

CERTIFICATE OF ANALYSIS

Work Order : **EM2218950**
Client : **Dept for Environment & Water**
Contact : DARCY MORRIS
Address : GPO BOX 2834
 ADELAIDE SA, AUSTRALIA 5001
Telephone : ----
Project : HCHB Monitoring Program
Order number : -
C-O-C number : 38348
Sampler : Bryce Drechsler, DARCY MORRIS
Site : HCBC Land 28/29th September
Quote number : AD/052/20 V2
No. of samples received : 11
No. of samples analysed : 11

Page : 1 of 11
Laboratory : Environmental Division Melbourne
Contact : Kieren Burns
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61881625130
Date Samples Received : 30-Sep-2022 13:30
Date Analysis Commenced : 01-Oct-2022
Issue Date : 10-Oct-2022 17:15



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	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Narelle Drummond	Laboratory Manager	Townsville Inorganics, Townsville, QLD



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 Contract 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:EP002:It is recognised that total organic carbon is less than dissolved organic carbon for samples EM2218950#1,#4, #8 & #11. However, the difference is within experimental variation of the methods.
- EK067G: EM2218950 #3-6,10 Sample required dilution for total phosphorus due to sample matrix. LOR has been raised accordingly.
- EP008: Chlorophyll-a standard does not contain pheophytin-a standard
- EP008B: LOR raised for samples 1-3 due to limited sample filtered by client
- EA015H: EM2218950 #1-2: 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.
- EA015H: EM2218950 #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, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Total Algae Count (MB010) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.



Analytical Results

Sub-Matrix: FRESH WATER
 (Matrix: WATER)

Sample ID

				US Tauwitchere	DS Tauwitchere	Long Point	Noonameena	Bonneys
Sampling date / time				28-Sep-2022 12:26	28-Sep-2022 12:28	28-Sep-2022 13:38	28-Sep-2022 14:12	28-Sep-2022 14:31
Compound	CAS Number	LOR	Unit	EM2218950-001	EM2218950-002	EM2218950-003	EM2218950-004	EM2218950-005
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	393	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	95.9	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	64	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	64	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	79	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	0.20	----	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water								
Ammonia as N	7664-41-7	0.02	mg/L	0.10	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.08	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.08	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.1	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.26	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	8	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	7	----	----	----	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	26	19	4	<1	2
Chlorophyll b	----	1	mg/m³	<4	<3	<2	<1	<1



Analytical Results

Sub-Matrix: FRESH WATER
 (Matrix: WATER)

Sample ID

				US Tauwitchere	DS Tauwitchere	Long Point	Noonameena	Bonneys
Sampling date / time				28-Sep-2022 12:26	28-Sep-2022 12:28	28-Sep-2022 13:38	28-Sep-2022 14:12	28-Sep-2022 14:31
Compound	CAS Number	LOR	Unit	EM2218950-001	EM2218950-002	EM2218950-003	EM2218950-004	EM2218950-005
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Pheophytin a	----	1	mg/m ³	9	6	4	2	2



Analytical Results

Sub-Matrix: FRESH WATER
 (Matrix: WATER)

Sample ID

				McGrath Flat North	Tilley Swamp Drain D/S Nth Outlet	Morella Basin @ outlet regulator	Morella Creek @ gauge	3.2km south of Salt Creek (land)
Sampling date / time				28-Sep-2022 15:00	29-Sep-2022 10:24	29-Sep-2022 08:49	29-Sep-2022 08:33	29-Sep-2022 08:13
Compound	CAS Number	LOR	Unit	EM2218950-006	EM2218950-007	EM2218950-008	EM2218950-009	EM2218950-010
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	6040	22000	7490	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	----	2.8	2.9	7.4	----
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	----	31	66	54	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	362	313	314	----
Total Alkalinity as CaCO3	----	1	mg/L	----	393	379	367	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	3380	4150	4160	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	----	14.8	17.5	17.4	----
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water								
Ammonia as N	7664-41-7	0.02	mg/L	----	0.06	<0.02	<0.02	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	0.02	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	0.39	<0.01	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.41	<0.01	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	1.0	2.6	1.8	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	----	1.4	2.6	1.8	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	----	0.01	0.04	0.02	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	----	7	11	10	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	8	9	12	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	9	<1	5	7	8
Chlorophyll b	----	1	mg/m³	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: FRESH WATER
 (Matrix: WATER)

Sample ID

				McGrath Flat North	Tilley Swamp Drain D/S Nth Outlet	Morella Basin @ outlet regulator	Morella Creek @ gauge	3.2km south of Salt Creek (land)
Sampling date / time				28-Sep-2022 15:00	29-Sep-2022 10:24	29-Sep-2022 08:49	29-Sep-2022 08:33	29-Sep-2022 08:13
Compound	CAS Number	LOR	Unit	EM2218950-006	EM2218950-007	EM2218950-008	EM2218950-009	EM2218950-010
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Pheophytin a	----	1	mg/m ³	2	<1	<1	1	3



Analytical Results

Sub-Matrix: FRESH WATER
 (Matrix: WATER)

Sample ID

				Tilley Swamp Drain Watercourse Outlet	----	----	----	----
Sampling date / time				29-Sep-2022 10:13	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2218950-011	-----	-----	-----	-----
Result				----	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	8700	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	5.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	29	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	380	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	409	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	4740	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	13.8	----	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water								
Ammonia as N	7664-41-7	0.02	mg/L	0.22	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.02	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.34	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.36	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.9	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	9	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	8	----	----	----	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	<1	----	----	----	----
Chlorophyll b	----	1	mg/m³	<1	----	----	----	----



Analytical Results

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

Sample ID

Tilley Swamp Drain
Watercourse Outlet

Sampling date / time

29-Sep-2022 10:13

Compound

CAS Number

LOR

Unit

EM2218950-011

Result

EP008: Chlorophyll - Continued

Pheophytin a

1

mg/m³

<1



Analytical Results

Sub-Matrix: MARINE WATER
 (Matrix: WATER)

Sample ID

				DS Tauwitschere	Long Point	Noonameena	Bonneys	McGrath Flat North
Sampling date / time				28-Sep-2022 12:28	28-Sep-2022 13:38	28-Sep-2022 14:12	28-Sep-2022 14:31	28-Sep-2022 15:00
Compound	CAS Number	LOR	Unit	EM2218950-002	EM2218950-003	EM2218950-004	EM2218950-005	EM2218950-006
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	372	19700	33600	34900	54900
EA045: Turbidity								
Turbidity	----	0.1	NTU	101	20.2	9.8	7.2	11.9
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	56	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	61	115	140	102	164
Total Alkalinity as CaCO3	----	1	mg/L	61	115	140	158	164
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	108	11000	18000	20100	28000
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	0.27	2.50	1.01	0.37	0.05
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	0.03	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	0.03	0.01	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	2.7	3.5	2.6	3.8
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.5	2.7	3.5	2.6	3.8
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.14	<0.10	<0.10	<0.10	<0.10
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	8	12	18	19	24
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	10	12	16	21	29



Analytical Results

Sub-Matrix: MARINE WATER
 (Matrix: WATER)

Sample ID

3.2km south of Salt
Creek (land)

Sampling date / time

29-Sep-2022 08:13

Compound	CAS Number	LOR	Unit	Result				
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	67000	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	18.3	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	202	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	202	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	37200	----	----	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	0.47	----	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.5	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.5	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	<0.10	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	28	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	35	----	----	----	----

Page : 11 of 11
Work Order : EM2218950
Client : Dept for Environment & Water
Project : HCHB Monitoring Program



Inter-Laboratory Testing

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

(WATER) EP008: Chlorophyll

Analysis conducted by ALS Townsville, NATA accreditation no. 825, site no. 23472 (Chemistry) 23313 (Biology).

(WATER) ED037P: Alkalinity by PC Titrator
