ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW2103313**	Page	: 1 of 5
Client	: **WINGECARRIBEE SHIRE COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Helen Harrison	Contact	: Aneta Prosaroski
Address	: PO BOX 141 MOSSVALE NSW AUSTRALIA	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: 02 42253125
Project	: RRC Quarterly	Date Samples Received	: 05-Aug-2021 15:30
Order number	: ----	Date Analysis Commenced	: 05-Aug-2021
C-O-C number	: ----	Issue Date	: 13-Aug-2021 16:25
Sampler	: Robert DaLio		
Site	: ----		
Quote number	: WO/067/12		
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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EN055: Ionic Balance out of acceptable limits for sample EW2103313-#001 due to analytes not quantified in this report.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Sampling completed as per FWI-EN002 Surface Water Sampling.
- Field tests completed on day of sampling/receipt.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	Point 1 MW1B (Front Gate)	Point 2 MW06 (Car Park)	Point 3 MW7 (South of Pond)	Point 5 SW01 (Upstream Stormwater)	Point 6 SW02 (Holding Pond)
				Sampling date / time	05-Aug-2021 13:40	05-Aug-2021 12:40	05-Aug-2021 13:00	05-Aug-2021 12:50	05-Aug-2021 13:30
					EW2103313-001	EW2103313-002	EW2103313-003	EW2103313-004	EW2103313-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		**6.1**	**4.9**	**5.4**	----	**8.3**
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		**3470**	**337**	**2390**	----	**905**
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**2680**	**226**	**1390**	----	**668**
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		----	----	----	----	**8**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**74**	**24**	**23**	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**74**	**24**	**23**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**238**	**18**	<1	----	**81**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**451**	**78**	**702**	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**277**	**3**	**27**	----	----
Magnesium	7439-95-4	1	mg/L		**102**	**3**	**42**	----	----
Sodium	7440-23-5	1	mg/L		**265**	**58**	**382**	----	----
Potassium	7440-09-7	1	mg/L		**57**	<1	**2**	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	----	----	**0.27**
Copper	7440-50-8	0.001	mg/L		----	----	----	----	**0.003**
Lead	7439-92-1	0.001	mg/L		----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L		----	----	----	----	**0.009**
Iron	7439-89-6	0.05	mg/L		----	----	----	----	**0.51**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.01**	**0.07**	**0.02**	----	**1.79**
EK086: Sulfite as SO3 2-									
Sulfite as SO3 2-	14265-45-3	2	mg/L		----	----	----	----	<2

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	Point 1 MW1B (Front Gate)	Point 2 MW06 (Car Park)	Point 3 MW7 (South of Pond)	Point 5 SW01 (Upstream Stormwater)	Point 6 SW02 (Holding Pond)
				Sampling date / time	05-Aug-2021 13:40	05-Aug-2021 12:40	05-Aug-2021 13:00	05-Aug-2021 12:50	05-Aug-2021 13:30
					EW2103313-001	EW2103313-002	EW2103313-003	EW2103313-004	EW2103313-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**19.2**	**3.05**	**20.3**	**----**	**----**
ø **Total Cations**	----	0.01	meq/L		**35.2**	**2.92**	**21.5**	**----**	**----**
ø **Ionic Balance**	----	0.01	%		**29.5**	**2.26**	**2.90**	**----**	**----**
EN67 PK: Field Tests									
Field Observations	----	0.01	--		**----**	**----**	**----**	**Dry Site**	**----**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**32**	**7**	**2**	**----**	**13**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		**----**	**----**	**----**	**----**	**24**
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m		**3.24**	**2.14**	**2.21**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Point 7 SW03 (Polishing Pond)	----	----	----	----
			Sampling date / time	05-Aug-2021 13:20	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2103313-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**8.9**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**1790**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**82**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.05**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**54**	----	----	----	----
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	<2	----	----	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
(WATER) EN055: Ionic Balance
(WATER) EP030: Biochemical Oxygen Demand (BOD)
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK086: Sulfite as SO3 2-
(WATER) EG020T: Total Metals by ICP-MS