

CERTIFICATE OF ANALYSIS

Work Order : **EM2112381**
Client : **Dept for Environment & Water**
Contact : **Mr FRANK MANGERUCA**
Address : **GPO BOX 2834**
ADELAIDE SA, AUSTRALIA 5001
Telephone : **----**
Project : **HCHB**
Order number : **20447681**
C-O-C number : **----**
Sampler : **----**
Site : **----**
Quote number : **AD/052/20 V2**
No. of samples received : **20**
No. of samples analysed : **20**

Page : 1 of 10
Laboratory : Environmental Division Melbourne
Contact : Kieren Burns
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61881625130
Date Samples Received : 30-Jun-2021 10:55
Date Analysis Commenced : 30-Jun-2021
Issue Date : 07-Jul-2021 15:51



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
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	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.

- EP002,EP005: EM2112381 It is recognised that total organic carbon is less than dissolved organic carbon for sample #10 . However, the difference is within experimental variation of the methods.
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- EP008, LOR raised due to sample matrix.
- EM2112381 # 1-4,7,9,12,15 ; 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.
- EK067G: EM2112381 #19 Poor duplicate precision for Total phosphorus due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- NRind - Reported in separate COA
- Total Algae Count (MB010) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Stony Well	North Jacks Point	South Policeman Point/ Seagull Island	Snipe Point	Morella Basin @ Outlet Regulator
Sampling date / time				28-Jun-2021 14:20	28-Jun-2021 13:50	28-Jun-2021 13:20	28-Jun-2021 13:05	28-Jun-2021 13:25	
Compound	CAS Number	LOR	Unit	EM2112381-001	EM2112381-002	EM2112381-003	EM2112381-004	EM2112381-005	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	115000	92200	94100	94800	9360	
EA045: Turbidity									
Turbidity	----	0.1	NTU	11.2	11.2	10.9	10.1	3.9	
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	87	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	203	210	210	214	353	
Total Alkalinity as CaCO3	----	1	mg/L	203	210	210	214	440	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	50100	50100	54400	60700	4560	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.55	0.74	1.45	1.62	15.1	
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water									
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	0.05	
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	2.0	2.1	1.1	0.7	1.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.0	2.1	1.1	0.7	1.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	4.43	3.77	4.27	0.14	0.04	
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	0.05	<0.01	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	26	29	29	30	6	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	32	32	34	34	8	
EP008: Chlorophyll									



Analytical Results

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

Sample ID

				Stony Well	North Jacks Point	South Policeman Point/ Seagull Island	Snipe Point	Morella Basin @ Outlet Regulator
Sampling date / time				28-Jun-2021 14:20	28-Jun-2021 13:50	28-Jun-2021 13:20	28-Jun-2021 13:05	28-Jun-2021 13:25
Compound	CAS Number	LOR	Unit	EM2112381-001	EM2112381-002	EM2112381-003	EM2112381-004	EM2112381-005
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Chlorophyll a	----	1	mg/m ³	12	9	14	18	17
Chlorophyll b	----	1	mg/m ³	<1	<1	2	<1	4
Pheophytin a	----	1	mg/m ³	5	2	7	6	3
Subcontracted Analysis								
Dummy Analyte	----	-	-	NRind	NRind	NRind	NRind	NRind



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Morella Basin @ Gauge	Salt Creek Outlet	1.8km West of Salt Creek	3.2km South of Salt Creek (Land)	Tilley Swamp Drain U/S Morella
Sampling date / time				28-Jun-2021 13:10	28-Jun-2021 12:30	28-Jun-2021 12:50	28-Jun-2021 12:45	28-Jun-2021 13:55
Compound	CAS Number	LOR	Unit	EM2112381-006	EM2112381-007	EM2112381-008	EM2112381-009	EM2112381-010
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	8450	103000	88200	102000	5120
EA045: Turbidity								
Turbidity	----	0.1	NTU	4.0	11.2	8.8	7.5	3.0
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	99	<1	<1	<1	17
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	326	216	206	211	441
Total Alkalinity as CaCO3	----	1	mg/L	425	216	206	211	458
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	4730	56200	54700	56500	2430
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	13.0	1.77	1.71	1.51	13.3
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water								
Ammonia as N	7664-41-7	0.02	mg/L	0.05	<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	0.14
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	0.15
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.4	1.2	1.0	0.2
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.9	1.4	1.2	1.0	0.4
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.04	5.13	4.40	4.25	0.04
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	7	30	30	30	1
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	8	35	34	34	<1



Analytical Results

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

Sample ID

				Morella Basin @ Gauge	Salt Creek Outlet	1.8km West of Salt Creek	3.2km South of Salt Creek (Land)	Tilley Swamp Drain U/S Morella
Sampling date / time				28-Jun-2021 13:10	28-Jun-2021 12:30	28-Jun-2021 12:50	28-Jun-2021 12:45	28-Jun-2021 13:55
Compound	CAS Number	LOR	Unit	EM2112381-006	EM2112381-007	EM2112381-008	EM2112381-009	EM2112381-010
				Result	Result	Result	Result	Result
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	34	20	16	16	1
Chlorophyll b	----	1	mg/m ³	6	2	<2	<1	<1
Pheophytin a	----	1	mg/m ³	3	18	10	3	<1
Subcontracted Analysis								
Dummy Analyte	----	-	-	NRind	NRind	NRind	NRind	NRind

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Murray Mouth	US Tauwitschere	DS Tauwitschere	Mark Point	Long Point
Sampling date / time				28-Jun-2021 09:45	28-Jun-2021 08:40	28-Jun-2021 08:45	28-Jun-2021 08:05	28-Jun-2021 07:15	
Compound	CAS Number	LOR	Unit	EM2112381-011	EM2112381-012	EM2112381-013	EM2112381-014	EM2112381-015	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	25600	1500	11000	26300	26600	
EA045: Turbidity									
Turbidity	----	0.1	NTU	6.4	62.0	41.7	2.9	9.1	
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	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	128	98	109	126	132	
Total Alkalinity as CaCO3	----	1	mg/L	128	98	109	126	132	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	15400	580	6430	15300	15200	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.59	0.09	0.26	1.52	0.84	
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.14	0.05	0.07	0.06	0.09	
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	0.02	0.01	0.04	<0.01	0.03	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.01	0.04	<0.01	0.03	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	1.6	1.2	0.5	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.5	1.6	1.2	0.5	0.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.19	0.11	0.08	0.14	0.09	
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	2	6	4	2	6	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	7	5	3	6	
EP008: Chlorophyll									



Analytical Results

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

Sample ID

				Murray Mouth	US Tauwitschere	DS Tauwitschere	Mark Point	Long Point
Sampling date / time				28-Jun-2021 09:45	28-Jun-2021 08:40	28-Jun-2021 08:45	28-Jun-2021 08:05	28-Jun-2021 07:15
Compound	CAS Number	LOR	Unit	EM2112381-011	EM2112381-012	EM2112381-013	EM2112381-014	EM2112381-015
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Chlorophyll a	----	1	mg/m ³	2	32	18	10	4
Chlorophyll b	----	1	mg/m ³	<1	<8	<8	<1	<1
Pheophytin a	----	1	mg/m ³	<1	<8	<8	3	<1
Subcontracted Analysis								
Dummy Analyte	----	-	-	NRind	NRind	NRind	NRind	NRind

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time				28-Jun-2021 16:30	28-Jun-2021 16:10	28-Jun-2021 15:05	28-Jun-2021 15:25	28-Jun-2021 14:40	
Compound	CAS Number	LOR	Unit	EM2112381-016	EM2112381-017	EM2112381-018	EM2112381-019	EM2112381-020	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	27500	40400	41500	46900	68800	
EA045: Turbidity									
Turbidity	----	0.1	NTU	4.0	8.8	7.3	6.3	10.7	
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	66	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	86	174	198	188	187	
Total Alkalinity as CaCO3	----	1	mg/L	152	174	198	188	187	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	17300	24100	27000	30100	46700	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.06	0.72	0.90	0.22	0.39	
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.05	<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	<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	1.2	1.4	1.4	2.0	2.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.2	1.4	1.4	2.0	2.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.21	0.34	0.43	0.18	2.79	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	7	10	11	14	21	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	7	11	13	----	25	
EP008: Chlorophyll									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time					28-Jun-2021 16:30	28-Jun-2021 16:10	28-Jun-2021 15:05	28-Jun-2021 15:25	28-Jun-2021 14:40
Compound	CAS Number	LOR	Unit		EM2112381-016	EM2112381-017	EM2112381-018	EM2112381-019	EM2112381-020
					Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued									
Chlorophyll a	----	1	mg/m ³		6	8	5	6	9
Chlorophyll b	----	1	mg/m ³		<1	1	<1	<1	<1
Pheophytin a	----	1	mg/m ³		2	5	3	1	2
Subcontracted Analysis									
Dummy Analyte	----	-	-		NRind	NRind	NRind	NRind	NRind

Inter-Laboratory Testing

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

(WATER) EP008: Chlorophyll