

CERTIFICATE OF ANALYSIS

Work Order : **EM2017172**
Client : **Dept for Environment & Water**
Contact : **Mr FRANK MANGERUCA**
Address : **GPO BOX 2834**
ADELAIDE SA, AUSTRALIA 5001
Telephone : **----**
Project : **HCHB**
Order number : **----**
C-O-C number : **----**
Sampler : **JOSHUA CASTLE**
Site : **----**
Quote number : **AD/052/20 V2**
No. of samples received : **19**
No. of samples analysed : **19**

Page : 1 of 10
Laboratory : Environmental Division Melbourne
Contact : Kieren Burns
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61881625130
Date Samples Received : 02-Oct-2020 09:35
Date Analysis Commenced : 02-Oct-2020
Issue Date : 09-Oct-2020 14:35



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Laboratory Coordinator	WRG Subcontracting, Springvale, VIC



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.

- It is recognised that TOC is less than DOC for sample #5. However, the difference is within experimental variation of the methods.
- EP008, LOR raised for Chlorophyll b and Pheophytin-a for various samples due to sample matrix.
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- EA015H: EM2017172 #3, #7-8: 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.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- NRind - Reported in separate COA
- Algal Count (BM010) has been performed by ALS Water Resources Group, NATA Accreditation no. 992, Site no. 989.

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Stony Well	North Jacks Point	Seagull Island	Snipe Point	Morella Creek @ gauge
Client sampling date / time				30-Sep-2020 10:40	30-Sep-2020 09:50	30-Sep-2020 09:20	30-Sep-2020 09:00	30-Sep-2020 08:50	
Compound	CAS Number	LOR	Unit	EM2017172-001	EM2017172-002	EM2017172-003	EM2017172-004	EM2017172-005	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NRind	NRind	NRind	NRind	NRind	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	78500	80000	87200	82000	9330	
EA045: Turbidity									
Turbidity	----	0.1	NTU	13.7	20.3	9.4	9.8	5.9	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	105	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	194	204	210	214	263	
Total Alkalinity as CaCO3	----	1	mg/L	194	204	210	214	368	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	44000	44100	50000	47500	5340	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.06	0.26	14.2	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	0.06	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.7	4.0	3.6	3.6	1.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.7	4.0	3.6	3.6	1.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.05	0.30	1.48	1.74	0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	<0.01	<0.01	<0.01	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	----	----	----	----	14	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Client sample ID

				Stony Well	North Jacks Point	Seagull Island	Snipe Point	Morella Creek @ gauge
Client sampling date / time				30-Sep-2020 10:40	30-Sep-2020 09:50	30-Sep-2020 09:20	30-Sep-2020 09:00	30-Sep-2020 08:50
Compound	CAS Number	LOR	Unit	EM2017172-001	EM2017172-002	EM2017172-003	EM2017172-004	EM2017172-005
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	35	34	34	34	13
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	11	11	7	8	4
Chlorophyll b	----	1	mg/m³	<2	<2	<1	<1	<1
Pheophytin a	----	1	mg/m³	2	2	2	2	1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				Salt Creek Outlet	1.8km west of Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Client sampling date / time				30-Sep-2020 07:50	30-Sep-2020 08:30	30-Sep-2020 08:10	30-Sep-2020 09:20	30-Sep-2020 17:30
Compound	CAS Number	LOR	Unit	EM2017172-006	EM2017172-007	EM2017172-008	EM2017172-009	EM2017172-010
				Result	Result	Result	Result	Result
BM010: Algal Count								
Algal Count	----	-	-	NRind	NRind	NRind	NRind	NRind
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	77600	86700	89600	8150	12700
EA045: Turbidity								
Turbidity	----	0.1	NTU	8.6	9.0	10.1	2.4	8.6
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	16	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	227	216	206	390	120
Total Alkalinity as CaCO3	----	1	mg/L	227	216	206	406	120
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	45400	49300	49700	4920	7740
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	1.12	0.13	<0.05	6.83	1.09
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	<0.02	0.05	0.06
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.04	0.03
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	0.04	0.03
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.6	3.8	3.3	0.5	0.8
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.6	3.8	3.3	0.5	0.8
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.79	1.66	1.28	<0.01	<0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	----	----	30	7	6



Analytical Results

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

Client sample ID

				Salt Creek Outlet	1.8km west of Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Client sampling date / time				30-Sep-2020 07:50	30-Sep-2020 08:30	30-Sep-2020 08:10	30-Sep-2020 09:20	30-Sep-2020 17:30
Compound	CAS Number	LOR	Unit	EM2017172-006	EM2017172-007	EM2017172-008	EM2017172-009	EM2017172-010
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	34	36	36	8	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	8	12	8	<1	2
Chlorophyll b	----	1	mg/m ³	<1	<1	<1	<1	<2
Pheophytin a	----	1	mg/m ³	2	3	1	<1	<2

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	US Tauwitschere	DS Tauwitschere	Mark Point	Long Point	Noonameena
Client sampling date / time				30-Sep-2020 16:20	30-Sep-2020 16:30	30-Sep-2020 15:55	30-Sep-2020 15:10	30-Sep-2020 13:55	
Compound	CAS Number	LOR	Unit	EM2017172-011	EM2017172-012	EM2017172-013	EM2017172-014	EM2017172-015	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NRind	NRind	NRind	NRind	NRind	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	810	900	19000	27700	46500	
EA045: Turbidity									
Turbidity	----	0.1	NTU	61.7	61.3	9.4	19.5	2.7	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	21	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	96	85	82	137	156	
Total Alkalinity as CaCO3	----	1	mg/L	96	85	103	137	156	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	375	517	11500	15900	25500	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.36	0.30	<0.05	<0.05	<0.05	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.04	0.06	0.04	0.04	0.02	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.02	0.02	0.02	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.02	0.02	0.03	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	1.7	1.1	1.8	1.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	1.7	1.1	1.8	1.8	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.12	0.12	<0.01	0.08	0.06	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.01	0.01	<0.01	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	7	7	7	----	14	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Client sample ID

				US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Client sampling date / time				30-Sep-2020 16:20	30-Sep-2020 16:30	30-Sep-2020 15:55	30-Sep-2020 15:10	30-Sep-2020 13:55
Compound	CAS Number	LOR	Unit	EM2017172-011	EM2017172-012	EM2017172-013	EM2017172-014	EM2017172-015
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	8	9	7	10	14
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	31	15	1	1	2
Chlorophyll b	----	1	mg/m³	<10	<5	<1	<1	<1
Pheophytin a	----	1	mg/m³	<10	<5	<1	1	<1

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Client sampling date / time				30-Sep-2020 13:35	30-Sep-2020 10:45	30-Sep-2020 12:30	30-Sep-2020 11:25	-----	
Compound	CAS Number	LOR	Unit	EM2017172-016	EM2017172-017	EM2017172-018	EM2017172-019	-----	
				Result	Result	Result	Result	----	
BM010: Algal Count									
Algal Count	----	-	-	NRind	NRind	NRind	NRind	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	49600	60900	74100	72000	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	3.8	10.9	17.9	47.1	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	172	178	201	202	----	
Total Alkalinity as CaCO3	----	1	mg/L	172	178	201	202	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	26300	35500	42500	43500	----	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	----	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.02	<0.02	<0.02	<0.02	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.3	3.1	3.3	3.5	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.3	3.1	3.3	3.5	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.13	0.32	0.46	0.99	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	16	22	----	----	----	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Client sample ID

				Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Client sampling date / time				30-Sep-2020 13:35	30-Sep-2020 10:45	30-Sep-2020 12:30	30-Sep-2020 11:25	----
Compound	CAS Number	LOR	Unit	EM2017172-016	EM2017172-017	EM2017172-018	EM2017172-019	-----
				Result	Result	Result	Result	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	16	25	30	28	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	6	8	8	16	----
Chlorophyll b	----	1	mg/m ³	<1	<2	<2	<6	----
Pheophytin a	----	1	mg/m ³	2	2	3	10	----