COASTWIDE CIVIL

SHELL COVE BOATHARBOUR
STAGE 2 AND BREAKWATERS
MONTHLY MONITORING SUMMARY
June 2019

COASTWIDE CIVIL PTY LTD
ADDRESS: 19 CROOME LANE, ALBION PARK, 2527
POSTAL: P.O.BOX 116, KIAMA, 2533
E-MAIL: info@coastwidecivil.com.au **ABN:** 71 073 648 594
TELEPHONE: (02) 4256 1499 **FAX:** (02) 4256 5243
MOBILE: 0418 229 702 **A.H.:** (02) 4232 2173

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APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

Contents

1. Preliminaries

1.1. Background

This project involves the construction of a boat harbour consisting of inner and outer harbour basins located behind an existing beach dune system in what is currently a degraded swamp, and an access channel across the beach. Included in the boat harbour project are:

- inner and outer harbour basins;
- boardwalk/promenade surrounding the inner and outer harbours;
- regional boat launching ramp located in the outer harbour;
- 470m long rock breakwater on the northern side of the access channel;
- 282m long rock groyne on the southern side of the access channel;
- dune construction and beach nourishment;
- land platform works for hotel, shopping centre, residential development, marina support facilities and dry boat storage surrounding the boat harbour;
- a staged 300 berth floating marina in the inner harbour;
- vessel fuelling facilities and sewage pump out facilities in the outer harbour; and
- a boat lift and hardstand area for vessel maintenance.

The works are to be conducted over multiple stages. Coastwide Civil have won the contract to conduct Stage 2 works. In addition, Coastwide Civil have also won the contract to construct the breakwaters for the boatharbour. The environmental management plan and practices in place for the Stage 2 project have broadened to also cover the breakwater works.

The main components of Stage 2 works are:

- Excavation of the remainder of the Boatharbour which was not excavated in Stage 1
- Surcharging (and removal) of the P2B Surcharge Area and any incomplete portions of the P3 Surcharge Area
- Removal of the surcharge material from Surcharge P1A, P1B and P2A
- Construct edge treatment for the Boatharbour
- Install boardwalk piles
- Construct boat ramp in the Outer Harbour

The main components of the Breakwater works are:

- the construction of a 470m long breakwater north of the channel
- 280m groyne (smaller breakwater) south of the channel
- full excavation of the entrance channel
- Installation of navigation aids (navigation lights and buoys)
- Construction of permanent access roads along the breakwater and groyne

1.2. Introduction

This document provides a summary of monthly environmental performance on site. It includes the following:

- Section 2 outlines monitoring requirements as per the conditions of the Environmental Protection Licence (EPL), the Site Environmental Management Plan (SEMP) and the Construction Environmental Management Plan (CEMP);
- Sections 3 to 5 detail the results of environmental monitoring undertaken on site; and
- Results of any lab testing are included as Appendix B. A copy of rainfall monitoring results for the month is attached as Appendix C.

2. Monitoring Requirements

2.1. Water Quality

Water Quality Inbound and Outbound Channels

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426, Section 2, P1.3

Station no.	Location	Testing Required
10	Upstream Location – Runoff into site from West	Oil and Grease, pH, Total Suspended Solids, Turbidity and Colour
11	Upstream Location– Runoff into site from North	Oil and Grease, pH, Total Suspended Solids, Turbidity and Colour
14	Upstream Location – Runoff into site from South	Oil and Grease, pH, Total Suspended Solids, Turbidity and Colour
20	Beach Zone Rectangular Pond – Discharge into near shore zone	Oil and Grease, pH, Total Suspended Solids, Turbidity and Colour
21	Southern Channel – Downstream of Precinct B1 and C1	Oil and Grease, pH, Total Suspended Solids, Turbidity and Colour

Monitoring Requirements
As nominated in EPL 12426, Section 5, M2.
No limit values for monitoring of inflows and outflows are specified in the EPL.

Station no.	Testing Requirement	Compliance Criteria	Frequency
10,11,14, 20,21	Oil and Grease	Not specified in EPL	Special Frequency 2 – daily if turbidity >5NTU at MP8,9,12, otherwise weekly
	pH	Not specified in EPL	
	Total Suspended solids	Not specified in EPL	
	Turbidity	Not specified in EPL	

Near Shore Monitoring

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426, Section 2, P1.3 for MP8, 9 and 20:

Station no.	Location	Testing Required
8	Surf zone, 100m south of groyne	Colour, Turbidity
9	Surf zone 100m north of breakwater	Colour, Turbidity
20	Beach zone rectangular pond	Colour, Turbidity

Monitoring Requirements
Limit criteria for points 8 and 9 are as established in the SEMP Section 11.4.

The EPL establishes a 5 NTU turbidity trigger value at points 8, 9 and 20 to initiate monitoring at monitoring points 10, 11, 14, 20 and 21 as per special frequency 2.

Station no.	Testing Requirement	Compliance Criteria	Frequency
8,9,20	Turbidity	<5 NTU	Special Frequency 1 – weekly during dry weather, daily during wet weather (>20mm rainfall within 24 hours in rain gauge), daily during any water break out on site Daily during marine works
	Colour	Visual Assessment	

The amber alert level triggers an investigation and review of the source of turbidity, and may prompt and adjustment in site practices if the source of turbidity is due to marine construction.

Station no.	Testing Requirement	Action Criteria	Frequency
8, 9	Turbidity	>15 NTU (Amber Alert)	Special Frequency 1 – weekly during dry weather, daily during wet weather (>20mm rainfall within 24 hours in rain gauge), daily during any water break out on site Daily during marine works

Storage Pond Monitoring

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426, Section 2, P1.3:

Station no.	Location	Testing Required
22	West of Boatharbour Excavation	Oil and Grease, Suspended Solids, Acidity, Turbidity, Nitrate, Nitrogen (Ammonia), Biochemical Oxygen Demand (BOD)
23	Outer Boatharbour	Oil and Grease, Suspended Solids, Acidity, Turbidity, Nitrate, Nitrogen (Ammonia), Biochemical Oxygen Demand (BOD)
24	Landscape Mound – west of Quarry Haul Road	Oil and Grease, Suspended Solids, Acidity, Turbidity

Monitoring Requirements
As nominated in EPL 12426, Section 5, M2 for monitoring requirements and Section 3, L2 for concentration limits:

Station no.	Testing Requirement	Compliance Criteria	Frequency
22, 23, 24	Oil and Grease	Not visible	Prior to any release into the clean water system. Daily during any discharge from the storage pond.
	Suspended Solids	<50 mg/L	
	Acidity	4.0 – 8.5 pH 6.5 – 8.5 pH (MP24)	
	Turbidity	Not specified in EPL /CEMP	
	Nitrate	Not specified in EPL /CEMP	
	Nitrogen (Ammonia)	Not specified in EPL /CEMP	
	Biochemical Oxygen Demand (BOD)	Not specified in EPL /CEMP	

2.2. Noise

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426, Section 2, P1.4:

Station no.	Location
17	Southernmost property on Boollwarroo Parade
18	Nearest residence on Mary, William or Sophia Streets
19	Nearest residence on Marina Drive

Monitoring Requirements

As nominated in EPL 12426, Section 3, L4:

"For any exceedance of the background noise level by more than 10 dB(A) the licensee must undertake community liaison and consultation in order to identify and implement any additional reasonable and feasible noise mitigation options.

L4.2 5dB(A) must be added to the measured noise levels if the noise is substantially tonal or impulsive in character."

Table 4.6 of the CEMP summarises noise trigger values based on background levels determined by Wilkinson Murray in 2005 as:

Parameter	Trigger Value	Measurement Location
Construction Noise	LAeq,15 min: 51 dBA	Nearest residence on Boollwarroo Parade
	LAeq,15 min: 46 dBA	Nearest residence on Mary, William or Sophia Streets
	LAeq,15 min: 43 dBA	Nearest residence on Marina Drive

2.3. Air Quality

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426 Section 2, P1.1:

Station no.	Location
1	Southernmost property on Boollwarroo Parade
2	Nearest residence on Mary, William or Sophia Streets
3	Nearest residence on Marina Drive

Monitoring Requirements
Compliance limit criteria are not specified in the EPL. As per SEMP, Section 8:

Station no.	Testing Requirement	Compliance Criteria	Frequency
1,2,3	Dust	<4g / m^2 / month, or <2g / m^2/ month over background levels	Monthly

2.4. Vibration

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
Monitoring Points are not specified in the EPL. Points as nominated in SEMP Section 8 are:

Station no.	Location
1	Southernmost property on Boollwarroo Parade
2	Nearest residence on Mary, William or Sophia Streets
3	Nearest residence on Marina Drive

Monitoring Requirements
As per CEMP, Section 4.7.4:

Station no.	Testing Requirement	Compliance Criteria	Frequency
1,2,3	vibration	Vibration dose: <0.4 $m/s^{1.75}$	Once during initial stages of work by plant likely to cause vibration

2.5. Blasting

Monitoring Locations – See Appendix A - Site Map for location of monitoring points
As nominated in EPL 12426 Section 5, M7.1:

Station no.	Location
1	Southernmost property on Boollwarroo Parade
2	Nearest residence on Mary, William or Sophia Streets
3	Nearest residence on Marina Drive

Monitoring Requirements
As nominated in EPL 12426 Section 3 L5.1 – 5.4 and Section 5, M7.2:

Station no.	Testing Requirement	Compliance Criteria	Frequency
1,2,3	vibration	<5mm/s for 95% of blasts <10mm/s for all blasts	During each blast
1,2,3	overpressure	<115 dB for 95% of blasts <120 dB for 100% of blasts	During each blast

2.6. Acid Sulphate Soils

Monitoring Requirements
As nominated in EPL 12426 Section 4, O5.11-5.14:

"Any acid sulphate soils disturbed during the project must be managed in accordance with the document titled "ACID SULPHATE SOIL MANUAL, ASSMAC 1998".

From the time when the acid sulphate soil is exposed to the atmosphere:
a) the licensee must complete a log of odour observations. These observations must continue for a duration of 20 consecutive days and be used to assess compliance with the odour condition/s of this licence and to assess the risks of odours impacting residential areas under worst-case wind conditions.
b) the licensee has 30 days to submit the log of odour observations to the EPA together with an assessment of actual and potential odour impacts on the nearest residential areas.

3. Water Quality

3.1. Near Shore Monitoring – Monitoring Points 8, 9 and 20

Test Results

Test frequency: Special Frequency 1 (Weekly in dry weather, daily in wet weather and daily during break out). To be completed daily during marine works.

Date	Pollutant	Point 8	Point 9	Point 20
28/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	**10.41**	**16.91**	55
27/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	4.37	1.94	23.45
26/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**10.53**	**7.42**	45.02
25/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**5.55**	4.37	49.03
24/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**5.56**	3.45	51
21/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	4.67	**5.29**	35.35
20/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	4.34	**6.6**	45.3
19/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**8.23**	2.75	60
18/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**16.89**	4.01	83
17/06/2019	Colour	Clear	Clear	Not Clear
	Turbidity	4.85	2.77	55
14/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	4.56	**10.42**	13.42
13/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	**6.36**	3.4	6.88
12/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	2.65	3.31	1.94
7/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	**5.38**	4.28	24.36
6/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	**17.62**	**7.37**	8.23
5/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	4.83	**11.45**	4.98
4/06/2019	*Colour*	Clear	Clear	Not Clear
	Turbidity	**22.97**	**43.33**	460
3/06/2019	*Colour*	Clear	Clear	Clear
	Turbidity	**10.07**	**12.59**	21.87

Date	Pollutant	Point 8	Point 9	Point 20
CEMP Compliance Limit	*Turbidity*	**5**	**5**	
SEMP Amber Alert Level	*Turbidity*	**15**	**15**	
EPL Special Frequency 2 Trigger Value	*Turbidity*	**5**	**5**	

Comments on Results

- Since the commencement of breakwater construction in the ocean on 07/09/16, an amber alert system has been implemented. As part of this system, an exceedance of 15 NTU at MP8 or MP9 triggers an amber alert, as detailed in Section 11.4 of the Site Environmental Management Plan.
- While turbidity at MP8 and MP9 regularly exceeded the 5 NTU compliance limit, exceedances were typically minor and likely due to wave action. Discolouration was not observed in the water at these locations.
    - There was one Amber Alert recorded at MP9 on 28th June 2019 it was seen to be because of choppy conditions and strong winds.
    - The were two Amber Alerts recorded at MP8 on 6th and 18th June 2019 both occasions were during periods of choppy conditions and strong winds.
    - There was one Amber Alert recorded at both MP8 and MP9 on 4th June 2019 this was during a storm event.
- Turbidity could be high at MP20 due to the monitoring point being inside of a silt boom, occasionally sediment trapped by that silt boom may be stirred up and affect the water quality.
- Aside from 4th June 2019, during a storm, on days where turbidity was elevated at MP20, there was no significant elevation in turbidity at MP8 or MP9, nor was visual discolouration observed in the ocean at these points.

3.2. Surface Water: Inbound flow– Monitoring Points 10, 11, 14, 21 and Outbound Flow – Monitoring Point 20

Test Results

Test frequency: Special Frequency 2 (Weekly, or daily when turbidity at MP8, 9 or 20 is greater than 5 NTU). On days where a monitoring point is not listed below, water was not flowing at that location.

Date	Monitoring Point	Oil and Grease	pH	Turbidity (NTU)	Colour	Total Suspended Solids (mg/L)
28/06/2019	MP10	Not Visible	7.94	12.57	Clear	5
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.1	55	Clear	293
	MP21	No water flowing				
27/06/2019	MP10	Not Visible	7.83	8.86	Clear	6
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	7.96	23.45	Clear	47
	MP21	No water flowing				
26/06/2019	MP10	Not Visible	8.05	17.68	Clear	8
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.12	45.02	Not Clear	105
	MP21	No water flowing				
25/06/2019	MP10	Not Visible	8	13.06	Clear	6
	MP11	No water flowing				
	MP14	Not Visible	7.97	3.66	Clear	5
	MP20	Not Visible	8.19	49.03	Not Clear	227
	MP21	No water flowing				
24/06/2019	MP10	Not Visible	8.12	12.58	Clear	6
	MP11	No water flowing				
	MP14	Not Visible	8.22	1.53	Clear	2
	MP20	Not Visible	8.17	51	Not Clear	141
	MP21	No water flowing				
21/06/2019	MP10	Not Visible	7.74	5.8	Clear	1
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.15	35.38	Clear	61
	MP21	No water flowing				

Date	Monitoring Point	Oil and Grease	pH	Turbidity (NTU)	Colour	Total Suspended Solids (mg/L)
20/06/2019	MP10	Not Visible	7.83	6.78	Clear	1
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.11	45.3	Clear	87
	MP21	No water flowing				
19/06/2019	MP10	Not Visible	7.95	12.21	Clear	4
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.23	60	Not Clear	106
	MP21	No water flowing				
18/06/2019	MP10	Not Visible	7.86	11.61	Clear	5
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.17	83	Not Clear	115
	MP21	No water flowing				
17/06/2019	MP10	Not Visible	7.73	17.2	Clear	4
	MP11	Not Visible	7.67	18.95	Clear	50
	MP14	No water flowing				
	MP20	Not Visible	8.21	55	Not Clear	115
	MP21	No water flowing				
14/06/2019	MP10	No water flowing				
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.25	13.42	Clear	13
	MP21	No water flowing				
13/06/2019	MP10	No water flowing				
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.23	6.88	Clear	6
	MP21	No water flowing				
12/06/2019	MP10	Not Visible	7.9	6.97	Clear	3
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.2	1.94	Clear	6
	MP21	No water flowing				

Date	Monitoring Point	Oil and Grease	pH	Turbidity (NTU)	Colour	Total Suspended Solids (mg/L)
7/06/2019	MP10	Not Visible	7.76	7.33	Clear	7
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.12	24.36	Clear	35
	MP21	No water flowing				
6/06/2019	MP10	Not Visible	8.03	16.49	Clear	4
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.23	8.63	Clear	9
	MP21	No water flowing				
5/06/2019	MP10	Not Visible	8.5	22.68	Not Clear	25
	MP11	Not Visible	8.62	20.32	Clear	8
	MP14	Not Visible	7.9	95	Clear	56
	MP20	Not Visible	8.28	4.98	Clear	10
	MP21	No water flowing				
4/06/2019	MP10	Not Visible	8.15	37.36	Not Clear	14
	MP11	Not Visible	8.01	30.46	Clear	9
	MP14	Not Visible	8.84	421	Not Clear	166
	MP20	Not Visible	8.16	460	Not Clear	521
	MP21	No water flowing				
3/06/2019	MP10	No water flowing				
	MP11	No water flowing				
	MP14	No water flowing				
	MP20	Not Visible	8.24	21.87	Clear	8
	MP21	No water flowing				

Comments on Results

- Southern channel opening (MP20):
  - Channel was open to the ocean on 6 out of 23 days this month and was otherwise closed to the ocean.
- See section 3.1 for commentary regarding results at MP20.
- Inbound streams:
  - MP10 Was flowing 15 days this month.
  - MP11 Was flowing 3 days this month.
  - MP14 Was flowing 4 days this month.
- Notable Rainfall Events:
  - 141 mm of total rainfall was recorded on site during the month.
  - 87mm fell from the 4th to 6th of June.

3.3. Storage Pond – Monitoring Points 22, 23 and 24

Test Results

Test frequency: Daily during discharge.

MP22							
	Pollutant						
Date	Oil and Grease	pH*	Total Suspended Solids (mg/L)	Turbidity* (NTU)	Biochemical Oxygen Demand (BOD) (mg/L)	Nitrate (mg/L)	Nitrogen (Ammonia) (mg/L)
17/06/2019	Not Visible	7.63	14	28.32	2	0.096	0.009
EPA Discharge Criteria		**4.0 – 8.5**	**50**	-	-	-	-

**Tests undertaken on site by Coastwide Civil*

Remarks – MP22

- Discharge was undertaken from MP22 for only one day in June. All site based monitoring and received lab testing results are compliant with discharge criteria.
- Samples were regularly taken and analysed, however discharge was not undertaken throughout the month, due to high turbidity.

MP23							
	Pollutant						
Date	Oil and Grease	pH*	Total Suspended Solids (mg/L)	Turbidity* (NTU)	Biochemical Oxygen Demand (BOD) (mg/L)	Nitrate (mg/L)	Nitrogen (Ammonia) (mg/L)
3/06/2019	Not Visible	8.42	5	4.27	2.2	<0.005	0.061
6/06/2019	Not Visible	7.8	8	28.34	<1	0.594	0.074
7/06/2019	Not Visible	8.25	3	21.65	<1	0.577	0.069
11/06/2019	Not Visible	8.31	8	17.29	1.2	0.405	0.089
13/06/2019	Not Visible	8.3	8	26.98	1	0.492	0.188
14/06/2019	Not Visible	8.15	5	19.83	<1	0.433	0.101
17/06/2019	Not Visible	8.39	41	9	1.2	0.469	0.086
19/06/2019	Not Visible	7.5	26	22.59	<1	0.381	0.326
20/06/2019	Not Visible	7.42	269	28.1	<1	0.388	0.292
21/06/2019	Not Visible	7.64	41	29.67	<1	0.440	0.248
24/06/2019	Not Visible	7.78	10	14.5	<1	0.653	0.188
25/06/2019	Not Visible	7.69	17	16.3	<1	0.608	0.066
26/06/2019	Not Visible	7.8	14	19.98	<1	0.261	0.081
27/06/2019	Not Visible	7.57	18	19.66	<1	0.254	0.061
28/06/2019	Not Visible	7.74	22	24.81	<1	0.296	0.124
EPA Discharge Criteria		**4.0 – 8.5**	**50**	-	-	-	-

Remarks – MP23

- Discharge was undertaken on the above listed day.
- Laboratory testing for the sample 20th June showed an elevated level of Total Suspended Solids. This result did not match the visual appearance of the sample, not the turbidity measurement. The measurement also does not match the rest of the TSS data set and it is therefore likely that the sample may have been contaminated. Possible sources of contamination may be organic growth or water sampling procedure not followed.

MP24							
	Pollutant						
Date	Oil and Grease	pH*	Total Suspended Solids (mg/L)	Turbidity* (NTU)	Biochemical Oxygen Demand (BOD) (mg/L)	Nitrate (mg/L)	Nitrogen (Ammonia) (mg/L)
EPA Discharge Criteria		**4.0 – 8.5**	**50**	**-**	**-**	**-**	**-**

Remarks – MP24

- No Discharge was undertaken during the month.

4. Air, Noise and Vibration Testing

4.1. Noise Testing

Test Results

Test frequency: Weekly

Date	Location	Time	Measured Noise Levels	Observed Noise Sources and notes (sound levels in dB)	Estimated L_{Aeq} Contribution	CEMP Trigger Value
26/06/2019	MP17	**4:10 – 4:25pm**	L_{A10} = 62 L_{A90} = 54.5 **L_{Aeq} = 62.0** L_{max} = 71 L_{min} = 48	Compactor 71, 68, 69, 70 Non-CWC Traffic 60, 62 CWC Compactor was operating directly adjacent to test CWC Noise was dominant over the duration of the test. Site contribution L_{Aeq} = L_{Aeq}	62.0	**51.0**
	MP18	**3:50 – 4:05pm**	L_{A10} = 49.3 L_{A90} = 35.2 **L_{Aeq} = 48.0** L_{max} = 62.6 L_{min} = 31.9	Plane 52.9, 92.6. 61.4 Birds 55, 57 CWC noise equal to other noise. Site contribution L_{Aeq} = L_{Aeq} – 3dB	**45.0**	**46.0**
	MP19	**3:30 – 3:45pm**	L_{A10} = 61.5 **L_{A90} = 51.3** L_{Aeq} = 57.1 L_{max} = 68.5 L_{min} = 47.8	Non-CWC Construction 65.4, 63 Grinder 68.5, 67, 64 Generator 60 Helicopter 59, 60 CWC Noise not Audible Site contribution L_{Aeq} = L_{A90} – 10dB	**41.3**	**43.0**

Date	Location	Time	Measured Noise Levels	Observed Noise Sources and notes (sound levels in dB)	Estimated L_{Aeq} Contribution	CEMP Trigger Value
19/06/2019	MP17	**10:35 – 10:50am**	L_{A10} = 62.5 L_{A90} = 51.8 **L_{Aeq} = 56.2** L_{max} = 71.3 L_{min} = 49.1	Excavator 67.9, 71.3 CWC Noise was dominant over the duration of the test. Site contribution L_{Aeq} = L_{Aeq}	56.2	**51.0**
	MP18	**10:15 – 10:30am**	L_{A10} = 59.6 L_{A90} = 50.4 **L_{Aeq} = 52.3** L_{max} = 72.9 L_{min} = 44.8	Non-CWC Traffic 54.3, 52.8 Plane 57.0 Reversing Alarms 58.3, 52.2, 53.9, 60.1 CWC Noise was dominant over the duration of the test. Site contribution L_{Aeq} = L_{Aeq}	52.3	**46.0**
	MP19	**11:00 – 11:15am**	L_{A10} = 68.7 **L_{A90} = 48.3** L_{Aeq} = 59.5 L_{max} = 77.5 L_{min} = 43.9	Non-CWC Traffic 72.5, 66.9, 74.0, 72.0, 64.8, 69.9, 72.2 Non-CWC Construction 76.4 Plane 56.5, 54.9 CWC Noise not Audible Site contribution L_{Aeq} = L_{A90} – 10dB	**38.3**	**43.0**

Date	Location	Time	Measured Noise Levels	Observed Noise Sources and notes (sound levels in dB)	Estimated L_{Aeq} Contribution	CEMP Trigger Value
13/06/2019	MP17	**2:30 – 2:45pm**	L_{A10} = 61.6 L_{A90} = 56.5 **L_{Aeq} = 57.4** L_{max} = 64.1 L_{min} = 46.7	CWC Equipment 58.1, 57.7, 61.1, 64.9, 65.6, 69.8 CWC Noise was dominant over the duration of the test. Site contribution L_{Aeq} = L_{Aeq}	57.4	**51.0**
	MP18	**2:05 – 2:20pm**	L_{A10} = 54.8 L_{A90} = 47.2 **L_{Aeq} = 48.5** L_{max} = 63.9 L_{min} = 42.8	CWC 50.5, 55.1, 58.6, 55.5 Plane 55.1 Non-CWC Work 59.3 Birds 48.5, 63.9 CWC Noise was equal to other sources of noise. Site contribution L_{Aeq} = L_{Aeq} - 3	45.5	**46.0**
	MP19	**1:45 – 2:00pm**	L_{A10} = 60.2 **L_{A90} = 48.1** L_{Aeq} = 53.3 L_{max} = 66 L_{min} = 43.5	Non-CWC Traffic 64.6, 57.2, 63.6, 59.6, 62.5, 55.2, 65.1, 60.5, 59.5, 59.3, 60.1 CWC Works 53.5 Non-CWC Construction 50.4, 51.3 Birds 48.5, 63.9 CWC Noise not Audible for the majority of the test. Site contribution L_{Aeq} = L_{A90} – 10dB	**38.1**	**43.0**

Date	Location	Time	Measured Noise Levels	Observed Noise Sources and notes (sound levels in dB)	Estimated L_{Aeq} Contribution	CEMP Trigger Value
6/06/2019	MP17	**1:30 – 1:45pm**	L_{A10} = 64.3 **L_{A90} = 47.7** L_{Aeq} = 50.2 L_{max} = 87.7 L_{min} = 45.0	Non-CWC Traffic 73.1, 61.2, 66.2, 61.061.2, 66.2, 61.0 Human Activity 55.9, 66.5 Birds 61.8, 56.8, 64.8, 55.9 CWC Inaudible – Dominant noise source was birds. Site contribution L_{Aeq} = L_{A90} – 10dB	**37.7**	**51.0**
	MP18	**1:55 – 2:10pm**	L_{A10} = 64.2 L_{A90} = 42.4 **L_{Aeq} = 59.7** L_{max} = 70.6 L_{min} = 40.1	CWC 43.4, 42.9, 43.0 Resident Tools 53.6, 66.4 Frog 44.1, 44.8 Tractor 70.4, 62.9, 64.0, 64.8 Non-CWC Traffic 55.4 CWC audible but non-CWC vehicle was dominant noise. Site contribution L_{Aeq} = L_{Aeq} – 6dB	53.7	**46.0**
	MP19	**2:15 – 2:30pm**	L_{A10} = 64.9 **L_{A90} = 53.0** L_{Aeq} = 56.2 L_{max} = 80.5 L_{min} = 48.5	Non-CWC Construction 78.8, 59.3, 58.9, 64.7, 62.4, 60.2, 64.1, 60.3 Helicopter 58.9, 59.8, 61.6, 59.3 Non-CWC Traffic 64.3, 64.7, 63.8, 71.3 CWC Inaudible – Dominant noise construction activity Site contribution L_{Aeq} = L_{A90} – 10dB	**43.0**	**43.0**

Comments on Results

- At MP17, weekly L_{Aeq} levels exceeded the trigger value on 13/6/19, 19/6/19 and 26/6/19
- At MP18, weekly L_{Aeq} levels exceeded the trigger value on 6/6/19, 13/6/19 and 19/6/19.
- At MP19, weekly L_{Aeq} levels there were no exceedances.
- No complaints have been received in this month about noise levels.

4.2. Air Quality

Test Results
Test frequency: Monthly

Date	Pollutant	Point 1	Point 2	Point 3
23/04/2019 – 30/05/2019	*Ash Content (g/m²/ month)*	0.6	0.3	0.5
	Combustible Matter (g/m²/ month)	0.2	0.3	0.2
	Total dust (g/m²/ month)	0.8	0.6	0.7
SEMP Compliance Limit	***Total dust (g/m²/ month)***	**4.0**	**4.0**	**4.0**

Date	Pollutant	Point 1	Point 2	Point 3
1/06/2019 – 1/07/2019	*Ash Content (g/m²/ month)*	Awaiting results	Awaiting results	Awaiting results
	Combustible Matter (g/m²/ month)			
	Total dust (g/m²/ month)			
SEMP Compliance Limit	***Total dust (g/m²/ month)***	**4.0**	**4.0**	**4.0**

Comments on Results

- Dust levels were compliant with SEMP limit for the month of May.
- Samples for this have been to the lab for testing, results and comments will be included in the July monthly report.

4.3. Vibration

Test Results
Test frequency: During initial stages of potentially vibratory work

No testing has been required this month.

4.4. Blasting

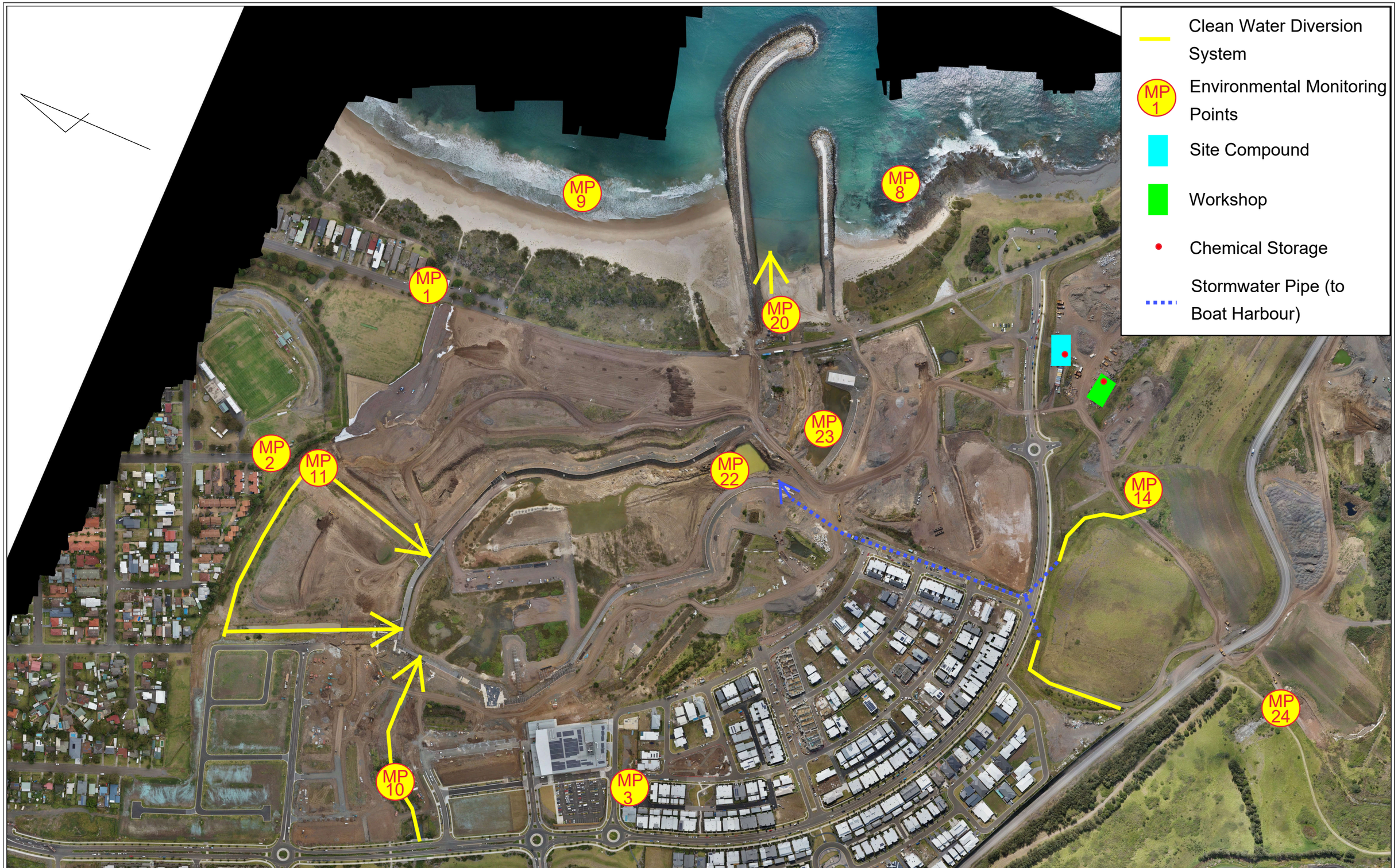
No Blasting has taken place this month.

5. Acid Sulphate Soils

5.1. Odour Monitoring

The monitoring of odour from any encountered Acid Sulphate Soil areas is ongoing as per the requirements of the EPL. Completed odour monitoring logs have been forwarded to the EPA as required.

Appendix A – Site Map



No.	Amendment Description	Initials	Date
2			
1			

A3 original | This sheet may be prepared using colour and may be incomplete if copied

CLIENT:

Co-ordinate System:

Height Datum: A.H.D.

SCALE: Not to Scale

DRAWN BY: B.Cardillo

DESIGNED BY:

CHECKED BY: C. Runciman

REVIEWED BY:

PROJECT: Shell Cove Boat Harbour Stage 2

COASTWIDE CIVIL
Civil, Marine & Earthworks Contractors
19 Croome Lane, Albion Park, 2527
Phone: (02) 4256 1499
email: info@coastwidecivil.com.au

COASTWIDE CIVIL

DWG/FILE No.

Date: 30/04/2019

Site Map

Rev No. 1

Sheet 1 of 1

Appendix B
– Lab Testing Results

RESULTS OF WATER ANALYSIS

2 samples supplied by Coastwide Civil Pty Ltd on 11th June, 2019. Lab Job No.i2638

Samples submitted by Lachlan Payne. Your Job: Shell Cove Boat Harbour

19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP23 3/06/19	Sample 2 MP23 6/06/19
	Job No.	*i2638/1*	*i2638/2*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	5	8
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	2.2	<1
Nitrate (mg/L N)	APHA 4500 NO_3^--F	<0.005	0.594
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.061	0.074

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Graham Lancaster
Laboratory Manager

RESULTS OF WATER ANALYSIS

11 samples supplied by Coastwide Civil Pty Ltd on 11th June, 2019. Lab Job No.i2639

Samples submitted by Lachlan Payne. Your Job: Shell Cove Boat Harbour

19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP20 3/06/19	Sample 2 MP10 4/06/19	Sample 3 MP11 4/06/19	Sample 4 MP14 4/06/19	Sample 5 MP20 4/06/19	Sample 6 MP10 5/06/19	Sample 7 MP11 5/06/19	Sample 8 MP14 5/06/19	Sample 9 MP20 5/06/19	Sample 10 MP10 6/06/19	Sample 11 MP20 6/06/19
	Job No.	*i2639/1*	*i2639/2*	*i2639/3*	*i2639/4*	*i2639/5*	*i2639/6*	*i2639/7*	*i2639/8*	*i2639/9*	*i2639/10*	*i2639/11*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	8	14	9	166	521	25	8	56	10	4	9

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

6 samples supplied by Coastwide Civil Pty Ltd on 24th June, 2019. Lab Job No.i3082
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP23 7/6/19	Sample 2 MP23 11/6/19	Sample 3 MP23 13/6/19	Sample 4 MP23 14/6/19	Sample 5 MP22 17/6/19	Sample 6 MP23 17/6/19
	Job No.	*i3082/1*	*i3082/2*	*i3082/3*	*i3082/4*	*i3082/5*	*i3082/6*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	3	8	8	5	14	41
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	<1	1.2	1.0	<1	2.0	1.2
Nitrate (mg/L N)	APHA 4500 NO_3^--F	0.577	0.405	0.492	0.433	0.096	0.469
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.069	0.089	0.188	0.101	0.009	0.086

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

9 samples supplied by Coastwide Civil Pty Ltd on 24th June, 2019. Lab Job No.i3083

Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour

19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP10 7/6/19	Sample 2 MP20 7/6/19	Sample 3 MP10 12/6/19	Sample 4 MP20 12/6/19	Sample 5 MP20 13/6/19	Sample 6 MP20 14/6/19	Sample 7 MP10 17/6/19	Sample 8 MP11 17/6/19	Sample 9 MP20 17/6/19
	Job No.	*i3083/1*	*i3083/2*	*i3083/3*	*i3083/4*	*i3083/5*	*i3083/6*	*i3083/7*	*i3083/8*	*i3083/9*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	7	35	3	6	6	13	4	50	115

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

8 samples supplied by Coastwide Civil Pty Ltd on 28th June, 2019. Lab Job No.i3272
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP10 18/6/19	Sample 2 MP20 18/6/19	Sample 3 MP10 19/6/19	Sample 4 MP20 19/6/19	Sample 5 MP10 20/6/19	Sample 6 MP20 20/6/19	Sample 7 MP10 21/6/19	Sample 8 MP20 21/6/19
	Job No.	*i3272/1*	*i3272/2*	*i3272/3*	*i3272/4*	*i3272/5*	*i3272/6*	*i3272/7*	*i3272/8*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	5	115	4	106	1	87	1	61

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

7 samples supplied by Coastwide Civil Pty Ltd on 28th June, 2019. Lab Job No.i3273
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP22 18/6/19	Sample 2 MP22 19/6/19	Sample 3 MP23 19/6/19	Sample 4 MP22 20/6/19	Sample 5 MP23 20/6/19	Sample 6 MP22 21/6/19	Sample 7 MP23 21/6/19
	Job No.	*i3273/1*	*i3273/2*	*i3273/3*	*i3273/4*	*i3273/5*	*i3273/6*	*i3273/7*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	19	5	26	13	269	33	41
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	<1	<1	<1	<1	<1	<1	<1
Nitrate (mg/L N)	APHA 4500 NO_3-F	0.624	0.564	0.381	0.560	0.388	0.524	0.440
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.226	0.170	0.326	0.121	0.292	0.108	0.248

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

6 samples supplied by Coastwide Civil Pty Ltd on 1st July, 2019. Lab Job No.i3323

Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour

19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP22 24/06/19	Sample 2 MP23 24/06/19	Sample 3 MP22 25/06/19	Sample 4 MP23 25/06/19	Sample 5 MP22 26/06/19	Sample 6 MP23 26/06/19
	Job No.	*i3323/1*	*i3323/2*	*i3323/3*	*i3323/4*	*i3323/5*	*i3323/6*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	18	10	15	17	72	14
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	<1	<1	<1	<1	5.0	<1
Nitrate (mg/L N)	APHA 4500 NO_3^--F	0.572	0.653	0.544	0.608	0.426	0.261
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.151	0.188	0.172	0.066	0.325	0.081

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Graham Lancaster
Laboratory Manager

RESULTS OF WATER ANALYSIS

8 samples supplied by Coastwide Civil Pty Ltd on 1st July, 2019. Lab Job No.i3324
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croome Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP10 24/06/19	Sample 2 MP14 24/06/19	Sample 3 MP20 24/06/19	Sample 4 MP10 25/06/19	Sample 5 MP14 25/06/19	Sample 6 MP20 25/06/19	Sample 7 MP10 26/06/19	Sample 8 MP20 26/06/19
	Job No.	*i3324/1*	*i3324/2*	*i3324/3*	*i3324/4*	*i3324/5*	*i3324/6*	*i3324/7*	*i3324/8*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	6	2	141	6	5	227	8	105

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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RESULTS OF WATER ANALYSIS

5 samples supplied by Coastwide Civil Pty Ltd on 8/07/2019 . Lab Job No.i3553
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croomes Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP10 27/06/19	Sample 2 MP20 27/06/19	Sample 3 MP10 28/06/19	Sample 4 MP20 28/06/19	Sample 5 MP20 02/07/19
	Job No.	*i3553/1*	*i3553/2*	*i3553/3*	*i3553/4*	*i3553/5*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	6	47	5	293	134

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Laboratory Manager

RESULTS OF WATER ANALYSIS

8 samples supplied by Coastwide Civil Pty Ltd on 8/07/2019 . Lab Job No.i3554
Samples submitted by Bernadette Cardillo. Your Job: Shell Cove Boat Harbour
19 Croomes Lane ALBION PARK NSW 2527

Parameter	Methods reference	Sample 1 MP22 27/6/19	Sample 2 MP23 27/6/19	Sample 3 MP22 28/6/19	Sample 4 MP23 28/6/19	Sample 5 MP22 01/7/19	Sample 6 MP23 01/7/19	Sample 7 MP22 02/7/19	Sample 8 MP23 02/7/19
	Job No.	*i3554/1*	*i3554/2*	*i3554/3*	*i3554/4*	*i3554/5*	*i3554/6*	*i3554/7*	*i3554/8*
Total Suspended Solids (mg/L)	GFC equiv. filter - APHA 2540-D	5	18	6	22	7	7	8	13
Biochemical Oxygen Demand$_5$ (mg/L O_2)	APHA 5210-B	<1	<1	<1	<1	<1	<1	<1	<1
Nitrate (mg/L N)	APHA 4500 NO_3^--F	0.285	0.254	0.248	0.286	0.187	0.160	0.189	0.147
Ammonia (mg/L N)	APHA 4500 NH_3-H	0.210	0.061	0.142	0.124	0.220	0.071	0.126	0.076

Notes:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
2. Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
3. Analysis conducted between sample arrival date and reporting date.
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Appendix C
– Site Rainfall Measurements

Saturday	1/06/2019	9:00 AM	*	
Sunday	2/06/2019	9:00 AM	*	
Monday	3/06/2019	9:00 AM	**0.0**	Charlie Runciman
Tuesday	4/06/2019	9:00 AM	**45.0**	Cameron Hawke
Wednesday	5/06/2019	9:00 AM	**35.0**	Charlie Runciman
Thursday	6/06/2019	9:00 AM	**7.0**	Charlie Runciman
Friday	7/06/2019	9:00 AM	**0.0**	Cameron Hawke
Saturday	8/06/2019	9:00 AM	*	
Sunday	9/06/2019	9:00 AM	*	
Monday	10/06/2019	9:00 AM	*	
Tuesday	11/06/2019	9:00 AM	*	
Wednesday	12/06/2019	9:00 AM	**0.0**	Charlie Runciman
Thursday	13/06/2019	9:00 AM	**0.0**	Charlie Runciman
Friday	14/06/2019	9:00 AM	**0.0**	Charlie Runciman
Saturday	15/06/2019	9:00 AM	*	
Sunday	16/06/2019	9:00 AM	*	
Monday	17/06/2019	9:00 AM	**25.0**	Cameron Hawke
Tuesday	18/06/2019	9:00 AM	**0.0**	Cameron Hawke
Wednesday	19/06/2019	9:00 AM	**0.0**	Cameron Hawke
Thursday	20/06/2019	9:00 AM	**0.0**	Cameron Hawke
Friday	21/06/2019	9:00 AM	**0.0**	Cameron Hawke
Saturday	22/06/2019	9:00 AM	*	
Sunday	23/06/2019	9:00 AM	*	
Monday	24/06/2019	9:00 AM	**11.0**	Casey Rogers
Tuesday	25/06/2019	9:00 AM	**9.0**	Casey Rogers
Wednesday	26/06/2019	9:00 AM	**0.0**	Casey Rogers
Thursday	27/06/2019	9:00 AM	**9.0**	Casey Rogers
Friday	28/06/2019	9:00 AM	**0.0**	Casey Rogers
Saturday	29/06/2019	9:00 AM	*	
Sunday	30/06/2019	9:00 AM	*	