ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2112381**	Page	: 1 of 7
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Project	: HCHB	Date Samples Received	: 30-Jun-2021
Order number	: 20447681	Date Analysis Commenced	: 30-Jun-2021
C-O-C number	: ----	Issue Date	: 07-Jul-2021
Sampler	: ----		
Site	: ----		
Quote number	: AD/052/20 V2		
No. of samples received	: 20		
No. of samples analysed	: 20		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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
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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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water (QC Lot: 3768880)									
EM2112381-001	Stony Well	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	0.0	No Limit
EM2112381-010	Tilley Swamp Drain U/S Morella	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	0.06	0.06	0.0	No Limit
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3769975)									
EM2112258-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	248	268	7.9	0% - 20%
EM2112298-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	168	167	0.9	0% - 50%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3769977)									
EM2112381-004	Snipe Point	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	94800	91500	3.6	0% - 20%
EM2112381-013	DS Tauwitchere	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	11000	11100	0.3	0% - 20%
EA045: Turbidity (QC Lot: 3766416)									
EM2112297-001	Anonymous	EA045: Turbidity	----	0.1	NTU	16.2	15.9	1.9	0% - 20%
EM2112323-005	Anonymous	EA045: Turbidity	----	0.1	NTU	0.5	0.5	0.0	No Limit
EA045: Turbidity (QC Lot: 3766417)									
EM2112381-011	Murray Mouth	EA045: Turbidity	----	0.1	NTU	6.4	6.0	5.2	0% - 20%
EM2112381-020	Villa de Yumpa	EA045: Turbidity	----	0.1	NTU	10.7	9.6	11.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3768135)									
EM2112258-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	138	144	4.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	138	144	4.4	0% - 20%
EM2112371-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	9	9	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	9	9	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 3768139)									
EM2112381-011	Murray Mouth	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	128	129	1.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	128	129	1.0	0% - 20%
EM2112387-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3	2	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	3	2	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3766902)									
EM2112381-009	3.2km South of Salt Creek (Land)	ED045G: Chloride	16887-00-6	1	mg/L	56500	59100	4.6	0% - 20%
EM2112381-001	Stony Well	ED045G: Chloride	16887-00-6	1	mg/L	50100	51200	2.2	0% - 20%
EG052G: Silica by Discrete Analyser (QC Lot: 3766901)									
EM2112381-011	Murray Mouth	EG052G: Reactive Silica	----	0.05	mg/L	0.59	0.54	10.4	0% - 50%
EM2112381-001	Stony Well	EG052G: Reactive Silica	----	0.05	mg/L	0.55	0.50	9.3	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3766900)									
EM2112378-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.06	0.06	0.0	No Limit
EM2112381-009	3.2km South of Salt Creek (Land)	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3766904)									
EM2112381-020	Villa de Yumpa	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3768879)									
EM2112381-001	Stony Well	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2112381-010	Tilley Swamp Drain U/S Morella	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.15	0.14	0.0	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3766426)									
EM2112356-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.5	0.0	0% - 50%
EM2112374-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	78.2	84.6	7.8	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3766428)									
EM2112381-010	Tilley Swamp Drain U/S Morella	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EM2112381-019	Parnka Point	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	1.8	7.5	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3766427)									
EM2112356-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.08	0.0	No Limit
EM2112374-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	16.2	17.7	9.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3766429)									
EM2112381-019	Parnka Point	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.18	# 0.27	42.9	0% - 20%
EM2112381-010	Tilley Swamp Drain U/S Morella	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.02	44.4	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3766903)									
EM2112381-010	Tilley Swamp Drain U/S Morella	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2112381-001	Stony Well	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 3770325)									
EM2112381-001	Stony Well	EP002: Dissolved Organic Carbon	----	1	mg/L	26	26	0.0	0% - 20%
EM2112381-010	Tilley Swamp Drain U/S Morella	EP002: Dissolved Organic Carbon	----	1	mg/L	1	2	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 3770324)									
EM2112381-001	Stony Well	EP005: Total Organic Carbon	----	1	mg/L	32	31	0.0	0% - 20%
EM2112381-010	Tilley Swamp Drain U/S Morella	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water (QCLot: 3768880)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	113	81.1	124
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3769975)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	95.2	91.0	110
				<10	293 mg/L	92.2	91.0	110
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3769977)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.4	91.0	110
				<10	293 mg/L	106	91.0	110
EA045: Turbidity (QCLot: 3766416)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	101	88.1	110
EA045: Turbidity (QCLot: 3766417)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	98.0	88.1	110
ED037P: Alkalinity by PC Titrator (QCLot: 3768135)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	108	85.0	116
ED037P: Alkalinity by PC Titrator (QCLot: 3768139)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	110	85.0	116
ED045G: Chloride by Discrete Analyser (QCLot: 3766902)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	102	85.0	115
				<1	1000 mg/L	106	85.0	122
EG052G: Silica by Discrete Analyser (QCLot: 3766901)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	95.6	78.9	118
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3766900)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	90.9	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3766904)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.8	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3768879)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	90.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3766426)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	89.4	70.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3766428)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	95.6	70.0	117
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3766427)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	81.9	71.9	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3766429)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	88.0	71.9	114
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3766903)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	118	92.7	119
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3770325)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	100 mg/L	90.4	83.0	115
EP005: Total Organic Carbon (TOC) (QCLot: 3770324)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	89.5	81.2	110
EP008: Chlorophyll (QCLot: 3772205)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	97.6	70.0	130
EP008: Pheophytin a	----	1	mg/m³	<1	----	----	----	----
EP008: Chlorophyll (QCLot: 3772206)								
EP008B: Chlorophyll b	----	1	mg/m³	<1	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water (QCLot: 3768880)							
EM2112381-002	North Jacks Point	EK055G-SW: Ammonia as N	7664-41-7	0.5 mg/L	85.5	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3766902)							
EM2112381-002	North Jacks Point	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
EG052G: Silica by Discrete Analyser (QCLot: 3766901)							
EM2112381-002	North Jacks Point	EG052G: Reactive Silica	----	5 mg/L	80.5	80.0	120
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3766900)							
EM2112381-001	Stony Well	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	91.0	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3768879)							
EM2112381-002	North Jacks Point	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	77.2	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3766426)							
EM2112356-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	103	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3766428)							
EM2112381-011	Murray Mouth	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	115	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3766427)							
EM2112356-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	101	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3766429)							
EM2112381-011	Murray Mouth	EK067G: Total Phosphorus as P	----	1 mg/L	97.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3766903)							
EM2112381-002	North Jacks Point	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	108	79.0	123
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3770325)							
EM2112381-002	North Jacks Point	EP002: Dissolved Organic Carbon	----	100 mg/L	79.0	75.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 3770324)							
EM2112381-002	North Jacks Point	EP005: Total Organic Carbon	----	100 mg/L	96.8	76.6	125