CBased Environmental Pty Limited
ABN 62 611 924 264

Calga Quarry

Environmental Monitoring

Dust Deposition, Surface Water, Groundwater and Meteorological Data

April 2020

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Date: 20 May 2020

Executive Summary

CBased Environmental is contracted by Hanson Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes:

- Dust deposition;
- Surface water;
- Groundwater; and
- A meteorological data.

This report was prepared by CBased Environmental and includes the following results for April 2020:

- Dust deposition;
- Surface water quality;
- Groundwater; and
- Meteorological parameters.

The April 2020 dust deposition results for insoluble solids showed:

- Increased levels when compared to March 2020;
- No excessively contaminated dust gauges; and
- Rolling annual averages below the Air Quality Management Plan criteria of 3.7g/m^2.month.

Monthly surface water samples were collected at sites A, B, C1, C2, and F. D was not flowing 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 sites A, B, C1, C2, and F in April 2020.

The Calga Quarry weather station data recovery in April 2020 was approximately 100%. A summary of rainfall comparison is provided below.

Location	Rainfall (mm)
Calga Quarry	49.4mm
BOM Peats Ridge*	NA
BOM Gosford*	39.8mm
BOM Peats Ridge long-term mean for April*	123.0mm

Notes: *NA = Not Available*
**Data sourced from Bureau of Meteorology (BOM) website: www.bom.gov.au*
BOM stations report rainfall at 9am
Calga Quarry station reports rainfall at midnight.

1.0 Sampling Programme

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 water, 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/m^2.month.

Six (6) dust deposition gauges are monitored as follows:

- CD1 – installed 1 May 2006. Gauges air quality impacts to the east of site operations;
- CD2c – located on a rehabilitated section of land between the extraction area and adjacent resident. Gauges air quality impacts to the north of site operations. Replaces former gauges CD2a and CD2b;
- CD3 – installed prior to May 2006. Gauges air quality impacts to the south of site operations;
- CD4 – installed 3 October 2006. Gauges air quality impacts to the south of site operations;
- CD5 – installed 14 December 2006. Gauges air quality impacts to the south of site operations; and
- CD6 installed 14 December 2006. Gauges air quality impacts to the south of the operations.

Dust gauge CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, 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. 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. CD2b was replacement by dust gauge CD2c.

Surface water is 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. Laboratory analysis includes pH, electrical conductivity, total suspended solids, total dissolved solids and total oil and grease. Monitoring 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.

Groundwater is 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 station has the following sensor configuration:

- Air temperature;
- Humidity;
- Rainfall;
- Atmospheric pressure;
- Evaporation;
- Solar radiation;
- Wind speed; and
- 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 Results

2.1 Dust Deposition

The results for April 2020 and the project 12-month rolling average are provided **Table 1**.

Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in **Appendix 1.**

Table 1: Dust Deposition Results: 2 April – 1 May 2020 (29 days)

Site	Monthly Insoluble Solids	Monthly Ash Residue	Monthly Combustible Matter	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids
CD1	2.2	2.0	0.2	91	2.3
CD2c	0.7	0.4	0.3	57	1.6
CD3	1.1	0.8	0.3	73	1.8
CD4	0.7	0.4	0.3	57	1.5
CD5	0.6	0.4	0.2	67	1.4
CD6	0.9	0.6	0.3	67	1.5

Notes:
Units in g/m^2.month unless indicated
*Insoluble solid results 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 3.7g/m^2.month; the Development Consent's annual average amenity criteria at residential locations*
The current rolling annual average is calculated from May 2019 to April 2020

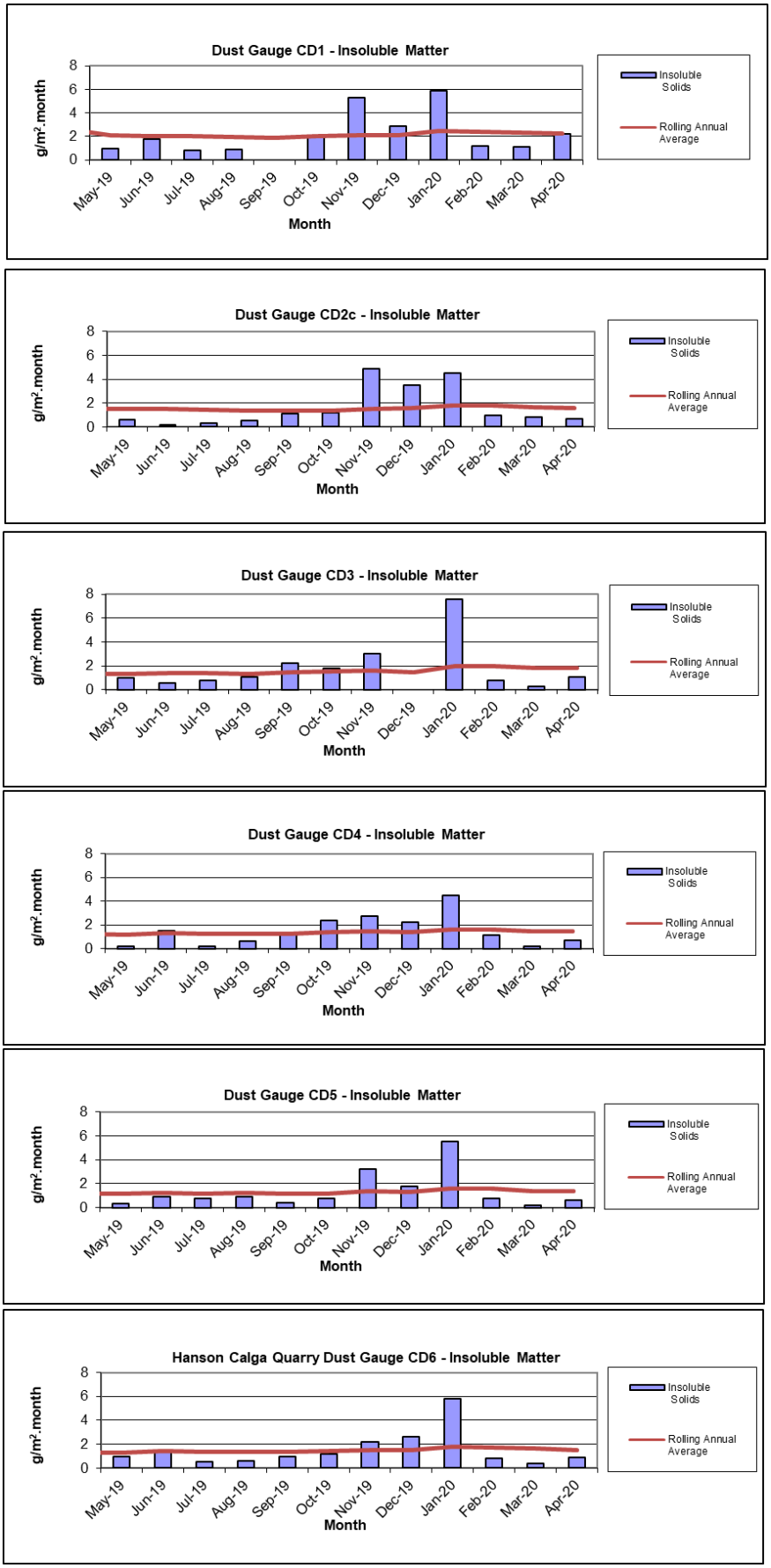


Figure 2: *Summary Monthly/Annual Dust Deposition Results for Insoluble Solids*

2.2 Surface Water (Monthly)

Monthly surface water monitoring was conducted on 2 April 2020 and results are provided in **Table 2**. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in **Appendix 1.**

Samples were collected at sites A, B, C1, C2, and F. D was not flowing at the time of sampling.

Table 2: Monthly Surface Water Monitoring Results – April 2020

Site	Observed Flow Rate* *(visual)*	Water Colour* *(visual)*	Turbidity* *(visual)*	pH	EC *(µS/cm)*	TDS *(mg/L)*	TSS *(mg/L)*	Oil and Grease *(mg/L)*
A	Dam	Clear	Clear	6.58	72	52	<5	<5
B	Trickle	Clear	Clear	6.62	95	77	31	<5
C1	Dam	Clear	Clear	6.85	82	56	6	<5
C2	Fast	Clear	Clear	6.06	116	61	5	<5
D	Not Flowing							
F	Dam	Clear	Clear	7.15	72	50	18	<5

** Indicates field measurements. All other results are laboratory analysed*
EC = Electrical conductivity
TDS = Total dissolved solids
TSS = Total suspended solids

2.2.1 Non-Routine Surface Water Sampling

No non-routine surface water sampling was undertaken in April

2.3 Groundwater (Bi-annually)

Groundwater was sampled on 2 April 2020. Data is displayed in Table 3 and Figures 3 – 6. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in Appendix 1.

Water quality tests for pH and electrical conductivity were conducted by CBased 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.

Table 3: Groundwater Quality Data

Site	Bore	Type	Depth to Water April 2006	Depth to Water (this report)	pH (this report)	Electrical Conductivity (this report)
CQ3	Voutos	* Monitor	10.53	10.59	6.1	126
CQ4	Voutos	* Monitor	8.78	10.66	4.58	149
CQ5	Gazzana	Dip only	8.69	5.74	5.76	243
CQ6	Gazzana	Dip only	16.00	*No longer accessible due to damage*		
CQ7	Gazzana	* Monitor	6.89	5.89	4.54	120
CQ8	Gazzana	* Monitor	11.03	5.34	4.28	154
CQ9	Gazzana	Dip only	10.10	*No longer accessible due to damage*		
CQ10	Voutos	* Monitor	NI	24.81	4.43	148
CQ11S	Gazzana	* Monitor	NI	11.23	5.62	175
CQ11D	Gazzana	* Monitor	NI	12.29	5.26	165
CQ12	Gazzana	* Monitor	NI	3.37	4.8	147
CQ13	Kashouli	* Monitor	NI	12.58	4.3	170
CP3	Gazzana	Domestic	10.40	*No longer accessible due to damage*		
CP4	Kashouli	Domestic	13.63	2.30	*Blocked*	
CP5	Kashouli	Domestic	16.61	8.45	5.17	140
CP6	Kashouli	Domestic	16.27	8.67	4.34	158
CP7	Kashouli	Production	8.56	0.97	6.3	163
CP8	Rozmanec	Domestic	22.17	20.78	4.46	129
CP13	W P White	Domestic	NI	10.70	4.71	120
CP15	32 Polins Road, Calga	Domestic	NI	1.86	4.35	157
MW7	Rocla Bore	* Monitor	15.76	13.94	6.11	53
MW8	Rocla Bore	* Monitor	9.82	6.47	5.06	77
MW9	Rocla Bore	* Monitor	22.44	23.52	4.45	96
MW10	Rocla Bore	* Monitor	15.41	10.44	4.55	127
MW13	Rocla Bore	Dip only	NI	7.36	4.48	131
MW16	Rocla Bore	Dip only	NI	7.99	4.47	127
MW17	Rocla Bore	Dip only	NI	9.67	4.90	132

Notes:
Water level measured from top of bore case (TOC) to water
pH measured in pH units / electrical conductivity measured in µS/cm
Blank cells = no data available
** = Logger Installed*
NI = Bores installed after April 2006. April 2006 was the first set of measurements taken by CBased Environmental Pty Limited
Yellow shading indicates increase to groundwater depth (water moved away from surface) since last sampling event
Green shading indicates decrease to groundwater depth (water moved towards surface) since last sampling event
Pink shading indicates stable groundwater depth (+/- 0.01m) since last sampling event

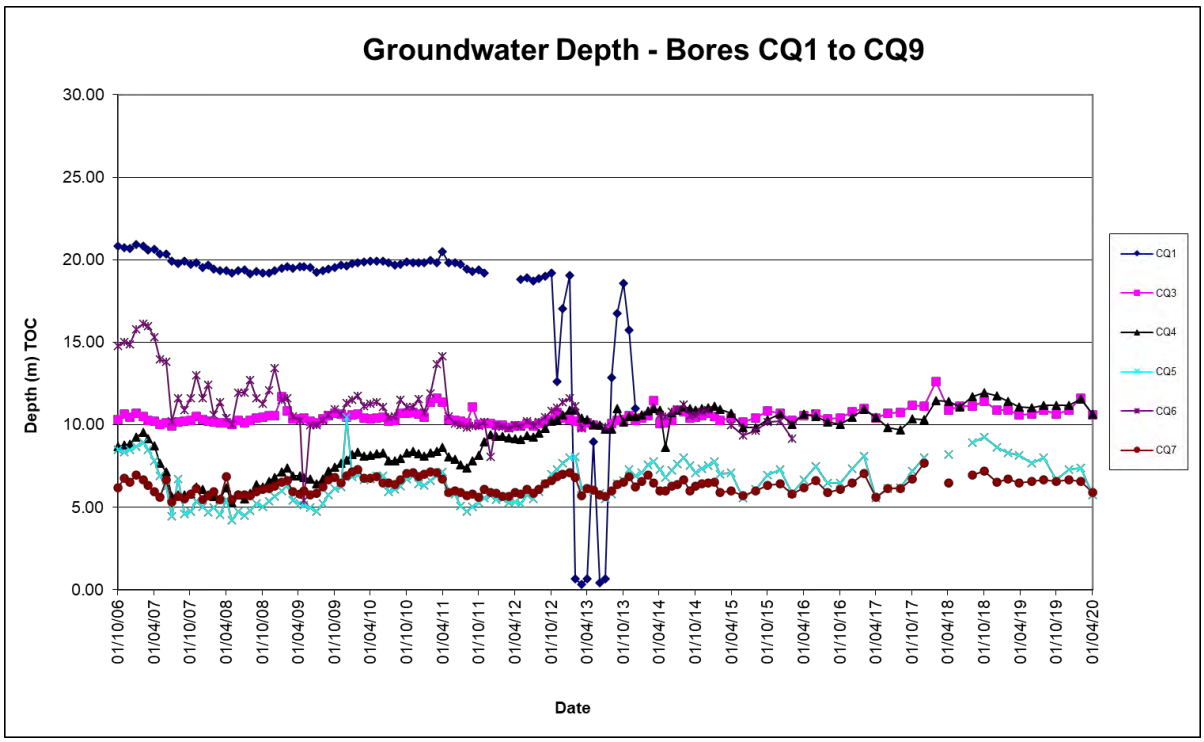


Figure 3: *Groundwater Depth – Bores CQ1 to CQ9*

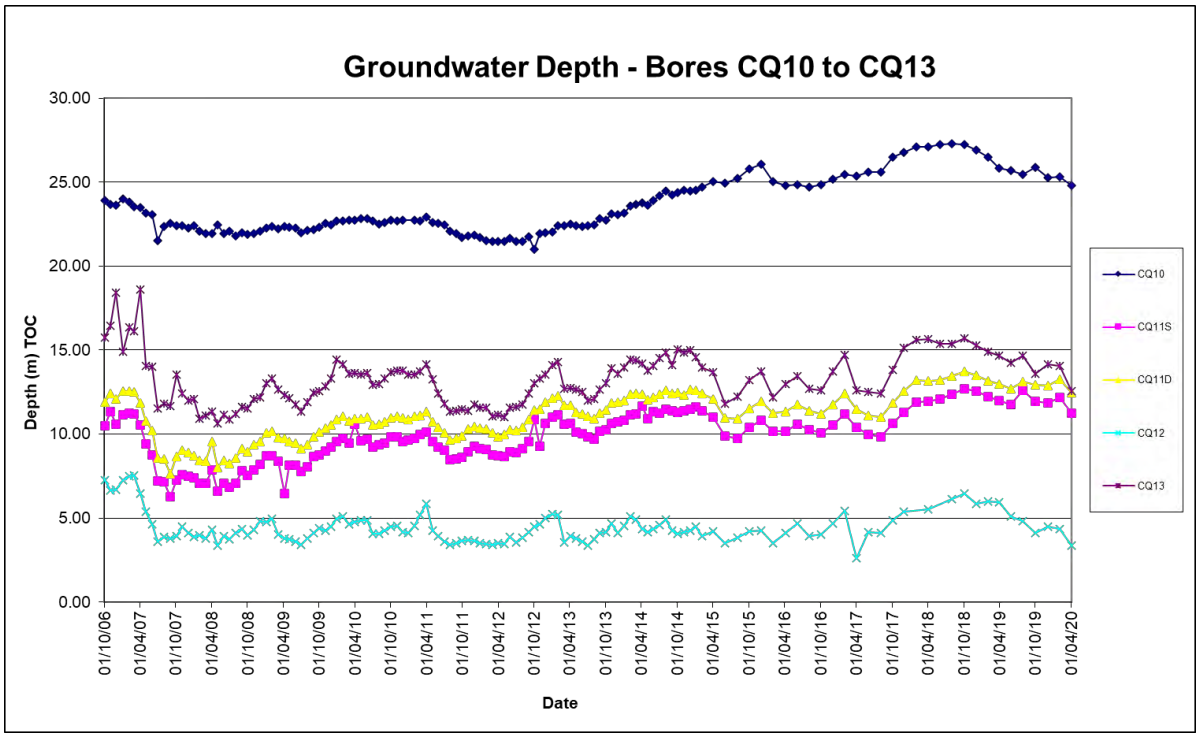


Figure 4: *Groundwater Depth – Bores CQ10 to CQ13*

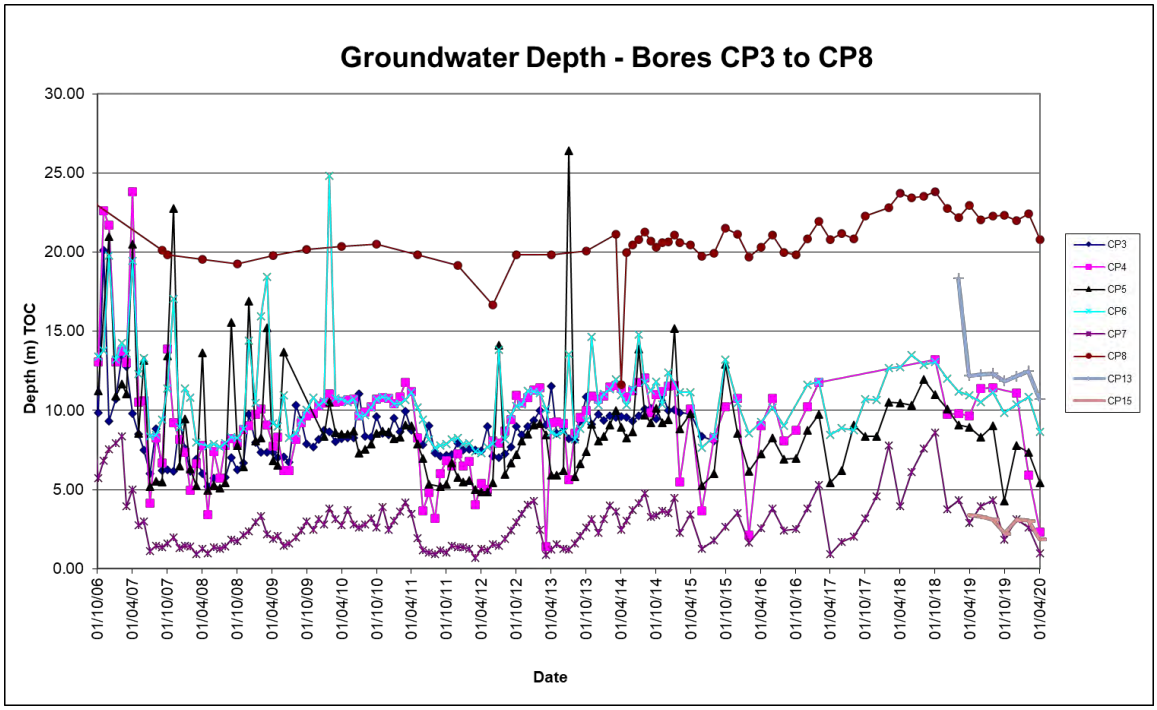


Figure 5: *Groundwater Depth – Bores CP3 to CP8*

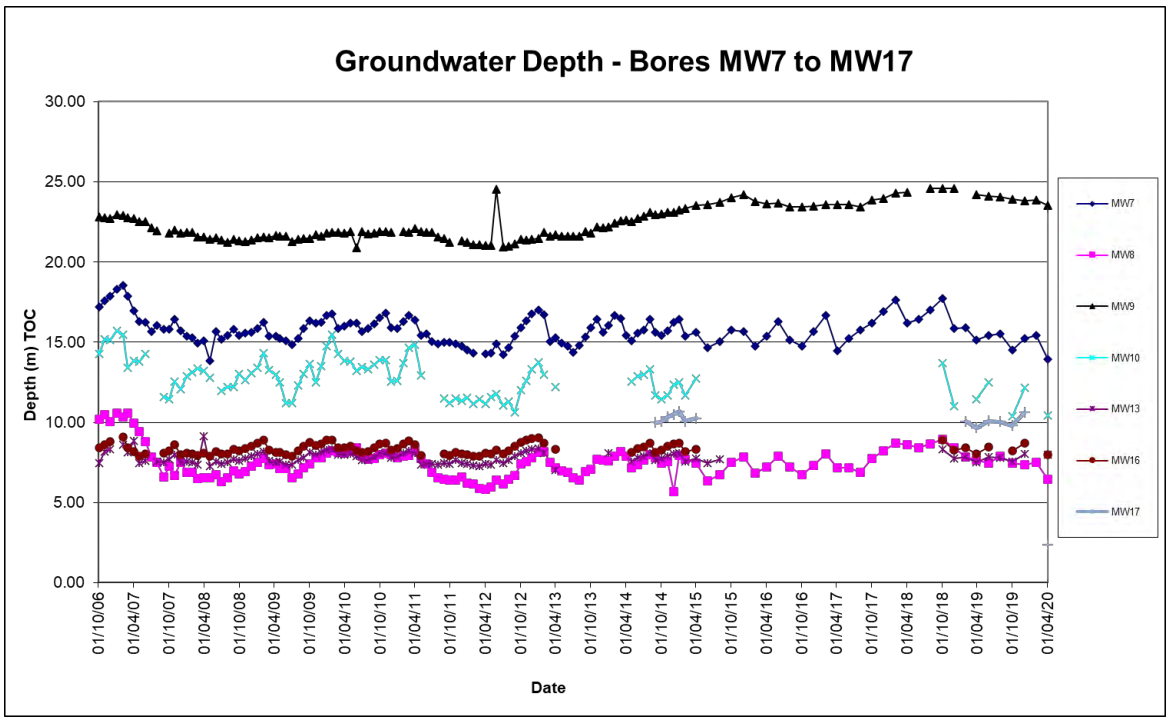


Figure 6: *Groundwater Depth – Bores MW7 to MW17*

2.4 Meteorological Data

The Calga Quarry weather station data recovery for April 2020 was approximately 100%.

The weather station data follows and includes:

- Monthly rainfall comparison between quarry data and BOM data. Refer to **Table 3**;
- Monthly data summary. Refer to **Table 4**;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception. Refer to **Figures 3 – 5**; and
- Wind rose (frequency distribution diagram of wind speed and direction). Refer to **Figure 6**.

A summary of rainfall comparison is provided in **Table 3**.

Table 3: Comparison of Local Rainfall – April 2020

Location	Rainfall (mm)
Calga Quarry	49.4mm
BOM Peats Ridge*	NA
BOM Gosford*	39.8mm
BOM Peats Ridge long-term mean for March*	123.0mm

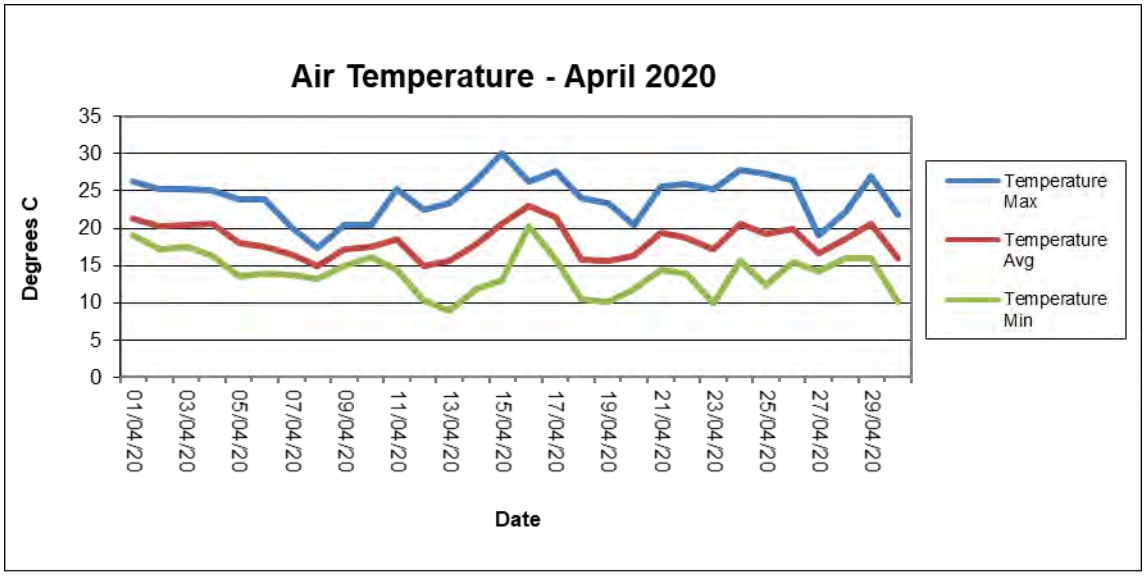
Notes: *NA = Not Available*
**Data sourced from Bureau of Meteorology (BOM) website: www.bom.gov.au*
BOM stations report rainfall at 9am
Calga Quarry station reports rainfall at midnight.

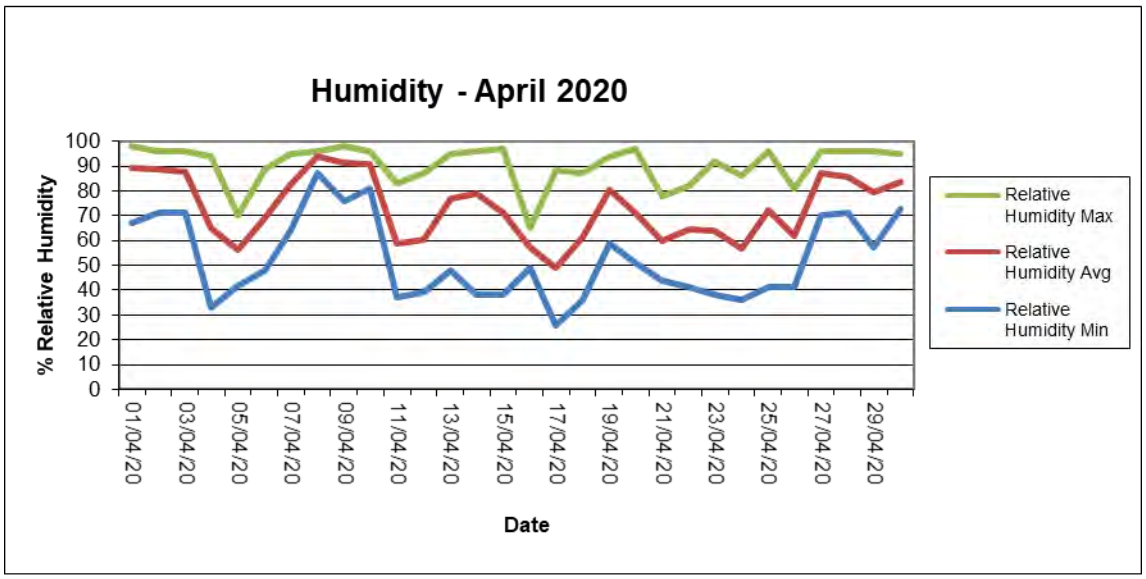
An annual calibration was undertaken on the weather station during April 2020 and is next due in March 2021. Please refer to **Appendix 1**.

Table 4: Summary of Monthly Meteorological Data – April 2020

Date	Temperature Min	Temperature Avg	Temperature Max	Relative Humidity Min	Relative Humidity Avg	Relative Humidity Max	Rain	Evapotranspiration	Wind Speed Min	Wind Speed Avg	Wind Speed Max	Wind Chill Min	Heat Index Max	Atmospheric Pressure Min	Atmospheric Pressure Avg	Atmospheric Pressure Max	Solar Radiation Min	Solar Radiation Avg	Solar Radiation Max	Data Min	Data Avg	Data Max
1/04/2020	19.1	21.4	26.3	67.0	89.1	98.0	3.4	2.6	0.0	1.9	8.0	19.1	27.7	1013.4	1014.9	1016.9	0.0	133.1	680.0	74.9	85.1	93.0
2/04/2020	17.2	20.2	25.2	71.0	88.9	96.0	2.0	1.6	0.0	1.3	7.2	17.3	26.2	1007.0	1009.9	1013.7	0.0	96.0	687.0	69.0	83.4	93.6
3/04/2020	17.6	20.4	25.2	71.0	87.6	96.0	5.0	1.9	0.9	1.8	9.8	17.7	25.9	998.5	1004.2	1007.5	0.0	107.8	562.0	56.4	81.5	92.1
4/04/2020	16.3	20.7	25.1	33.0	65.0	94.0	7.6	5.6	1.3	4.4	16.5	15.4	24.8	994.7	999.4	1007.6	0.0	210.8	820.0	76.3	85.0	91.2
5/04/2020	13.6	18.0	23.8	42.0	56.3	70.0	0.0	4.7	0.0	2.6	10.3	12.7	23.2	1007.7	1010.2	1013.4	0.0	220.9	791.0	82.5	87.0	92.4
6/04/2020	13.9	17.5	23.8	48.0	69.1	89.0	0.0	3.7	0.0	1.6	7.2	13.6	23.6	1012.4	1014.8	1017.8	0.0	201.6	810.0	65.2	84.3	95.9
7/04/2020	13.7	16.4	20.1	64.0	82.8	95.0	0.2	1.9	0.0	0.9	7.6	13.7	20.2	1017.0	1018.1	1019.7	0.0	105.6	526.0	67.3	81.2	95.3
8/04/2020	13.2	15.0	17.3	87.0	93.7	96.0	1.0	0.6	0.0	0.7	6.7	13.2	17.6	1016.5	1019.2	1022.5	0.0	44.3	211.0	69.6	82.8	95.3
9/04/2020	14.9	17.3	20.5	76.0	91.6	98.0	4.8	1.4	0.0	1.0	4.5	15.0	21.2	1020.6	1022.3	1024.2	0.0	99.5	654.0	61.1	84.9	95.3
10/04/2020	16.1	17.4	20.4	81.0	90.8	96.0	2.2	1.2	0.0	1.5	8.9	15.9	21.2	1007.0	1013.5	1020.4	0.0	67.3	552.0	83.0	88.2	94.7
11/04/2020	14.4	18.5	25.3	37.0	58.9	83.0	0.0	6.0	2.2	5.2	18.3	12.7	24.6	997.0	1002.7	1007.3	0.0	209.6	795.0	79.8	88.0	95.3
12/04/2020	10.3	15.0	22.5	39.0	60.4	87.0	0.0	4.0	0.0	1.6	7.6	10.4	21.7	1007.3	1012.3	1016.2	0.0	211.0	768.0	77.2	82.6	86.8
13/04/2020	8.9	15.6	23.3	48.0	77.0	95.0	0.0	3.1	0.0	1.2	6.3	9.0	22.9	1015.6	1017.4	1019.1	0.0	179.1	933.0	77.2	84.7	90.4
14/04/2020	11.8	17.9	26.4	38.0	78.8	96.0	12.4	2.7	0.0	0.6	6.3	11.8	26.6	1018.4	1020.1	1022.2	0.0	202.4	744.0	59.9	82.0	92.4
15/04/2020	13.1	20.6	30.1	38.0	71.4	97.0	0.2	3.5	0.0	0.7	4.9	13.2	30.4	1012.7	1017.5	1021.0	0.0	196.1	724.0	75.7	88.1	94.7
16/04/2020	20.2	23.0	26.3	49.0	57.5	65.0	0.0	2.9	0.4	2.1	10.3	20.2	26.3	1005.7	1009.0	1012.5	0.0	91.7	443.0	36.3	70.7	99.1
17/04/2020	15.8	21.4	27.6	26.0	49.0	88.0	0.0	4.9	0.0	1.7	9.4	15.8	26.3	1005.2	1007.1	1009.1	0.0	204.8	750.0	56.2	71.1	87.4
18/04/2020	10.4	15.8	24.1	36.0	61.6	87.0	0.0	3.3	0.0	0.8	5.8	10.6	23.3	1007.7	1009.2	1011.0	0.0	185.2	751.0	49.5	63.3	88.3
19/04/2020	10.1	15.6	23.3	59.0	80.3	94.0	0.0	2.6	0.0	0.5	5.8	10.1	23.4	1008.8	1010.5	1012.8	0.0	169.0	914.0	53.6	62.7	73.8
20/04/2020	11.9	16.4	20.5	51.0	71.1	97.0	0.0	1.9	0.0	1.3	7.2	12.0	19.6	1010.0	1012.0	1014.0	0.0	79.4	774.0	41.0	65.7	88.6
21/04/2020	14.4	19.4	25.6	44.0	60.0	78.0	0.0	3.1	0.0	0.7	5.4	14.5	24.8	1011.1	1013.7	1016.5	0.0	159.2	693.0	25.2	53.5	81.7
22/04/2020	13.9	18.7	25.9	41.0	64.4	82.0	0.0	3.4	0.0	1.1	8.0	13.9	25.3	1012.5	1014.4	1016.4	0.0	183.5	708.0	0.0	50.6	73.2
23/04/2020	10.0	17.2	25.3	38.0	64.2	92.0	0.0	3.2	0.0	0.6	8.0	10.1	24.6	1012.8	1015.6	1019.1	0.0	178.8	716.0	23.0	45.5	80.4
24/04/2020	15.7	20.7	27.8	36.0	56.9	86.0	0.0	3.9	0.0	1.0	7.6	15.7	26.9	1012.1	1014.1	1017.3	0.0	179.8	690.0	0.0	50.9	72.6
25/04/2020	12.4	19.3	27.4	41.0	72.5	96.0	0.0	3.4	0.0	0.9	6.7	12.4	26.9	1013.9	1016.3	1019.4	0.0	183.0	693.0	39.1	59.2	95.0
26/04/2020	15.4	20.0	26.5	41.0	61.7	81.0	0.0	3.2	0.0	1.7	9.8	15.5	25.8	1009.5	1012.3	1016.4	0.0	127.9	731.0	40.7	58.6	69.7
27/04/2020	14.3	16.6	19.1	70.0	87.3	96.0	0.6	1.1	0.0	0.3	4.9	14.3	19.5	1016.5	1019.9	1022.2	0.0	61.1	327.0	34.7	62.6	89.3
28/04/2020	15.9	18.6	22.1	71.0	85.6	96.0	0.0	1.7	0.0	1.5	9.4	15.9	22.4	1016.0	1019.4	1021.5	0.0	87.7	539.0	36.0	67.9	100.0
29/04/2020	15.9	20.6	27.0	57.0	79.6	96.0	0.2	2.7	0.0	1.4	8.9	16.0	27.5	1005.9	1011.3	1015.8	0.0	128.9	604.0	0.0	52.5	79.8
30/04/2020	10.2	16.0	21.8	73.0	83.8	95.0	9.8	1.1	0.0	2.6	12.1	9.0	22.4	1001.0	1004.0	1006.6	0.0	33.0	186.0	38.8	58.5	95.6
Monthly	8.9	18.4	30.1	26	73	98	49.4	86.7	0.0	1.5	18.3	9.0	30.4	994.7	1012.8	1024.2	0.0	144.6	933.0	0.0	72.1	100.0
Unit	*Degrees Celcius (°C)*			*Percentage Relative Humidity*			*mm*	*mm*	*Metres per second (m/s)*			*°C*	*°C*	*Hector Pascals (hPa)*			*Watts per square metre (W/m²)*			*Percentage (%)*		

No data





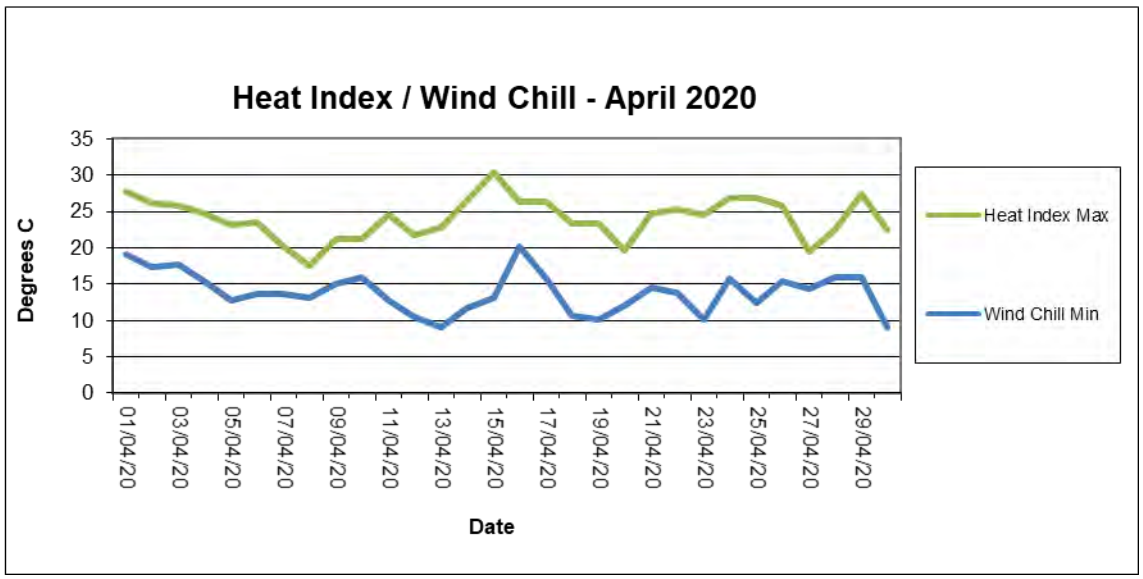
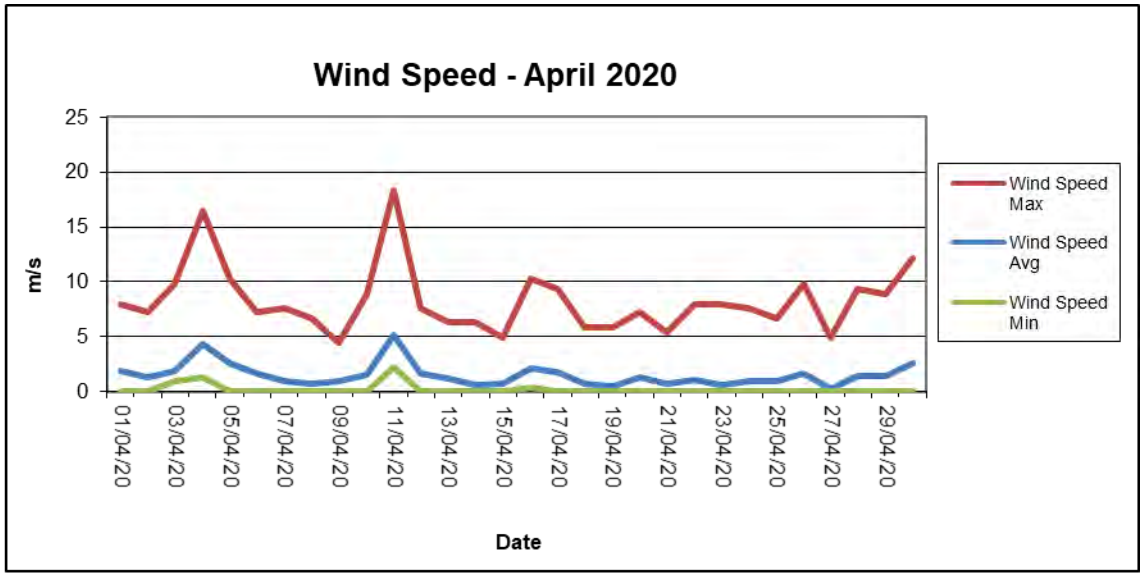
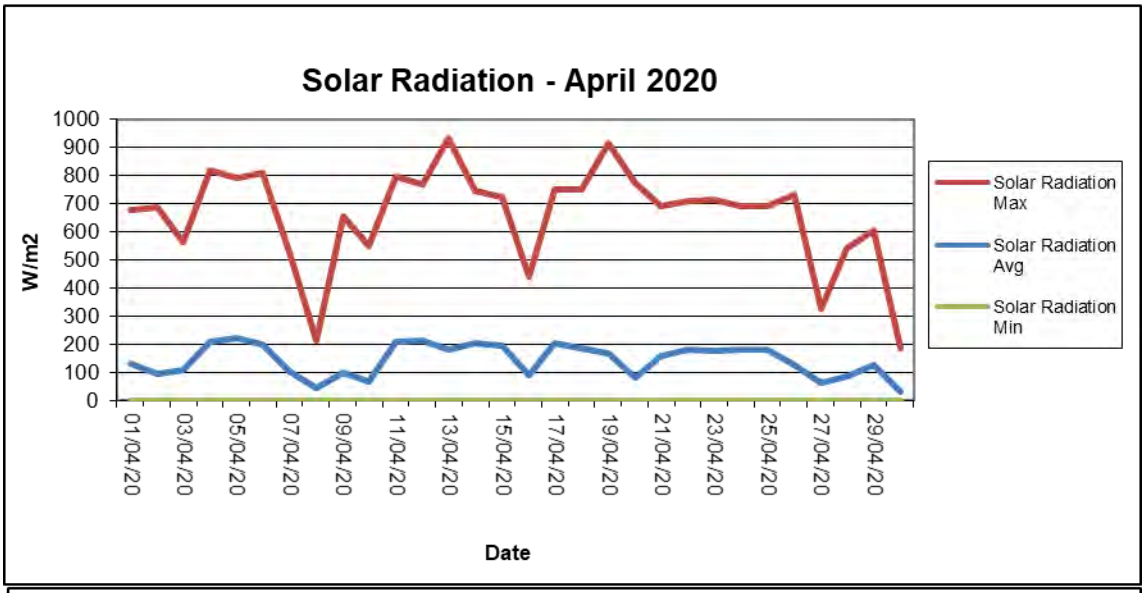


Figure 3 *Summary of Monthly Temperature, Humidity and Heat Index Results*





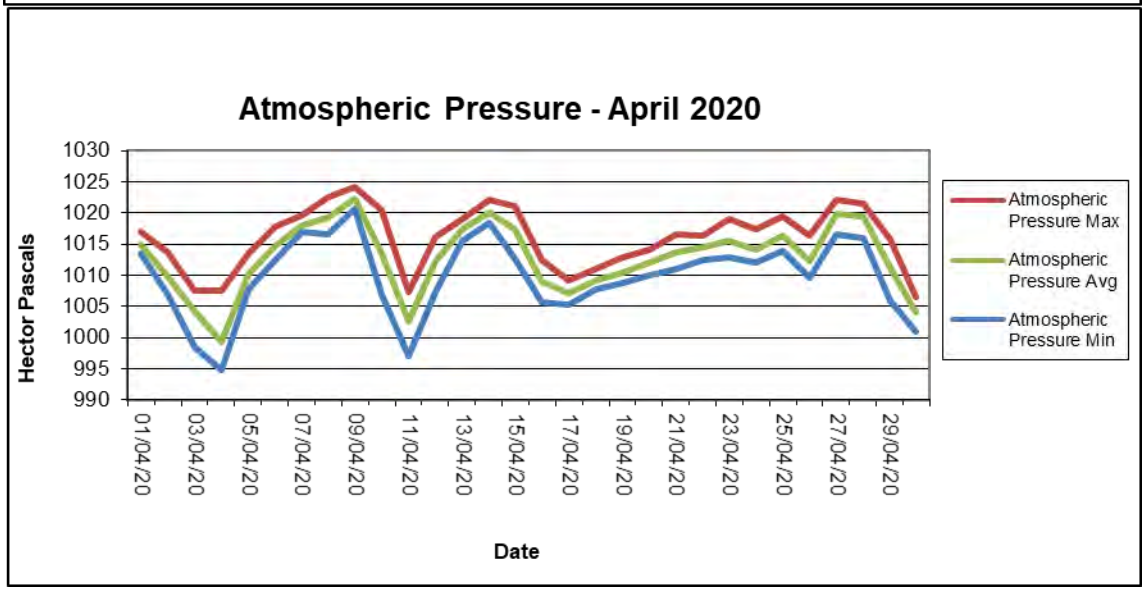
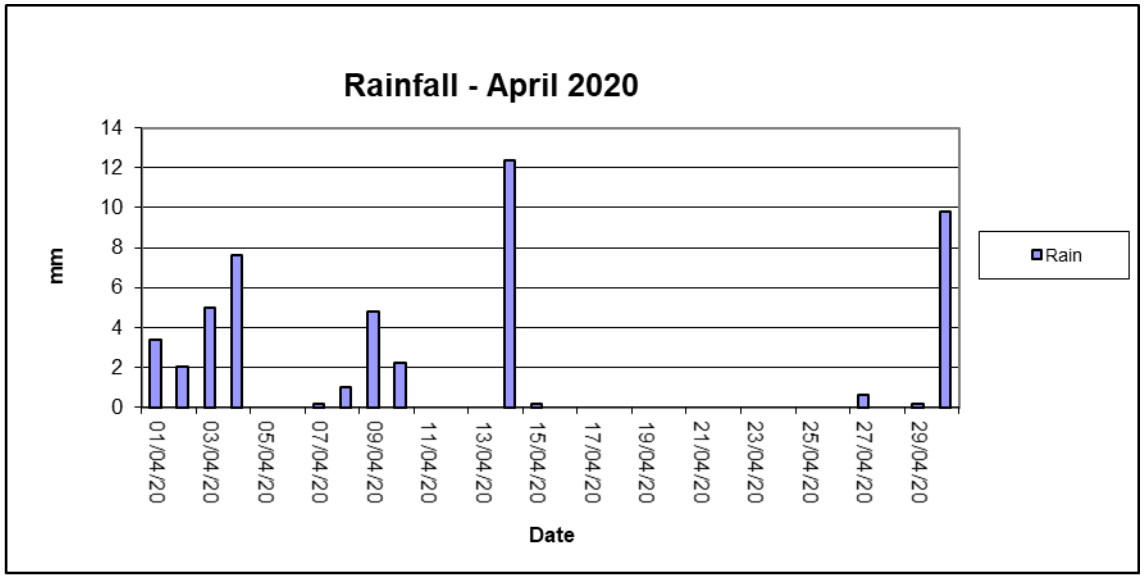
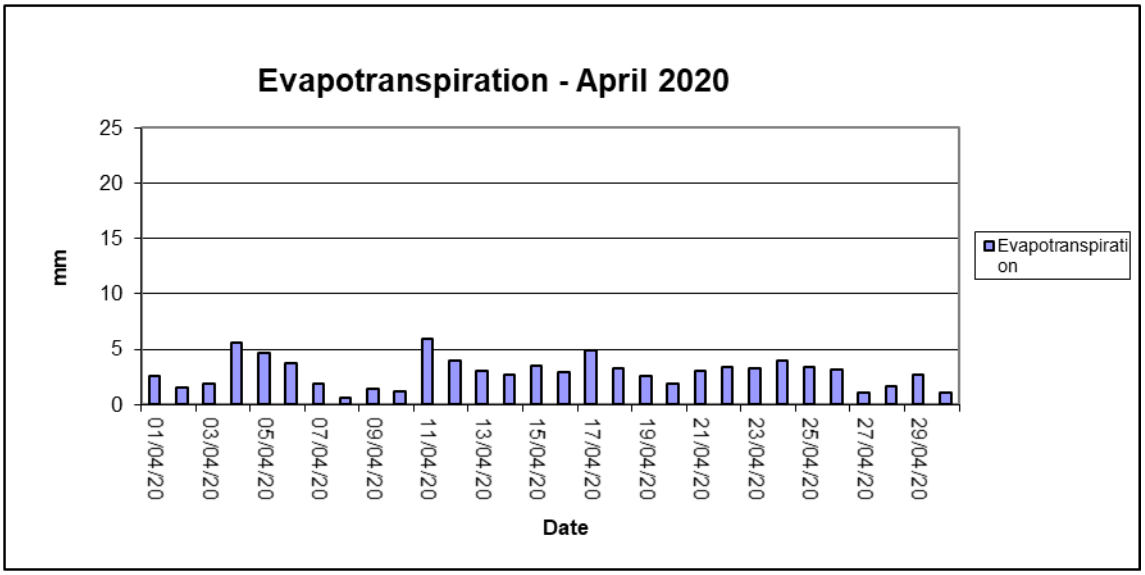


Figure 4 *Summary of Monthly Wind Speed, Solar Radiation and Atmospheric Pressure Results*





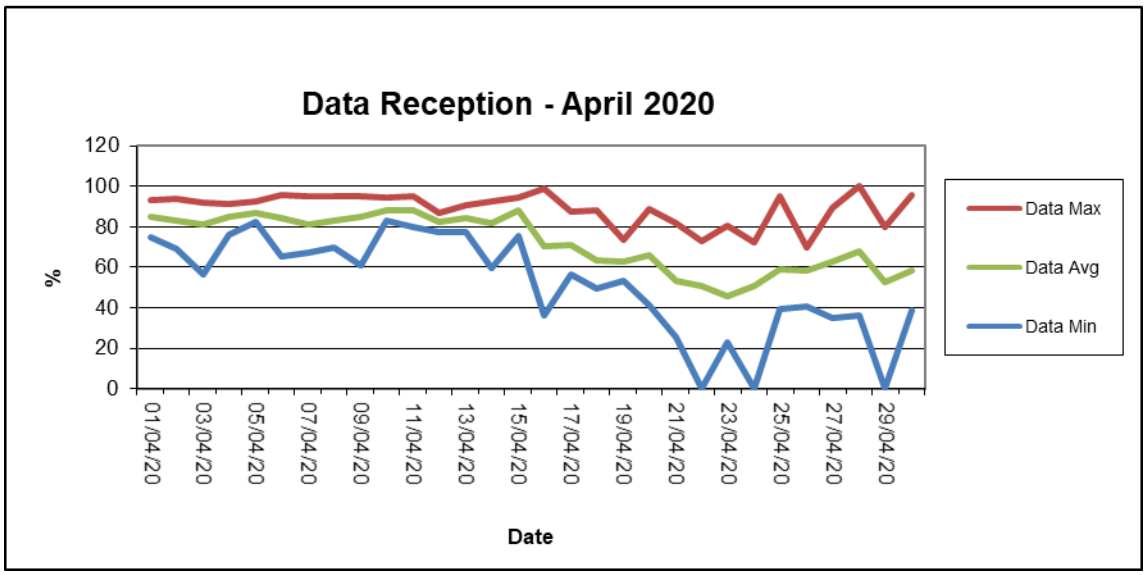
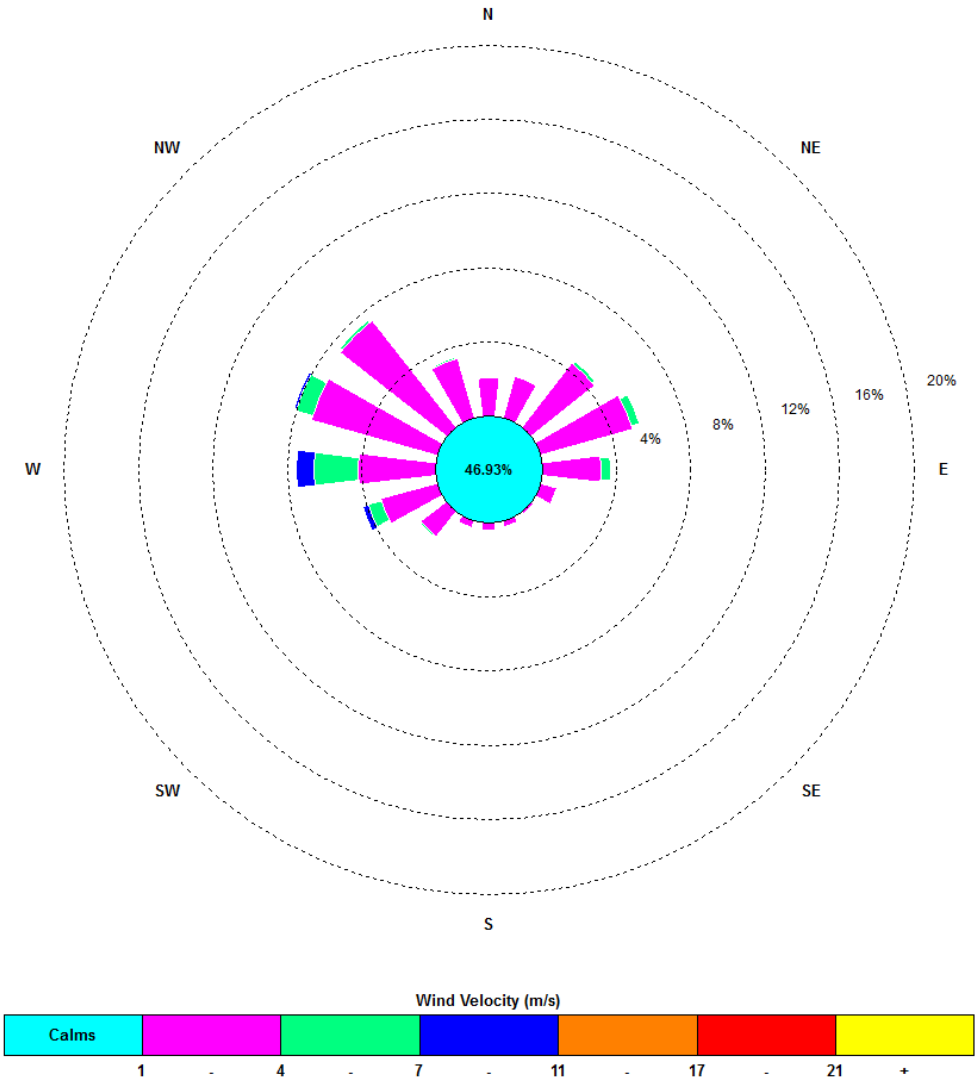


Figure 5 *Summary of Monthly Rainfall, Evapotranspiration and Data Reception Results*

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.



12:15, 1 April 2020 – 11:45, 30 April 2020

Figure 6: *Monthly Windrose Plot – April 2020*

The predominant wind for April was from the West, with most frequent, strongest winds also from the West. The maximum wind speed was 18.3m/s from the West.

Appendix 1

Field Sheets

Chain of Custody Documentation

Laboratory Analysis Certificates

DEPOSITIONAL DUST MONITORING

Client: ..... **Hanson Calga Quarry** ..... Date Installed: 24.20 Collection Start Time: 11.30 Sampled By: J Peterson

Date Collected: 1.5.20 Collection Stop Time: 12.50 Sampling ID: .....

Site	Time Collected	Water Level (mL)	Insoluble Material (✔ = slight, ✔ ✔ = mod etc)				Water Turbidity	Water Colour	Stand Level (Y/N)	Funnel Level (Y/N)	New Funnel Diameter (mm)	Comments
			Insects	Bird droppings	Vegetation	Dust						
CD1	11.50	700ml	✓		✓	✓	C S T	C O Bn Gn Gy	Y	Y		
CD2C	12.00	700ml	✓			✓	C S T	C O Bn Gn Gy	Y	Y		
CD3	11.40	700ml	✓		✓	✓	C S T	C O Bn Gn Gy	Y	Y		
CD4	12.25	700ml	✓			✓	C S T	C O Bn Gn Gy	Y	Y		
CD5	12.35	700ml	✓			✓	C S T	C O Bn Gn Gy	Y	Y		
CD6	12.40	700ml	✓			✓	C S T	C O Bn Gn Gy	Y	Y		
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				
							C S T	C O Bn Gn Gy				

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

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

Report broken funnels and replacement diameters

Signed: J Peterson

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd
LABORATORY BATCH NO.:
POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325
SAMPLERS: CBased Environmental Pty Ltd

SEND REPORT TO: monitoringresults@cbased.com.au
SEND INVOICE TO: admin@cbased.com.au, renae.mikka@cbased.com.au
PHONE: 0265713334 E-MAIL: monitoringresults@cbased.com.au

DATA NEEDED BY: 7 working days REPORT NEEDED BY: 7 working days
REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

PROJECT ID: Hanson Calga Dusts QUOTE NO.: SYBQ 222-16
QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

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

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

ANALYSIS REQUIRED

SAMPLE ID	MATRIX	DATE ON	DATE OFF	TYPE & PRESERVATIVE	NO.	Insoluable Soldi	Ash Residue	Combustable Matt	NOTES
CD1	Dust	2.4.20	1.5.20			x	x	x	
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:		RECEIVED BY		
NAME: [signature]	DATE: 1.5.20	NAME: [signature]	DATE: 1/5/20	METHOD OF SHIPMENT
OF: CBased Environmental	TIME: 2.20	OF: [signature]	TIME: 14:10	CONSIGNMENT NOTE NO.
NAME:	DATE:	NAME:	DATE:	TRANSPORT CO. NAME.
OF:	TIME:	OF:	TIME:	

*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
Newcastle
Work Order Reference
EN2002922

Telephone : + 61 2 4014 2500

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2002922**	Page	: 1 of 4
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: All Deliverables	Contact	:
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: +61 02 6571 3334	Telephone	: +61 2 4014 2500
Project	: Hanson Calga Dusts	Date Samples Received	: 01-May-2020 14:10
Order number	: ----	Date Analysis Commenced	: 04-May-2020
C-O-C number	: ----	Issue Date	: 08-May-2020 12:09
Sampler	: CARBON BASED ENVIRONMENTAL PTY LTD		
Site	:		
Quote number	: SYBQ/222/16 and PLANNED EVENTS		
No. of samples received	: 6		
No. of samples analysed	: 6		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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*
Joel Mullarvey	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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**)

Compound	CAS Number	LOR	Unit	Client sample ID	CD1 02/04/2020-01/05/2020	CD2c 02/04/2020-01/05/2020	CD3 02/04/2020-01/05/2020	CD4 02/04/2020-01/05/2020	CD5 02/04/2020-01/05/2020
				Client sampling date / time	01-May-2020 00:00	01-May-2020 00:00	01-May-2020 00:00	01-May-2020 00:00	01-May-2020 00:00
					EN2002922-001	EN2002922-002	EN2002922-003	EN2002922-004	EN2002922-005
					Result	Result	Result	Result	Result
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**2.0**	**0.4**	**0.8**	**0.4**	**0.4**
Ash Content (mg)	----	1	mg		**35**	**7**	**13**	**7**	**7**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.2**	**0.3**	**0.3**	**0.3**	**0.2**
Combustible Matter (mg)	----	1	mg		**2**	**5**	**5**	**5**	**3**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**2.2**	**0.7**	**1.1**	**0.7**	**0.6**
Total Insoluble Matter (mg)	----	1	mg		**37**	**12**	**18**	**12**	**10**

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	**CD6 02/04/2020-01/05/2020**	**----**	**----**	**----**	**----**
				Client sampling date / time	01-May-2020 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN2002922-006**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.6**	**----**	**----**	**----**	**----**
Ash Content (mg)	----	1	mg		**10**	**----**	**----**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.3**	**----**	**----**	**----**	**----**
Combustible Matter (mg)	----	1	mg		**5**	**----**	**----**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.9**	**----**	**----**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**15**	**----**	**----**	**----**	**----**

CBASED ENVIRONMENTAL PTY LIMITED

Date: 2-4-20

Client : Hanson Calga

Project :

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	DAM	NO	9-30	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
B	tricicle	No	10.00	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
C1	DAM	NO	11.00	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
C2	Fast	No	11.15	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
D				1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	Not flowing
F	DAM	NO	9.00	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	

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

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

Signed: Jill

Sampled by: Leesa + Jill

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd

LABORATORY BATCH NO.:

POSTAL ADDRESS: PO Box 245 CESSNOCK NSW 2325

SAMPLERS: CBased Environmental Pty Ltd Loosa + JiY

SEND REPORT TO: monitoringresults@cbased.com.au

SEND INVOICE TO: renae.mikka@cbased.com.au; accounts@cbased.com.au

PHONE: 0265713334 E-MAIL: monitoringresults@cbased.com.au

DATA NEEDED BY: 5 working days

REPORT NEEDED BY: 5 working days

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

PROJECT ID: Hanson Quarry SW

QUOTE NO.: SYBQ-403-18

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

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

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

Total unless specified

SAMPLE DATA				CONTAINER DATA		ANALYSIS REQUIRED																NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.	pH	EC	TSS	TDS	O + G												
A	Water	2-4-20		1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x												
B	Water			1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x												
C1	Water			1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x												
C2	Water			1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x												
~~D~~	~~Water~~			~~1x 250mlGP,1x 500mLGP,1xPG~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~												
F	Water			1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x												
				TOTAL BOTTLES:																		

Environmental Division
Sydney
Work Order Reference
ES2011653

Telephone : + 61-2-8784 8555

RELINQUISHED BY:		RECEIVED BY		
NAME: J. Paterson	DATE: 3.4.20	NAME: AL	DATE: 3/4/20	METHOD OF SHIPMENT
OF: CBased Environmental	TIME: 4.10	OF: ALS	TIME: 4:12pm	CONSIGNMENT NOTE NO.
NAME:	DATE:	NAME:	DATE:	TRANSPORT CO. NAME.
OF:	TIME:	OF:	TIME:	

*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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2011653**	Page	: 1 of 2
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: All Deliverables	Contact	: Customer Services ES
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6571 3334	Telephone	: +61-2-8784 8555
Project	: Hanson Quarry SW	Date Samples Received	: 03-Apr-2020 16:12
Order number	: ----	Date Analysis Commenced	: 03-Apr-2020
C-O-C number	: ----	Issue Date	: 09-Apr-2020 12:02
Sampler	: Jill, Leesa King		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

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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.

- 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	A	B	C1	C2	F
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	*CAS Number*	*LOR*	*Unit*		**ES2011653-001**	**ES2011653-002**	**ES2011653-003**	**ES2011653-004**	**ES2011653-005**
					Result	Result	Result	Result	Result
EA005: pH									
pH Value	----	0.01	pH Unit		**6.58**	**6.62**	**6.85**	**6.06**	**7.15**
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**72**	**95**	**82**	**116**	**72**
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**52**	**77**	**56**	**61**	**50**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	**31**	**6**	**5**	**18**
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	<5

C BASED ENVIRONMENTAL PTY LIMITED

Date: 2-4-20

GROUNDWATERS

Client : Hanson Calga
Project : Bi-Annual Bores

Site	Time	DEPTH	Typical Depth (m)	Odour	Water Turbidity	Water Colour	1		2		Bottles (Apr/Oct)	Downloaded Logger? (Y/N)*	Comments
							pH	EC	pH	EC			
CQ3	9·20	10.59	10.74	NO	(C) S T	(C) LO O B G	6·28	148·0us	6·24	139·4us	1x 250ml GP, 1x 500mL GP, 1RP		
CQ4	1·10	10.66	11.19	NO	(C) S T	(C) LO O B G	4·68	168·1us	4·69	168·0us	1x 250ml GP, 1x 500mL GP, 1RP	Y	Trace overgrown
CQ5	9.15	5.74	8.04	Yes	C (S) T	(C) LO O B G	7.08	277.8us	7.18	279.6us	1x 250ml GP, 1x 500mL GP, 1RP		dead animal
CQ7	4.45	5.89	6.61	NO	(C) S T	(C) LO O B G	6.17	139.7us	6.21	140.4us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ8	4.20	5.34	6.93	No	(C) S T	(C) LO O B G	6.57	176.3us	6.69	176.1us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ10	1·30	24·81	25.86	No	(C) S T	(C) LO O B G	4·65	168·7us	4·67	168·3us	1x 250ml GP, 1x 500mL GP, 1RP	Y	[illegible]
CQ11S	12·35	11·23	12.1	Yes	(C) S T	(C) LO O B G	5·72	189·4us	5·77	191·4us	1x 250ml GP, 1x 500mL GP, 1RP	Y	dead animal Smell
CQ11D	12·45	12·29	12.98	Yes	(C) S T	(C) LO O B G	5·63	168·3us	5·53	168·3us	1x 250ml GP, 1x 500mL GP, 1RP	Y	dead animal Smell
CQ12	4·30	3.37	5.46	No	(C) S T	(C) LO O B G	6.14	168.7us	6.22	168.5us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ13	12·10	12·58	14.42	NO	(C) S T	(C) LO O B G	4·58	186·1us	4·49	182·4us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CP4	11·45	2·30	~~10.56~~		C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		double checked depth
CP5	11·35	5·45	7.95	NO	(C) S T	(C) LO O B G	5·86	156·2us	5·86	156·8us	1x 250ml GP, 1x 500mL GP, 1RP		
CP6	11·40	8.67	10.73	NO	(C) S T	(C) LO O B G	4.58	179.9us	4.54	178.1us	1x 250ml GP, 1x 500mL GP, 1RP		
CP7	11·25	0.97	3.47	NO	(C) S T	(C) LO O B G	6.28	184.5us	6·34	187·2us	1x 250ml GP, 1x 500mL GP, 1RP		
CP8	10·40	20·78	22.36	NO	(C) S T	(C) LO O B G	4·50	149·7us	4·48	150·4us	1x 250ml GP, 1x 500mL GP, 1RP		
CP13	11·50	10·70	13.4	NO	(C) S T	(C) LO O B G	4·74	135·7us	4·76	135·2us	1x 250ml GP, 1x 500mL GP, 1RP		
CP15	11·20	1·86	3.01	NO	(C) S T	(C) LO O B G	4·48	181·8us	4·45	181·7us	1x 250ml GP, 1x 500mL GP, 1RP		
MW7	2.10	13.94	15.3	NO	C S (T)	C LO O (B) G	6·34	50·5us	6·29	50·9us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW8	2·20	6·47	7.66	NO	(C) S T	(C) LO O B G	6·48	83.6us	6·35	82·1us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW9	1·45	23.52	24.09	NO	(C) S T	(C) LO O B G	4·64	111·1us	4·65	110·9us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW10	3·45	10.44	11.44	NO	(C) S T	(C) LO O B G	6·10	142.9us	6·15	142.8us	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW13	3·20	7·36	7.71	No	(C) S T	(C) LO O B G	6.07	180.0us	6.24	180.7us	1x 250ml GP, 1x 500mL GP, 1RP		
MW16	3·30	7·99	8.29	No	(C) S T	(C) LO O B G	5·85	147·7us	5·91	148·2us	1x 250ml GP, 1x 500mL GP, 1RP		
MW17	2·35	9·67	9.93	NO	(C) S T	(C) LO O B G	6·32	147·8us	6·85	149·5us	1x 250ml GP, 1x 500mL GP, 1RP		

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)
pH/EC meter #:

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

*If unable to download logger please provide comment/ explanation above

Signed: [signature]

Sampled by: Leesa + Jill

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: PO BOX 245 CESSNOCK NSW 2325

SEND REPORT TO: monitoringresults@cbased.com.au

SEND INVOICE TO: accounts@cbased.com.au, renae.mikka@cbased.com.au

DATA NEEDED BY: 7 working days

REPORT NEEDED BY: 7 working days

PROJECT ID: Hanson GW

QUOTE NO.: SYBQ-403-18

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

also email results to cbased1@bigpond.com

Total unless specified

FOR LAB USE ONLY: 1.3
COOLER SEAL
Yes ...... No ......
Broken ...... ice Intact ......
COOLER TEMP: deg.C

LABORATORY BATCH NO.:

SAMPLERS: Leesa + Jill

PHONE: 0265713334 E-MAIL: monitoringresults@cbased.com.au

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	Ca, Mg, K, Na	Alkalinity	Sulfate	Chloride	Fluoride	Nitrate	Al, As, B, Cd	Cr, Cu, Fe, Hg	Mn, Ni, Pb, Se, Zn	NOTES
CQ3	Water	2-4-20		1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ4	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ5	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ6	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ7	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ8	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ9	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ10	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ11s	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ11d	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ12	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CQ13	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP3	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
~~CP4~~	~~Water~~			~~1x500mlGP, 1x250mlGP,1xRP~~	~~3~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	
CP5	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP6	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP7	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP8	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP13	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
CP15	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW7	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW8	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW9	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW10	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW13	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW16	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
MW17	Water			1x500mlGP, 1x250mlGP,1xRP	3	x	x	x	x	x	x	x	x	x	x	x	
				Total Bottles													

Environmental Division
Sydney
Work Order Reference
ES2011652
Telephone: + 61-2-8784 8555

RELINQUISHED BY:		RECEIVED BY:		
NAME: J Peterson	DATE: 3.4.20	NAME: AL	DATE: 3/4/20	METHOD OF SHIPMENT
OF: C Based Environmental	TIME: 4.10	OF: ALS	TIME: 4:11pm	CONSIGNMENT NOTE NO.
NAME:	DATE:	NAME:	DATE:	TRANSPORT CO. NAME.
OF:	TIME:	OF:	TIME:	

*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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2011652**	Page	: 1 of 12
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: All Deliverables	Contact	: Customer Services ES
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6571 3334	Telephone	: +61-2-8784 8555
Project	: Hanson GW	Date Samples Received	: 03-Apr-2020 16:11
Order number	: ----	Date Analysis Commenced	: 03-Apr-2020
C-O-C number	: ----	Issue Date	: 14-Apr-2020 16:47
Sampler	: Jill, Leesa King		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 23		
No. of samples analysed	: 23		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- ED041G: LOR raised for Sulfate on sample No 17 due to sample matrix.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	CQ3	CQ4	CQ5	CQ7	CQ8
			Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	ES2011652-001	ES2011652-002	ES2011652-003	ES2011652-004	ES2011652-005
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	**6.10**	**4.58**	**5.76**	**4.54**	**4.28**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**126**	**149**	**243**	**120**	**154**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**21**	**8**	**48**	**3**	<1
Total Alkalinity as CaCO3	----	1	mg/L	**21**	**8**	**48**	**3**	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**4**	**8**	**21**	**5**	**11**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**24**	**24**	**30**	**24**	**21**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**2**	<1	**5**	<1	<1
Magnesium	7439-95-4	1	mg/L	**4**	**2**	**5**	**2**	**4**
Sodium	7440-23-5	1	mg/L	**14**	**20**	**16**	**14**	**14**
Potassium	7440-09-7	1	mg/L	**2**	<1	**6**	**1**	<1
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.13**	**0.32**	**2.33**	**0.19**	**0.54**
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	**0.0002**	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	**0.001**	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	**0.002**	**0.001**	**0.011**	**0.001**	**0.011**
Lead	7439-92-1	0.001	mg/L	**0.001**	<0.001	**0.004**	**0.002**	**0.001**
Manganese	7439-96-5	0.001	mg/L	**0.152**	**0.003**	**0.052**	**0.004**	**0.007**
Nickel	7440-02-0	0.001	mg/L	**0.004**	<0.001	**0.001**	<0.001	**0.002**
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	**0.048**	**0.028**	**0.317**	**0.027**	**0.080**
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	**1.02**	<0.05	**1.00**	**0.08**	**0.09**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CQ3	CQ4	CQ5	CQ7	CQ8
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		ES2011652-001	ES2011652-002	ES2011652-003	ES2011652-004	ES2011652-005
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	**0.04**	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.31**	**4.27**	<0.01	**1.87**	**4.63**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.31**	**4.27**	<0.01	**1.91**	**4.63**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	CQ10	CQ11s	CQ11d	CQ12	CQ13
			Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	ES2011652-006	ES2011652-007	ES2011652-008	ES2011652-009	ES2011652-010
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	4.43	5.62	5.26	4.80	4.30
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	148	175	165	147	170
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1	20	11	3	<1
Total Alkalinity as CaCO3	----	1	mg/L	1	20	11	3	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	16	19	24	27	3
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	27	26	25	17	31
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	1	<1	<1	<1
Magnesium	7439-95-4	1	mg/L	2	4	4	5	4
Sodium	7440-23-5	1	mg/L	18	20	20	11	17
Potassium	7440-09-7	1	mg/L	<1	3	2	2	2
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	1.32	0.18	0.35	0.71	0.42
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.004	0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.027	0.002	0.002	0.002	<0.001
Lead	7439-92-1	0.001	mg/L	0.015	0.002	0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.036	0.019	0.017	0.008	0.004
Nickel	7440-02-0	0.001	mg/L	0.004	0.002	0.002	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.200	0.056	0.106	0.267	0.006
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	1.13	0.35	0.24	<0.05	<0.05
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	0.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CQ10	CQ11s	CQ11d	CQ12	CQ13
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		ES2011652-006	ES2011652-007	ES2011652-008	ES2011652-009	ES2011652-010
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	**0.19**	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.67**	**0.01**	**0.06**	**1.00**	**4.85**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.67**	**0.01**	**0.06**	**1.19**	**4.85**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	CP5	CP6	CP7	CP8	CP13
			Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	ES2011652-011	ES2011652-012	ES2011652-013	ES2011652-014	ES2011652-015
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	5.17	4.34	6.30	4.46	4.71
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	140	158	163	129	120
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2	<1	24	2	<1
Total Alkalinity as CaCO3	----	1	mg/L	2	<1	24	2	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	10	<1	10	16
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	17	21	15	25	21
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1	<1	6	<1	2
Magnesium	7439-95-4	1	mg/L	8	6	3	2	2
Sodium	7440-23-5	1	mg/L	9	14	6	17	13
Potassium	7440-09-7	1	mg/L	2	<1	18	<1	3
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.39	0.23	1.11	0.68	0.50
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0004	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.006	0.005	0.002	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.022	0.007	0.102	0.003	0.002
Lead	7439-92-1	0.001	mg/L	0.006	0.024	0.017	0.003	0.001
Manganese	7439-96-5	0.001	mg/L	0.023	0.111	0.326	0.008	0.016
Nickel	7440-02-0	0.001	mg/L	0.046	0.016	0.002	<0.001	0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.155	0.332	0.126	0.029	0.019
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.23	1.91	6.64	0.25	0.22
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CP5	CP6	CP7	CP8	CP13
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		ES2011652-011	ES2011652-012	ES2011652-013	ES2011652-014	ES2011652-015
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	**0.02**	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**5.72**	**5.93**	**0.17**	**1.08**	**0.27**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**5.72**	**5.93**	**0.19**	**1.08**	**0.27**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	CP15	MW7	MW8	MW9	MW10
			Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit	ES2011652-016	ES2011652-017	ES2011652-018	ES2011652-019	ES2011652-020
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	4.35	6.11	5.06	4.45	4.55
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	157	53	77	96	127
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	11	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	<1	11	<1	<1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	<5	4	4	6
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	22	8	18	23	30
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	3	<1	<1	<1
Magnesium	7439-95-4	1	mg/L	5	<1	1	1	2
Sodium	7440-23-5	1	mg/L	14	5	10	13	14
Potassium	7440-09-7	1	mg/L	2	1	<1	<1	<1
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.54	4.09	0.12	0.41	0.68
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.005	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.156	0.003	0.001	0.002	0.002
Lead	7439-92-1	0.001	mg/L	0.004	0.007	<0.001	0.002	0.002
Manganese	7439-96-5	0.001	mg/L	0.014	0.066	0.007	0.013	0.026
Nickel	7440-02-0	0.001	mg/L	0.009	0.002	<0.001	0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.385	0.495	0.046	0.061	0.069
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.12	1.96	0.10	0.24	0.06
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CP15	MW7	MW8	MW9	MW10
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00
Compound	CAS Number	LOR	Unit		ES2011652-016	ES2011652-017	ES2011652-018	ES2011652-019	ES2011652-020
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**5.14**	**0.07**	**0.01**	**0.16**	**0.18**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**5.14**	**0.07**	**0.01**	**0.16**	**0.18**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	MW13	MW16	MW17	----	----
			Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2011652-021	ES2011652-022	ES2011652-023	--------	--------
				Result	Result	Result	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**4.48**	**4.47**	**4.90**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**131**	**127**	**132**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**6**	**3**	**3**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**28**	**31**	**34**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	<1	<1	----	----
Magnesium	7439-95-4	1	mg/L	**2**	**2**	**2**	----	----
Sodium	7440-23-5	1	mg/L	**15**	**16**	**16**	----	----
Potassium	7440-09-7	1	mg/L	<1	<1	<1	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.19**	**0.23**	**0.09**	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	**0.004**	**0.002**	**0.002**	----	----
Lead	7439-92-1	0.001	mg/L	**0.002**	<0.001	**0.004**	----	----
Manganese	7439-96-5	0.001	mg/L	**0.058**	**0.019**	**0.174**	----	----
Nickel	7440-02-0	0.001	mg/L	**0.003**	**0.002**	**0.005**	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L	**0.086**	**0.032**	**0.071**	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Iron	7439-89-6	0.05	mg/L	**0.12**	<0.05	**0.10**	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW13	MW16	MW17	----	----
				Client sampling date / time	02-Apr-2020 00:00	02-Apr-2020 00:00	02-Apr-2020 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2011652-021	ES2011652-022	ES2011652-023	--------	--------
					Result	Result	Result	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.98**	**0.50**	**0.25**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.98**	**0.50**	**0.25**	----	----

CBASED Environmental Pty Limited

ABN 62 611 924 264

Weather Station Field Check

Site: Hanson Calga AWS - Met Station

Date/Time: 14/04/2020 13:00-15:00

Checks Against Reference Sensors

Parameter	Units	Measurement		Difference	Allowable	Pass/Fail	Reference Description
		Site	Reference				
Temperature 1.35m	°C	26.0	26.0	0.0	± 0.5 C	PASS	Ref Temp Sensor
Humidity	%RH	38	39	-1	± 2%	PASS	Ref RH Sensor
Rainfall	mm	4.4	4.7	-0.3	± 0.5 mm	PASS	Glass Pipette
Wind Speed 10m	km/hr	4.7	4.8	-0.1	± 5.4km/hr[1]	PASS	Ref Anemometer
Wind Direction 10m	Degrees	327	325	2	± 5.0°	PASS	Sighting Compass

Allowable tolerances from NSW EPA Approved Methods AM-2 (AS2923-1987) and/or AM-4 (USEPA (2000) EPA 454/R-99-005)

[1] Allowable wind speed either: ± 5.4km/hr (AS2923-1987) or ± 0.2 m/s + 5% of observed (USEPA (2000) EPA 454/R-99-005)

Reference Sensor Specifications: *Calibration expires: 15/01/2021

Sensor	Serial Number	Specifications	Accuracy
*Temperature	200115N01	-40 to 5°C	+/- 0.3°C
		5 to 15°C	+/- 0.3°C
		15 to 65°C	+/- 0.3°C
*Humidity	200115N01	10 to 90%RH	+/- 2%RH
*Anemometer	200115N03	0 to 64km/hr	+/- 0.9m/s
**Rainfall	Standard number of tips	4.7mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degre	+/- 5 Deg

** 100mL Glass pipette used.
Davis Rain bucket station

Reference sensors were certified by Davis Instruments USA using a reference traceable to National Institute of Standards and Technology (NIST) and were "in calibration" when used.

Comments:

The meteorological station passed the field calibration check at the measured levels. Wind vane is aligned to true North. A Davis rain bucket is used at this station.

NA=Not Available

The meteorological station meets the requirements of the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

The weather station has **PASSED** the field check. Next annual field check due: Mar-21

Checked by: C. Davies

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CBASED Environmental Pty Limited
ABN 62 611 924 264

Weather Station Field Check
Annual Physical Screening

Site: Hanson Calga AWS - Met Station
Date: 14/04/2020 13:00-15:00

Check	Comments
Review recorded data	Radio reception is moderate but is working Ok. Av 72% in April
Anemometer zero check	OK
True north alignment	Yes WD sensor aligned to True North
Visual inspection for damage	No visual damage to sensors
Water or insect damage to equipment	Checked and no issues
Anemometer and wind vane	OK
Temperature and Humidity shields	OK
Rain gauge	Cleaned, re-leveled and calibration checked
Battery and Solar panel condition	Ok, cleaned solar panel
Battery Storage level	Good, checked in Weatherlink
Logger system	OK
Time and Date	Correct
Mast and guy wires	Rusty guy wires were replaced with stainless steel wires. OK
Cabinet and wiring	No visual damage

The weather station has **PASSED** the field check. Next field check due: March 2021

Describe any remedial action required:	Nil

Comments:

Mast and mast bolts in good condition. Paper wasp nest removed from the station.

Checked by:	C. Davies

CBASED Environmental Pty Limited
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