

CERTIFICATE OF ANALYSIS

Work Order : **EM2020558**
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 : 20-Nov-2020 10:55
Date Analysis Commenced : 20-Nov-2020
Issue Date : 27-Nov-2020 13:17



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument 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.

- EP005,EP002It is recognised that total organic carbon is less than dissolved organic carbon for samples #6 and #15. However, the difference is within experimental variation of the methods.
- EP008, LOR raised for various samples for Chlorophyll/ Pheophytin-a due to sample matrix .
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- 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)				Sample ID	Murray Mouth	US Tauwitschere	DS Tauwitschere	Mark Point	Long Point
Sampling date / time				17-Nov-2020 11:50	17-Nov-2020 13:00	17-Nov-2020 13:00	17-Nov-2020 13:45	17-Nov-2020 14:30	
Compound	CAS Number	LOR	Unit	EM2020558-001	EM2020558-002	EM2020558-003	EM2020558-004	EM2020558-005	
				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	21500	608	7390	12100	25000	
EA045: Turbidity									
Turbidity	----	0.1	NTU	3.7	39.7	19.7	4.5	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	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	128	93	101	116	131	
Total Alkalinity as CaCO3	----	1	mg/L	128	93	101	116	131	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	13100	178	4170	8090	12000	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	<0.05	<0.05	0.31	<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	0.06	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	0.08	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	0.08	0.03	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	1.5	1.0	0.7	<0.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.7	1.5	1.1	0.7	<0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.07	0.05	<0.01	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	4	8	7	5	7	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Sample ID

				Murray Mouth	US Tauwitchere	DS Tauwitchere	Mark Point	Long Point
Sampling date / time				17-Nov-2020 11:50	17-Nov-2020 13:00	17-Nov-2020 13:00	17-Nov-2020 13:45	17-Nov-2020 14:30
Compound	CAS Number	LOR	Unit	EM2020558-001	EM2020558-002	EM2020558-003	EM2020558-004	EM2020558-005
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	4	8	7	5	8
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	<1	5	2	<1	<1
Chlorophyll b	----	1	mg/m ³	<1	<2	<1	<1	<1
Pheophytin a	----	1	mg/m ³	<2	<1	<1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time				18-Nov-2020 12:20	18-Nov-2020 12:00	18-Nov-2020 10:00	18-Nov-2020 10:30	18-Nov-2020 10:00	
Compound	CAS Number	LOR	Unit	EM2020558-006	EM2020558-007	EM2020558-008	EM2020558-009	EM2020558-010	
				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	37400	60700	71900	73100	87900	
EA045: Turbidity									
Turbidity	----	0.1	NTU	4.7	6.4	19.7	17.3	28.9	
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	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	166	205	225	231	263	
Total Alkalinity as CaCO3	----	1	mg/L	166	205	225	231	263	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	18800	33600	41200	42000	48500	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	0.23	0.67	0.91	0.81	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.08	<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	3.3	2.8	2.9	3.1	4.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.3	2.8	2.9	3.1	4.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.16	0.34	0.83	1.07	2.70	
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	17	21	25	25	32	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Sample ID

				Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time				18-Nov-2020 12:20	18-Nov-2020 12:00	18-Nov-2020 10:00	18-Nov-2020 10:30	18-Nov-2020 10:00
Compound	CAS Number	LOR	Unit	EM2020558-006	EM2020558-007	EM2020558-008	EM2020558-009	EM2020558-010
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	16	24	28	30	43
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	4	6	7	9	26
Chlorophyll b	----	1	mg/m ³	<1	<1	<2	<2	<2
Pheophytin a	----	1	mg/m ³	<1	1	3	3	12

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Stoney Well		North Jacks Point		South Policeman Point/Seagull Island		Snipe Point		Morella Creek @ gauge	
				Sampling date / time	18-Nov-2020 09:40		18-Nov-2020 08:30		18-Nov-2020 08:15		18-Nov-2020 07:55		18-Nov-2020 08:05	
Compound		CAS Number	LOR	Unit	EM2020558-011		EM2020558-012		EM2020558-013		EM2020558-014		EM2020558-015	
					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	92500		88000		95200		90600		11300	
EA045: Turbidity														
Turbidity		----	0.1	NTU	28.7		18.1		13.9		11.4		3.6	
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		<1		156	
Bicarbonate Alkalinity as CaCO3		71-52-3	1	mg/L	250		230		238		236		220	
Total Alkalinity as CaCO3		----	1	mg/L	250		230		238		236		376	
ED045G: Chloride by Discrete Analyser														
Chloride		16887-00-6	1	mg/L	48300		48900		48200		48000		6060	
EG052G: Silica by Discrete Analyser														
Reactive Silica		----	0.05	mg/L	0.68		0.17		0.26		0.23		13.8	
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		0.07	
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	3.8		3.6		3.6		3.3		1.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser														
^ Total Nitrogen as N		----	0.1	mg/L	3.8		3.6		3.6		3.3		1.4	
EK067G: Total Phosphorus as P by Discrete Analyser														
Total Phosphorus as P		----	0.01	mg/L	2.56		2.75		2.30		2.67		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	30		30		31		31		15	
EP005: Total Organic Carbon (TOC)														



Analytical Results

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

Sample ID

				Stoney Well	North Jacks Point	South Policeman Point/Seagull Island	Snipe Point	Morella Creek @ gauge
Sampling date / time				18-Nov-2020 09:40	18-Nov-2020 08:30	18-Nov-2020 08:15	18-Nov-2020 07:55	18-Nov-2020 08:05
Compound	CAS Number	LOR	Unit	EM2020558-011	EM2020558-012	EM2020558-013	EM2020558-014	EM2020558-015
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	39	40	39	42	13
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	32	16	13	13	2
Chlorophyll b	----	1	mg/m³	<3	2	2	2	<1
Pheophytin a	----	1	mg/m³	18	5	5	7	1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				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				18-Nov-2020 07:25	18-Nov-2020 07:40	18-Nov-2020 07:40	18-Nov-2020 08:40	----
Compound	CAS Number	LOR	Unit	EM2020558-016	EM2020558-017	EM2020558-018	EM2020558-019	-----
				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	85200	77700	92400	12600	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	11.5	11.2	10.9	6.9	----
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	41	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	239	238	213	382	----
Total Alkalinity as CaCO3	----	1	mg/L	239	238	213	422	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	48500	48600	49500	6280	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	0.41	0.33	0.08	20.8	----
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	0.02	0.02	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	0.02	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.6	3.9	3.8	1.0	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.6	3.9	3.8	1.0	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	2.48	2.80	2.74	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	<0.01	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	31	30	32	10	----



Analytical Results

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

Sample ID

				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				18-Nov-2020 07:25	18-Nov-2020 07:40	18-Nov-2020 07:40	18-Nov-2020 08:40	----
Compound	CAS Number	LOR	Unit	EM2020558-016	EM2020558-017	EM2020558-018	EM2020558-019	-----
				Result	Result	Result	Result	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	39	38	38	10	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	12	12	16	2	----
Chlorophyll b	----	1	mg/m ³	2	2	3	<1	----
Pheophytin a	----	1	mg/m ³	7	4	3	<1	----