



CBased Environmental Pty Limited

ABN 62 611 924 264



Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

June 2019

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 19 July 2019

Executive Summary

CBased Environmental is contracted by Hanson 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 CBased Environmental and includes the following;

- Dust Deposition results for June 2019;
- Surface Water quality results for June 2019; and
- Meteorological report for June 2019.

The June 2019 dust deposition results for insoluble solids were generally varied when compared to May 2019. There were no excessively contaminated dust gauges this month. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m².month. Results were found to be representative of dust levels as determined by the Australian Standard.

Monthly surface water samples were collected at sites A, C1, C2, D and F. Site B was dry at the time of sampling. 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 and low Total Suspended Solids. Oil and Grease was not detected at any sites in June 2019.

Bi-monthly groundwater monitoring is next scheduled for July 2019.

The Calga Quarry weather station data recovery in June 2019 was approximately 87%. No data was available between 26 June 2019 and 30 June 2019. Data for June 2019 shows that rainfall recorded at the Calga Quarry was below the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for June.

The rainfall comparison is provided below:

Calga Quarry	94.6 mm
BOM Peats Ridge*	NA
BOM Gosford*	161.2 mm
BOM Peats Ridge Long term mean for June*	99.5 mm

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

Note: Differences in the daily rainfall readings between BOM and the Calga station may occur due to BOM stations reporting rainfall at 9am and the Calga station recording rainfall at midnight.

Sampling Program

Hanson Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (EPA) licence and Environmental Management Plans. CBased Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. CBased 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. 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/m².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. Metrological parameters are measured according to Australian Standard AS3580.14 *“Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring applications”*

The weather stations have the following sensor configuration;

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

CBased 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**.

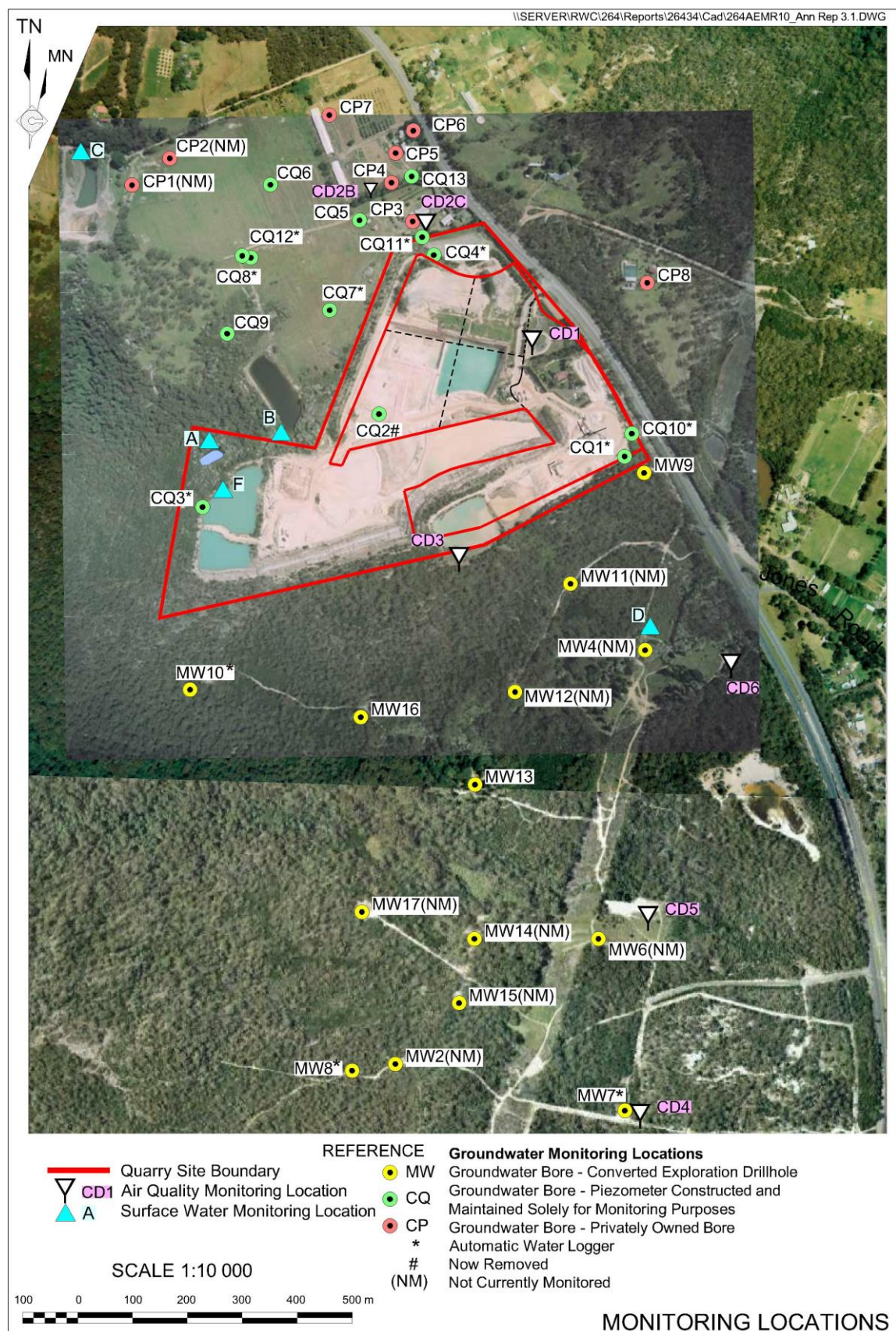


Figure 1: Hanson Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for June 2019 and the project 12-month rolling average. Results are in g/m².month.

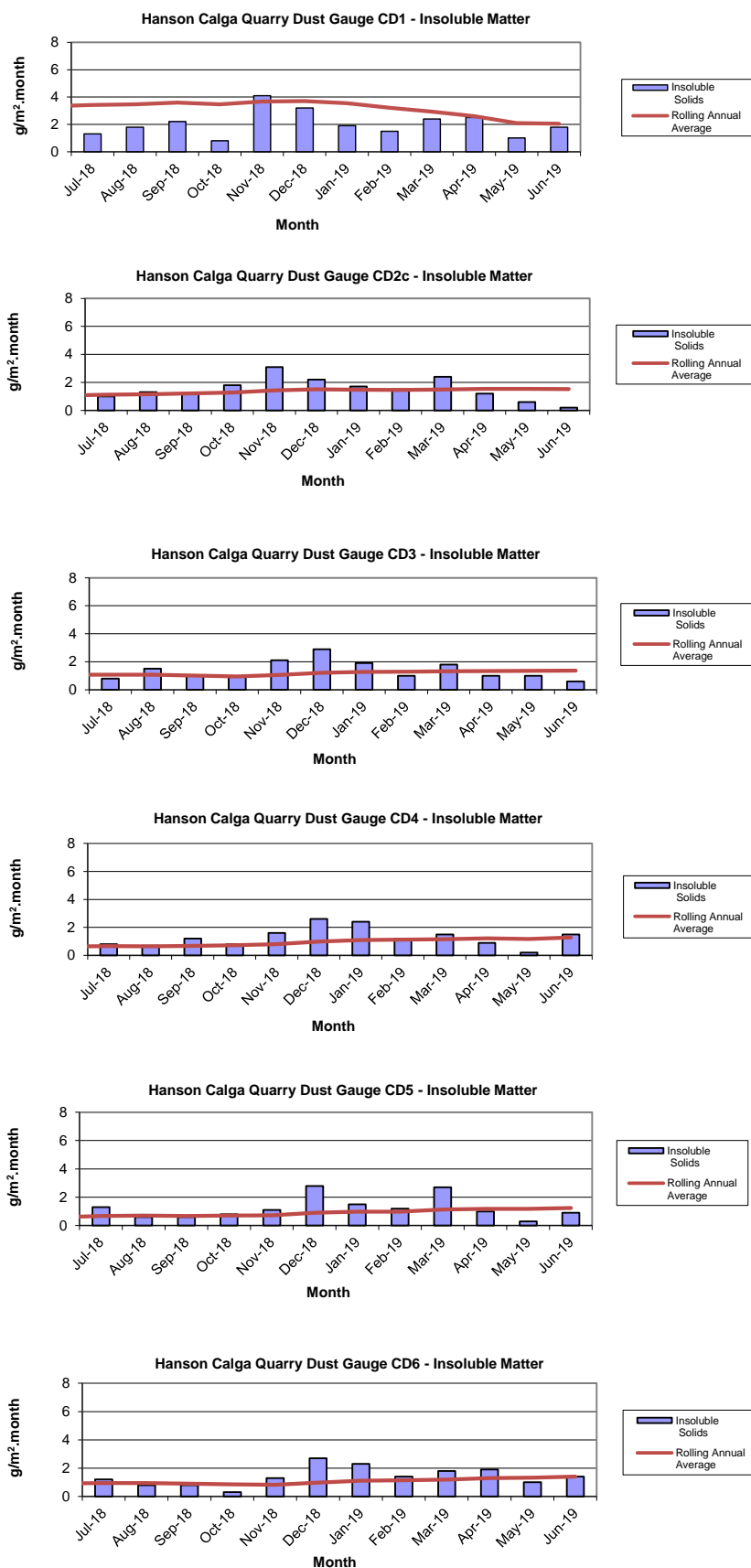
Table 1: Dust Deposition results: 30 May – 28 June 2019 (29 days)

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	1.8	1.8	<0.1	100	2.0
CD2c	0.2	0.2	<0.1	100	1.5
CD3	0.6	0.4	0.2	67	1.4
CD4	1.5	1.2	0.3	80	1.3
CD5	0.9	0.4	0.5	44	1.2
CD6	1.4	0.8	0.6	57	1.4

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/m².month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from April 2018 to March 2019.

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 28 June 2019 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

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

Site	Observed Flow Rate	Water Colour	Turbidity	pH	EC ($\mu\text{S/cm}$)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
A	Dam	Clear	Clear	6.47	92	56	12	<5
B	Dry							
C1	Dam	NR	NR	6.56	89	48	12	<5
C2	Trickle	Clear	Clear	6.79	110	59	<5	<5
D	Trickle	Clear	Clear	5.88	100	64	<5	<5
F	Dam	Clear	Clear	5.75	85	58	21	<5

Samples were collected at sites A, C1, C2, D and F. Site B was dry at the time of sampling. 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 and low Total Suspended Solids. Oil and Grease was not detected at any sites in June 2019.

2.2.1 Non-Routine Surface Water Sampling

The following non-routine sampling was undertaken by Hanson staff in June 2019;

- Discharge Point 1 (A) sampled on the 5 June 2019;
- Discharge Point 1 (A) sampled on the 25 June 2019; and
- Dam 1 (A), Dam 7B/C, Dam 13 (B), Point D Creek and Point C Spillway sampled 25 June 2019.

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

2.3 Groundwater Monitoring

Bi-monthly groundwater monitoring is next scheduled for July 2019.

2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in June 2019 was approximately 87%. No data was available between 27 June 2019 and 30 June 2019.

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).

An annual calibration was undertaken on the weather station during September 2018 and is next due in September 2019.

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 June 2019 shows that rainfall recorded at the Calga Quarry was below the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for June.

The rainfall comparison is provided below:

Calga Quarry	94.6 mm
BOM Peats Ridge*	NA
BOM Gosford*	161.2 mm
BOM Peats Ridge Long term mean for June*	99.5 mm

NA = Not Available

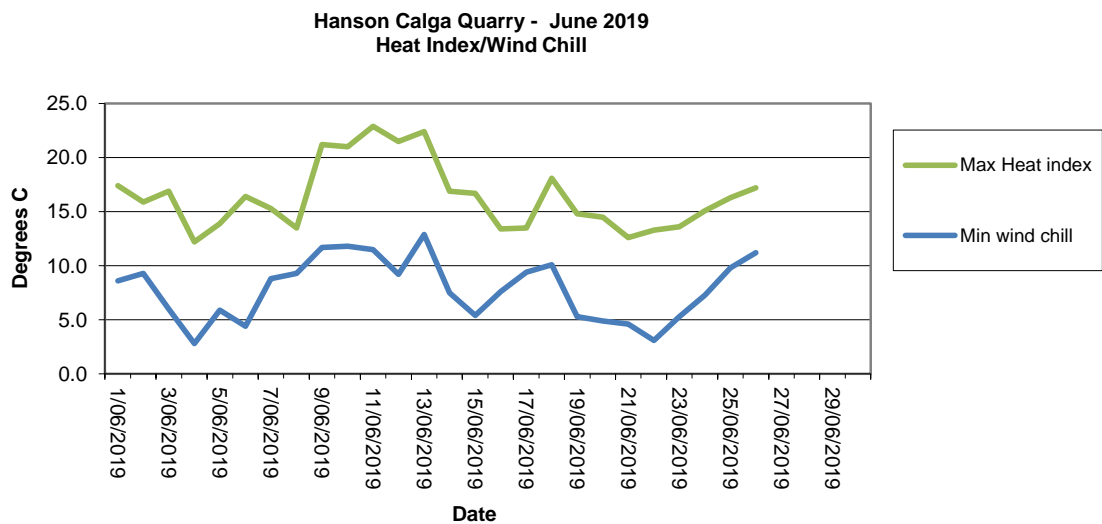
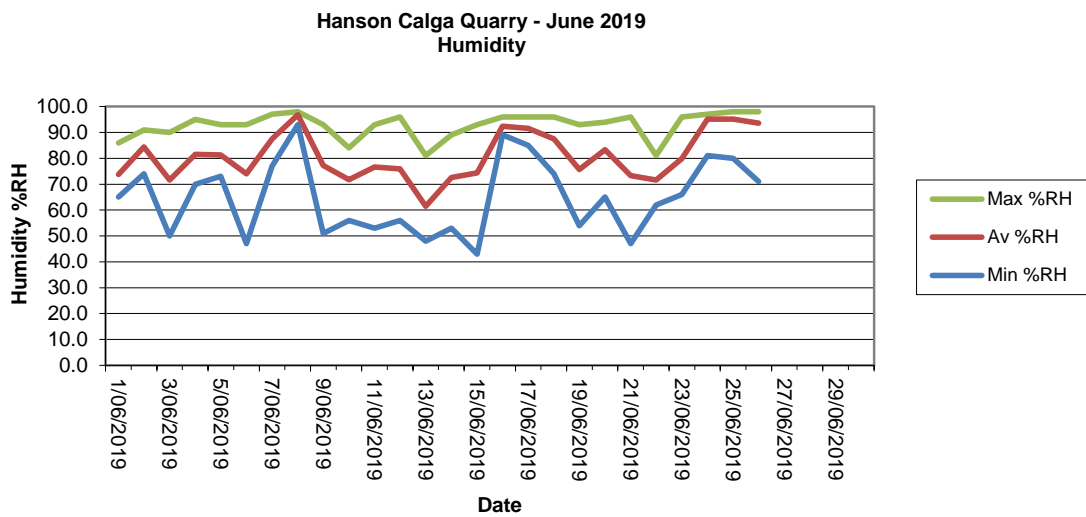
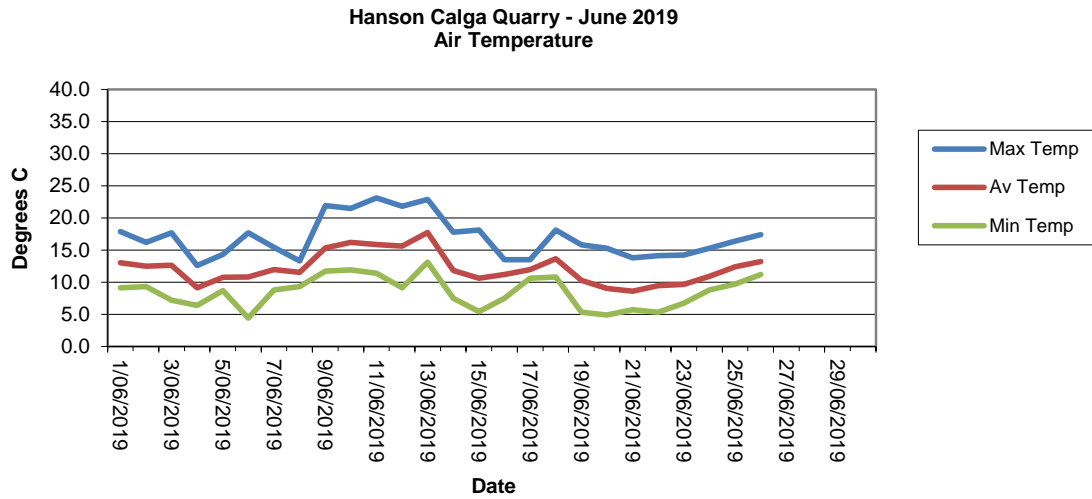
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

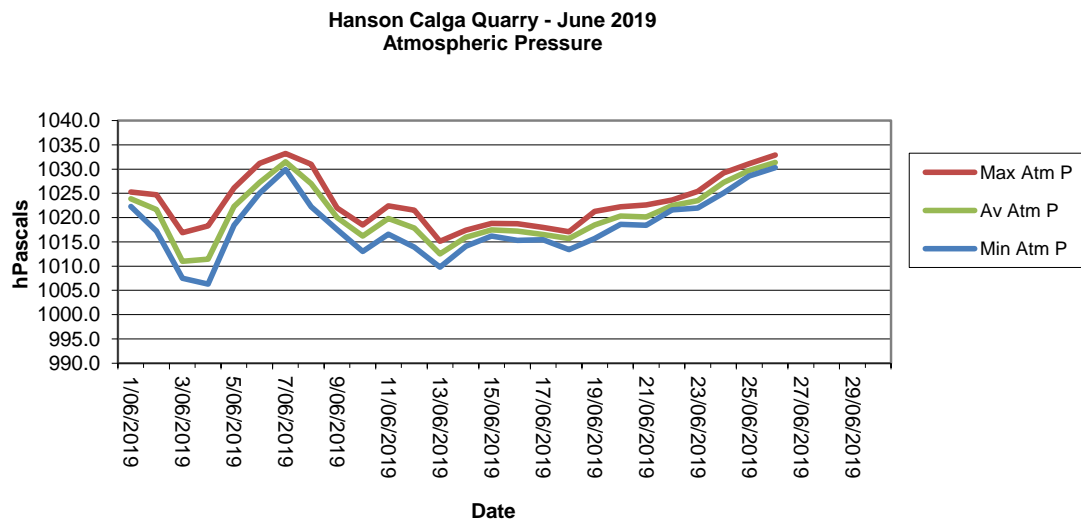
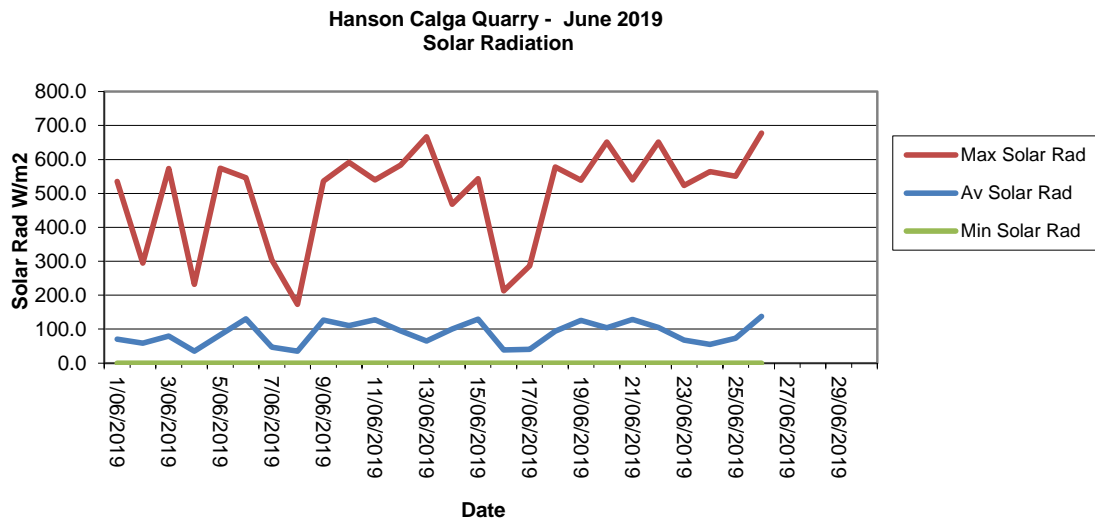
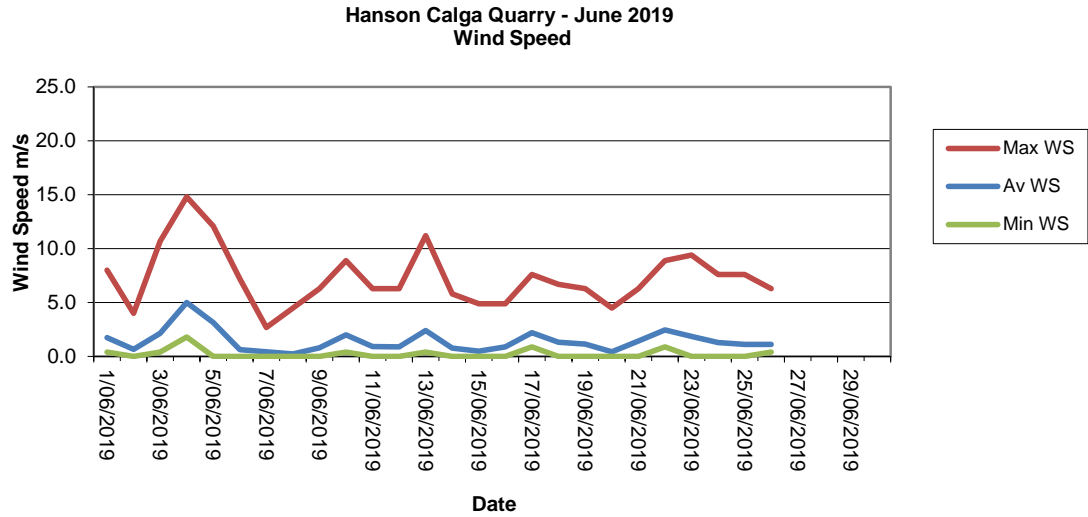
2.4.1 Monthly Meteorological Data Summary

Summary Jun-19 Hanson - Calga

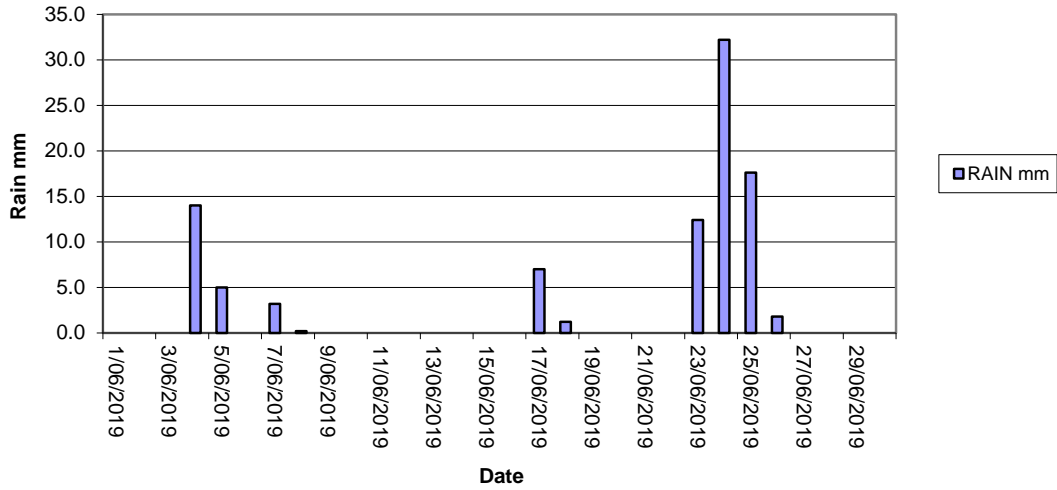
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/06/2019	9.1	13.0	17.9	65.0	73.8	86.0	0.0	1.5	0.4	1.7	8.0	8.6	17.4	1022.3	1023.8	1025.3	0.0	70.6	535.0	76.3	86.7	95.3
2/06/2019	9.3	12.5	16.2	74.0	84.3	91.0	0.0	1.0	0.0	0.7	4.0	9.3	15.9	1017.2	1021.7	1024.7	0.0	58.7	295.0	77.6	82.2	86.8
3/06/2019	7.2	12.6	17.7	50.0	71.6	90.0	0.0	2.0	0.4	2.1	10.7	6.0	16.9	1007.5	1011.0	1016.9	0.0	79.7	573.0	66.2	77.7	91.2
4/06/2019	6.4	9.1	12.6	70.0	81.5	95.0	14.0	1.3	1.8	5.0	14.8	2.8	12.2	1006.3	1011.5	1018.3	0.0	35.2	232.0	68.1	80.9	95.6
5/06/2019	8.7	10.7	14.3	73.0	81.3	93.0	5.0	1.7	0.0	3.2	12.1	5.9	13.9	1018.4	1022.3	1026.1	0.0	83.2	574.0	58.0	81.4	90.2
6/06/2019	4.4	10.8	17.7	47.0	74.0	93.0	0.0	2.0	0.0	0.6	7.2	4.4	16.4	1025.0	1027.2	1031.2	0.0	130.5	546.0	60.9	80.3	89.0
7/06/2019	8.8	12.0	15.4	77.0	87.5	97.0	3.2	0.9	0.0	0.4	2.7	8.8	15.3	1029.9	1031.5	1033.2	0.0	46.8	304.0	68.8	86.9	100.0
8/06/2019	9.3	11.5	13.3	93.0	96.8	98.0	0.2	0.4	0.0	0.2	4.5	9.3	13.5	1022.2	1027.0	1031.0	0.0	35.4	173.0	80.8	88.3	98.4
9/06/2019	11.7	15.3	21.9	51.0	77.2	93.0	0.0	2.0	0.0	0.8	6.3	11.7	21.2	1017.5	1020.0	1022.0	0.0	127.0	536.0	80.8	85.9	89.3
10/06/2019	11.9	16.2	21.5	56.0	71.7	84.0	0.0	2.5	0.4	2.0	8.9	11.8	21.0	1013.0	1016.2	1018.5	0.0	110.3	591.0	79.2	84.5	88.6
11/06/2019	11.4	15.8	23.1	53.0	76.6	93.0	0.0	2.4	0.0	0.9	6.3	11.5	22.9	1016.6	1019.8	1022.4	0.0	127.6	540.0	75.1	88.7	98.7
12/06/2019	9.1	15.6	21.8	56.0	75.9	96.0	0.0	1.8	0.0	0.9	6.3	9.2	21.5	1013.9	1017.8	1021.5	0.0	94.9	583.0	73.8	86.5	100.0
13/06/2019	13.1	17.7	22.9	48.0	61.5	81.0	0.0	2.4	0.4	2.4	11.2	12.9	22.4	1009.8	1012.5	1015.1	0.0	65.0	667.0	75.4	86.2	96.5
14/06/2019	7.5	11.8	17.8	53.0	72.5	89.0	0.0	1.9	0.0	0.8	5.8	7.5	16.9	1014.1	1016.0	1017.4	0.0	100.6	468.0	53.3	85.6	100.0
15/06/2019	5.4	10.6	18.1	43.0	74.4	93.0	0.0	1.9	0.0	0.5	4.9	5.4	16.7	1016.2	1017.5	1018.8	0.0	129.1	543.0	55.8	80.6	100.0
16/06/2019	7.5	11.2	13.5	89.0	92.4	96.0	0.0	0.5	0.0	0.9	4.9	7.6	13.4	1015.3	1017.2	1018.7	0.0	38.2	213.0	72.9	77.5	83.6
17/06/2019	10.6	12.0	13.5	85.0	91.5	96.0	7.0	0.7	0.9	2.2	7.6	9.4	13.5	1015.4	1016.5	1018.0	0.0	40.3	286.0	75.1	86.9	100.0
18/06/2019	10.8	13.7	18.1	74.0	87.5	96.0	1.2	1.5	0.0	1.3	6.7	10.1	18.1	1013.4	1015.7	1017.1	0.0	94.1	578.0	56.8	86.7	99.1
19/06/2019	5.3	10.3	15.8	54.0	75.7	93.0	0.0	2.1	0.0	1.2	6.3	5.3	14.8	1015.7	1018.5	1021.3	0.0	125.9	539.0	76.0	87.5	99.7
20/06/2019	4.9	9.0	15.3	65.0	83.3	94.0	0.0	1.3	0.0	0.4	4.5	4.9	14.5	1018.6	1020.3	1022.2	0.0	104.4	651.0	69.4	89.7	100.0
21/06/2019	5.7	8.6	13.8	47.0	73.3	96.0	0.0	2.0	0.0	1.4	6.3	4.6	12.6	1018.4	1020.1	1022.6	0.0	128.2	540.0	65.9	90.9	100.0
22/06/2019	5.3	9.4	14.1	62.0	71.7	81.0	0.0	2.1	0.9	2.5	8.9	3.1	13.3	1021.6	1022.5	1023.6	0.0	104.6	651.0	76.3	89.2	98.7
23/06/2019	6.7	9.6	14.2	66.0	79.9	96.0	12.4	1.3	0.0	1.9	9.4	5.3	13.6	1022.0	1023.5	1025.4	0.0	67.2	523.0	85.5	90.6	98.7
24/06/2019	8.8	10.9	15.3	81.0	95.1	97.0	32.2	0.8	0.0	1.3	7.6	7.3	15.1	1025.1	1027.2	1029.2	0.0	54.7	564.0	75.7	90.5	100.0
25/06/2019	9.7	12.4	16.4	80.0	95.2	98.0	17.6	1.0	0.0	1.1	7.6	9.8	16.3	1028.6	1029.7	1031.1	0.0	73.5	551.0	83.3	93.0	100.0
26/06/2019	11.2	13.2	17.4	71.0	93.6	98.0	1.8	1.0	0.4	1.1	6.3	11.2	17.2	1030.3	1031.4	1032.9	0.0	137.5	678.0	87.1	95.8	100.0
27/06/2019																						
28/06/2019																						
29/06/2019																						
30/06/2019																						
Monthly	4.4	12.1	23.1	43	81	98	94.6	39.7	0	1.5	14.8	2.8	22.9	1006.3	1020.7	1033.2	0	87.0	678	53.3	86.2	100

2.4.2 Monthly Weather Charts

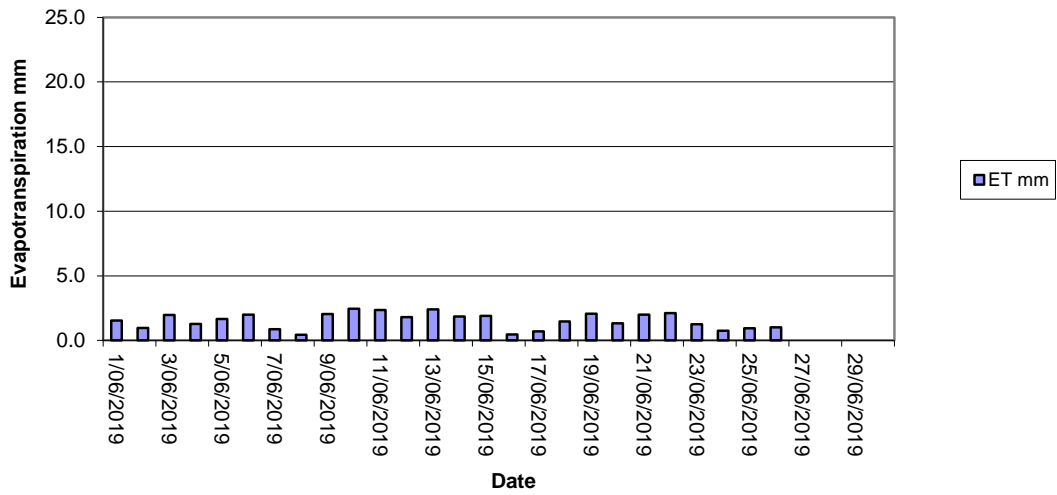




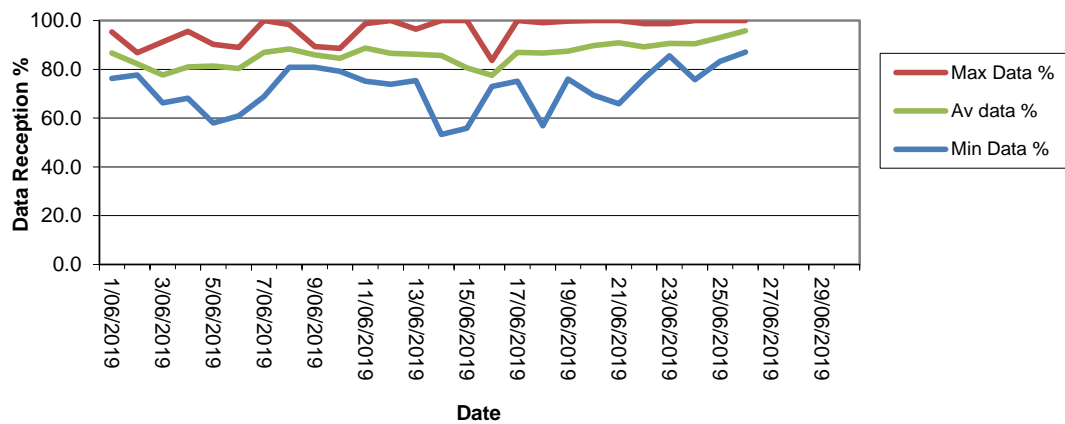
Hanson Calga Quarry - June 2019
Rainfall



Hanson Calga Quarry - June 2019
Evapotranspiration



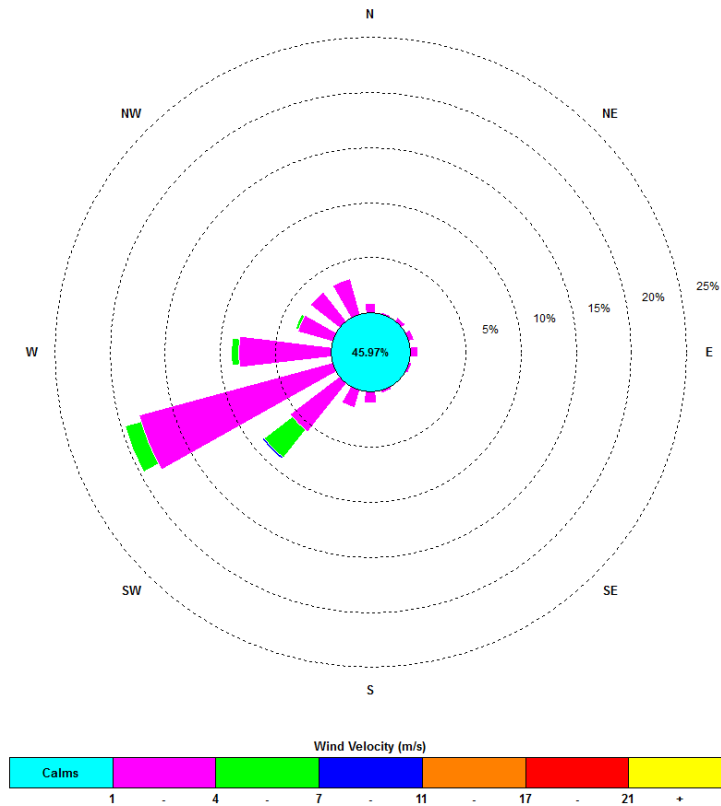
Hanson Calga Quarry - June 2019
Data Reception



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 at less than a 15-minute average of 1m/s.

0:00, 1 June 2019 – 23: 45, 30 June 2019



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

Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates



Sampled By: Leesa + Jill

Date Collected: 28-6-19

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

Colour: C=Colourless, O=Orange, Bn=Brown, Gn=Green, Gy = Grey (CIRCLE)

Report broken funnels and replacement diameters

Signed: LM

[illegible]

Environmental Division
Newcastle
Work Order Reference
EN1904465



Telephone : + 61 2 4014 2500

CERTIFICATE OF ANALYSIS

Work Order : **EN1904465**
Client : **CBASED ENVIRONMENTAL PTY LTD**
Contact : All Deliverables
Address : Unit 3 2 Enterprise Cres
 Singleton NSW 2330
Telephone : +61 02 6571 3334
Project : Hanson Calga Dusts
Order number :
C-O-C number : ----
Sampler : CARBON BASED ENVIRONMENTAL PTY LTD
Site :
Quote number : SYBQ/403/18 - WILD - COMPASS
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 4
Laboratory : Environmental Division Newcastle
Contact :
Address : 5/585 Maitland Road Mayfield West NSW Australia 2304

Telephone : +61 2 4014 2500
Date Samples Received : 28-Jun-2019 15:05
Date Analysis Commenced : 02-Jul-2019
Issue Date : 05-Jul-2019 21:29



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.

~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. 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: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Client sample ID

				CD1 30/05/19 - 28/06/19	CD2c 30/05/19 - 28/06/19	CD3 30/05/19 - 28/06/19	CD4 30/05/19 - 28/06/19	CD5 30/05/19 - 28/06/19
Client sampling date / time				28-Jun-2019 00:00	28-Jun-2019 00:00	28-Jun-2019 00:00	28-Jun-2019 00:00	28-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	EN1904465-001	EN1904465-002	EN1904465-003	EN1904465-004	EN1904465-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	1.8	0.2	0.4	1.2	0.4
Ash Content (mg)	----	1	mg	30	3	6	21	7
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	<0.1	<0.1	0.2	0.3	0.5
Combustible Matter (mg)	----	1	mg	1	1	4	4	8
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	1.8	0.2	0.6	1.5	0.9
Total Insoluble Matter (mg)	----	1	mg	31	4	10	25	15



Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Client sample ID

				CD6				
				30/05/19 - 28/06/19				
Client sampling date / time				28-Jun-2019 00:00				
Compound	CAS Number	LOR	Unit	EN1904465-006				
Result								
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.8	----	----	----	----
Ash Content (mg)	----	1	mg	13	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.6	----	----	----	----
Combustible Matter (mg)	----	1	mg	11	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	1.4	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	24	----	----	----	----



Date: 28-6-19

Client :
Project :

Hanson Calga

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	DAM	NO	12-20	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
B	DRY			1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	DRY
C1	DAM	NO	1-30	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
C2	Trickle	NO	1-35	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
D	Trickle	NO	1-15	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
F	DAM	NO	12-10	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	

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

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

Signed: [Signature]

Sampled by: Leesa King

[illegible]

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ice

Environmental Division
Sydney
Work Order Reference
ES1920122



Telephone : + 61-2-8784 8555

CERTIFICATE OF ANALYSIS

Work Order : **ES1920122**
Client : **CBASED ENVIRONMENTAL PTY LTD**
Contact : All Deliverables
Address : Unit 3 2 Enterprise Cres
Singleton NSW 2330
Telephone : +61 02 6571 3334
Project : HANSON QUARRY SW
Order number : ----
C-O-C number : ----
Sampler : CARBON BASED ENVIRONMENTAL PTY LTD
Site :
Quote number : SYBQ/222/16 and PLANNED EVENTS
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 28-Jun-2019 15:07
Date Analysis Commenced : 29-Jun-2019
Issue Date : 03-Jul-2019 15:08



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				A	C1	C2	D	F
Client sampling date / time				28-Jun-2019 12:20	28-Jun-2019 13:30	28-Jun-2019 13:35	28-Jun-2019 13:15	28-Jun-2019 12:10
Compound	CAS Number	LOR	Unit	ES1920122-001	ES1920122-002	ES1920122-003	ES1920122-004	ES1920122-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.47	6.56	6.79	5.88	5.75
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	92	89	110	100	85
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	56	48	59	64	58
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	12	12	<5	<5	21
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

CERTIFICATE OF ANALYSIS

Work Order : **ES1917343**
Client : **HANSON CONSTRUCTION MATERIALS PTY LTD**
Contact : MR SHANE PESCU
Address : PO BOX 206
 BATHURST NSW,AUSTRALIA 2795
Telephone : 02 4375 1151
Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE POINT
 1 (A)
Order number : 4502579234
C-O-C number : ----
Sampler : Dale Wilcox
Site : ----
Quote number : EN/333
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555
Date Samples Received : 05-Jun-2019 09:55

Date Analysis Commenced : 06-Jun-2019
Issue Date : 12-Jun-2019 14:32



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
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 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				Discharge Point 1 (A) 5062019	----	----	----	----
Client sampling date / time				05-Jun-2019 07:32	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1917343-001	-----	-----	-----	-----
Result				----	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.33	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	93	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	73	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	13	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----



Work Order	: ES1919612
Client	: HANSON CONSTRUCTION MATERIALS PTY LTD
Contact	: MR SHANE PESCU
Address	: 20 Parker street Carrington 2294
Telephone	: 02 4375 1151
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)
Order number	: 4502587615
C-O-C number	: ----
Sampler	: Dale Wilcox
Site	: ----
Quote number	: EN/333
No. of samples received	: 1
No. of samples analysed	: 1

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555
Date Samples Received : 25-Jun-2019 15:50

Date Analysis Commenced : 25-Jun-2019
Issue Date : 28-Jun-2019 10:51



This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
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 ~ = Indicates an estimated value.

- 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

				Discharge Dam 1(A) 25062019	----	----	----	----
Client sampling date / time				25-Jun-2019 11:32	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1919612-001	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.90	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	88	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	68	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	21	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----



Work Order	: ES1919614
Client	: HANSON CONSTRUCTION MATERIALS PTY LTD
Contact	: MR SHANE PESCU
Address	: 20 Parker street Carrington 2294
Telephone	: 02 4375 1151
Project	: HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)
Order number	: 4502587615
C-O-C number	: ----
Sampler	: SHANE PESCU
Site	: ----
Quote number	: EN/333
No. of samples received	: 5
No. of samples analysed	: 5

Page	: 1 of 2
Laboratory	: Environmental Division Sydney
Contact	: Customer Services ES
Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61-2-8784 8555
Date Samples Received	: 25-Jun-2019 15:50
Date Analysis Commenced	: 25-Jun-2019
Issue Date	: 01-Jul-2019 17:25





This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW



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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 ~ = Indicates an estimated value.

- 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**
 (Matrix: **WATER**)

Client sample ID

				Dam 1 (A)	Dam 7B/C	Dam 13 (B)	Point D Creek	Point C Spillway
Client sampling date / time				25-Jun-2019 09:30	25-Jun-2019 09:35	25-Jun-2019 09:45	25-Jun-2019 10:00	25-Jun-2019 10:20
Compound	CAS Number	LOR	Unit	ES1919614-001	ES1919614-002	ES1919614-003	ES1919614-004	ES1919614-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.59	6.56	7.05	6.05	6.50
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	87	89	130	68	87
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	64	59	71	52	70
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	12	21	<5	44
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5