Monthly Air Quality Monitoring – September 2019
Bass Point Quarry

Licensee
HANSON CONSTRUCTION MATERIALS PTY LTD
LOCKED BAG 5260
PARRAMATTA NSW 2124

Premises Details
HANSON CONSTRUCTION MATERIALS PTY LTD
BOOLLWARROO PARADE
SHELLHARBOUR
NSW 2529
LOT 16 DP 627783, LOT 78 DP 751290, LOT 22 DP 1010797

Project Approval: Ref 08_0143, January 28, 2014
Environmental Protection Licence (EPL) No: 2193*

* Listed in the EPA Public Register

Report Author: Chelsea Flood (Compliance Officer)
Date issued: 21.11.2019

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Figures

Tables

1. Air quality monitoring requirements

As per the Project Approval and Air Quality Management Plan (AQMP), the quarry is required to report on the following:

1.1. Particulate Matter

The quarry monitors two PM_{10} samplers (**Table 1**, **Figure 1**) and will gather representative data, to compare the results against the following tables:

Table 4: Long-Term Impact Assessment Criteria for Particulate Matter

Pollutant	***Averaging period***	***[d] Criterion***
Total suspended particulates (TSP)	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 5: Short Term Impact Assessment Criteria for Particulate Matter

Pollutant	***Averaging period***	***[d] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

1.2. Dust Deposition Gauges

The quarry monitors two Dust Deposition Gauges (DDGs) (**Table 1**, **Figure 1**) and will compare the results against the following table:

Table 6: Long-Term Impact Assessment Criteria for Deposited Dust

Pollutant	***Averaging period***	***Maximum increase in deposited dust level***	***Maximum total deposited dust level***
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

1.3. Representative Meteorological Data

The quarry will gather representative meteorological data for the respective month including temperature, rainfall, wind speed and direction.

2. Air quality monitoring program

The Air Quality Management Plan was prepared by SLR Global Environmental solutions and details the assessment criteria, monitoring locations and procedures, and the compliance checking procedures for the subsequent reporting in accordance with the Department of Planning, Industry and Environment (DPIE) and the Environment Protection Authority (EPA) requirements.

All monitoring locations conform to the requirements of *AS 3580.1.1:2016*, subject to local site constraints. Monitoring activities are outlined in **Table 1**, with site monitoring points shown in **Figure 1**. Note that Site No. PM10-1 is used as a management tool and not for compliance purposes, and as such, is not used to establish compliance monitoring for PM_{10}. In addition, though not part of the Bass Point Quarry air quality monitoring program, regional background data for 24 hour PM_{10} concentration is sourced from the Office of Environment and Heritage (OEH) Albion Park South Air Quality Monitoring Station (AQMS) as per the AQMP.

Table 1: Summary of the air quality monitoring program at Bass Point Quarry. Sites that are not monitored for compliance purposes (e.g. used as management tools only) are shaded pale grey.

Site No.	Location	Parameter	Instrument	Sampling frequency	Reporting frequency
DDG-1	Western Boundary	Dust Deposition	Dust Deposition Gauge (DDG)	30 days (± 2 days)	Monthly
DDG-2	Northwest of Pit	Dust Deposition	Dust Deposition Gauge (DDG)	30 days (± 2 days)	Monthly
Automatic Weather Station	Kiama (Bombo Headland)	Meteorological Parameters	Automatic Weather Station (AWS)	Continuous	Monthly
PM10-1	West of the Main Site Office	PM_{10}	Beta Attenuation Monitor (BAM)	Continuous	Monthly
PM10-2	West, on the amenity bund	PM_{10}	Low Volume Air Sampler (LVAS)	1 in 6 day sampling	Monthly

Figure 1: Air quality monitoring locations at the Bass Point Quarry. Locations have been acroynmised as follows: DDG-1 – Dust Deposition Gauge 1; DDG-2 – Dust Deposition Gauge 2; PM10-1 – Continuous PM_{10} Monitor; PM10-2 – Low Volume PM_{10} Sampler.

3. Monthly results

3.1. Particulate Matter – Particulate Matter < 10 µm (PM_{10})

The PM10-2 (LVAS) monitoring site is located on the site boundary (as per the AQMP). An exceedance of the 24 hour or annual average criteria at this monitoring point therefore does not necessarily mean that there has been an exceedance of the assessment criteria outlined in Project Approval 08_0143 Schedule 3 (which apply at any residence on privately-owned land). All monitoring data collected at PM10-2 during September 2019 was above the 24 hour average PM_{10} criterion of 50 µg/m^3, and was hence non-compliant (**Figure 2**). This has triggered a detailed investigation as per the AQMP. The preliminary stages of this investigation suggest that the results are being inflated by local works associated with the Marina, including the close proximity of the unsealed haul route (approximately 80 m), and do not reflect the results that would be obtained at the closest residences.

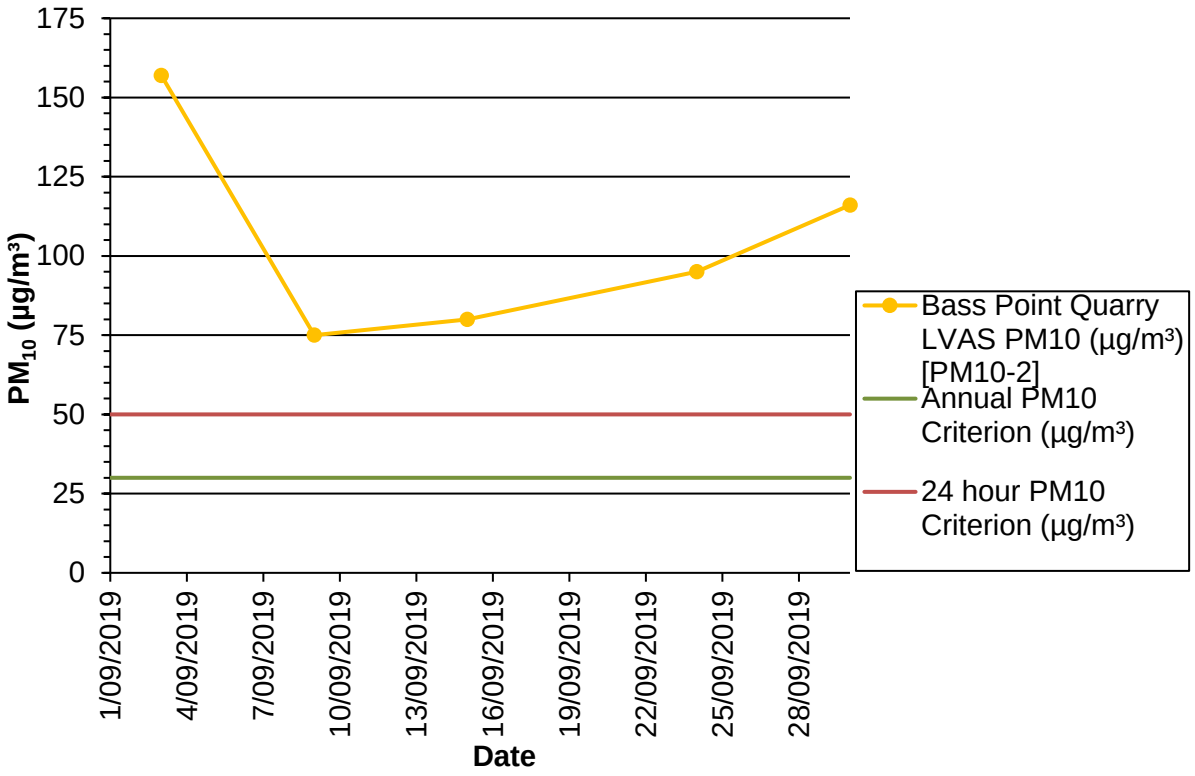


Figure 2: Twenty-four hour PM10 concentration (µg/m^3) as measured at PM10-2 during September 2019, compared to the annual criterion and 24 hour criterion (µg/m^3).

The 24 hour average PM_{10} reading from the OEH Albion Park South AQMS was below the 50 µg/m^3 criterion – and hence was compliant – for all days during September 2019 (**Figure 3**, **Table 2**).

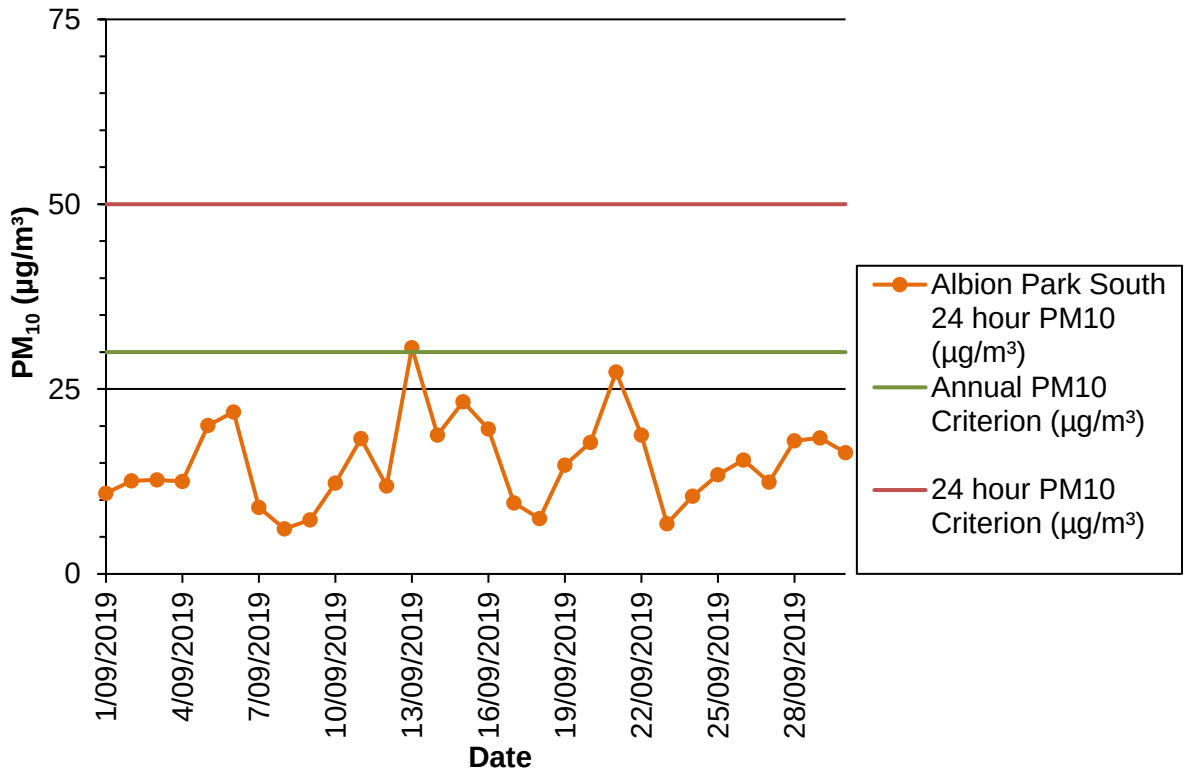


Figure 3: Twenty-four hour PM_{10} concentration (µg/m^3) as measured at Albion Park South AQMS during September 2019, compared to the annual criterion and 24 hour criterion (µg/m^3).

Hanson are required to report on the annual average 24 hour PM_{10} concentration for the identified periods: (i) calendar year, as part of the Environmental Management Annual Review, and; (ii) 15th June to 14th June, as part of the EPL Annual Return. Annual average PM_{10} data is therefore not required as part of the September 2019 monthly report. However, as a management tool, Hanson have begun calculating the rolling annual average 24 hour PM_{10} for the monthly air quality reports.

The rolling annual average 24 hour PM_{10} for the PM10-2 site, as calculated using data up to and including September 2019, was 54.1 µg/m^3. This is above the annual PM_{10} criterion of 30 µg/m^3. As such, Hanson will be undertaking a more detailed investigation into the PM_{10} levels experienced at a relevant nearby residence or receiver, as is required under the site AQMP.

The rolling annual average 24 hour PM_{10} from the OEH Albion Park South AQMS, as calculated using data the 12 months up to and including September 2019, was 17.5 µg/m^3. This is less than two-thirds of the 30 µg/m^3 annual limit as outlined in the Project Approval 08_0143.

As per the AQMP, the PM10-1 (BAM) monitoring site is located on-site and is significantly closer to the quarrying activities than the nearest sensitive receptors. An exceedance of the PM_{10} criterion recorded at this location (**Figure 4**, **Table 2**)

therefore does not represent non-compliance with the criteria outlined in Project Approval 08_0143 Schedule 3 (which apply at any residence on privately-owned land). In addition, PM10-1 is used as a management tool and not for compliance purposes, and as such, is not used to establish compliance monitoring for PM_{10}.

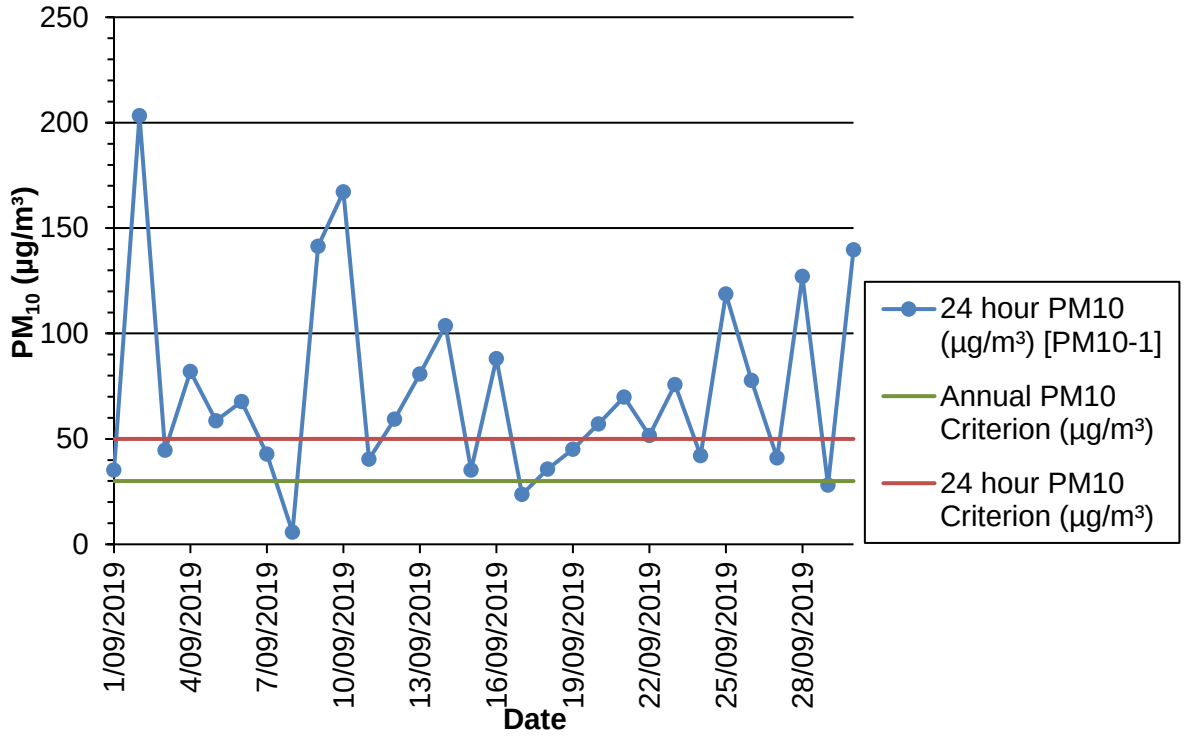


Figure 4: Twenty-four hour PM_{10} concentration (µg/m^3) as measured at PM10-1 during September 2019, compared to the annual PM_{10} criterion and 24 hour PM_{10} criterion (µg/m^3).

Table 2: Monitoring results for Particulate Matter – PM_{10} monitoring during September 2019. Prevailing wind conditions and climate data were measured at PM10-1. Apparent exceedances of the 24 hour PM_{10} criteria are shaded red. Note that as previously discussed, PM10-1 is not used for compliance monitoring; exceedances of the 24 hour PM_{10} criteria at this monitoring location are shaded orange.

Date	24 hour PM_{10} ($\mu g/m^3$) [PM10-1]	24 hour PM_{10} ($\mu g/m^3$) [PM10-2]	24 hour PM_{10} ($\mu g/m^3$) [Albion Park South]	24 hour PM_{10} Criterion ($\mu g/m^3$)	Mean Wind Speed (m/s)	Mode Wind Direction (°)	Mean Atm. Temp. (°C)	Mean Relative Humidity (%)	Mean Bar. Pressure (mmHg)	Comments
1/09/2019	35	-	11	50	2.3	N	15.9	74	763	
2/09/2019	203	-	13	50	2.7	SSE	15.4	65	761	
3/09/2019	45	157	13	50	1.5	WSW	16.4	61	760	Wind direction suggests an external dust source.
4/09/2019	82	-	13	50	2.1	W	18.0	53	758	
5/09/2019	59	-	20	50	2.1	SSW	17.2	70	759	
6/09/2019	68	-	22	50	5.3	NNW	16.8	74	752	
7/09/2019	43	-	9	50	5.6	W	14.0	43	752	
8/09/2019	6	-	6	50	4.1	WSW	14.6	39	755	
9/09/2019	141	75	7	50	5.2	SW	13.5	48	757	Wind direction suggests partially external dust source
10/09/2019	167	-	12	50	4.9	SSW	12.9	51	766	
11/09/2019	40	-	18	50	2.7	SW	14.3	66	770	
12/09/2019	59	-	12	50	2.2	W	17.3	47	764	
13/09/2019	81	-	31	50	2.8	SSW	16.7	68	764	
14/09/2019	104	-	19	50	2.1	ESE	15.8	58	764	
15/09/2019	35	80	23	50	1.8	N	16.3	70	763	Wind direction suggests an external dust source.
16/09/2019	88	-	20	50	3.3	S	17.4	67	760	
17/09/2019	24	-	10	50	4.7	SSW	11.3	84	765	
18/09/2019	36	-	8	50	4.8	S	13.5	87	768	
19/09/2019	45	-	15	50	2.1	SSW	16.7	90	768	
20/09/2019	57	-	18	50	5.5	N	17.6	90	767	
21/09/2019	70	-	27	50	6.8	N	18.0	89	762	
22/09/2019	52	-	19	50	1.6	E	17.9	74	763	
23/09/2019	76	-	7	50	2.7	WSW	15.5	51	765	
24/09/2019	42	95	11	50	2.4	WSW	14.8	54	767	Wind direction suggests partially external dust source
25/09/2019	119	-	13	50	2.0	SW	15.2	62	768	
26/09/2019	78	-	15	50	3.0	SSW	16.5	75	767	
27/09/2019	41	-	12	50	2.2	NW	19.0	56	761	
28/09/2019	127	-	18	50	3.5	SE	16.6	55	760	
29/09/2019	28	-	18	50	1.7	SW	14.0	71	762	
30/09/2019	140	116	16	50	2.8	SSW	15.3	67	766	Wind direction suggests internal dust source

3.2. Particulate Matter – Total Suspended Particles (TSP)

Total Suspended Particles (TSP) is not currently monitored in the vicinity of the Bass Point Quarry. The SLR Global Environmental Solutions (formerly Heggies Pty Ltd) prepared report *Bass Point Quarry Expansion – Air Quality Impact Assessment* (2010) determined that the approximate PM_{10} to TSP ratio is 36.2% for the Illawarra region.

Hanson are required to report on the annual average TSP concentration for the calendar year, as part of the Environmental Management Annual Review. This annual average TSP data is therefore not required as part of the September 2019 monthly report. However, as a management tool, Hanson have begun calculating the rolling annual average TSP for the monthly air quality reports. In the absence of TSP readings, the 36.2% ratio has been applied to the Albion Park South AQMS rolling annual average 24 hour PM_{10} data (as per the AQMP) for September 2019 (**Table 3**). The rolling annual average TSP is therefore 48.3 µg/m^3; just over half of the annual TSP criterion of 90 µg/m^3 identified in Project Approval 08_0143 Schedule 3.

Table 3: Calculation of Rolling Annual Average TSP (µg/m^3) for the month of September 2019.

Rolling annual average 24 hour PM_{10} (µg/m^3) [Albion Park South]	**PM_{10} to TSP ratio**	**Calculated rolling annual average TSP**	**Annual TSP criterion**
17.5 µg/m^3	36.2%	48.3 µg/m^3	90 µg/m^3

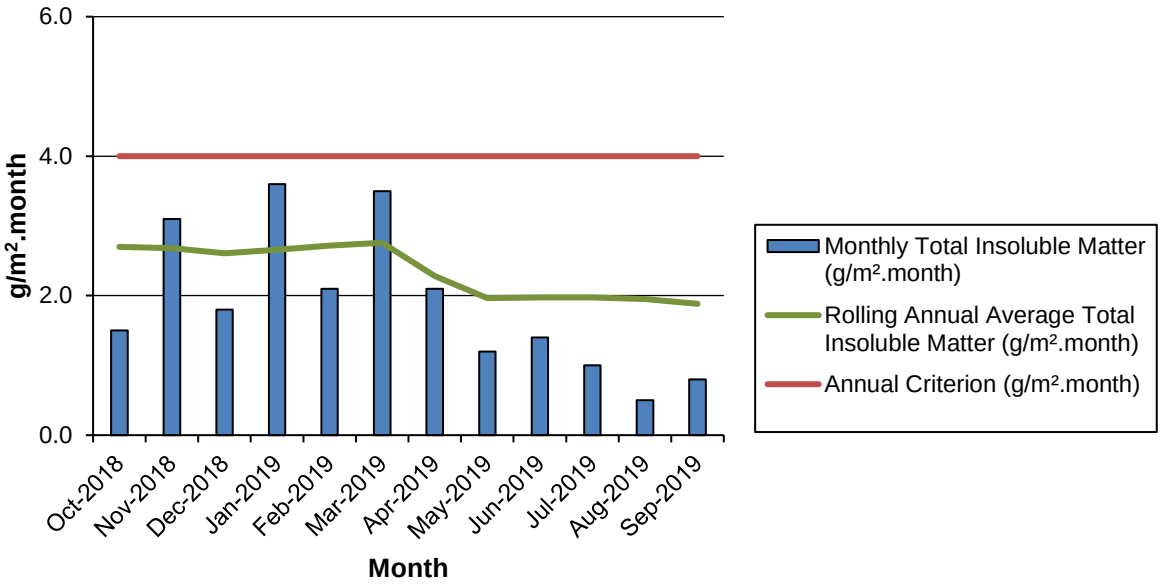
3.3. Dust Deposition Gauges

Monthly analyses of deposited dust samples collected at DDG-1 and DDG-2 are completed by NATA-accredited laboratory ALS Environmental. Monitoring results for the month of September 2019 indicate that dust deposition at DDG-1 was less than the annual criterion of 4 g/m^2.month identified in Project Approval 08_0143 Schedule 3 and EPL-2193 (**Table 4**, **Figure 5(a), Figure 5(b)**). Dust deposition at DDG-2 was greater than the annual criterion, however, over 30% of the sample consisted of combustible matter (i.e. not dust), which typically consists of contaminants such as leaves and other organic matter. The actual dust content of the sample is therefore considerably lower than the data we are required to report, although it is likely still above the annual criterion. It is believed that this is due to the close proximity to the haul route being used for the Shell Cove Marina construction. DDG-2 is in the process of being relocated as per EPL-2193.

Table 4: Monthly Total Insoluble Matter (g/m^2.month) measured at the two Bass Point Quarry Dust Deposition Gauges (DDGs) during the period 13/08/2019 to 13/09/2019 (i.e. September 2019), and calculated rolling annual average Total Insoluble Matter (g/m^2.month).

Site	Monthly Total Insoluble Matter (g/m^2.month)	Rolling Annual Average Total Insoluble Matter (g/m^2.month)	Comments
DDG-1	0.8	1.9	
DDG-2	11.9	7.8	Results likely affected by Marina construction. DDG-2 to be relocated as per EPL variation.

5(a)



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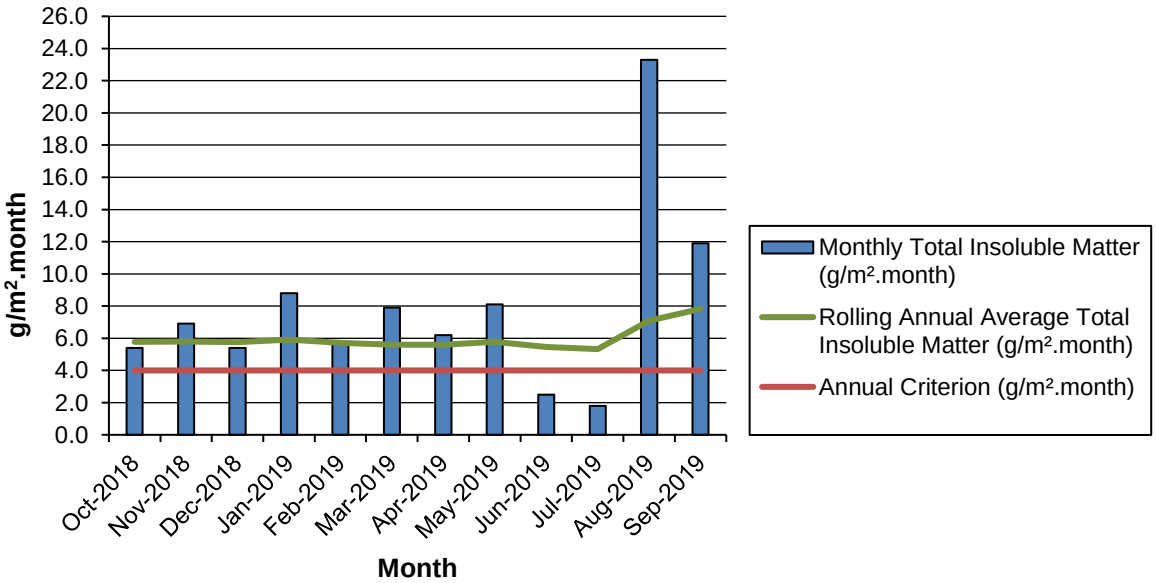


Figure 5: Total Insoluble Matter, rolling annual average, and annual criterion (g/m^2.month) for the Bass Point Quarry as measured at **(a)** DDG-1, and; **(b)** DDG-2; during the 12-month period to September 2019.

4. Representative Meteorological Data

Representative meteorological data has been sourced from the Bureau of Meteorology's (BOM) Kiama (Bombo Headland) Automatic Weather Station (AWS), as per the AQMP.

4.1. Monthly Meteorological Data Summary

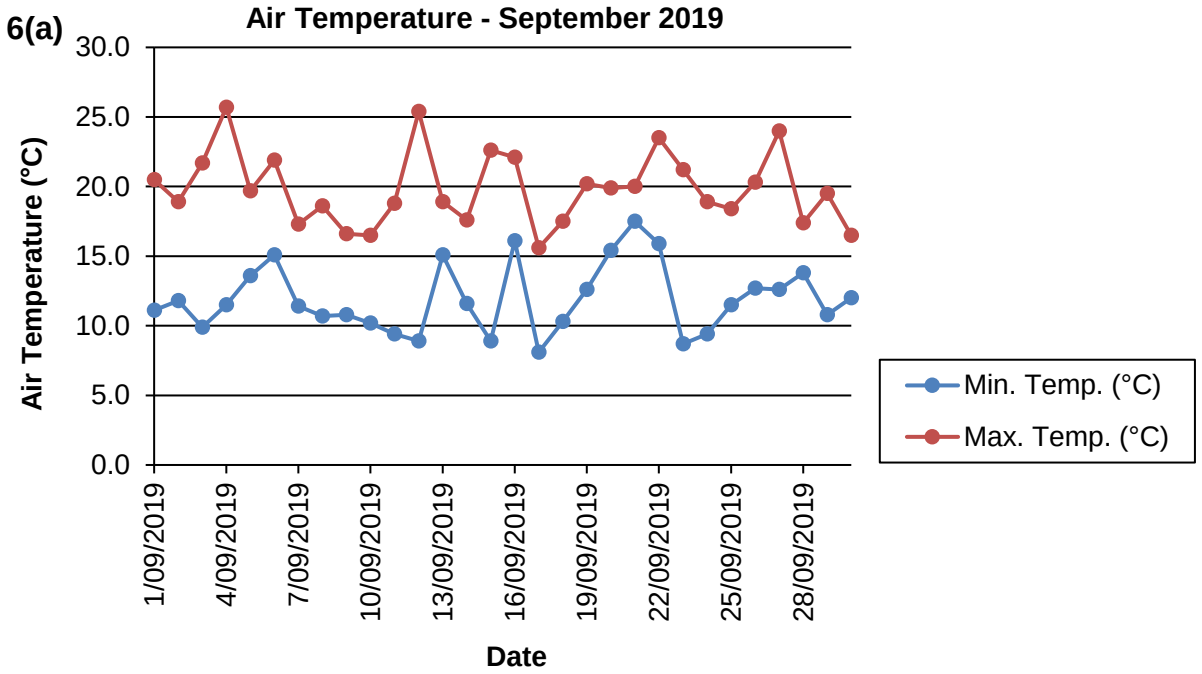
Table 5: Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS.

Date	Min. Temp. (°C)	Max. Temp. (°C)	Evapo-Transp. (mm)	Rainfall (mm)	Min. RH (%)	Max. RH (%)	Direction of maximum wind gust	Speed of maximum wind gust (km/h)	Time of maximum wind gust	Average 10 m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
1/09/2019	11.1	20.5	2.8	0.0	55	81	NNE	26	14:54	2.54	17.08
2/09/2019	11.8	18.9	3.1	0.0	48	79	SSE	48	11:51	4.14	13.71
3/09/2019	9.9	21.7	2.8	0.0	42	77	N	17	14:09	1.63	17.38
4/09/2019	11.5	25.7	4.6	0.0	14	68	WSW	50	18:06	3.26	16.88
5/09/2019	13.6	19.7	2.8	0.0	48	81	SSW	26	5:37	2.32	15.76
6/09/2019	15.1	21.9	4.8	0.0	32	79	WSW	115	18:28	6.75	15.04
7/09/2019	11.4	17.3	5.4	0.0	28	53	WSW	89	10:33	8.76	18.04
8/09/2019	10.7	18.6	5.3	0.0	30	52	WSW	76	0:34	7.92	18.16
9/09/2019	10.8	16.6	4.7	0.0	33	62	S	78	15:47	9.17	13.43
10/09/2019	10.2	16.5	3.9	0.2	44	72	S	67	1:04	7.36	17.26
11/09/2019	9.4	18.8	3.2	0.0	47	81	NNE	28	15:54	3.16	18.56
12/09/2019	8.9	25.4	3.9	0.0	14	82	WSW	48	14:04	2.39	14.82
13/09/2019	15.1	18.9	3.7	0.0	34	81	S	33	0:48	3.47	18.06
14/09/2019	11.6	17.6	3.3	0.0	38	85	S	35	4:35	3.23	18.57
15/09/2019	8.9	22.6	3.2	0.0	33	80	N	28	16:44	1.74	17.49
16/09/2019	16.1	22.1	4.4	0.0	25	90	S	76	12:35	6.14	9.40
17/09/2019	8.1	15.6	2.4	14.8	59	89	SE	59	16:00	9.24	4.43
18/09/2019	10.3	17.5	2.6	23.8	54	92	SSE	56	1:13	7.54	5.38
19/09/2019	12.6	20.2	2.7	29.0	74	89	NNE	22	18:58	2.06	18.47
20/09/2019	15.4	19.9	2.6	0.4	77	89	N	46	13:45	5.34	14.59
21/09/2019	17.5	20.0	2.8	0.0	74	87	N	54	12:52	5.96	13.62
22/09/2019	15.9	23.5	4.0	0.2	30	87	WSW	39	7:31	2.79	18.27
23/09/2019	8.7	21.2	4.1	0.0	27	81	WNW	59	14:36	3.69	17.12
24/09/2019	9.4	18.9	3.6	0.0	40	72	WSW	20	0:06	2.66	21.11
25/09/2019	11.5	18.4	3.4	0.0	48	72	SSE	33	11:05	2.96	18.35
26/09/2019	12.7	20.3	3.1	0.0	63	79	NNE	33	14:49	3.13	16.30
27/09/2019	12.6	24.0	4.0	0.0	23	85	ENE	26	12:17	2.03	20.34
28/09/2019	13.8	17.4	4.8	0.0	28	77	S	67	2:32	6.71	21.21
29/09/2019	10.8	19.5	3.7	0.0	50	76	SE	30	19:20	3.17	21.27
30/09/2019	12.0	16.5	3.2	0.0	58	76	SSE	50	12:26	5.14	15.51

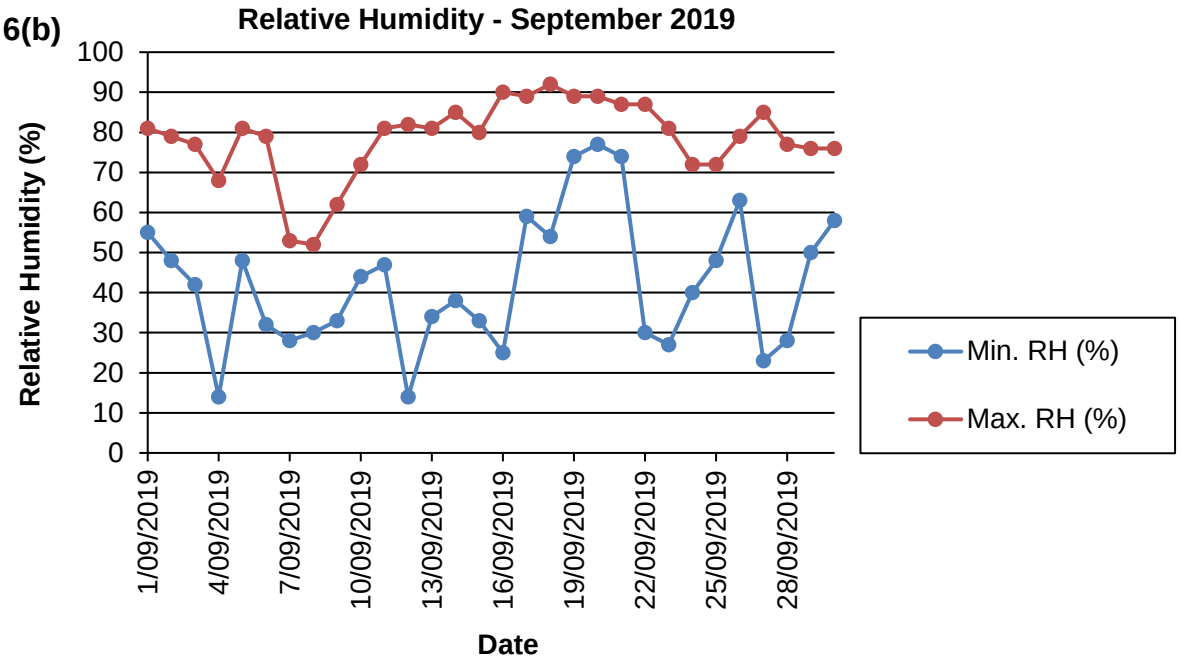
Monthly	Min. Temp. (°C)	Max. Temp. (°C)	Evapo-Transp. (mm)	Rainfall (mm)	Min. RH (%)	Max. RH (%)	Direction of maximum wind gust	Speed of maximum wind gust (km/h)	Time of maximum wind gust	Average 10 m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
Mean	11.9	19.9	3.6	2.3	42	78	-	48	-	4.55	16.19
Lowest	8.1	15.6	2.4	0.0	14	52	N	17	14:09	1.63	4.43
Highest	17.5	25.7	5.4	29.0	77	92	WSW	115	18:28	9.24	21.27
Total	-	-	108.9	68.4	-	-	-	-	-	-	-

4.2. Monthly Weather Charts

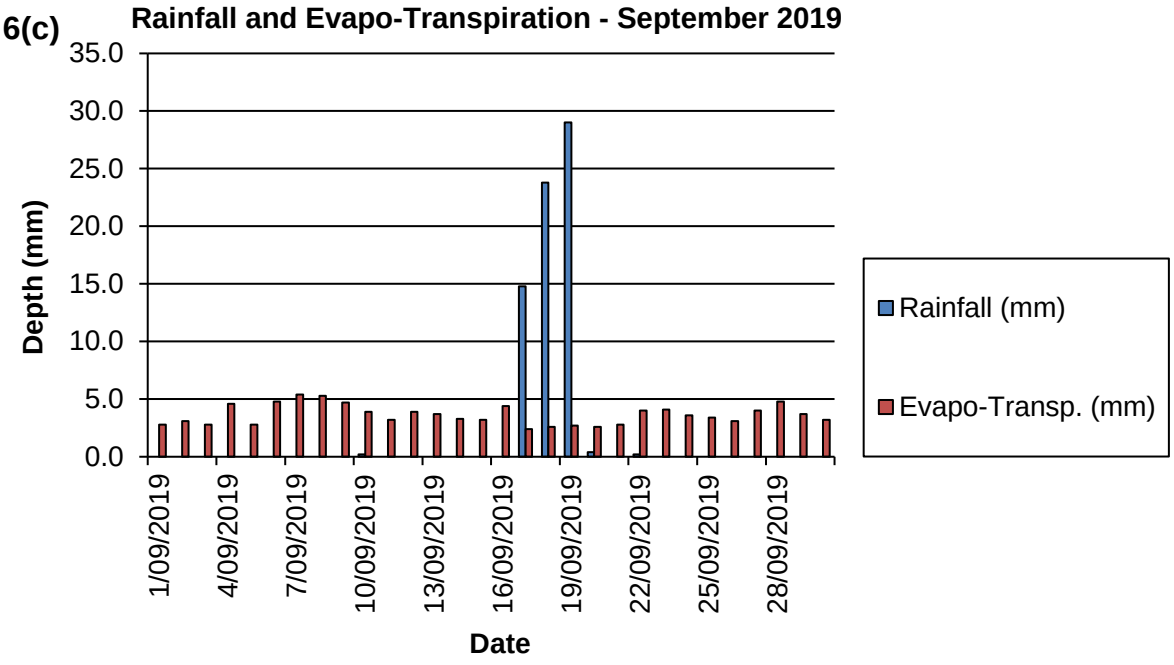
Figure 6: Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS for **(a)** Air Temperature; **(b)** Relative Humidity; and, **(c)** Rainfall and Evapo-Transpiration. Wind rose for data sourced from PM10-1 for **(d)** Wind Speed and Direction.



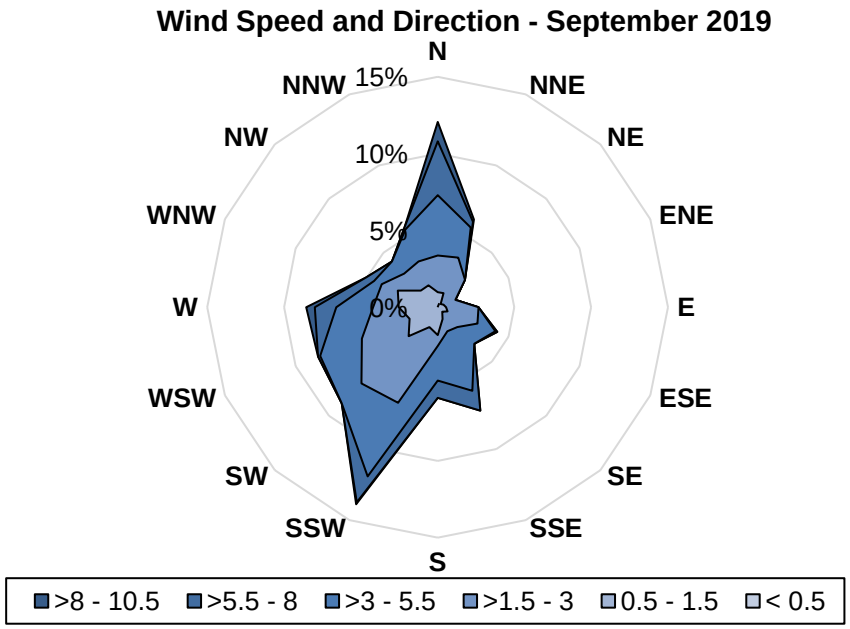
6(b)


Relative Humidity - September 2019
Relative Humidity (%)
100
90
80
70
60
50
40
30
20
10
0
1/09/2019
4/09/2019
7/09/2019
10/09/2019
13/09/2019
16/09/2019
19/09/2019
22/09/2019
25/09/2019
28/09/2019
Date
Min. RH (%)
Max. RH (%)

6(c)


Rainfall and Evapo-Transpiration - September 2019
Depth (mm)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1/09/2019
4/09/2019
7/09/2019
10/09/2019
13/09/2019
16/09/2019
19/09/2019
22/09/2019
25/09/2019
28/09/2019
Date
Rainfall (mm)
Evapo-Transp. (mm)

6(d)


Wind Speed and Direction - September 2019
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
15%
10%
5%
0%
>8 - 10.5
>5.5 - 8
>3 - 5.5
>1.5 - 3
0.5 - 1.5
< 0.5

Appendix 1
Chain of Custody & Laboratory Certificates

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney**: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle**: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane**: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville**: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne**: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide**: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth**: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston**: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Hanson Construction Materials	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**	
OFFICE:	Boollwarroo Pde Shellharbour NSW 2529		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact?	Yes / No / N/A
PROJECT:	Bass Point Dust Monitoring	**ALS QUOTE NO.:**	WL/043/11	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER:			**COC SEQUENCE NUMBER (Circle)**	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER:	Steve Butcher	**CONTACT PH:**	02 4295 1352	COC: 1 2 3 4 5 6 7	Other comment:
SAMPLER:		**SAMPLER MOBILE:**		OF: 1 2 3 4 5 6 7	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**			
Email Reports to :	steve.butcher@hanson.com.au				
Email Invoice to :	steve.butcher@hanson.com.au				

RELINQUISHED BY:	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
Robert	Aneta		
DATE/TIME: 20/9/19	DATE/TIME: 20/9/19	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	**SAMPLE DETAILS** MATRIX: Solid(S) Water(W)			**CONTAINER INFORMATION**		**ANALYSIS REQUIRED including SUITES** (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								**Additional Information**
LAB ID	**SAMPLE ID**	**DATE / TIME**	**MATRIX**	**TYPE & PRESERVATIVE** *(refer to codes below)*	**TOTAL BOTTLES**	**A04-3 (Total Insoluble Solids, Ash, Combustibles)**								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	DDG 1	13.9.19	AIR	AG	1	✓								
2	DDG 2	13-9-19	AIR	AG	1	✓								
3	DDG 3	19.9.19	AIR	AG	1	✓								
				TOTAL	3									

Environmental Division
Wollongong
Work Order Reference
EW1903982

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW1903982**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division NSW South Coast
Contact	: MR STEVE BUTCHER	Contact	: Glenn Davies
Address	: BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: +61 02 4295 1355	Telephone	: 02 42253125
Project	: Bass Point Dust Monitoring	Date Samples Received	: 20-Sep-2019 11:30
Order number	: 4502628097	Date Analysis Commenced	: 24-Sep-2019
C-O-C number	: ----	Issue Date	: 27-Sep-2019 13:27
Sampler	: Robert DaLio		
Site	: ----		
Quote number	: WL/043/11 Bass Point Dust Monitoring		
No. of samples received	: 3		
No. of samples analysed	: 3		

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*
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Sample exposure period is 37 days for #3 which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.
- Sampling completed as per FWI-EN010 Sampling of Dust Depositon Gauges.

Analytical Results

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)				Client sample ID	DDG 1 13/08/2019 - 13/09/2019	DDG 2 13/08/2019 - 13/09/2019	DDG 3 13/08/2019 - 19/09/2019	----	----
				Client sampling date / time	13-Sep-2019 00:00	13-Sep-2019 00:00	19-Sep-2019 00:00	----	----
Compound	CAS Number	LOR	Unit		EW1903982-001	EW1903982-002	EW1903982-003	--------	--------
					Result	Result	Result	---	---
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		0.8	8.1	4.2	----	----
Ash Content (mg)	----	1	mg		14	147	99	----	----
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		<0.1	3.8	0.4	----	----
Combustible Matter (mg)	----	1	mg		1	70	9	----	----
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		0.8	11.9	4.6	----	----
Total Insoluble Matter (mg)	----	1	mg		15	217	108	----	----

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Hanson Construction Materials	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	PO Box 4022 Shellharbour NSW 2529		
PROJECT:	LVAS (PM10)	**ALS QUOTE NO.:**	
ORDER NUMBER:			
PROJECT MANAGER:	Steve Butcher	**CONTACT PH:** 02 4247 3900	
SAMPLER:	Chelsea Flood	**SAMPLER MOBILE:** 0448 290 721	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed): steve.butcher@hanson.com.au			
Email Invoice to (will default to PM if no other addresses are listed): steve.butcher@hanson.com.au			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Chelsea			
DATE/TIME: 04/09/2019 11:55am	DATE/TIME: 04/9/2019 11:55	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please provide pre- and post-sampling filter paper weight on the report

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	LVAS PM10							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	47-125P6498614	3/09/2019	Filter		1	✓							
	47-125P6498615	9/09/2019	Filter		1	✓							
	47-125P6498616	15/09/2019	Filter		1	✓							
	47-125P6498617	24/09/2019	Filter		1	✓							
	47-125P6498618	30/09/2019	Filter		1	✓							
				TOTAL	0								

Environmental Division
Wollongong
Work Order Reference
EW1904345

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
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Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW1904345**	Page	: 1 of 2
Client	: **HANSON CONSTRUCTION MATERIALS PTY LTD**	Laboratory	: Environmental Division NSW South Coast
Contact	: MR STEVE BUTCHER	Contact	: Glenn Davies
Address	: BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: +61 02 4295 1355	Telephone	: 02 42253125
Project	: LVAS	Date Samples Received	: 04-Oct-2019 12:16
Order number	: ----	Date Analysis Commenced	: 10-Oct-2019
C-O-C number	: ----	Issue Date	: 11-Oct-2019 18:01
Sampler	: CHELSEA FLOOD		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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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*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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^ = 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.

- EA143-LV: Reporting of 'Initial' and 'Final' weights to 0.0001mg not covered by scope of NATA accreditation.
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

Analytical Results

Sub-Matrix: FILTER (Matrix: AIR)				Client sample ID	47-125P6498614 47-125P6498614	47-125P6498615 47-125P6498615	47-125P6498616 47-125P6498616	47-125P6498617 47-125P6498617	47-125P6498618 47-125P6498618
				Client sampling date / time	03-Sep-2019 00:00	09-Sep-2019 00:00	15-Sep-2019 00:00	24-Sep-2019 00:00	30-Sep-2019 00:00
Compound	CAS Number	LOR	Unit		EW1904345-001	EW1904345-002	EW1904345-003	EW1904345-004	EW1904345-005
					Result	Result	Result	Result	Result
EA143: Particulates in Air - LVAFs									
^ øPM10	----	14	µg/m³		157	75	80	95	116
PM10 (mass per filter)	----	100	µg/filter		633	305	324	392	474
EA143: Total Suspended Particulates									
Initial Weight	----	0.0001	mg		138.0506	141.3155	140.9793	141.6942	141.6979
Final Weight	----	0.0001	mg		138.6832	141.6201	141.3038	142.0863	142.1718
Low Volume Air-Sampling Parameters									
ø Volume	----	1	L		4040	4080	4050	4110	4100