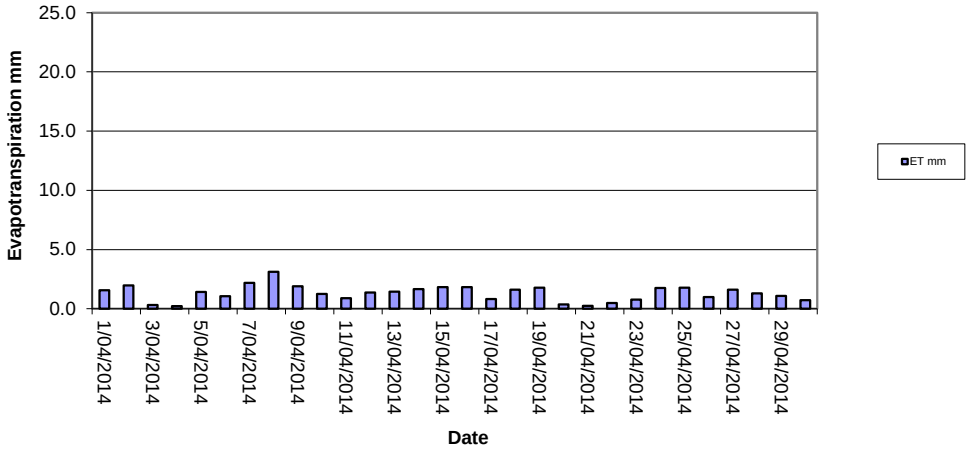
29/04/2014
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - April 2015
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
970.0
1/04/2014
3/04/2014
5/04/2014
7/04/2014
9/04/2014
11/04/2014
13/04/2014
15/04/2014
17/04/2014
19/04/2014
21/04/2014
23/04/2014
25/04/2014
27/04/2014
29/04/2014
Date
Max Atm P
Av Atm P
Min Atm P

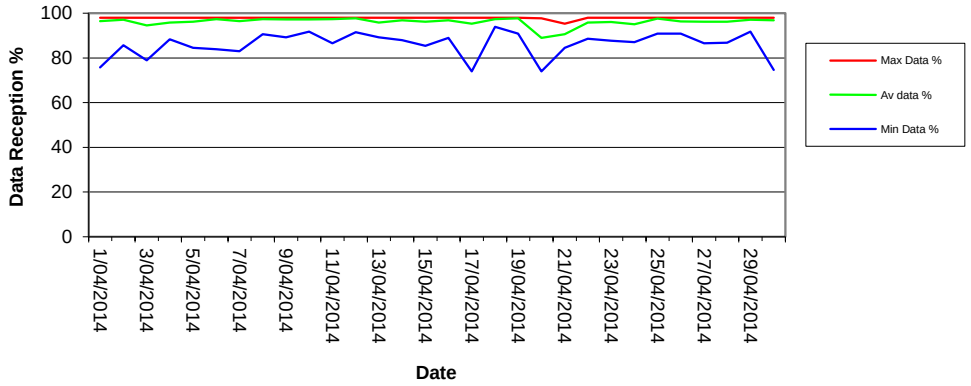
Rocla Calga Quarry - April 2015
Rainfall



Rocla Calga Quarry - April 2015
Evapotranspiration



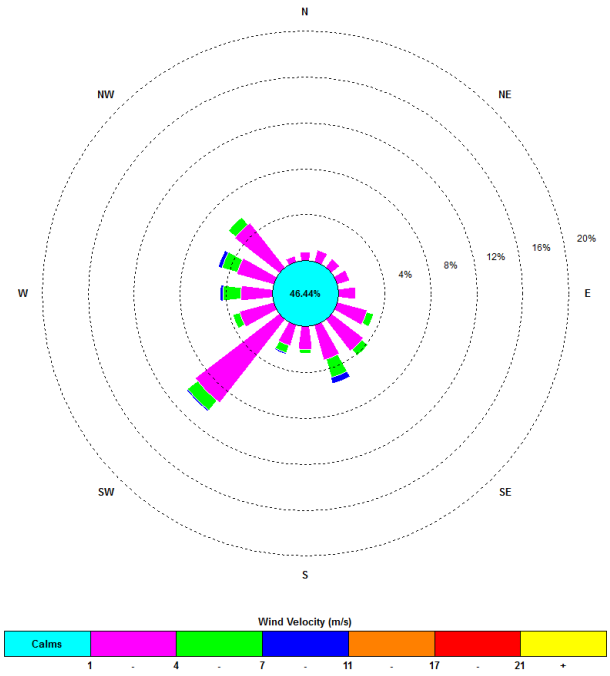
Rocla Calga Quarry - April 2015
Data Reception



2.4.3 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.

00:00, 1 April 2015 – 23:45, 30 April 2015



The predominant winds were from the SW, with most frequent, strongest winds from the SSE and W-WNW. The maximum wind speed was 20.1 m/s from the SSE.

Appendix 1

Laboratory Certificates

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1511423**	Page	: 1 of 4
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Newcastle
Contact	: MR COLIN DAVIES (cbased)	Contact	: Peter Keyte
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cbased@bigpond.com	E-mail	: peter.keyte@alsglobal.com
Telephone	: +61 49904443	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 49904442	Facsimile	: +61 2 4967 7382
Project	: Rocla Calga Dusts	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 01-May-2015 14:16
C-O-C number	: ----	Date Analysis Commenced	: 05-May-2015
Sampler	: ----	Issue Date	: 13-May-2015 16:34
Site	: Rocla Calga		
		No. of samples received	: 6
Quote number	: ----	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

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*
Barbara Coupland	Quality Officer	Newcastle - 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 insufficient 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
ø = ALS is not NATA accredited for these tests.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.

Analytical Results

Sub-Matrix: **DUST** (Matrix: **AIR**)			Client sample ID	CD1 02/04/15 - 01/05/15	CD2c 02/04/15 - 01/05/15	CD3 02/04/15 - 01/05/15	CD4 02/04/15 - 01/05/15	CD5 02/04/15 - 01/05/15
			Client sampling date / time	[01-May-2015]	[01-May-2015]	[01-May-2015]	[01-May-2015]	[01-May-2015]
Compound	CAS Number	LOR	Unit	EN1511423-001	EN1511423-002	EN1511423-003	EN1511423-004	EN1511423-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**1.4**	**1.2**	**0.6**	**0.2**	**0.2**
Ash Content (mg)	----	1	mg	**24**	**21**	**10**	**4**	**3**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.7**	**1.3**	**1.1**	**1.2**	**0.9**
Combustible Matter (mg)	----	1	mg	**12**	**21**	**19**	**20**	**16**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**2.1**	**2.5**	**1.7**	**1.4**	**1.1**
Total Insoluble Matter (mg)	----	1	mg	**36**	**42**	**29**	**24**	**19**

Analytical Results

Sub-Matrix: **DUST** (Matrix: **AIR**)			Client sample ID	**CD6 02/04/15 - 01/05/15**	----	----	----	----
			Client sampling date / time	[01-May-2015]	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EN1511423-006**	--------	--------	--------	--------
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.3**	----	----	----	----
Ash Content (mg)	----	1	mg	**5**	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.9**	----	----	----	----
Combustible Matter (mg)	----	1	mg	**15**	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**1.2**	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	**20**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1520969**	Page	: 1 of 2
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MR COLIN DAVIES (cbased)	Contact	:
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased@bigpond.com	E-mail	:
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 01-May-2015 14:16
C-O-C number	: ----	Date Analysis Commenced	: 01-May-2015
Sampler	: CBASED 1 UNKNOWN	Issue Date	: 08-May-2015 13:54
Site	: ----		
		No. of samples received	: 4
Quote number	: ----	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - 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 insufficient 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
ø = ALS is not NATA accredited for these tests.

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

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)				Client sample ID	A	B	D	F	----
				Client sampling date / time	[01-May-2015]	[01-May-2015]	[01-May-2015]	[01-May-2015]	----
Compound	CAS Number	LOR	Unit		ES1520969-001	ES1520969-002	ES1520969-003	ES1520969-004	--------
					Result	Result	Result	Result	Result
EA005: pH									
pH Value	----	0.01	pH Unit		**5.15**	**5.09**	**6.84**	**5.32**	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**52**	**52**	**65**	**52**	----
EA015: Total Dissolved Solids									
^ **Total Dissolved Solids @180°C**	----	10	mg/L		**42**	**35**	**79**	**48**	----
EA025: Suspended Solids									
^ **Suspended Solids (SS)**	----	5	mg/L		**34**	**65**	**34**	**68**	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		**14**	----	----	----	----
^ **Oil & Grease**	----	5	mg/L		----	<5	<5	<5	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1520539**	Page	: 1 of 2
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MR COLIN DAVIES (cbased)	Contact	:
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased@bigpond.com	E-mail	:
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 27-Apr-2015 13:00
C-O-C number	: ----	Date Analysis Commenced	: 28-Apr-2015
Sampler	: CBASED 1 UNKNOWN	Issue Date	: 01-May-2015 15:59
Site	: ----		
		No. of samples received	: 4
Quote number	: ----	No. of samples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

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*
Ankit Joshi	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.

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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.

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	A	B	D	F	-----
			Client sampling date / time	[22-Apr-2015]	[22-Apr-2015]	[22-Apr-2015]	[22-Apr-2015]	-----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1520539-001**	**ES1520539-002**	**ES1520539-003**	**ES1520539-004**	--------
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.89**	**6.54**	----	**5.74**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**58**	**68**	----	**49**	----
EA015: Total Dissolved Solids								
^ **Total Dissolved Solids @180°C**	----	10	mg/L	**30**	**34**	----	**27**	----
EA025: Suspended Solids								
^ **Suspended Solids (SS)**	----	5	mg/L	**67**	**10**	----	**189**	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	----	**13**	<5	**18**	----