CBased Environmental Pty Limited
ABN 62 611 924 264

Calga Quarry

Environmental Monitoring

Dust Deposition, Surface Water, Groundwater and Meteorological Data

June 2021

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Date: 20 July 2021

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;
- Ground water; and
- A meteorological data.

This report was prepared by CBased Environmental and includes the following results for June 2021:

- Dust deposition;
- Surface water quality;
- Bi-annual ground water quality; and
- Meteorological parameters.

The June 2021 dust deposition results for insoluble solids showed:

- Decreased levels when compared to May 2021 with exception to CD5 and CD6 which has increased levels in comparison.
- 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, C1, C2, D and F. 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 were not detected at sites A, C1, C2, D and F in June 2021. Site B was not collected due to water not flowing.

The Calga Quarry weather station data recovery in June 2021 was approximately 100%. A summary of rainfall comparison is provided below.

Location	Rainfall (mm)
Calga Quarry	47.2mm
BOM Peats Ridge*	NA
BOM Gosford*	67.6mm
BOM Peats Ridge long-term mean for June*	99.5mm

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**.

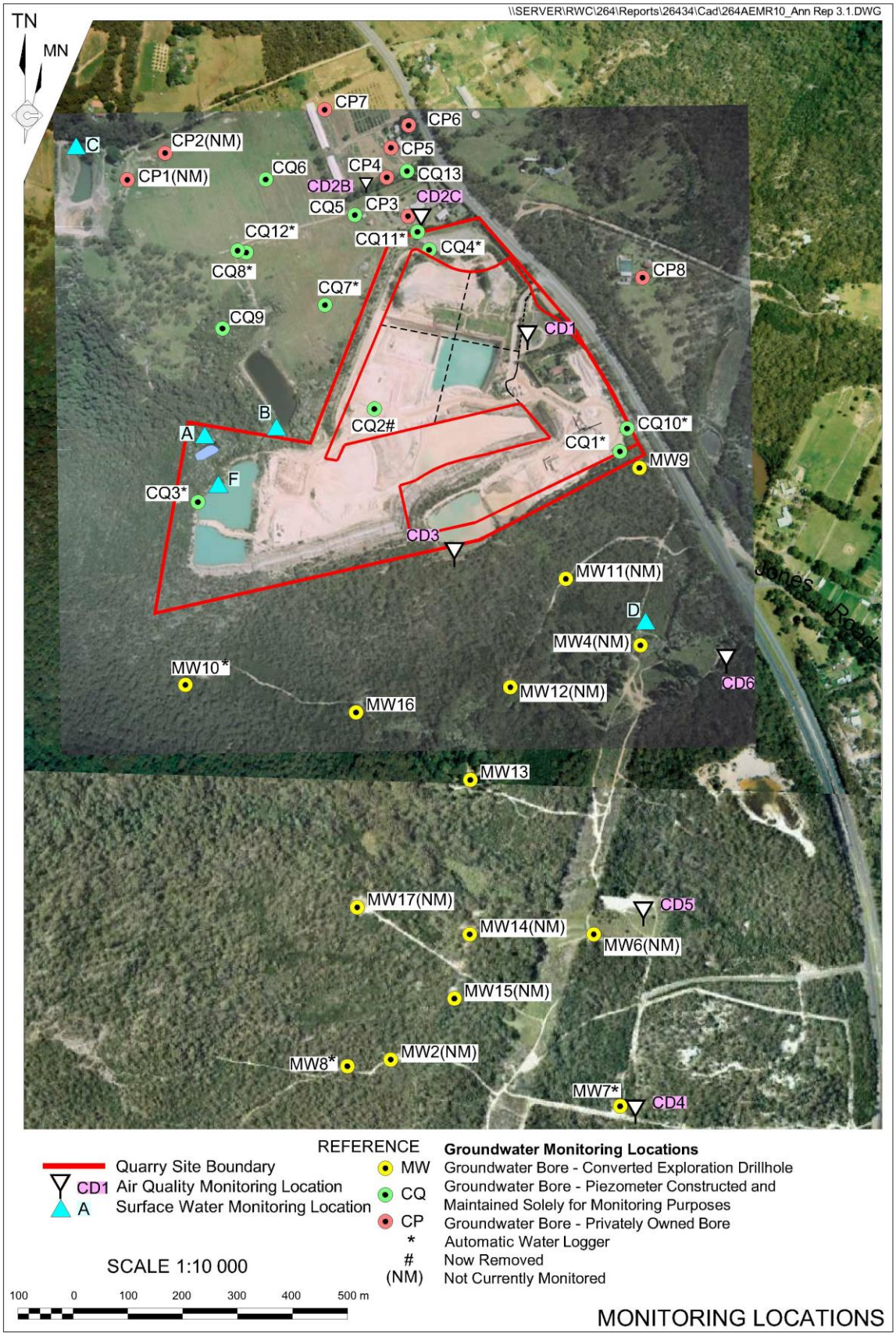


Figure 1: *Hanson Calga Quarry Environmental Monitoring Locations*

2.0 Results

2.1 Dust Deposition

The results for June 2021 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: 3 June 2021 – 1 July 2021 (29 days)

Site	Monthly Insoluble Solids	Monthly Ash Residue	Monthly Combustible Matter	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids
CD1	0.5	0.2	0.3	40	1.4
CD2c	0.2	0.1	0.1	50	0.8
CD3	0.4	0.2	0.2	50	1.2
CD4	0.2	0.1	0.1	50	0.6
CD5	0.2	0.1	0.1	50	0.7
CD6	0.3	0.1	0.2	33	0.6

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 July 2020 to June 2021

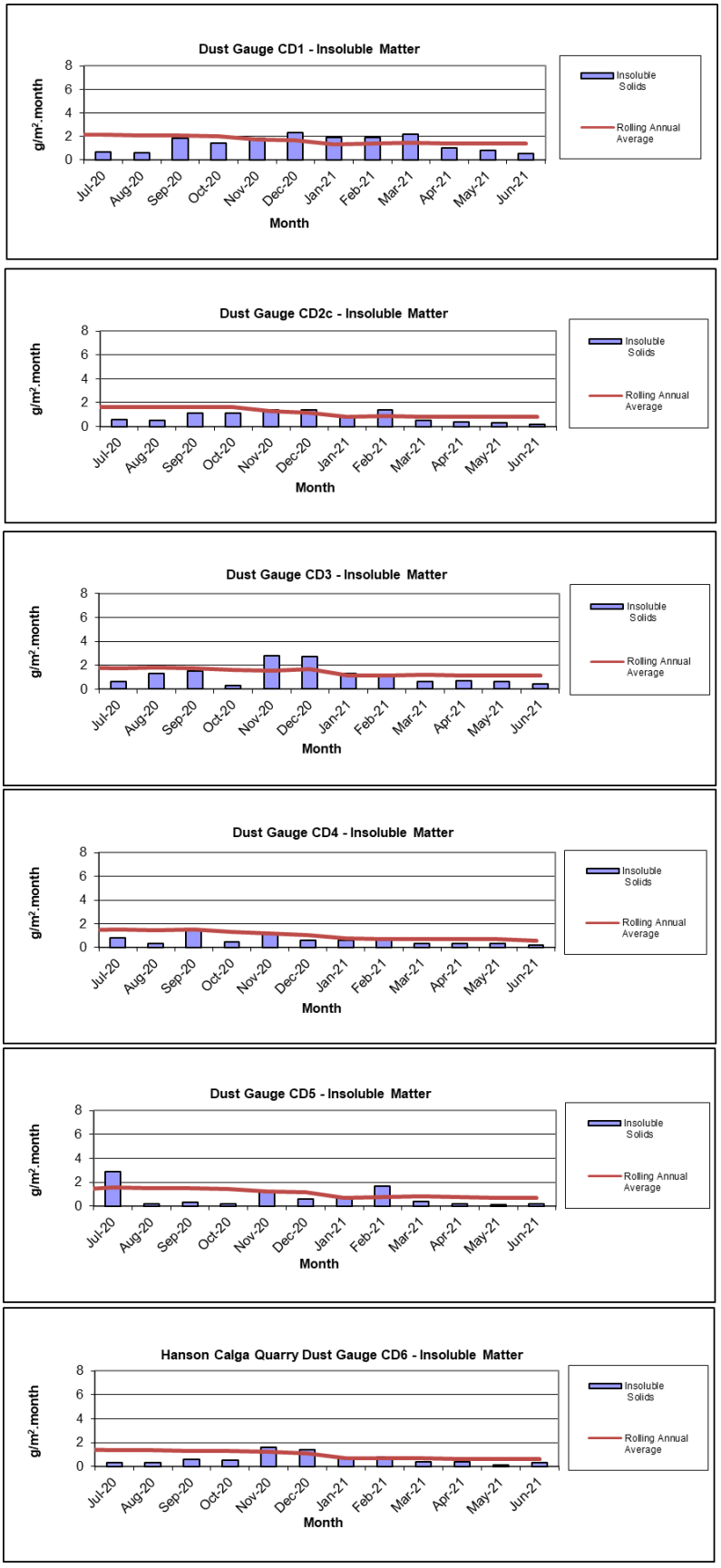


Figure 2: *Summary Monthly/Annual Dust Deposition Results for Insoluble Solids*

2.2 Surface Water (Monthly)

Monthly surface water monitoring was conducted on 3 June 2021 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, C1, C2, D and F.

Table 2: Monthly Surface Water Monitoring Results – June 2021

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	5.85	62	44	<5	<5
B	Not flowing							
C1	Dam	Green	Clear	6.14	93	77	6	<5
C2	Trickle	Green	Clear	6.32	112	62	34	<5
D	Still	Clear	Clear	5.18	93	74	<5	<5
F	Dam	Clear	Clear	6.37	59	48	16	<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 completed in June 2021.

2.3 Groundwater (Bi-monthly)

Groundwater was sampled on 3 June 2021. 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	10.97	6.06	166.9
CQ4	Voutos	* Monitor	8.78	10.61	4.46	166.0
CQ5	Gazzana	Dip only	8.69	6.23	3.92	221.8
CQ6	Gazzana	Dip only	16.00			
CQ7	Gazzana	* Monitor	6.89	5.94	3.89	208.2
CQ8	Gazzana	* Monitor	11.03	5.72	4.07	164.3
CQ9	Gazzana	Dip only	10.10			
CQ10	Voutos	* Monitor	NI	24.45	5.32	161.2
CQ11S	Gazzana	* Monitor	NI	10.76	5.49	189
CQ11D	Gazzana	* Monitor	NI	12.03	5.1	183.3
CQ12	Gazzana	* Monitor	NI	3.79	4.14	193
CQ13	Kashouli	* Monitor	NI	12.63	4.1	189
CP3	Gazzana	Domestic	10.40			
CP4	Kashouli	Domestic	13.63	8.34	4.35	256.3
CP5	Kashouli	Domestic	16.61	5.87	6	144.7
CP6	Kashouli	Domestic	16.27	8.36	4.23	174.3
CP7	Kashouli	Production	8.56	1.31	4.84	172.1
CP8	Rozmanec	Domestic	22.17	20.75	4.25	140
CP13	W P White	Domestic	NI	10.21	4.35	233.1
CP15	32 Polins Road, Calga	Domestic	NI	2.52	4.75	151.9
MW7	Rocla Bore	* Monitor	15.76	13.85	5.38	40.1
MW8	Rocla Bore	* Monitor	9.82	6.72	4.81	82.4
MW9	Rocla Bore	* Monitor	22.44	23.09	4.47	111.0
MW10	Rocla Bore	* Monitor	15.41	11.78	4.36	144.8
MW13	Rocla Bore	Dip only	NI	7.87	4.36	127.9
MW16	Rocla Bore	Dip only	NI	8.35	4.46	142.4
MW17	Rocla Bore	Dip only	NI	10.31	4.79	152.0

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

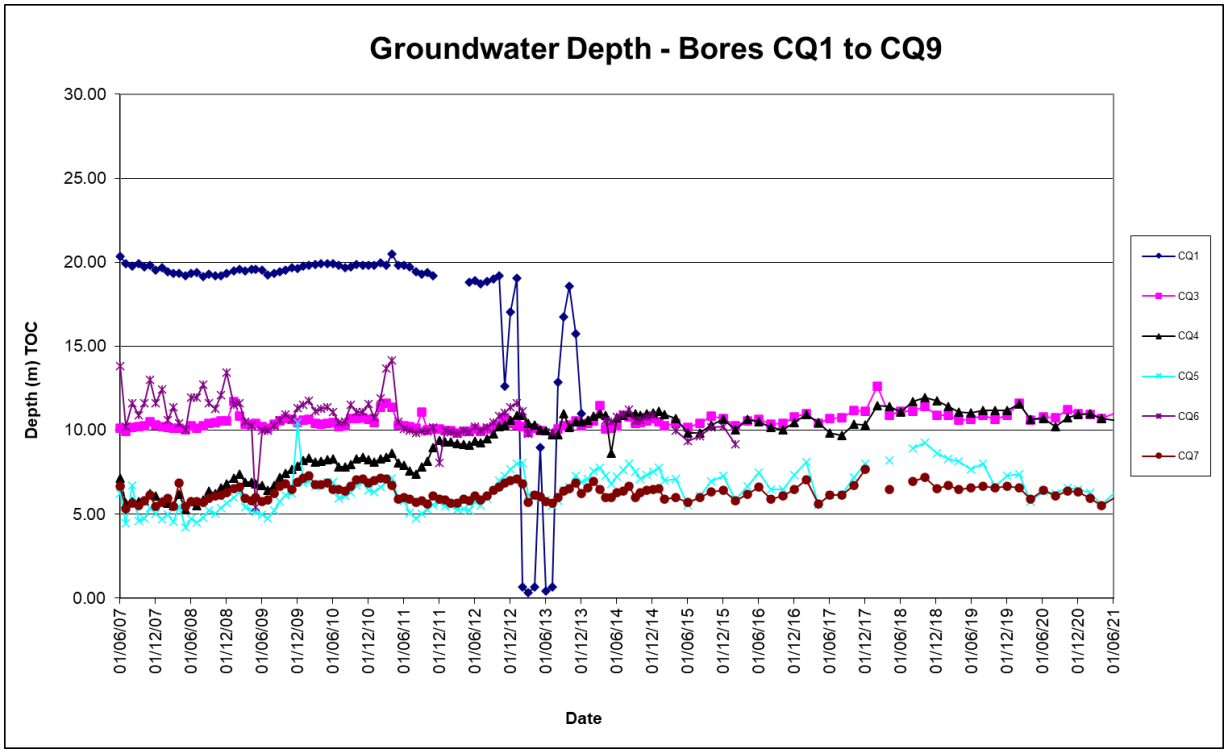


Figure 3: *Groundwater Depth – Bores CQ1 to CQ9*

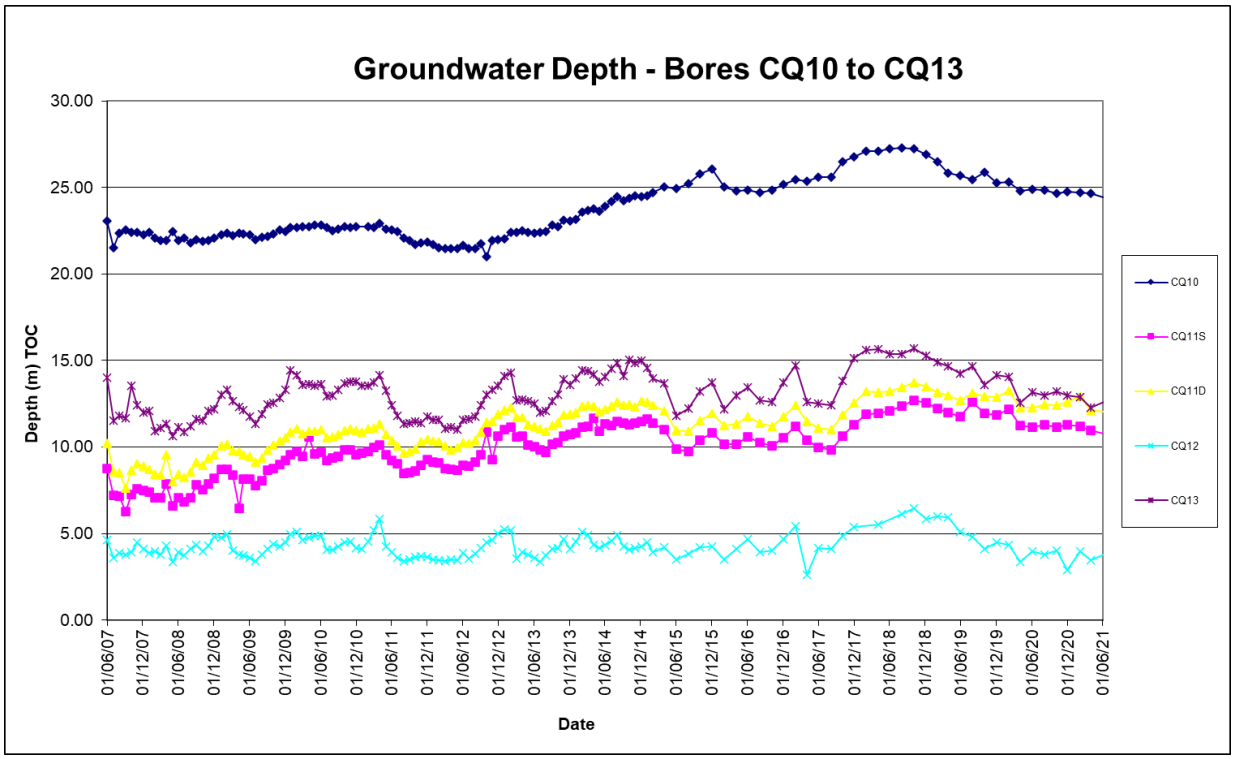


Figure 4: *Groundwater Depth – Bores CQ10 to CQ13*

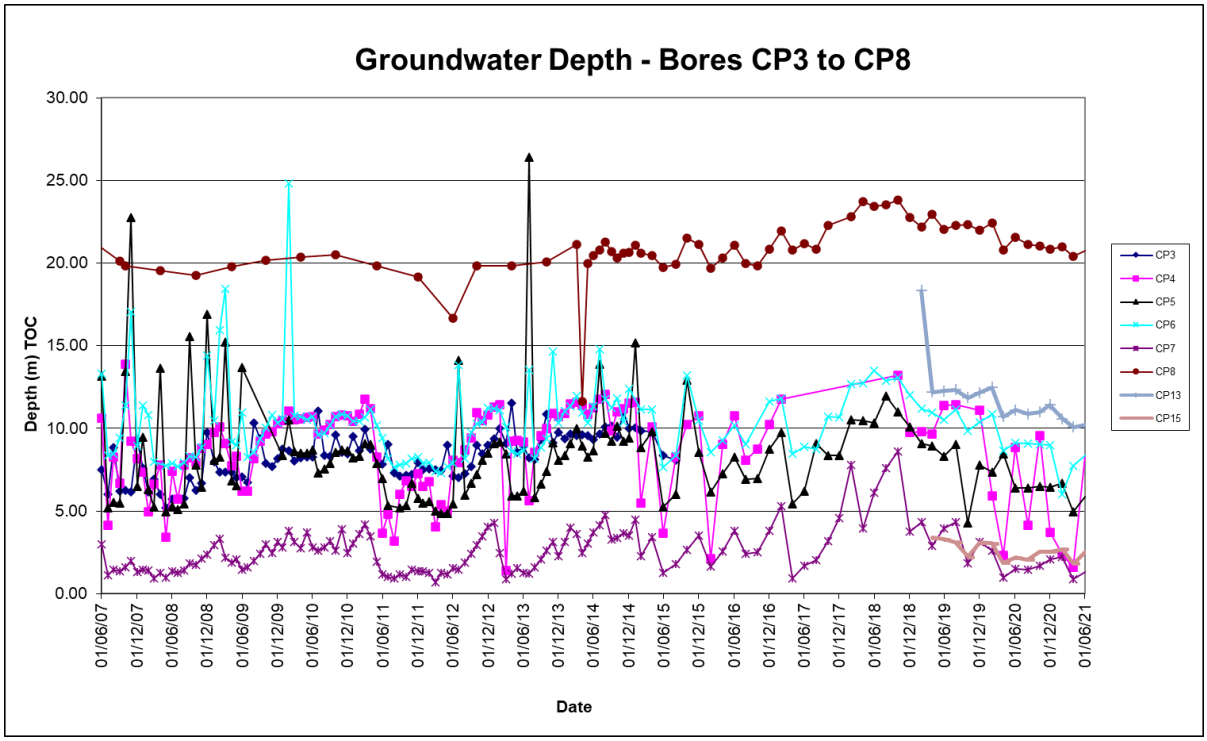


Figure 5: *Groundwater Depth – Bores CP3 to CP8*

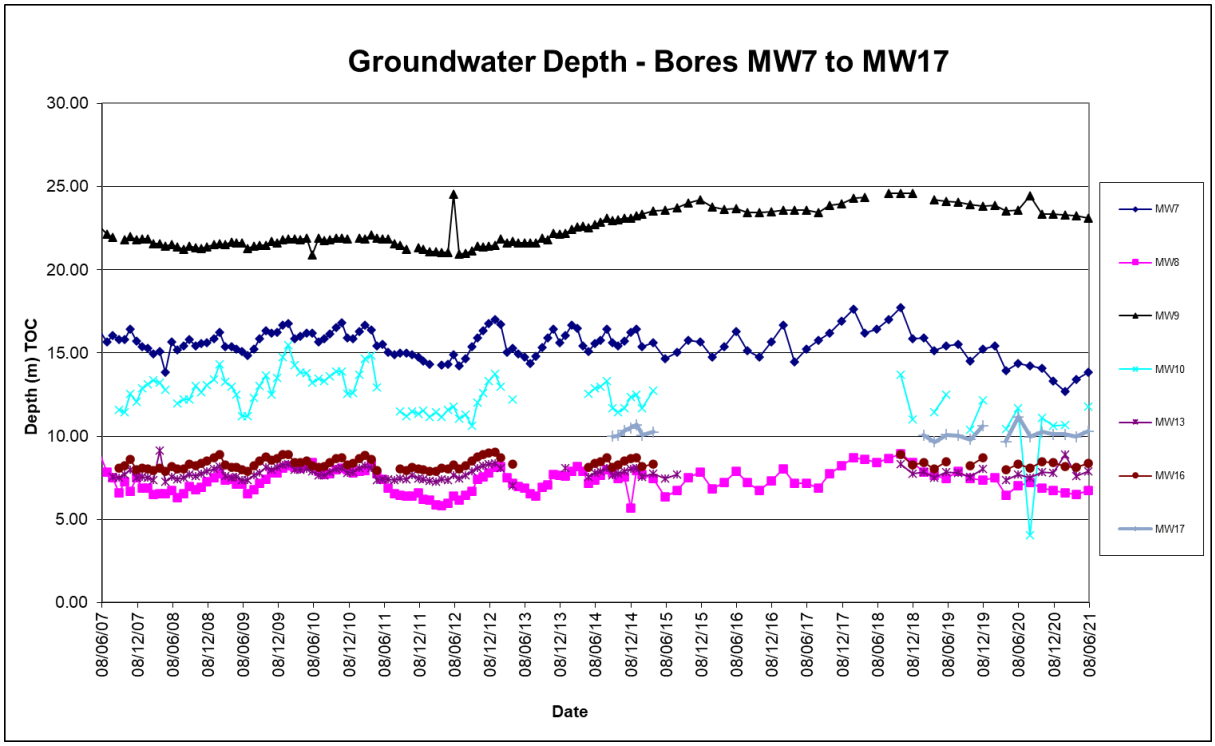


Figure 6: *Groundwater Depth – Bores MW7 to MW17*

2.4 Meteorological Data

The Calga Quarry weather station data recovery for June 2021 was approximately 100%.

The weather station data follows and includes:

- Monthly rainfall comparison between quarry data and BOM data. Refer to **Table 4**;
- Monthly data summary. Refer to **Table 5**;
- 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 7 – 10**; and
- Wind rose (frequency distribution diagram of wind speed and direction). Refer to **Figure 10**.

A summary of rainfall comparison is provided in **Table 4**.

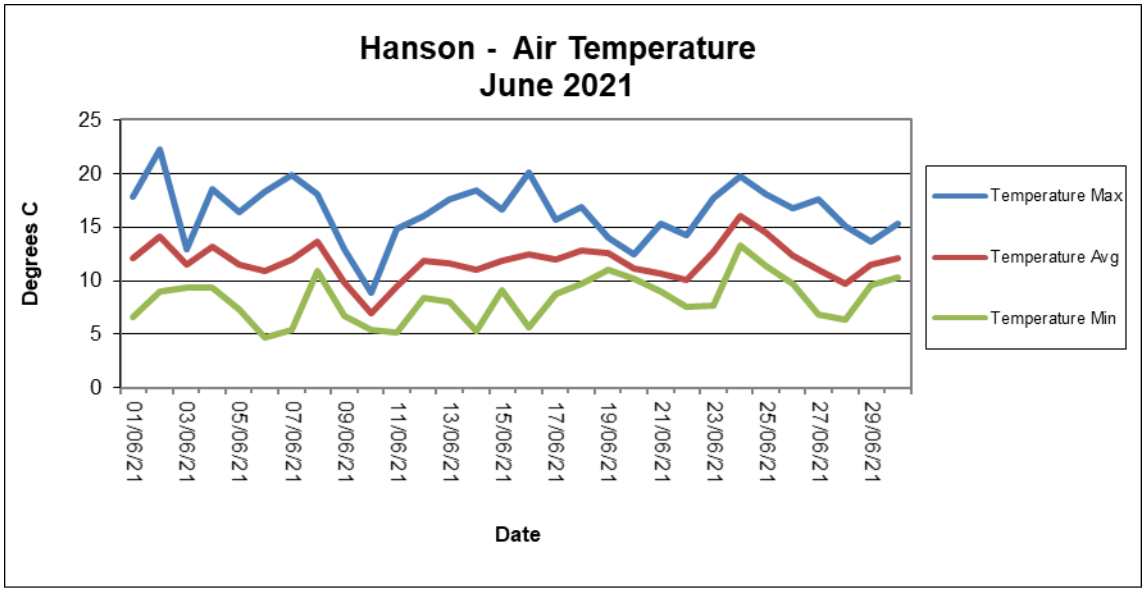
Table 4: Comparison of Local Rainfall – June 2021

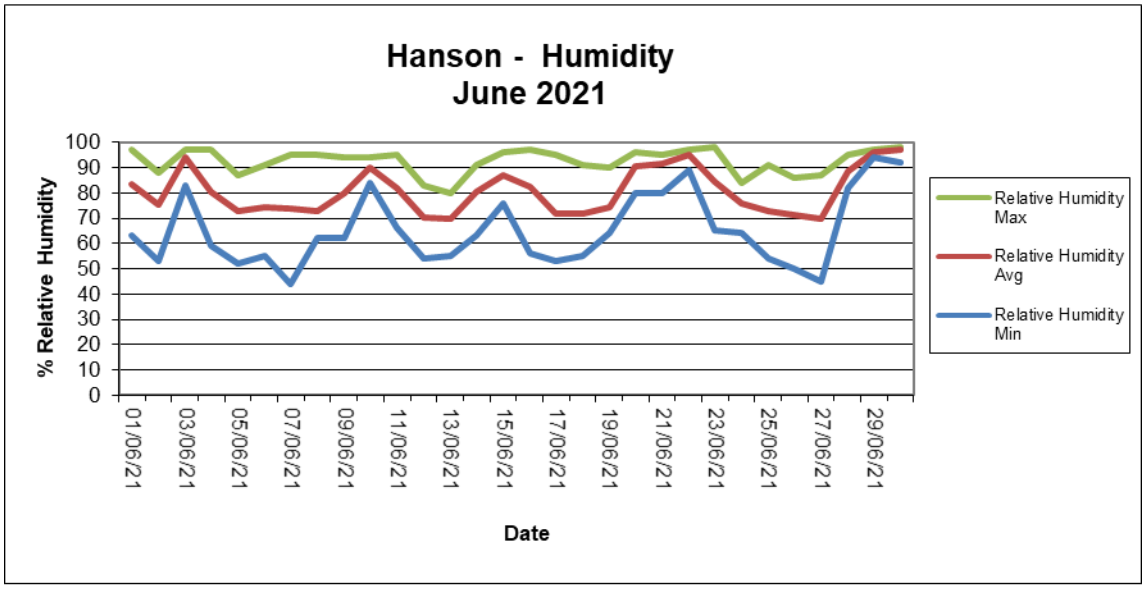
Location	Rainfall (mm)
Calga Quarry	47.2mm
BOM Peats Ridge*	NA
BOM Gosford*	67.6mm
BOM Peats Ridge long-term mean for June*	99.5mm

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.

Table 5: Summary of Monthly Meteorological Data – June 2021

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
1/06/2021	6.6	12.1	17.8	63.0	83.5	97.0	0.0	1.7	0.0	0.6	6.3	6.6	17.4	1017.4	1019.2	1020.8	0.0	111.7	593.0	69.1	89.8	97.8
2/06/2021	9.0	14.2	22.3	53.0	75.6	88.0	0.0	2.2	0.0	0.8	4.9	9.1	21.9	1014.2	1016.4	1018.7	0.0	133.4	566.0	53.6	89.3	99.1
3/06/2021	9.3	11.5	12.9	83.0	94.3	97.0	5.2	0.3	0.0	0.2	3.1	9.3	13.1	1004.9	1009.7	1014.2	0.0	23.1	112.0	50.5	84.8	97.2
4/06/2021	9.3	13.2	18.6	59.0	80.4	97.0	0.2	2.1	0.0	2.1	9.8	9.1	17.9	1004.7	1008.5	1014.8	0.0	109.7	550.0	35.6	81.1	98.1
5/06/2021	7.3	11.5	16.4	52.0	72.8	87.0	0.0	2.2	0.0	1.2	6.7	7.4	15.6	1014.8	1017.7	1020.0	0.0	136.6	565.0	71.3	88.1	95.9
6/06/2021	4.7	11.0	18.3	55.0	74.1	91.0	0.0	2.1	0.0	0.7	6.7	4.7	17.6	1017.7	1020.2	1021.9	0.0	133.8	550.0	75.7	87.6	95.6
7/06/2021	5.4	12.0	19.8	44.0	73.9	95.0	0.0	2.0	0.0	0.7	4.5	5.4	18.7	1013.8	1018.0	1021.1	0.0	128.0	568.0	40.1	86.7	96.5
8/06/2021	10.9	13.6	18.1	62.0	72.9	95.0	7.8	1.5	0.0	1.9	8.5	9.6	17.6	1003.8	1008.5	1013.4	0.0	64.9	515.0	45.1	82.2	96.5
9/06/2021	6.7	9.8	12.9	62.0	80.0	94.0	0.4	2.1	0.0	2.8	10.7	4.2	12.2	999.2	1001.3	1004.7	0.0	129.9	560.0	46.1	79.8	94.3
10/06/2021	5.4	7.0	8.9	84.0	89.9	94.0	3.6	0.4	0.0	1.0	6.7	4.2	9.0	1000.3	1002.3	1005.1	0.0	28.8	155.0	42.6	79.2	95.3
11/06/2021	5.2	9.4	14.8	66.0	82.0	95.0	0.2	2.0	0.0	2.5	10.7	3.4	14.1	1004.9	1008.2	1012.6	0.0	132.3	597.0	48.9	75.2	94.6
12/06/2021	8.4	11.8	16.0	54.0	70.3	83.0	0.0	2.8	1.8	3.3	10.3	6.7	15.1	1011.1	1012.7	1014.0	0.0	132.8	555.0	65.3	78.3	95.0
13/06/2021	8.1	11.7	17.6	55.0	69.6	80.0	0.0	2.5	0.0	1.9	7.6	6.8	16.8	1011.2	1013.3	1014.8	0.0	132.4	550.0	71.9	80.6	88.3
14/06/2021	5.3	11.1	18.4	63.0	80.2	91.0	0.0	1.9	0.0	0.5	4.5	5.3	17.7	1011.6	1013.1	1014.3	0.0	130.1	536.0	74.1	78.5	84.9
15/06/2021	9.1	11.9	16.6	76.0	87.0	96.0	0.0	1.1	0.0	0.2	3.1	9.1	16.2	1012.4	1013.8	1015.3	0.0	81.4	533.0	34.4	67.2	82.6
16/06/2021	5.7	12.5	20.1	56.0	82.6	97.0	2.4	1.9	0.0	1.4	9.8	5.8	19.8	1004.6	1011.4	1014.9	0.0	120.3	546.0	15.5	68.2	86.4
17/06/2021	8.7	11.9	15.7	53.0	71.6	95.0	1.4	2.7	1.3	4.0	13.4	6.3	14.8	1004.7	1006.0	1007.3	0.0	121.1	543.0	26.2	61.9	87.4
18/06/2021	9.7	12.8	16.9	55.0	71.6	91.0	1.6	2.8	1.8	4.2	13.9	7.1	16.0	1001.6	1004.2	1005.7	0.0	107.2	555.0	28.1	51.7	77.6
19/06/2021	11.0	12.6	14.0	64.0	74.6	90.0	0.6	2.1	4.0	5.9	16.1	8.4	13.6	1005.0	1010.4	1016.5	0.0	44.0	273.0	42.9	61.2	78.5
20/06/2021	10.2	11.2	12.4	80.0	90.7	96.0	13.4	0.8	0.9	2.9	9.4	8.2	12.4	1016.2	1019.5	1022.3	0.0	36.2	265.0	43.5	58.5	71.6
21/06/2021	9.0	10.7	15.3	80.0	91.8	95.0	0.0	0.4	0.0	0.9	5.8	8.7	15.2	1021.6	1023.6	1025.9	0.0	43.3	521.0	0.0	37.4	71.3
22/06/2021	7.6	10.1	14.2	89.0	95.3	97.0	0.6	0.3	0.0	0.1	2.2	7.7	13.8	1025.6	1027.2	1029.4	0.0	30.4	526.0	0.0	29.7	72.9
23/06/2021	7.7	12.7	17.7	65.0	84.4	98.0	0.2	1.5	0.0	0.9	5.8	7.8	17.2	1015.8	1022.0	1027.0	0.0	96.0	612.0	0.0	32.9	59.0
24/06/2021	13.3	16.0	19.7	64.0	76.0	84.0	0.0	1.7	0.0	2.0	13.4	13.3	19.5	1008.0	1011.5	1015.7	0.0	70.2	481.0	0.9	42.4	79.8
25/06/2021	11.4	14.5	18.1	54.0	72.6	91.0	0.0	2.6	0.0	1.9	11.2	11.4	17.3	1009.2	1012.1	1015.2	0.0	131.0	545.0	16.1	32.8	50.8
26/06/2021	9.7	12.3	16.7	50.0	71.2	86.0	0.0	2.3	0.0	2.7	9.8	8.7	15.5	1014.8	1016.6	1019.9	0.0	104.3	592.0	0.0	35.1	56.8
27/06/2021	6.8	11.1	17.6	45.0	69.9	87.0	0.0	2.2	0.0	0.9	6.3	6.8	16.3	1019.8	1022.7	1026.9	0.0	133.5	554.0	22.1	35.0	48.6
28/06/2021	6.4	9.8	15.1	82.0	88.6	95.0	0.0	0.4	0.0	0.3	4.5	6.4	15.0	1026.3	1028.1	1029.6	0.0	42.4	444.0	0.0	18.3	86.4
29/06/2021	9.6	11.5	13.6	94.0	95.9	97.0	5.4	0.6	0.0	0.7	5.4	9.1	13.8	1028.3	1029.5	1031.1	0.0	51.2	298.0	0.0	33.3	100.0
30/06/2021	10.3	12.0	15.3	92.0	96.9	98.0	4.2	0.7	0.0	0.3	3.1	10.3	15.6	1024.0	1026.4	1029.3	0.0	57.3	378.0	16.1	31.2	48.9
Monthly	4.7	11.8	22.3	44	81	98	47.2	49.8	0.0	1.6	16.1	3.4	21.9	999.2	1015.1	1031.1	0.0	93.2	612.0	0.0	61.9	100.0
Unit	*Degrees Celcius (^oC)*			*Percentage Relative Humidity*			*mm*	*mm*	*Metres per second (m/s)*			*^oC*	*^oC*	*Hector Pascals (hPa)*			*Watts per square metre (W/m^2)*			*Percentage (%)*		





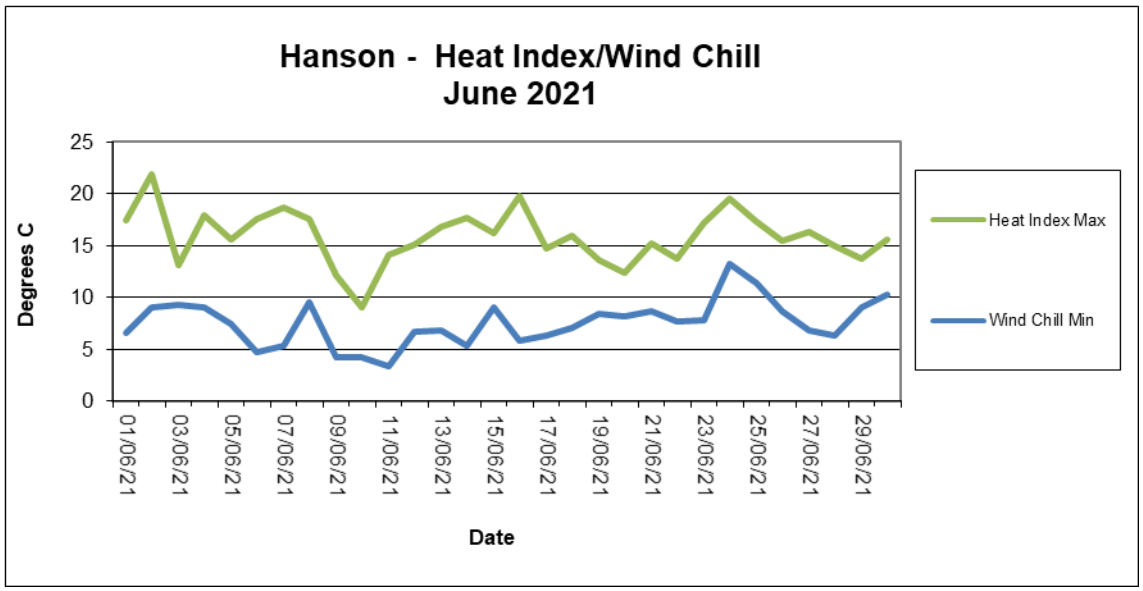
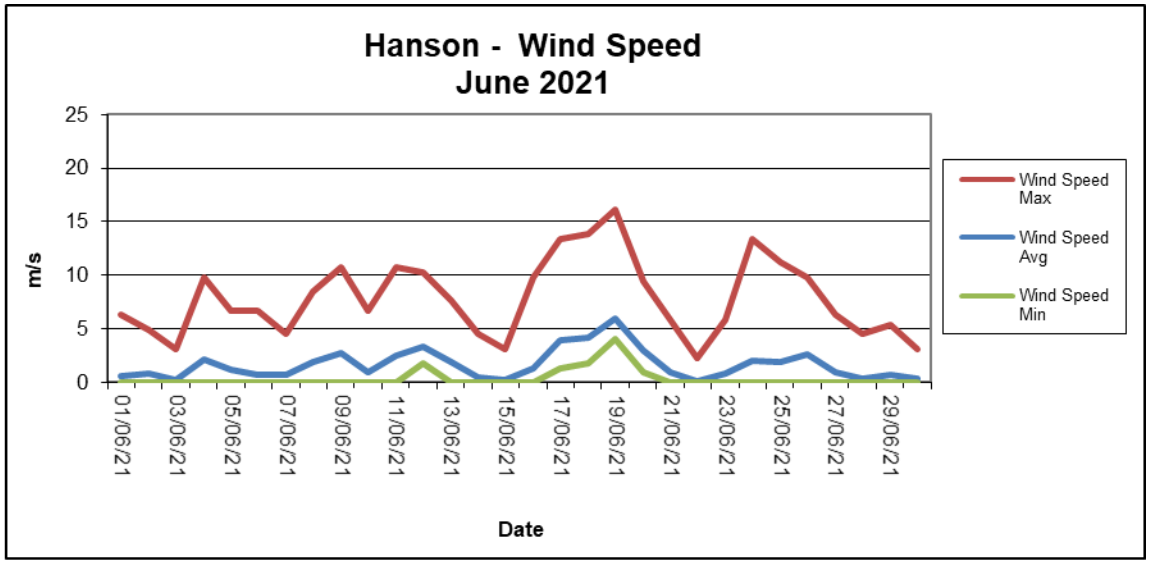
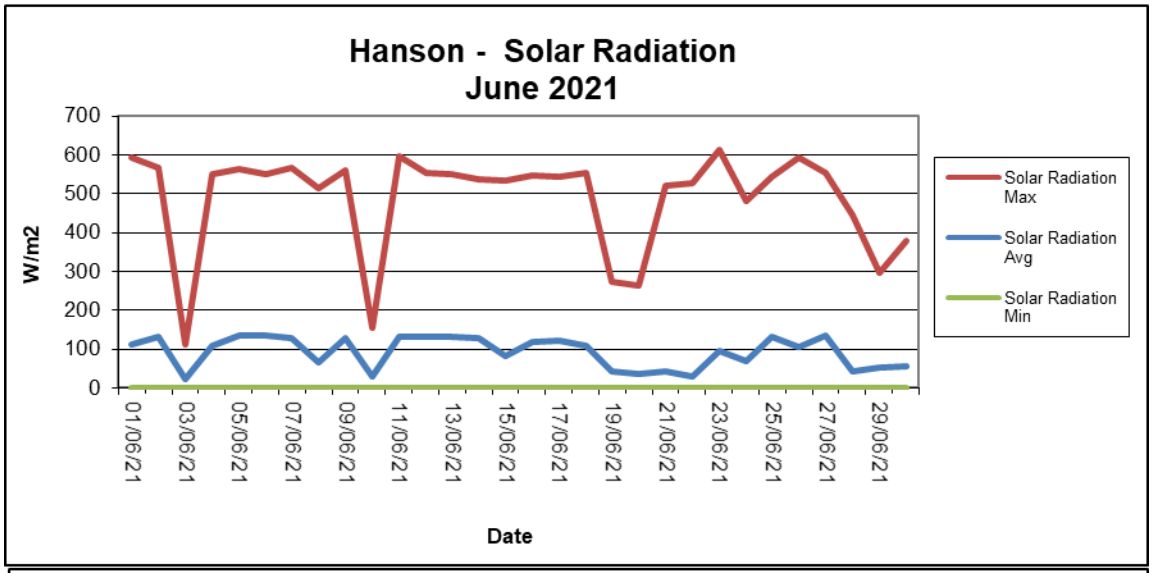


Figure 7 *Summary of Monthly Temperature, Humidity and Heat Index Results*





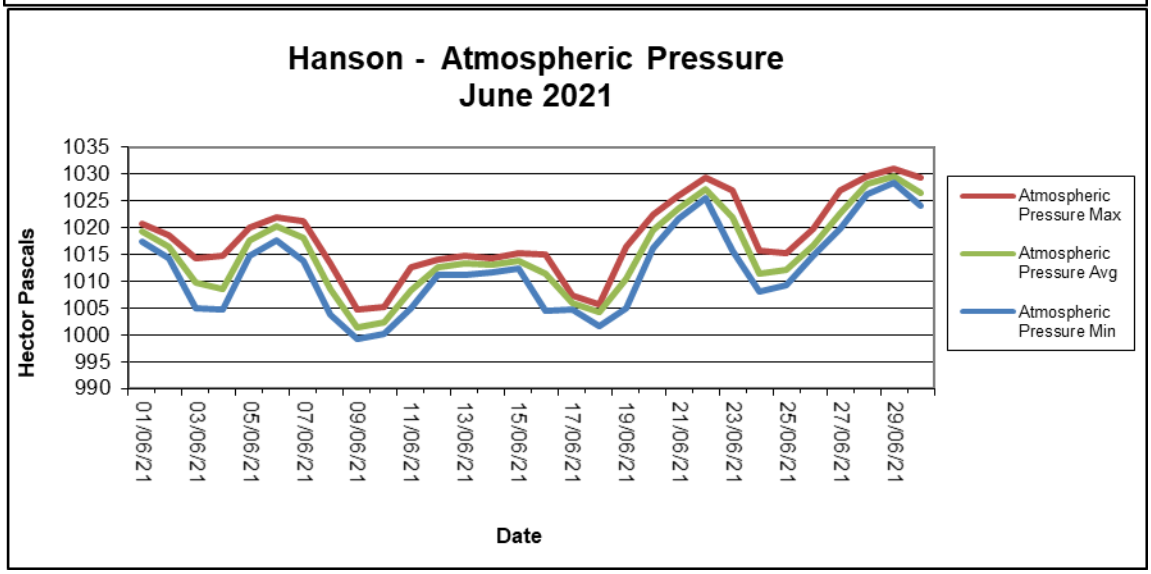


Figure 8 *Summary of Monthly Wind Speed, Solar Radiation and Atmospheric Pressure Results*

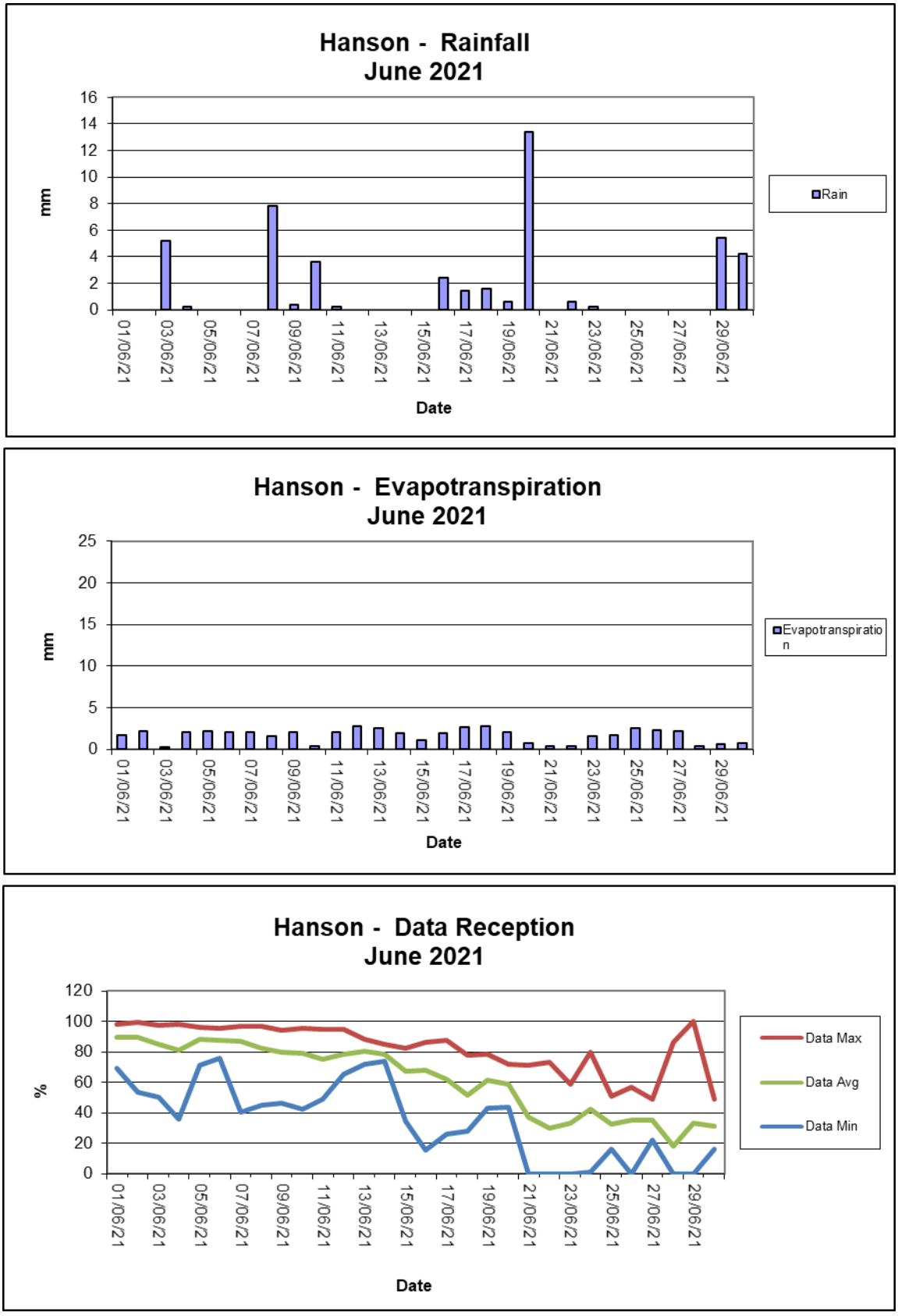


Figure 9 *Summary of Monthly Rainfall, Evapotranspiration and Data Reception Results*

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.

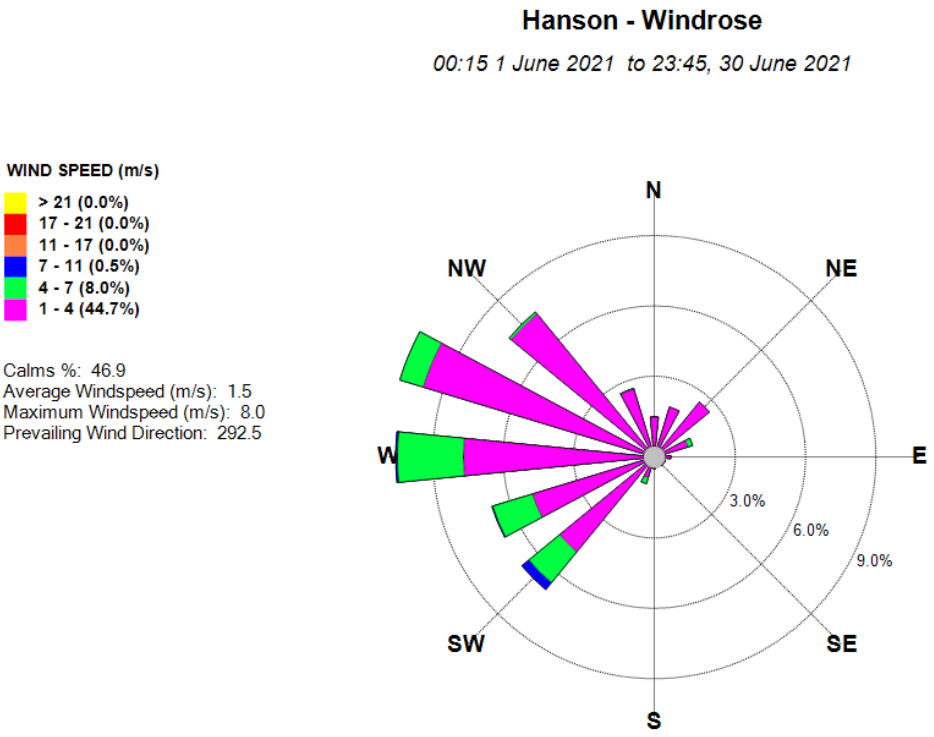


Figure 10: *Monthly Windrose Plot – June 2021*

The predominant wind for June was from the West-North-West with most frequent, strongest winds from the West-North-West. The maximum wind speed was 16.1 m/s from the South-West.

Appendix 1

Field Sheets

Chain of Custody Documentation

Laboratory Analysis Certificates

DEPOSITIONAL DUST MONITORING

Client: ..... **Hanson Calga Quarry** .....

Date Installed: 3.6.21

Date Collected: 1.7.21

Sampled By: Maddie + Leesa

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	9:30	1300	✔		✔	✔	(C) S T	(C) O Bn Gn Gy	Y	Y	–	
CD2C	10:40	1000	✔			✔	(C) S T	(C) O Bn Gn Gy	|	|	|	overgrown
CD3	9:20	1000	✔		✔	✔	(C) S T	(C) O Bn Gn Gy	|	|	|	overgrown.
CD4	10:20	1200	✔		✔	✔	(C) S T	(C) O Bn Gn Gy	|	|	|	
CD5	10:10	1200	✔			✔	(C) S T	(C) O Bn Gn Gy	|	|	|	
CD6	10:00	1200	✔			✔	(C) S T	(C) O Bn Gn Gy	|	|	|	

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: M

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: 47 Boomerang St 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 Calga Dusts

QUOTE NO.: SYBQ 403-18

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

LABORATORY BATCH NO.:

SAMPLERS: Leesa + maddie

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 DATA				CONTAINER DATA		Insoluable Solids	Ash Residue	Combustable Matte	NOTES
SAMPLE ID	MATRIX	DATE ON	DATE OFF	TYPE & PRESERVATIVE	NO.				
CD1	Dust	30/6/21	1-7-21			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:

NAME: Leesa King DATE: 2-7-21

OF: CBased Environmental TIME: 11-30

NAME: DATE:

OF: TIME:

RECEIVED BY

NAME: DATE: 2-7-21

OF: ALS TIME: 11:30

NAME: DATE:

OF: TIME:

METHOD OF SHIPMENT

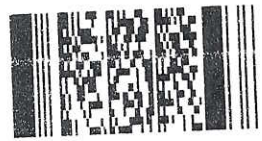
CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

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

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Newcastle
Work Order Reference
EN2105712



Telephone : + 61 2 4014 2500

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2105712**	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	: 02-Jul-2021 11:30
Order number	: ----	Date Analysis Commenced	: 05-Jul-2021
C-O-C number	: ----	Issue Date	: 13-Jul-2021 16:18
Sampler	: Leesa King, Maddie Brown		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 6		
No. of samples analysed	: 6		

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, unless the sampling was conducted by ALS. 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*
Zoran Grozdanovski	Laboratory Operator	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	Sample ID	CD1 03/06/21 - 1/07/21	CD2c 03/06/21 - 1/07/21	CD3 03/06/21 - 1/07/21	CD4 03/06/21 - 1/07/21	CD5 03/06/21 - 1/07/21
				Sampling date / time	01-Jul-2021 00:00	01-Jul-2021 00:00	01-Jul-2021 00:00	01-Jul-2021 00:00	01-Jul-2021 00:00
					EN2105712-001	EN2105712-002	EN2105712-003	EN2105712-004	EN2105712-005
					Result	Result	Result	Result	Result
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.2**	**0.1**	**0.2**	**0.1**	**0.1**
Ash Content (mg)	----	1	mg		**3**	**2**	**3**	**1**	**2**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.3**	**0.1**	**0.2**	**0.1**	**0.1**
Combustible Matter (mg)	----	1	mg		**5**	**1**	**4**	**2**	**2**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.5**	**0.2**	**0.4**	**0.2**	**0.2**
Total Insoluble Matter (mg)	----	1	mg		**8**	**3**	**7**	**3**	**4**

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Sample ID	**CD6 03/06/21 - 1/07/21**	----	----	----	----
				Sampling date / time	01-Jul-2021 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN2105712-006**	--------	--------	--------	--------
					Result	----	----	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.1**	**----**	**----**	**----**	**----**
Ash Content (mg)	----	1	mg		**2**	**----**	**----**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.2**	**----**	**----**	**----**	**----**
Combustible Matter (mg)	----	1	mg		**3**	**----**	**----**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.3**	**----**	**----**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**5**	**----**	**----**	**----**	**----**

CBASED ENVIRONMENTAL PTY LIMITED

Date: 3.6.21

Client : Hanson Calga

Project :

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	Dam	NO	8:45	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
B	—	—	8:30	~~1x 250ml GP, 1x 500mL GP, 1x PG~~	~~C S T~~	~~C LO O B G~~	Not flowing
C1	Dam Trickle	NO	14:55	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	C LO O B (G)	
C2		NO	15:10	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	C LO O B (G)	
D	STILL	NO	10:20	1x 250ml GP, 1x 500mL GP, 1x PG	(C) S T	(C) LO O B G	
F	Dam	NO	8:40	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: M.

Sampled by: Maddie + Alex

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: renae.mikka@cbased.com.au; accounts@cbased.com.au

DATA NEEDED BY: 5 working days

REPORT NEEDED BY: 5 working days

PROJECT ID: Hanson Quarry SW

QUOTE NO.: SYBQ-403-18

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... Intact ....
COOLER TEMP: 2-2 (ice) deg.C

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS: CBased Environmental Pty Ltd

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 DATA				CONTAINER DATA		pH	EC	TSS	TDS	O+G	NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.						
A	Water	3.6.21	8:45	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
~~B~~	~~Water~~			~~1x 250mlGP,1x 500mLGP,1xPG~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	
C1	Water	3.6.21	14:55	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
C2	Water	3.6.21	15:10	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
D	Water	3.6.21	10:20	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
F	Water	3.6.21	8:40	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
				TOTAL BOTTLES:							

RELINQUISHED BY:

NAME: Teresa King DATE: 4.6.21

OF: CBased Environmental TIME: 12:00

NAME: DATE:

OF: TIME:

RECEIVED BY

NAME: KS DATE: 4.6.21

OF: ALS TIME: 1pm

NAME: DATE:

OF: TIME:

METHOD OF SHIPMENT

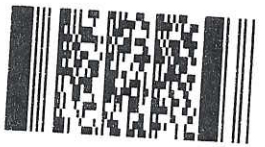
CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

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

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Sydney
Work Order Reference
ES2121079



Telephone : + 61-2-8784 8555

CERTIFICATE OF ANALYSIS

Work Order	: **ES2121079**	Page	: 1 of 2
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: All Deliverables	Contact	: Helen Simpson
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	: 04-Jun-2021 12:00
Order number	: ----	Date Analysis Commenced	: 04-Jun-2021
C-O-C number	: ----	Issue Date	: 11-Jun-2021 10:27
Sampler	: CBased Environmental Pty Ltd		
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, unless the sampling was conducted by ALS. 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.

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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**)			Sample ID	A	C1	C2	D	F
			Sampling date / time	03-Jun-2021 08:45	03-Jun-2021 14:55	03-Jun-2021 15:10	03-Jun-2021 10:20	03-Jun-2021 08:40
Compound	*CAS Number*	*LOR*	*Unit*	**ES2121079-001**	**ES2121079-002**	**ES2121079-003**	**ES2121079-004**	**ES2121079-005**
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	**5.85**	**6.14**	**6.32**	**5.18**	**6.37**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**62**	**93**	**112**	**93**	**59**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**44**	**77**	**62**	**74**	**48**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**6**	**34**	<5	**16**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	<5

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle - Water, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(WATER) EA005: pH

C BASED ENVIRONMENTAL PTY LIMITED

Date: 3.6.21

Client : Hanson Calga
Project : Bi-Monthly Bores

GROUNDWATERS

Site	Time	DEPTH	Typical Depth (m)	Odour	Water Turbidity	Water Colour	1 pH	1 EC	2 pH	2 EC	Downloaded Logger? (Y/N)*	Comments
CQ3	9:00	10.97	10.74	NO	C S T	C LO O B G	6.11	164.5us	6.06	166.9us	Y	
CQ4	12:40	10.61	11.19	NO	C S T	C LO O B G	4.38	164.4	4.46	166 us	Y	
CQ5	14:00	6.23	8.04	NO	C S T	C LO O B G	3.90	275.6	3.98	271.8us		
CQ7	13:50	5.94	6.61	NO	C S T	C LO O B G	3.91	219.8	3.89	208.2us		
* CQ8	13:15	5.72	6.93	NO	C S T	C LO O B G	4.13	175.8us	4.07	164.3us	Y	LOGGER REMOVED.
CQ10	9:50	24.45	25.86	YES	C S T	C LO O B G	5.20	149.7us	5.32	161.2us	Y	SLIGHT H2S SMELL.
CQ11S	12:30	10.76	12.1	YES	C S T	C LO O B G	5.55	179 us	5.49	189 us	Y	" "
CQ11D	12:55	12.03	12.98	YES	C S T	C LO O B G	5.17	185.9us	5.10	183.3us	Y	" "
CQ12	13:30	3.79	5.46	NO	C S T	C LO O B G	4.08	190.6us	4.14	193. us	Y	
CQ13	14:05	12.63	14.42	NO	C S T	C LO O B G	4.06	194.2us	4.10	189.4us	Y	
CP4	14.10	8.34	10.56	NO	C S T	C LO O B G	4.32	257.8us	4.35	258.3us		
CP5	14.25	5.87	7.95	NO	C S T	C LO O B G	5.81	146.7us	6.00	144.7us		
CP6	12:20	8.36	10.73	NO	C S T	C LO O B G	4.24	184.6us	4.23	174.3us		
CP7	14:35	1.31	3.47	NO	C S T	C LO O B G	4.83	167.3us	4.84	172.1us		
CP8	15:30	26.75	22.36	NO	C S T	C LO O B G	4.42	146.1us	4.25	140.us		
CP13**	14:50	10.21	13.4	NO	C S T	C LO O B G	4.41	236.4us	4.35	233.1us		
CP15	15:20	2.52	3.01	NO	C S T	C LO O B G	4.93	153.3us	4.95	151.9us		
MW7	11:40	13.85	15.3	NO	C S T	C LO O B G	5.49	42.5us	5.38	40.1us	Y	
MW8	11:20	6.72	7.66	NO	C S T	C LO O B G	4.85	81.9us	4.81	82.4us	Y	
MW9	10:00	23.09	24.09	NO	C S T	C LO O B G	4.39	110.7us	4.47	111us	Y	
MW10	10:45	11.78	11.44	NO	C S T	C LO O B G	4.29	139.5us	4.36	144.1us	Y	
MW13	10:25	7.87	7.71	NO	C S T	C LO O B G	4.30	128.0us	4.36	127.9us		
MW16	10:30	8:35	8.29	NO	C S T	C LO O B G	4.31	143.1us	4.40	142.4us		
MW17	12:00	10.31	9.93	NO	C S T	C LO O B G	4.39	148 us	4.39	152 us		

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)
pH/EC meter #: 0515453
Laptop ID #: TBK-003.
Signed:

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

Sampled by: maddie + Alex.

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

Contact Wynston 15 min prior to access on: **0414 900 555

* LOGGER REMOVED DUE TO MALFUNCTION.