

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: EM2014780</b>	<b>Page</b>	<b>: 1 of 6</b>
<b>Client</b>	<b>: Dept for Environment &amp; Water</b>	<b>Laboratory</b>	<b>: Environmental Division Melbourne</b>
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<b>Project</b>	<b>: HCHB</b>	<b>Date Samples Received</b>	<b>: 27-Aug-2020</b>
<b>Order number</b>	<b>: ----</b>	<b>Date Analysis Commenced</b>	<b>: 27-Aug-2020</b>
<b>C-O-C number</b>	<b>: ----</b>	<b>Issue Date</b>	<b>: 03-Sep-2020</b>
<b>Sampler</b>	<b>: JOSHUA CASTLE</b>		
<b>Site</b>	<b>: ----</b>		
<b>Quote number</b>	<b>: AD/052/20 V2</b>		
<b>No. of samples received</b>	<b>: 19</b>		
<b>No. of samples analysed</b>	<b>: 19</b>		



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 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Arenie Vijayaratham	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
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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

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**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3228042)									
EM2014771-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3890	3810	2.18	0% - 20%
EM2014780-003	Seagull Island	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	84200	93200	10.1	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3228043)									
EM2014780-015	Long Point	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	24600	26500	7.20	0% - 20%
EM2014784-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3610	3490	3.46	0% - 20%
EA045: Turbidity (QC Lot: 3223962)									
EM2014724-021	Anonymous	EA045: Turbidity	----	0.1	NTU	1.0	1.0	0.00	0% - 50%
EM2014780-001	Stony Well	EA045: Turbidity	----	0.1	NTU	6.3	6.2	0.00	0% - 20%
EA045: Turbidity (QC Lot: 3223963)									
EM2014780-013	DS Tauwitchere	EA045: Turbidity	----	0.1	NTU	28.9	29.2	1.03	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3228866)									
EM2014780-002	North Jacks Point	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	211	221	4.82	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	211	221	4.82	0% - 20%
EM2014780-013	DS Tauwitchere	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	115	125	8.43	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	115	125	8.43	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 3224037)									
EM2014784-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3770	3150	18.1	0% - 20%
EM2014780-001	Stony Well	ED045G: Chloride	16887-00-6	1	mg/L	40900	39900	2.51	0% - 20%
EG052G: Silica by Discrete Analyser (QC Lot: 3224034)									
EM2014780-012	US Tauwitchere	EG052G: Reactive Silica	----	0.05	mg/L	0.38	0.39	3.46	No Limit

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Sub-Matrix: <b>WATER</b>				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EG052G: Silica by Discrete Analyser (QC Lot: 3224034) - continued</b>									
EM2014780-001	Stony Well	EG052G: Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.00	No Limit
<b>EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 3225877)</b>									
EM2014780-001	Stony Well	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	0.00	No Limit
EM2014780-011	Murray Mouth	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	0.15	0.15	0.00	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3224035)</b>									
EM2014780-011	Murray Mouth	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.00	No Limit
EM2014780-001	Stony Well	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3225876)</b>									
EM2014780-001	Stony Well	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2014780-011	Murray Mouth	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.00	No Limit
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3224458)</b>									
EM2014768-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	503	490	2.58	0% - 20%
EM2014780-004	Snipe Point	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.2	4.3	0.00	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3224460)</b>									
EM2014780-016	Noonameena	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.4	2.4	0.00	0% - 20%
EM2014790-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.00	No Limit
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3224459)</b>									
EM2014768-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	147	147	0.00814	0% - 20%
EM2014780-004	Snipe Point	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.35	1.30	3.47	0% - 20%
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3224461)</b>									
EM2014780-016	Noonameena	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.06	0.00	No Limit
EM2014790-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.04	0.00	No Limit
<b>EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3224036)</b>									
EM2014780-011	Murray Mouth	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2014780-001	Stony Well	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EP002: Dissolved Organic Carbon (DOC) (QC Lot: 3231563)</b>									
EM2014780-001	Stony Well	EP002: Dissolved Organic Carbon	----	1	mg/L	30	31	3.81	0% - 20%
EM2014780-011	Murray Mouth	EP002: Dissolved Organic Carbon	----	1	mg/L	7	7	0.00	No Limit
<b>EP005: Total Organic Carbon (TOC) (QC Lot: 3231562)</b>									
EM2014780-001	Stony Well	EP005: Total Organic Carbon	----	1	mg/L	30	33	9.76	0% - 20%
EM2014780-011	Murray Mouth	EP005: Total Organic Carbon	----	1	mg/L	7	7	0.00	No Limit



## Method Blank (MB) and Laboratory Control Spike (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 Spike (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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3228042)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	99.8	93.7	107
				<10	293 mg/L	100	90.0	110
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3228043)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.0	93.7	107
				<10	293 mg/L	108	90.0	110
EA045: Turbidity (QCLot: 3223962)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	102	88.1	110
EA045: Turbidity (QCLot: 3223963)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	102	88.1	110
ED037P: Alkalinity by PC Titrator (QCLot: 3228866)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	112	88.0	112
ED045G: Chloride by Discrete Analyser (QCLot: 3224037)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	102	85.0	122
				<1	1000 mg/L	107	85.0	122
EG052G: Silica by Discrete Analyser (QCLot: 3224034)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	103	78.9	128
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 3225877)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	108	81.1	124
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3224035)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	96.4	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3225876)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	115	90.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3224458)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	87.3	70.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3224460)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	84.8	70.0	117
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3224459)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	101	71.9	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3224461)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	99.5	71.9	114
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3224036)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	92.7	119



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
<b>EP002: Dissolved Organic Carbon (DOC) (QCLot: 3231563)</b>								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	100 mg/L	97.0	83.0	115
<b>EP005: Total Organic Carbon (TOC) (QCLot: 3231562)</b>								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	102	81.2	109
<b>EP008: Chlorophyll (QCLot: 3232269)</b>								
EP008B: Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	----	----	----	----
<b>EP008: Chlorophyll (QCLot: 3232273)</b>								
EP008: Chlorophyll a	----	1	mg/m <sup>3</sup>	<1	20 mg/m <sup>3</sup>	128	70.0	130
EP008: Pheophytin a	----	1	mg/m <sup>3</sup>	<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**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
<b>ED045G: Chloride by Discrete Analyser (QCLot: 3224037)</b>							
EM2014780-002	North Jacks Point	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
<b>EG052G: Silica by Discrete Analyser (QCLot: 3224034)</b>							
EM2014780-002	North Jacks Point	EG052G: Reactive Silica	----	5 mg/L	82.8	80.0	120
<b>EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 3225877)</b>							
EM2014780-002	North Jacks Point	EK055G-SW: Ammonia as N	7664-41-7	0.5 mg/L	81.1	70.0	130
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 3224035)</b>							
EM2014780-002	North Jacks Point	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.6	80.0	114
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3225876)</b>							
EM2014780-002	North Jacks Point	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	80.9	70.0	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3224458)</b>							
EM2014768-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	# Not Determined	70.0	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3224460)</b>							
EM2014780-017	Bonneys	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	115	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3224459)</b>							
EM2014768-004	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	# Not Determined	70.0	130



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Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3224461)</b>							
EM2014780-017	Bonneys	EK067G: Total Phosphorus as P	----	1 mg/L	76.1	70.0	130
<b>EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3224036)</b>							
EM2014780-002	North Jacks Point	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.9	79.0	123
<b>EP002: Dissolved Organic Carbon (DOC) (QCLot: 3231563)</b>							
EM2014780-002	North Jacks Point	EP002: Dissolved Organic Carbon	----	100 mg/L	105	75.0	117
<b>EP005: Total Organic Carbon (TOC) (QCLot: 3231562)</b>							
EM2014780-002	North Jacks Point	EP005: Total Organic Carbon	----	100 mg/L	102	80.0	114