

**DISCHARGE WATER MONITORING UNDERTAKEN DURING
OCTOBER**

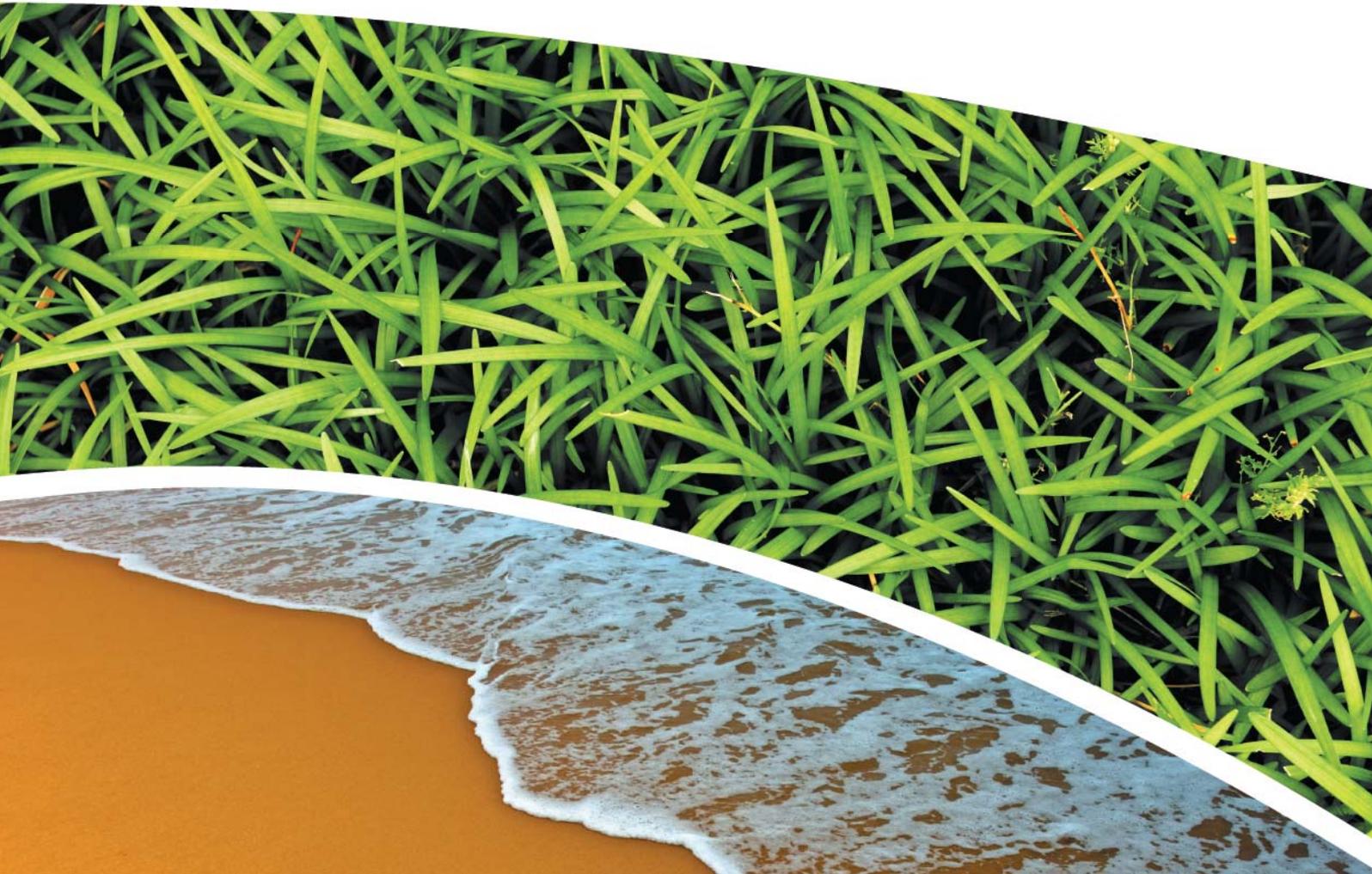
KOORAGANG ISLAND FACILITY

Prepared for INCITEC PIVOT LTD

Prepared by RCA AUSTRALIA

RCA Ref 6919-1347/1

NOVEMBER 2021



RCA ref 6919-1347/1



26 November 2021

Incitec Pivot Limited
PO Box 148
MAYFIELD NSW 2304

Attention: Mr Anthony Peters



**REPORT COMPILED FOR INCITEC PIVOT PTY LTD
DETAILING THE DISCHARGE WATER MONITORING
AT THE KOORAGANG ISLAND FACILITY
DURING OCTOBER 2021**

This report must not be reproduced except in full.

Results or figures from this report must not be used without acknowledgment.

1 GENERAL COMMENTS

Job number: 6919.

Client Order Number: 46027674.

Date Samples Received: During October 2021.

Samples received were sampled by RCA Laboratories – Environmental staff.

Note: Sampling of Surface and Ground Waters by the client and/or by RCA Laboratories - Environmental staff is not covered by our NATA Scope of Accreditation.

This report has been revised to correct results within **Table 3**.

2 PROCEDURES

The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**.

Table 1 Analytical Test Methods

| Analysis | Method | Units | Analysing Laboratory | NATA Status |
|--|---------------|---------|-------------------------------------|-------------------|
| pH | ENV-LAB006 | pH unit | RCA Laboratories - Environmental | NATA |
| Total Suspended Solids | ENV-LAB009 | mg/L | RCA Laboratories - Environmental | NATA |
| Sulfur as S | ED043 | mg/L | ALS | Non-NATA; NATA |
| Sulfate as SO ₄ | ED041G | mg/L | ALS | NATA |
| Dissolved As, Cd, Pb & Zn | EG020F | mg/L | ALS | NATA |
| Total As, Cd, Pb & Zn | EG020T | mg/L | ALS | NATA |
| Total & Dissolved Mercury | EG035T/EG035F | mg/L | ALS | NATA |
| Ammonia as N | EK055G | mg/L | ALS | NATA |
| Nitrite as N | EK057G | mg/L | ALS | NATA |
| Nitrate as N | EK058G | mg/L | ALS | NATA |
| Nitrite and Nitrate as N | EK059G | mg/L | ALS | Non-NATA; NATA |
| Total Kjeldahl Nitrogen as N | EK061G | mg/L | ALS | NATA |
| Total Nitrogen as N | EK062G | mg/L | ALS | NATA |
| Phosphorus (Total) as P | EK067G | mg/L | ALS | Non-NATA; NATA |
| Phosphorus (Reactive) as P | EK071G | mg/L | ALS | NATA |
| Phosphate (Calculation from Total Phosphorus) | EK067G | mg/L | ALS | Non-NATA; NATA |
| Sulfide (Total) as S ²⁻ | EK084 | mg/L | ALS | NATA |
| Sulfide (Dissolved) as S ²⁻ | EK085M | mg/L | ALS | NATA |

When an external testing laboratory is used to obtain the analysis of samples which become a part of this report, then the details of that laboratory's NATA accreditation and their official report will be attached as an appendix. Refer to ALS Environmental (NATA accreditation number 825) reports in **Appendix B**.

3 WATER ANALYSIS RESULTS

3.1 GENERAL COMMENTS

An automated ISCO water sampler is located on the central stormwater drainage line within the Incitec site. This central drainage line has recently undergone improvement works and carries the entire site's stormwater. The northern ISCO water sampler has been decommissioned.

The central automated water sampler is connected to a rain gauge. A magnetic flow meter is also located at the central drainage line. Stormwater samples are automatically collected by the ISCO water sampler when the following two (2) conditions are met:

- A minimum of 2mm of rainfall in a 60-minute period is recorded; and
- Flow is detected over the weir plate inside the stormwater pit.

Samples are collected every 15 minutes provided that these two (2) conditions are continued to be satisfied. Samples are composited per rainfall event. A rainfall event is defined as the continuous length of time the rainfall and flow conditions are met, that is if one sample is collected every 15 minutes. The cessation of these conditions being satisfied indicates the end of a rainfall event.

Stormwater discharge quality monitoring is undertaken by RCA Australia in accordance with the site's Environment Protection Licence (EPL) 11781. Stormwater monitoring is undertaken at EPA identification site 7 (Central Drain).

The central stormwater drains were checked for samples and reset by RCA Laboratories – Environmental staff on two (2) occasions during this reporting period. RCA checked and reset the drain ISCO on the 11 and 14 October 2021. It is noted that the ISCO was without power upon site attendance 8:15am 11 October; bottles had been filled by earlier rainfall and these were collected later that day. Power was restored by 8:05am 13 October.

3.2 CENTRAL DRAIN WATER ANALYSIS RESULTS

Two (2) composite samples corresponding to two (2) days of rainfall events were collected from the Central drain during October 2021 as shown in **Table 2** below.

Table 2 Central Drain Water Quality Results: October 2021

| ANALYSIS | UNITS | Central Drain | |
|---|---------|---------------|-------------|
| | | 10216919002 | 10216919003 |
| Sample Number | - | 10216919002 | 10216919003 |
| Date Sampled | - | 10/11/2021 | 14/11/2021 |
| Rainfall period (time) | - | 17:31-20:59 | 14:24-15:03 |
| pH | pH unit | 8.97 | 7.75 |
| Total Suspended Solids | mg/L | 121 | 16 |
| Sulfur as S | mg/L | 910 | 90 |
| Sulfate as SO ₄ | mg/L | 973 | 13 |
| Total Zinc | mg/L | 0.72 | 0.181 |
| Ammonia as N | mg/L | 893 | 53.9 |
| Nitrite as N | mg/L | 5.38 | 1.33 |
| Nitrate as N | mg/L | 23.4 | 10.1 |
| Nitrite and Nitrate as N | mg/L | 28.8 | 11.4 |
| Total Kjeldahl Nitrogen as N | mg/L | 1750 | 80.6 |
| Total Nitrogen as N | mg/L | 1780 | 92 |
| Phosphorus (Total) as P | mg/L | 99 | 16 |
| Phosphorus (Reactive) as P | mg/L | 93.1 | 14.1 |
| Phosphate (Calculation from Total Phosphorus) | mg/L | 304 | 49.1 |

4 RAINFALL AND FLOW DATA

No flow rate information has been provided to RCA; however, it is understood that flow data is currently being recorded at the Central stormwater drainage line.

A rainfall gauge independent to the ISCO samplers is also located on site however data has not yet been downloaded; an attempt in October 2021 was unsuccessful. RCA have therefore utilised the data from the Bureau of Meteorology as shown in **Figure 1** below.

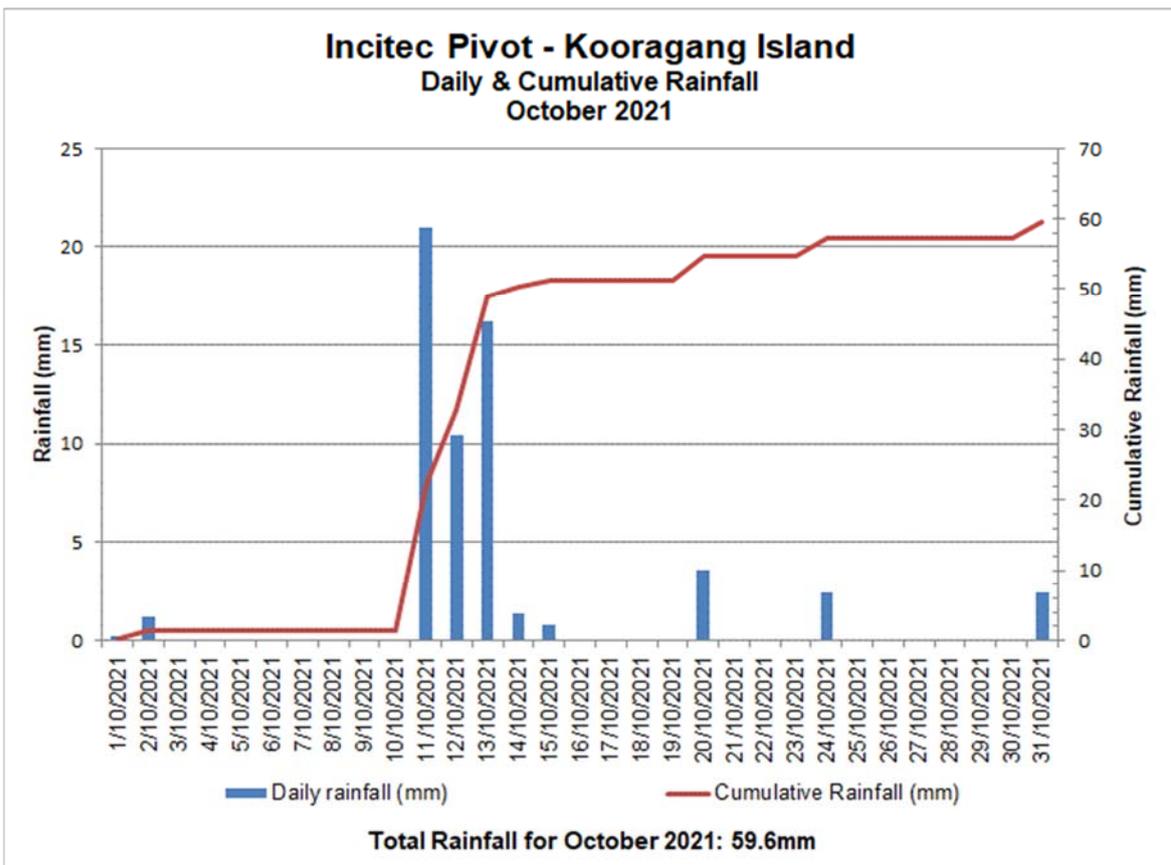


Figure 1 October 2021 Rainfall

5 BENEFICIAL REUSE SAMPLING

Two (2) samples were collected from the wheel wash during October 2021, one (1) sample was analysed for nutrients only due to an error with the analytical request and as such a second sample was collected. Results are shown in **Table 3**. Laboratory report sheets are attached in **Appendix A** and **Appendix B**, noting that there are analytes included which have not been reported.

Table 3 Reuse Analysis Results

| Sample Location | | Wheel Wash | |
|------------------------|----------|------------|------------|
| Date | Units | 5/10/2021 | 29/10/2021 |
| Time | | 5/10/2021 | 29/10/2021 |
| pH | pH units | 8.91 | 8.44 |
| Nitrite as N | mg/L | 12.7 | 13.5 |
| Nitrate as N | mg/L | 159 | 132 |
| TKN | mg/L | 9820 | 18400 |
| Total Nitrogen | mg/L | 9990 | 18600 |
| Total Phosphorus | mg/L | 1020 | 2000 |
| Arsenic (dissolved) | mg/L | -- | 0.293 |
| Cadmium (dissolved) | mg/L | -- | 0.0012 |
| Copper (dissolved) | mg/L | -- | 0.214 |
| Lead (dissolved) | mg/L | -- | <0.001 |
| Molybdenum (dissolved) | mg/L | -- | 0.189 |
| Nickel (dissolved) | mg/L | -- | 0.069 |
| Zinc (dissolved) | mg/L | -- | 0.435 |
| Mercury (dissolved) | mg/L | -- | <0.0001 |
| Chromium (total) | mg/L | -- | 0.01 |

6 LIMITATIONS

This report has been prepared for Incitec Pivot in accordance with an agreement with RCA Australia (RCA). The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Incitec Pivot. The report may not contain sufficient information for purposes of other uses or for parties other than Incitec Pivot. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site.

Yours faithfully
RCA AUSTRALIA



Fiona Brooker
 Manager of Environmental Services

Appendix A

Internal NATA Analysis Reports

Incitec Pivot Limited
PO Box 148
MAYFIELD NSW 2304

Project: RCA ref 6919-1347/0
Date: 2/11/2021
Client reference: Kooragang Island ISCO Water Sampling
Received date: 5/10/2021, 11/10/2021, 14/10/2021, 29/10/2021
Client order number: 45987323
Number of samples: 4
Testing commenced: 5/10/2021, 12/10/2021, 14/10/2021, 29/10/2021

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

| ANALYSIS | METHOD | UNITS | ANALYSING LABORATORY | NATA ANALYSIS / NON NATA | Measurement of Uncertainty Coverage Factor 2 |
|------------------------|-------------|-------|----------------------------------|--------------------------|--|
| pH | ENV-LAB006* | pH | RCA Laboratories - Environmental | NATA | ±0.54 |
| Total Suspended Solids | ENV-LAB009* | mg/L | RCA Laboratories - Environmental | NATA | ±6.41 |

* The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards.

2 RESULTS

| ANALYSIS | UNITS | Central | Central |
|------------------------|---------|-------------|-------------|
| Water | | | |
| Sample Number | - | 10216919002 | 10216919003 |
| Date Sampled | - | 10/11/2021 | 14/11/2021 |
| Sampled By | - | ISCO-SK | ISCO-SK |
| pH Value | pH unit | 8.97 | 7.75 |
| Total Suspended Solids | mg/L | 121 | 16 |

| ANALYSIS | UNITS | Wheel Wash | Wheel Wash |
|------------------------|---------|-------------|-------------|
| Water | | | |
| Sample Number | - | 10216919001 | 10216919004 |
| Date Sampled | - | 5/10/2021 | 29/10/2021 |
| Sampled By | - | SK | LS |
| pH Value | pH unit | 8.91 | 8.44 |
| Total Suspended Solids | mg/L | | |

3 QUALITY CONTROL RESULTS

Water Quality Control Sample Results

| DATE | ANALYSIS | METHOD | UNITS | QUALITY CONTROL STANDARD VALUE | QUALITY CONTROL ACCEPTANCE CRITERIA | QUALITY CONTROL STANDARD RESULT |
|------------|------------------------|------------|-------|--------------------------------|-------------------------------------|---------------------------------|
| 5/10//2021 | pH | ENV-LAB006 | pH | 7.00 | 6.95 - 7.05 | 7.01 |
| 12/10/2021 | pH | ENV-LAB006 | pH | 7.00 | 6.95 - 7.05 | 7.02 |
| 14/10/2021 | pH | ENV-LAB006 | pH | 7.00 | 6.95 - 7.05 | 7.02 |
| 29/10/2021 | pH | ENV-LAB006 | pH | 7.00 | 6.95 - 7.05 | 7.02 |
| 22/10/2021 | Total Suspended Solids | ENV-LAB009 | mg/L | 75 | 67.5 – 82.5 | 70 |

Water Duplicate Analysis Results

| SAMPLE NUMBER | DATE | ANALYSIS | METHOD | UNITS | LOR | SAMPLE RESULT | SAMPLE DUPLICATE RESULT |
|-----------------------|------------|------------------------|------------|-------|-----|---------------|-------------------------|
| 10216919001 | 5/10//2021 | pH | ENV-LAB006 | pH | - | 8.91 | 8.94 |
| 10216919002 | 12/10/2021 | pH | ENV-LAB006 | pH | - | 8.97 | 8.95 |
| 10216919003 | 14/10/2021 | pH | ENV-LAB006 | pH | - | 7.75 | 7.77 |
| 10216919004 | 29/10/2021 | pH | ENV-LAB006 | pH | - | 8.44 | 8.47 |
| 102114302001 BATCH | 22/10/2021 | Total Suspended Solids | ENV-LAB009 | mg/L | 5 | <5 | <5 |

Please contact the undersigned if you have any queries.

Yours sincerely



Laura Schofield
Environmental Laboratory Manager
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories -Environmental
Approved Signatory



Neena Tewari
Environmental Scientist
Robert Carr & Associates Pty Ltd Trading as
RCA Laboratories -Environmental

RCA Internal Quality Review

General

1. Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. RCA QC Acceptance / Rejection Criteria are available on request.
3. Proficiency Trial results are available on request.
4. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
5. When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow.
6. Samples were analysed on an 'as received' basis.
7. Sampled dates in this report are those listed on the COC or sample jars; if no sample dates are noted, the date the samples are received at the laboratory have been used.
8. All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
9. This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

IS insufficient sample for analysis

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected

Appendix B

External Laboratory Reports

CERTIFICATE OF ANALYSIS

Work Order : **WN2111438**
Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : MS LAURA SCHOFIELD
Address : 92 HILL STREET
 CARRINGTON NSW 2294
Telephone : +61 02 49029200
Project : 6919 ISCOs
Order number : ----
C-O-C number : ----
Sampler : SK
Site : ----
Quote number : WN/087/16v2
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3
Laboratory : ALS Water - Newcastle
Contact : Hayley Worthington
Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +612 4014 2500
Date Samples Received : 05-Oct-2021 14:16
Date Analysis Commenced : 06-Oct-2021
Issue Date : 12-Oct-2021 14:45



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> |
|--------------------|-------------------------|------------------------------------|
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | Sample ID | | 10216919001 | ---- | ---- | ---- | ---- |
|---|------------|----------------------|------|-------------------|-------|-------|-------|-------|
| | | Sampling date / time | | 05-Oct-2021 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | WN2111438-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | | |
| Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 8260 | ---- | ---- | ---- | ---- |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | | |
| Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 3140 | ---- | ---- | ---- | ---- |
| EG020T: Total Metals by ICP-MS | | | | | | | | |
| Zinc | 7440-66-6 | 0.005 | mg/L | 4.82 | ---- | ---- | ---- | ---- |
| EK055A: Ammonia as N | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.05 | mg/L | 8210 | ---- | ---- | ---- | ---- |
| EK057A: Nitrite as N | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.05 | mg/L | 12.7 | ---- | ---- | ---- | ---- |
| EK058A: Nitrate as N | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.05 | mg/L | 159 | ---- | ---- | ---- | ---- |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 172 | ---- | ---- | ---- | ---- |
| EK061A: Total Kjeldahl Nitrogen as N | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 9820 | ---- | ---- | ---- | ---- |
| EK062A: Total Nitrogen as N | | | | | | | | |
| Total Nitrogen as N | ---- | 0.1 | mg/L | 9990 | ---- | ---- | ---- | ---- |
| EK067A: Total Phosphorus as P | | | | | | | | |
| Total Phosphorus as P | ---- | 0.05 | mg/L | 1020 | ---- | ---- | ---- | ---- |
| Total Phosphate | ---- | 0.20 | mg/L | 3130 | ---- | ---- | ---- | ---- |
| EK071A: Reactive Phosphorus as P | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 1020 | ---- | ---- | ---- | ---- |

Inter-Laboratory Testing

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

(WATER) ED043: Total Oxidised Sulfur as SO4 2-

(WATER) EG020T: Total Metals by ICP-MS

QUALITY CONTROL REPORT

| | | | |
|--------------------------------|---|--------------------------------|---|
| Work Order | : WN2111438 | Page | : 1 of 5 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 05-Oct-2021 |
| Order number | : ---- | Date Analysis Commenced | : 06-Oct-2021 |
| C-O-C number | : ---- | Issue Date | : 12-Oct-2021 |
| Sampler | : SK | | |
| Site | : ---- | | |
| Quote number | : WN/087/16v2 | | |
| No. of samples received | : 1 | | |
| No. of samples analysed | : 1 | | |



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 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 |
|-------------|-------------------------|------------------------------------|
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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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.

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 (%) |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QC Lot: 3948130) | | | | | | | | | |
| WN2111051-005 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 2190 | 2120 | 3.3 | 0% - 20% |
| WN2111702-001 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 14 | 16 | 9.1 | No Limit |
| ED043: Total Oxidised Sulfur as SO4 2- (QC Lot: 3947193) | | | | | | | | | |
| WN2111438-001 | 10216919001 | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 3140 | 3640 | 14.7 | 0% - 20% |
| EG020T: Total Metals by ICP-MS (QC Lot: 3945920) | | | | | | | | | |
| ES2135810-002 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | 0.040 | 0.038 | 5.7 | No Limit |
| WN2111414-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | 0.052 | 0.051 | 2.2 | 0% - 50% |
| EK055A: Ammonia as N (QC Lot: 3941160) | | | | | | | | | |
| WN2111394-004 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | 62.6 | 61.8 | 1.3 | 0% - 20% |
| WN2111398-001 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | <0.05 | <0.05 | 0.0 | No Limit |
| EK057A: Nitrite as N (QC Lot: 3940172) | | | | | | | | | |
| WN2111415-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | 0.10 | 0.24 | 81.3 | No Limit |
| EK059A: Nitrite and Nitrate as N (NOx) (QC Lot: 3941161) | | | | | | | | | |
| WN2111398-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 1.15 | 1.15 | 0.0 | 0% - 20% |
| WN2111453-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 5.23 | 5.48 | 4.7 | 0% - 20% |
| EK062A: Total Nitrogen as N (QC Lot: 3944936) | | | | | | | | | |
| WN2111399-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 2.6 | 2.8 | 6.2 | 0% - 20% |
| WN2111453-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 8.0 | 8.3 | 3.3 | 0% - 20% |
| EK067A: Total Phosphorus as P (QC Lot: 3942616) | | | | | | | | | |
| WN2111402-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 8.67 | 9.14 | 5.2 | 0% - 20% |
| WN2111562-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 0.34 | 0.33 | 5.0 | No Limit |
| EK071A: Reactive Phosphorus as P (QC Lot: 3940677) | | | | | | | | | |

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 Work Order : WN2111438
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 ISCOs



Sub-Matrix: **WATER**

| | | | | <i>Laboratory Duplicate (DUP) Report</i> | | | | | |
|---|------------------|----------------------------------|-------------------|--|-------------|------------------------|-------------------------|----------------|---------------------------|
| <i>Laboratory sample ID</i> | <i>Sample ID</i> | <i>Method: Compound</i> | <i>CAS Number</i> | <i>LOR</i> | <i>Unit</i> | <i>Original Result</i> | <i>Duplicate Result</i> | <i>RPD (%)</i> | <i>Acceptable RPD (%)</i> |
| EK071A: Reactive Phosphorus as P (QC Lot: 3940677) - continued | | | | | | | | | |
| WN2111059-015 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 7.50 | 7.46 | 0.5 | 0% - 20% |
| WN2111402-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 5.70 | 5.72 | 0.3 | 0% - 20% |



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: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report Result | Laboratory Control Spike (LCS) Report | | | |
|--|------------|-------|------|---------------------------------|---------------------------------------|------------------------|--------------------------------|-----|
| | | | | | Spike Concentration | Spike Recovery (%) LCS | Acceptable Limits (%) Low High | |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3948130) | | | | | | | | |
| ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | <2 | 20 mg/L | 91.8 | 90.0 | 110 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3947193) | | | | | | | | |
| ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | <10 | 500 mg/L | 80.6 | 80.0 | 120 |
| EG020T: Total Metals by ICP-MS (QCLot: 3945920) | | | | | | | | |
| EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | 0.1 mg/L | 90.4 | 79.0 | 117 |
| EK055A: Ammonia as N (QCLot: 3941160) | | | | | | | | |
| EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | <0.05 | 2 mg/L | 103 | 90.0 | 110 |
| EK057A: Nitrite as N (QCLot: 3940172) | | | | | | | | |
| EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.03 | 1 mg/L | 96.6 | 90.0 | 110 |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3941161) | | | | | | | | |
| EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | 2 mg/L | 110 | 90.0 | 110 |
| EK062A: Total Nitrogen as N (QCLot: 3944936) | | | | | | | | |
| EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | <0.1 | 5 mg/L | 105 | 90.0 | 110 |
| EK067A: Total Phosphorus as P (QCLot: 3942616) | | | | | | | | |
| EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | <0.05 | 5 mg/L | 97.5 | 90.0 | 110 |
| EK071A: Reactive Phosphorus as P (QCLot: 3940677) | | | | | | | | |
| EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | <0.05 | 5 mg/L | 98.1 | 90.0 | 110 |

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 | Spike Recovery(%) MS | Acceptable Limits (%) Low High |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3948130) | | | | | | |
| WN2111057-002 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 20 mg/L | 118 | 80.0 120 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3947193) | | | | | | |
| WN2111456-010 | Anonymous | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 500 mg/L | 91.0 | 70.0 130 |
| EG020T: Total Metals by ICP-MS (QCLot: 3945920) | | | | | | |
| EW2104083-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 1 mg/L | 93.6 | 70.0 130 |
| EK055A: Ammonia as N (QCLot: 3941160) | | | | | | |



Sub-Matrix: **WATER**

| | | | | Matrix Spike (MS) Report | | | |
|--|-----------|----------------------------------|------------|--------------------------|------------------|-----------------------|------|
| | | | | Spike | SpikeRecovery(%) | Acceptable Limits (%) | |
| Laboratory sample ID | Sample ID | Method: Compound | CAS Number | Concentration | MS | Low | High |
| EK055A: Ammonia as N (QCLot: 3941160) - continued | | | | | | | |
| WN2111399-001 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 2 mg/L | 96.8 | 80.0 | 120 |
| EK057A: Nitrite as N (QCLot: 3940172) | | | | | | | |
| WN2111454-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 1 mg/L | 90.8 | 80.0 | 120 |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3941161) | | | | | | | |
| WN2111454-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 2 mg/L | 81.8 | 80.0 | 120 |
| EK062A: Total Nitrogen as N (QCLot: 3944936) | | | | | | | |
| WN2111400-002 | Anonymous | EK062A: Total Nitrogen as N | ---- | 20 mg/L | 97.4 | 80.0 | 120 |
| EK067A: Total Phosphorus as P (QCLot: 3942616) | | | | | | | |
| WN2111402-002 | Anonymous | EK067A: Total Phosphorus as P | ---- | 5 mg/L | 90.0 | 80.0 | 120 |
| EK071A: Reactive Phosphorus as P (QCLot: 3940677) | | | | | | | |
| WN2111077-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 2 mg/L | # Not Determined | 80.0 | 120 |

QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|--------------|---|-------------------------|-------------------------|
| Work Order | : WN2111438 | Page | : 1 of 7 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 05-Oct-2021 |
| Site | : ---- | Issue Date | : 12-Oct-2021 |
| Sampler | : SK | No. of samples received | : 1 |
| Order number | : ---- | No. of samples analysed | : 1 |

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

| Compound Group Name | Laboratory Sample ID | Client Sample ID | Analyte | CAS Number | Data | Limits | Comment |
|-------------------------------------|----------------------|------------------|--------------------------|------------|----------------|--------|---|
| Matrix Spike (MS) Recoveries | | | | | | | |
| EK071A: Reactive Phosphorus as P | WN2111077--001 | Anonymous | Reactive Phosphorus as P | 14265-44-2 | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED041A) 10216919001 | 05-Oct-2021 | ---- | ---- | ---- | 11-Oct-2021 | 02-Nov-2021 | ✔ |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED043) 10216919001 | 05-Oct-2021 | 11-Oct-2021 | 02-Nov-2021 | ✔ | 11-Oct-2021 | 02-Nov-2021 | ✔ |
| EG020T: Total Metals by ICP-MS | | | | | | | |
| Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919001 | 05-Oct-2021 | 08-Oct-2021 | 03-Apr-2022 | ✔ | 08-Oct-2021 | 03-Apr-2022 | ✔ |
| EK055A: Ammonia as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919001 | 05-Oct-2021 | ---- | ---- | ---- | 07-Oct-2021 | 02-Nov-2021 | ✔ |
| EK057A: Nitrite as N | | | | | | | |
| Clear Plastic Bottle - Natural (EK057A) 10216919001 | 05-Oct-2021 | ---- | ---- | ---- | 07-Oct-2021 | 07-Oct-2021 | ✔ |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919001 | 05-Oct-2021 | ---- | ---- | ---- | 07-Oct-2021 | 02-Nov-2021 | ✔ |
| EK062A: Total Nitrogen as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919001 | 05-Oct-2021 | 11-Oct-2021 | 02-Nov-2021 | ✔ | 11-Oct-2021 | 02-Nov-2021 | ✔ |

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 Work Order : WN2111438
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 ISCOs



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EK067A: Total Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919001 | 05-Oct-2021 | 08-Oct-2021 | 02-Nov-2021 | ✓ | 08-Oct-2021 | 02-Nov-2021 | ✓ |
| EK071A: Reactive Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Natural (EK071A) 10216919001 | 05-Oct-2021 | ---- | ---- | ---- | 06-Oct-2021 | 07-Oct-2021 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---|----------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Reaular | Actual | Expected | Evaluation | |
| Analytical Methods | | | | | | | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Ammonia as N | EK055A | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 2 | 19 | 10.53 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 7 | 14.29 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 2 | 13 | 15.38 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 2 | 7 | 28.57 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 2 | 13 | 15.38 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 3 | 33.33 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 19 | 5.26 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 19 | 5.26 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 19 | 5.26 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 7 | 14.29 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---------------------------------------|--------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Regular | Actual | Expected | Evaluation | |
| Analytical Methods | | | | | | | |
| Matrix Spikes (MS) - Continued | | | | | | | |
| Total Nitrogen as N | EK062A | 1 | 13 | 7.69 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 3 | 33.33 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|----------------------------------|----------|--------|---|
| Sulfate (Turbidimetric) | ED041A | WATER | In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol. |
| Total Oxidised Sulfur as SO4 2- | ED043 | WATER | In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2-. |
| Total Metals by ICP-MS - Suite A | EG020A-T | WATER | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. |
| Ammonia as N | EK055A | WATER | In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochloramine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm. |
| Nitrite as N | EK057A | WATER | In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl)-ethylenediamine dihydrochloride which is measured at 520 nm. |
| Nitrate as N | EK058A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Nitrite and Nitrate as N (NOx) | EK059A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Total Kjeldahl Nitrogen as N | EK061A | WATER | In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA |
| Total Nitrogen as N | EK062A | WATER | In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method. |



| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---|---------------|---------------|---|
| Total Phosphorus as P | EK067A | WATER | In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid. |
| Reactive Phosphorus as P | EK071A | WATER | In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm. |
| <i>Preparation Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
| Total Oxidisable Sulfur as SO ₄ ²⁻ Prep | ED043-PR | WATER | In house |
| Basic Persulfate Digestion for TN with FIA finish. | EK062-PA | WATER | In house: Referenced to APHA 24500 P - J. |
| Acid Persulfate Digestion for TP with FIA finish. | EK067-PA | WATER | # |
| Digestion for Total Recoverable Metals | EN25 | WATER | In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3) |



CHAIN OF CUSTODY

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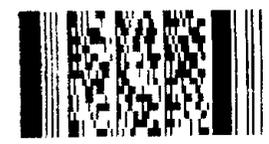
Mudgee 1/29 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee@mail@alsglobal.com

| | | | | | |
|---|--|--|--|---|--|
| CLIENT: RCA (ROBCAR) | | TURNAROUND REQUIREMENTS : Standard TAT (List due date): | | FOR LABORATORY USE ONLY (Circle) | |
| OFFICE: Carrington | | (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) | | Custody Seal Intact? Yes No <input checked="" type="checkbox"/> N/A | |
| PROJECT: 6919 ISCOs | | <input type="checkbox"/> Non Standard or urgent TAT (List due date): | | Freeze/frozen ice bricks present upon receipt? <input checked="" type="checkbox"/> Yes No N/A | |
| PURCHASE ORDER NO.: | | ALS QUOTE NO.: WN/087/16v2 | | Random Sample Temperature on Receipt: 5.4 °C | |
| PROJECT MANAGER: Laura Schofield | | COUNTRY OF ORIGIN: | | Other comment: | |
| SAMPLER: SK | | CONTACT PH: | | RECEIVED BY: | |
| COC Emailed to ALS? (NO) | | SAMPLER MOBILE: 0412 686 411 | | RELINQUISHED BY: | |
| Email Reports to (will default to PM if no other addresses are listed): lauras@rca.com.au; enviro@rca.com.au | | EDD FORMAT (or default): | | RECEIVED BY: | |
| Email Invoice to: lauras@rca.com.au; administrator@rca.com.au; enviro@rca.com.au | | RELINQUISHED BY: SK | | RECEIVED BY: | |
| | | DATE/TIME: 5/10/21 | | DATE/TIME: 5.10.21 2:16 | |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

| ALS USE ONLY | SAMPLE DETAILS <small>MATRIX: Sol(s) Water(W)</small> | | | CONTAINER INFORMATION | | *ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).*</small> | | | | | Additional Information | |
|--------------|--|-------------|--------|--|---------------|---|-------------------|-------------------------|------------|------------------------|------------------------|--|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE <small>codes below</small> | TOTAL BOTTLES | NT-98A, WN (TP, TON, TON, Reactive Phos, NO2, NO3, NH3) | ED041A - Sulphate | ED043 - Sulphur - Total | Total Zinc | EK067A PO4 - Phosphate | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| | 10216919001 | 5/10/2021 | W | 1 x 500ml P, 1 x 125ml P, 1 x 125ml SP, 1 x 60ml N | 4 | X | X | X | X | X | | Wheel wash |
| TOTAL | | | | | | | | | | | | |

Environmental Division
Newcastle - Water
Work Order Reference
WN2111438



Telephone: 011 2 4314 2500

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Oil Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111438

| | | | |
|--------------|---|--------------|--|
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| E-mail | : lauras@rca.com.au | E-mail | : hayley.worthington@Alsglobal.com |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Facsimile | : +61 02 4036 99112 | Facsimile | : +61 2 4967 7382 |
| Project | : 6919 ISCOs | Page | : 1 of 2 |
| Order number | : ---- | Quote number | : WN2016ROBCAR0005 (WN/087/16v2) |
| C-O-C number | : ---- | QC Level | : NEPM 2013 B3 & ALS QC Standard |
| Site | : ---- | | |
| Sampler | : SK | | |

Dates

| | | | |
|---------------------------|---------------------|--------------------------|----------------------|
| Date Samples Received | : 05-Oct-2021 14:16 | Issue Date | : 06-Oct-2021 |
| Client Requested Due Date | : 12-Oct-2021 | Scheduled Reporting Date | : 12-Oct-2021 |

Delivery Details

| | | | |
|----------------------|-------------------|------------------------------------|---------------------|
| Mode of Delivery | : Client Drop Off | Security Seal | : Not Available |
| No. of coolers/boxes | : ---- | Temperature | : 8.4 - Ice present |
| Receipt Detail | : | No. of samples received / analysed | : 1 / 1 |

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

| Laboratory sample ID | Sampling date / time | Sample ID | WATER - ED041A Turbidimetric Sulfate | WATER - ED043 Total Oxidised Sulfur as SO4 2- | WATER - EG020A-T Total Metals by ICPMS - Suite A | WATER - EK067A - PO4 Total Phosphate | WATER - NT-08A.WN Total Nitrogen + NO2 + NO3 + NH3 + Total P + |
|----------------------|----------------------|-------------|---|--|---|---|---|
| WN2111438-001 | 05-Oct-2021 00:00 | 10216919001 | ✓ | ✓ | ✓ | ✓ | ✓ |

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ADMINISTRATOR

- A4 - AU Tax Invoice (INV) Email administrator@rca.com.au

ENVIRO

- *AU Certificate of Analysis - NATA (COA) Email enviro@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email enviro@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email enviro@rca.com.au
- A4 - AU Tax Invoice (INV) Email enviro@rca.com.au
- Chain of Custody (CoC) (COC) Email enviro@rca.com.au
- EDI Format - ENMRG (ENMRG) Email enviro@rca.com.au
- EDI Format - ESDAT (ESDAT) Email enviro@rca.com.au

LAURA SCHOFIELD

- *AU Certificate of Analysis - NATA (COA) Email lauras@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email lauras@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email lauras@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email lauras@rca.com.au
- A4 - AU Tax Invoice (INV) Email lauras@rca.com.au
- Chain of Custody (CoC) (COC) Email lauras@rca.com.au
- EDI Format - ENMRG (ENMRG) Email lauras@rca.com.au
- EDI Format - ESDAT (ESDAT) Email lauras@rca.com.au

CERTIFICATE OF ANALYSIS

Work Order : **WN2111827**
Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : MS LAURA SCHOFIELD
Address : 92 HILL STREET
 CARRINGTON NSW 2294
Telephone : +61 02 49029200
Project : 6919 ISCOs
Order number : ----
C-O-C number : ----
Sampler : SK
Site : ----
Quote number : WN/087/16v2
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3
Laboratory : ALS Water - Newcastle
Contact : Hayley Worthington
Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +612 4014 2500
Date Samples Received : 12-Oct-2021 16:02
Date Analysis Commenced : 13-Oct-2021
Issue Date : 20-Oct-2021 09:31



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> |
|--------------------|-------------------------|------------------------------------|
| Gregory Towers | Technical Officer | Chemistry, Newcastle West, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | Sample ID | | 10216919002 | ---- | ---- | ---- | ---- |
|---|------------|----------------------|------|-------------------|-------|-------|-------|-------|
| | | Sampling date / time | | 10-Oct-2021 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | WN2111827-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | | |
| Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 973 | ---- | ---- | ---- | ---- |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | | |
| Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 910 | ---- | ---- | ---- | ---- |
| EG020T: Total Metals by ICP-MS | | | | | | | | |
| Zinc | 7440-66-6 | 0.005 | mg/L | 0.720 | ---- | ---- | ---- | ---- |
| EK055A: Ammonia as N | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.05 | mg/L | 893 | ---- | ---- | ---- | ---- |
| EK057A: Nitrite as N | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.05 | mg/L | 5.38 | ---- | ---- | ---- | ---- |
| EK058A: Nitrate as N | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.05 | mg/L | 23.4 | ---- | ---- | ---- | ---- |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 28.8 | ---- | ---- | ---- | ---- |
| EK061A: Total Kjeldahl Nitrogen as N | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 1750 | ---- | ---- | ---- | ---- |
| EK062A: Total Nitrogen as N | | | | | | | | |
| Total Nitrogen as N | ---- | 0.1 | mg/L | 1780 | ---- | ---- | ---- | ---- |
| EK067A: Total Phosphorus as P | | | | | | | | |
| Total Phosphorus as P | ---- | 0.05 | mg/L | 99.0 | ---- | ---- | ---- | ---- |
| Total Phosphate | ---- | 0.20 | mg/L | 304 | ---- | ---- | ---- | ---- |
| EK071A: Reactive Phosphorus as P | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 93.1 | ---- | ---- | ---- | ---- |

Inter-Laboratory Testing

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

(WATER) ED043: Total Oxidised Sulfur as SO4 2-

(WATER) EG020T: Total Metals by ICP-MS

QUALITY CONTROL REPORT

| | | | |
|--------------------------------|---|--------------------------------|---|
| Work Order | : WN2111827 | Page | : 1 of 5 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 12-Oct-2021 |
| Order number | : ---- | Date Analysis Commenced | : 13-Oct-2021 |
| C-O-C number | : ---- | Issue Date | : 20-Oct-2021 |
| Sampler | : SK | | |
| Site | : ---- | | |
| Quote number | : WN/087/16v2 | | |
| No. of samples received | : 1 | | |
| No. of samples analysed | : 1 | | |



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 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> |
|--------------------|-------------------------|------------------------------------|
| Gregory Towers | Technical Officer | Chemistry, Newcastle West, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

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 (%) |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QC Lot: 3960329) | | | | | | | | | |
| WN2111051-014 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 19 | 19 | 0.0 | No Limit |
| WN2112004-001 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 115 | 111 | 2.8 | 0% - 20% |
| ED043: Total Oxidised Sulfur as SO4 2- (QC Lot: 3956805) | | | | | | | | | |
| WN2111745-001 | Anonymous | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 2820 | 2690 | 4.5 | 0% - 20% |
| EG020T: Total Metals by ICP-MS (QC Lot: 3960033) | | | | | | | | | |
| ES2136844-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | <0.005 | 0.0 | No Limit |
| ES2136847-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | 0.020 | 0.020 | 0.0 | No Limit |
| EK055A: Ammonia as N (QC Lot: 3952536) | | | | | | | | | |
| WN2111827-001 | 10216919002 | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | 893 | 886 | 0.8 | 0% - 20% |
| WN2111440-001 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | 17.9 | 17.6 | 1.8 | 0% - 20% |
| EK057A: Nitrite as N (QC Lot: 3950391) | | | | | | | | | |
| WN2111745-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.05 | <0.05 | 0.0 | No Limit |
| EK059A: Nitrite and Nitrate as N (NOx) (QC Lot: 3950807) | | | | | | | | | |
| WN2111788-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | <0.05 | 0.0 | No Limit |
| WN2111440-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | 0.06 | 19.3 | No Limit |
| EK062A: Total Nitrogen as N (QC Lot: 3957281) | | | | | | | | | |
| WN2111788-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 179 | 181 | 1.1 | 0% - 20% |
| WN2111856-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 9.6 | 8.6 | 11.0 | 0% - 20% |
| EK067A: Total Phosphorus as P (QC Lot: 3955015) | | | | | | | | | |
| WN2111787-002 | Anonymous | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 29.3 | 30.5 | 4.0 | 0% - 20% |
| WN2111856-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 0.55 | 0.51 | 7.4 | 0% - 50% |
| EK071A: Reactive Phosphorus as P (QC Lot: 3953205) | | | | | | | | | |

Page : 3 of 5
 Work Order : WN2111827
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 ISCOs



Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

| <i>Laboratory sample ID</i> | <i>Sample ID</i> | <i>Method: Compound</i> | <i>CAS Number</i> | <i>LOR</i> | <i>Unit</i> | <i>Original Result</i> | <i>Duplicate Result</i> | <i>RPD (%)</i> | <i>Acceptable RPD (%)</i> |
|---|------------------|----------------------------------|-------------------|------------|-------------|------------------------|-------------------------|----------------|---------------------------|
| EK071A: Reactive Phosphorus as P (QC Lot: 3953205) - continued | | | | | | | | | |
| WN2111775-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 1.79 | 1.79 | 0.0 | 0% - 20% |



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: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report Result | Laboratory Control Spike (LCS) Report | | | |
|--|------------|-------|------|------------------------------------|---------------------------------------|---------------------------|-----------------------------------|-----|
| | | | | | Spike Concentration | Spike Recovery (%) LCS | Acceptable Limits (%) Low High | |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3960329) | | | | | | | | |
| ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | <2 | 20 mg/L | 96.8 | 90.0 | 110 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3956805) | | | | | | | | |
| ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | <10 | 500 mg/L | 81.4 | 80.0 | 120 |
| EG020T: Total Metals by ICP-MS (QCLot: 3960033) | | | | | | | | |
| EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | 0.1 mg/L | 92.4 | 79.0 | 117 |
| EK055A: Ammonia as N (QCLot: 3952536) | | | | | | | | |
| EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | <0.05 | 2 mg/L | 104 | 90.0 | 110 |
| EK057A: Nitrite as N (QCLot: 3950391) | | | | | | | | |
| EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.03 | 1 mg/L | 94.3 | 90.0 | 110 |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3950807) | | | | | | | | |
| EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | 2 mg/L | 104 | 90.0 | 110 |
| EK062A: Total Nitrogen as N (QCLot: 3957281) | | | | | | | | |
| EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | <0.1 | 5 mg/L | 106 | 90.0 | 110 |
| EK067A: Total Phosphorus as P (QCLot: 3955015) | | | | | | | | |
| EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | <0.05 | 5 mg/L | 94.9 | 90.0 | 110 |
| EK071A: Reactive Phosphorus as P (QCLot: 3953205) | | | | | | | | |
| EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | <0.05 | 5 mg/L | 94.8 | 90.0 | 110 |

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 | Spike Recovery (%) MS | Acceptable Limits (%) Low High | |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3960329) | | | | | | | |
| WN2111440-001 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 20 mg/L | 105 | 80.0 | 120 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3956805) | | | | | | | |
| WN2111827-001 | 10216919002 | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 500 mg/L | 74.2 | 70.0 | 130 |
| EG020T: Total Metals by ICP-MS (QCLot: 3960033) | | | | | | | |
| ES2136844-002 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 1 mg/L | 90.0 | 70.0 | 130 |
| EK055A: Ammonia as N (QCLot: 3952536) | | | | | | | |



Sub-Matrix: **WATER**

| | | | | <i>Matrix Spike (MS) Report</i> | | | |
|---|------------------|----------------------------------|-------------------|---------------------------------|-------------------------|------------------------------|-------------|
| | | | | <i>Spike</i> | <i>SpikeRecovery(%)</i> | <i>Acceptable Limits (%)</i> | |
| <i>Laboratory sample ID</i> | <i>Sample ID</i> | <i>Method: Compound</i> | <i>CAS Number</i> | <i>Concentration</i> | <i>MS</i> | <i>Low</i> | <i>High</i> |
| EK055A: Ammonia as N (QCLot: 3952536) - continued | | | | | | | |
| WN2111439-014 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 2 mg/L | # Not Determined | 80.0 | 120 |
| EK057A: Nitrite as N (QCLot: 3950391) | | | | | | | |
| WN2111827-001 | 10216919002 | EK057A: Nitrite as N | 14797-65-0 | 1 mg/L | # Not Determined | 80.0 | 120 |
| EK059A: Nitrite and Nitrate as N (NO_x) (QCLot: 3950807) | | | | | | | |
| WN2111790-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 2 mg/L | 104 | 80.0 | 120 |
| EK062A: Total Nitrogen as N (QCLot: 3957281) | | | | | | | |
| WN2111790-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 20 mg/L | # Not Determined | 80.0 | 120 |
| EK067A: Total Phosphorus as P (QCLot: 3955015) | | | | | | | |
| WN2111788-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 5 mg/L | # Not Determined | 80.0 | 120 |
| EK071A: Reactive Phosphorus as P (QCLot: 3953205) | | | | | | | |
| WN2111779-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 2 mg/L | 97.5 | 80.0 | 120 |

QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|--------------|---|-------------------------|-------------------------|
| Work Order | : WN2111827 | Page | : 1 of 7 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 12-Oct-2021 |
| Site | : ---- | Issue Date | : 20-Oct-2021 |
| Sampler | : SK | No. of samples received | : 1 |
| Order number | : ---- | No. of samples analysed | : 1 |

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

| Compound Group Name | Laboratory Sample ID | Client Sample ID | Analyte | CAS Number | Data | Limits | Comment |
|-------------------------------------|----------------------|------------------|-----------------------|------------|----------------|--------|---|
| Matrix Spike (MS) Recoveries | | | | | | | |
| EK055A: Ammonia as N | WN2111439--014 | Anonymous | Ammonia as N | 7664-41-7 | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |
| EK057A: Nitrite as N | WN2111827--001 | 10216919002 | Nitrite as N | 14797-65-0 | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |
| EK062A: Total Nitrogen as N | WN2111790--001 | Anonymous | Total Nitrogen as N | ---- | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |
| EK067A: Total Phosphorus as P | WN2111788--001 | Anonymous | Total Phosphorus as P | ---- | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

| Method Container / Client Sample ID(s) | Extraction / Preparation | | | Analysis | | |
|---|--------------------------|--------------------|--------------|---------------|------------------|--------------|
| | Date extracted | Due for extraction | Days overdue | Date analysed | Due for analysis | Days overdue |
| EK057A: Nitrite as N | | | | | | |
| Clear Plastic Bottle - Natural 10216919002 | ---- | ---- | ---- | 13-Oct-2021 | 12-Oct-2021 | 1 |
| EK071A: Reactive Phosphorus as P | | | | | | |
| Clear Plastic Bottle - Natural 10216919002 | ---- | ---- | ---- | 13-Oct-2021 | 12-Oct-2021 | 1 |

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED041A) 10216919002 | 10-Oct-2021 | ---- | ---- | ---- | 18-Oct-2021 | 07-Nov-2021 | ✓ |



Matrix: **WATER** Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

| Method <i>Container / Client Sample ID(s)</i> | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED043) 10216919002 | 10-Oct-2021 | 15-Oct-2021 | 07-Nov-2021 | ✔ | 15-Oct-2021 | 07-Nov-2021 | ✔ |
| EG020T: Total Metals by ICP-MS | | | | | | | |
| Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919002 | 10-Oct-2021 | 18-Oct-2021 | 08-Apr-2022 | ✔ | 18-Oct-2021 | 08-Apr-2022 | ✔ |
| EK055A: Ammonia as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919002 | 10-Oct-2021 | ---- | ---- | ---- | 13-Oct-2021 | 07-Nov-2021 | ✔ |
| EK057A: Nitrite as N | | | | | | | |
| Clear Plastic Bottle - Natural (EK057A) 10216919002 | 10-Oct-2021 | ---- | ---- | ---- | 13-Oct-2021 | 12-Oct-2021 | ✖ |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919002 | 10-Oct-2021 | ---- | ---- | ---- | 13-Oct-2021 | 07-Nov-2021 | ✔ |
| EK062A: Total Nitrogen as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919002 | 10-Oct-2021 | 15-Oct-2021 | 07-Nov-2021 | ✔ | 15-Oct-2021 | 07-Nov-2021 | ✔ |
| EK067A: Total Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919002 | 10-Oct-2021 | 15-Oct-2021 | 07-Nov-2021 | ✔ | 15-Oct-2021 | 07-Nov-2021 | ✔ |
| EK071A: Reactive Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Natural (EK071A) 10216919002 | 10-Oct-2021 | ---- | ---- | ---- | 13-Oct-2021 | 12-Oct-2021 | ✖ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---|----------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Reaular | Actual | Expected | Evaluation | |
| Analytical Methods | | | | | | | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Ammonia as N | EK055A | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 2 | 11 | 18.18 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 4 | 25.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 2 | 11 | 18.18 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 2 | 13 | 15.38 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 2 | 10 | 20.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 2 | 50.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 4 | 25.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 2 | 50.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 4 | 25.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 2 | 50.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 4 | 25.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---------------------------------------|--------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Regular | Actual | Expected | Evaluation | |
| <i>Analytical Methods</i> | | | | | | | |
| Matrix Spikes (MS) - Continued | | | | | | | |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 2 | 50.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 20 | 5.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|----------------------------------|----------|--------|---|
| Sulfate (Turbidimetric) | ED041A | WATER | In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol. |
| Total Oxidised Sulfur as SO4 2- | ED043 | WATER | In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2-. |
| Total Metals by ICP-MS - Suite A | EG020A-T | WATER | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. |
| Ammonia as N | EK055A | WATER | In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochloramine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm. |
| Nitrite as N | EK057A | WATER | In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl)-ethylenediamine dihydrochloride which is measured at 520 nm. |
| Nitrate as N | EK058A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Nitrite and Nitrate as N (NOx) | EK059A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Total Kjeldahl Nitrogen as N | EK061A | WATER | In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA |
| Total Nitrogen as N | EK062A | WATER | In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method. |



| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|--|---------------|---------------|---|
| Total Phosphorus as P | EK067A | WATER | In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid. |
| Reactive Phosphorus as P | EK071A | WATER | In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm. |
| <i>Preparation Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
| Total Oxidisable Sulfur as SO4 2- Prep | ED043-PR | WATER | In house |
| Basic Persulfate Digestion for TN with FIA finish. | EK062-PA | WATER | In house: Referenced to APHA 24500 P - J. |
| Acid Persulfate Digestion for TP with FIA finish. | EK067-PA | WATER | # |
| Digestion for Total Recoverable Metals | EN25 | WATER | In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3) |



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111827

| | | | |
|--------------|---|--------------|--|
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| E-mail | : lauras@rca.com.au | E-mail | : hayley.worthington@Alsglobal.com |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Facsimile | : +61 02 4036 99112 | Facsimile | : +61 2 4967 7382 |
| Project | : 6919 ISCOs | Page | : 1 of 2 |
| Order number | : ---- | Quote number | : WN2016ROBCAR0005 (WN/087/16v2) |
| C-O-C number | : ---- | QC Level | : NEPM 2013 B3 & ALS QC Standard |
| Site | : ---- | | |
| Sampler | : SK | | |

Dates

| | | | |
|---------------------------|---------------------|--------------------------|----------------------|
| Date Samples Received | : 12-Oct-2021 16:02 | Issue Date | : 12-Oct-2021 |
| Client Requested Due Date | : 19-Oct-2021 | Scheduled Reporting Date | : 19-Oct-2021 |

Delivery Details

| | | | |
|----------------------|-------------------|------------------------------------|---------------------|
| Mode of Delivery | : Client Drop Off | Security Seal | : Not Available |
| No. of coolers/boxes | : ---- | Temperature | : 5.4 - Ice present |
| Receipt Detail | : | No. of samples received / analysed | : 1 / 1 |

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

| Laboratory sample ID | Sampling date / time | Sample ID | WATER - ED041A Turbidimetric Sulfate | WATER - ED043 Total Oxidised Sulfur as SO4 2- | WATER - EG020A-T Total Metals by ICPMS - Suite A | WATER - EK067A - PO4 Total Phosphate | WATER - NT-08A.WN Total Nitrogen + NO2 + NO3 + NH3 + Total P + |
|----------------------|----------------------|-------------|--------------------------------------|---|--|--------------------------------------|--|
| WN2111827-001 | 10-Oct-2021 00:00 | 10216919002 | ✓ | ✓ | ✓ | ✓ | ✓ |

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV) Email administrator@rca.com.au

ENVIRO

- *AU Certificate of Analysis - NATA (COA) Email enviro@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email enviro@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email enviro@rca.com.au
- A4 - AU Tax Invoice (INV) Email enviro@rca.com.au
- Chain of Custody (CoC) (COC) Email enviro@rca.com.au
- EDI Format - ENMRG (ENMRG) Email enviro@rca.com.au
- EDI Format - ESDAT (ESDAT) Email enviro@rca.com.au

LAURA SCHOFIELD

- *AU Certificate of Analysis - NATA (COA) Email lauras@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email lauras@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email lauras@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email lauras@rca.com.au
- A4 - AU Tax Invoice (INV) Email lauras@rca.com.au
- Chain of Custody (CoC) (COC) Email lauras@rca.com.au
- EDI Format - ENMRG (ENMRG) Email lauras@rca.com.au
- EDI Format - ESDAT (ESDAT) Email lauras@rca.com.au

CERTIFICATE OF ANALYSIS

Work Order : **WN2111951**
Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : MS LAURA SCHOFIELD
Address : 92 HILL STREET
 CARRINGTON NSW 2294
Telephone : +61 02 49029200
Project : 6919 ISCOs
Order number : ----
C-O-C number : ----
Sampler : SK
Site : ----
Quote number : WN/087/16v2
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3
Laboratory : ALS Water - Newcastle
Contact : Hayley Worthington
Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +612 4014 2500
Date Samples Received : 14-Oct-2021 15:48
Date Analysis Commenced : 15-Oct-2021
Issue Date : 19-Oct-2021 13:04



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> |
|--------------------|-------------------------|------------------------------------|
| Gregory Towers | Technical Officer | Chemistry, Newcastle West, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | Sample ID | | 10216919003 | ---- | ---- | ---- | ---- |
|---|------------|----------------------|------|-------------------|-------|-------|-------|-------|
| | | Sampling date / time | | 12-Oct-2021 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | WN2111951-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | | |
| Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 13 | ---- | ---- | ---- | ---- |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | | |
| Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 90 | ---- | ---- | ---- | ---- |
| EG020T: Total Metals by ICP-MS | | | | | | | | |
| Zinc | 7440-66-6 | 0.005 | mg/L | 0.181 | ---- | ---- | ---- | ---- |
| EK055A: Ammonia as N | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.05 | mg/L | 53.9 | ---- | ---- | ---- | ---- |
| EK057A: Nitrite as N | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.05 | mg/L | 1.33 | ---- | ---- | ---- | ---- |
| EK058A: Nitrate as N | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.05 | mg/L | 10.1 | ---- | ---- | ---- | ---- |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 11.4 | ---- | ---- | ---- | ---- |
| EK061A: Total Kjeldahl Nitrogen as N | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 80.6 | ---- | ---- | ---- | ---- |
| EK062A: Total Nitrogen as N | | | | | | | | |
| Total Nitrogen as N | ---- | 0.1 | mg/L | 92.0 | ---- | ---- | ---- | ---- |
| EK067A: Total Phosphorus as P | | | | | | | | |
| Total Phosphorus as P | ---- | 0.05 | mg/L | 16.0 | ---- | ---- | ---- | ---- |
| Total Phosphate | ---- | 0.20 | mg/L | 49.1 | ---- | ---- | ---- | ---- |
| EK071A: Reactive Phosphorus as P | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | 14.1 | ---- | ---- | ---- | ---- |

Inter-Laboratory Testing

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

(WATER) ED043: Total Oxidised Sulfur as SO4 2-

(WATER) EG020T: Total Metals by ICP-MS

QUALITY CONTROL REPORT

| | | | |
|--------------------------------|---|--------------------------------|---|
| Work Order | : WN2111951 | Page | : 1 of 4 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 14-Oct-2021 |
| Order number | : ---- | Date Analysis Commenced | : 15-Oct-2021 |
| C-O-C number | : ---- | Issue Date | : 19-Oct-2021 |
| Sampler | : SK | | |
| Site | : ---- | | |
| Quote number | : WN/087/16v2 | | |
| No. of samples received | : 1 | | |
| No. of samples analysed | : 1 | | |



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 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> |
|--------------------|-------------------------|------------------------------------|
| Gregory Towers | Technical Officer | Chemistry, Newcastle West, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

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 (%) |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QC Lot: 3960329) | | | | | | | | | |
| WN2111051-014 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 19 | 19 | 0.0 | No Limit |
| WN2112004-001 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | 115 | 111 | 2.8 | 0% - 20% |
| ED043: Total Oxidised Sulfur as SO4 2- (QC Lot: 3960373) | | | | | | | | | |
| ES2137179-001 | Anonymous | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | 170 | 160 | 0.0 | 0% - 50% |
| EG020T: Total Metals by ICP-MS (QC Lot: 3960033) | | | | | | | | | |
| ES2136844-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | <0.005 | 0.0 | No Limit |
| ES2136847-001 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | 0.020 | 0.020 | 0.0 | No Limit |
| EK055A: Ammonia as N (QC Lot: 3955652) | | | | | | | | | |
| WN2111835-001 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | 108 | 109 | 1.0 | 0% - 20% |
| WN2111913-002 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | 1.17 | 1.18 | 0.0 | 0% - 20% |
| EK057A: Nitrite as N (QC Lot: 3955653) | | | | | | | | | |
| WN2111835-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.05 | 0.09 | 53.8 | No Limit |
| EK059A: Nitrite and Nitrate as N (NOx) (QC Lot: 3955651) | | | | | | | | | |
| WN2111835-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 134 | 134 | 0.1 | 0% - 20% |
| WN2111913-002 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 3.56 | 3.58 | 0.5 | 0% - 20% |
| EK062A: Total Nitrogen as N (QC Lot: 3957281) | | | | | | | | | |
| WN2111788-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 179 | 181 | 1.1 | 0% - 20% |
| WN2111856-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 9.6 | 8.6 | 11.0 | 0% - 20% |
| EK067A: Total Phosphorus as P (QC Lot: 3957202) | | | | | | | | | |
| WN2111917-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 5.12 | 5.19 | 1.4 | 0% - 20% |
| EK071A: Reactive Phosphorus as P (QC Lot: 3957731) | | | | | | | | | |
| WN2111835-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | <0.05 | <0.05 | 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: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report Result | Laboratory Control Spike (LCS) Report | | | |
|--|------------|-------|------|------------------------------------|---------------------------------------|---------------------------|-----------------------------------|-----|
| | | | | | Spike Concentration | Spike Recovery (%) LCS | Acceptable Limits (%) Low High | |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3960329) | | | | | | | | |
| ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 2 | mg/L | <2 | 20 mg/L | 96.8 | 90.0 | 110 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3960373) | | | | | | | | |
| ED043: Total Oxidised Sulfur as SO4 2- | ---- | 10 | mg/L | <10 | 500 mg/L | 80.1 | 80.0 | 120 |
| EG020T: Total Metals by ICP-MS (QCLot: 3960033) | | | | | | | | |
| EG020A-T: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | 0.1 mg/L | 92.4 | 79.0 | 117 |
| EK055A: Ammonia as N (QCLot: 3955652) | | | | | | | | |
| EK055A: Ammonia as N | 7664-41-7 | 0.05 | mg/L | <0.05 | 2 mg/L | 98.5 | 90.0 | 110 |
| EK057A: Nitrite as N (QCLot: 3955653) | | | | | | | | |
| EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.03 | 1 mg/L | 102 | 90.0 | 110 |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3955651) | | | | | | | | |
| EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | 2 mg/L | 104 | 90.0 | 110 |
| EK062A: Total Nitrogen as N (QCLot: 3957281) | | | | | | | | |
| EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | <0.1 | 5 mg/L | 106 | 90.0 | 110 |
| EK067A: Total Phosphorus as P (QCLot: 3957202) | | | | | | | | |
| EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | <0.05 | 5 mg/L | 96.3 | 90.0 | 110 |
| EK071A: Reactive Phosphorus as P (QCLot: 3957731) | | | | | | | | |
| EK071A: Reactive Phosphorus as P | 14265-44-2 | 0.05 | mg/L | <0.05 | 5 mg/L | 94.8 | 90.0 | 110 |

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 | Spike Recovery (%) MS | Acceptable Limits (%) Low High | |
| ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3960329) | | | | | | | |
| WN2111440-001 | Anonymous | ED041A: Sulfate as SO4 - Turbidimetric | 14808-79-8 | 20 mg/L | 105 | 80.0 | 120 |
| ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3960373) | | | | | | | |
| ES2137180-001 | Anonymous | ED043: Total Oxidised Sulfur as SO4 2- | ---- | 500 mg/L | 79.4 | 70.0 | 130 |
| EG020T: Total Metals by ICP-MS (QCLot: 3960033) | | | | | | | |
| ES2136844-002 | Anonymous | EG020A-T: Zinc | 7440-66-6 | 1 mg/L | 90.0 | 70.0 | 130 |
| EK055A: Ammonia as N (QCLot: 3955652) | | | | | | | |

Page : 4 of 4
 Work Order : WN2111951
 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 ISCOs



Sub-Matrix: WATER

| | | | | Matrix Spike (MS) Report | | | |
|--|-----------|----------------------------------|------------|--------------------------|------------------|-----------------------|------|
| | | | | Spike | SpikeRecovery(%) | Acceptable Limits (%) | |
| Laboratory sample ID | Sample ID | Method: Compound | CAS Number | Concentration | MS | Low | High |
| EK055A: Ammonia as N (QCLot: 3955652) - continued | | | | | | | |
| WN2111886-001 | Anonymous | EK055A: Ammonia as N | 7664-41-7 | 2 mg/L | # Not Determined | 80.0 | 120 |
| EK057A: Nitrite as N (QCLot: 3955653) | | | | | | | |
| WN2111886-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 1 mg/L | 93.1 | 80.0 | 120 |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3955651) | | | | | | | |
| WN2111886-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 2 mg/L | # Not Determined | 80.0 | 120 |
| EK062A: Total Nitrogen as N (QCLot: 3957281) | | | | | | | |
| WN2111790-001 | Anonymous | EK062A: Total Nitrogen as N | ---- | 20 mg/L | # Not Determined | 80.0 | 120 |
| EK067A: Total Phosphorus as P (QCLot: 3957202) | | | | | | | |
| WN2111918-001 | Anonymous | EK067A: Total Phosphorus as P | ---- | 5 mg/L | 94.5 | 80.0 | 120 |
| EK071A: Reactive Phosphorus as P (QCLot: 3957731) | | | | | | | |
| WN2111886-001 | Anonymous | EK071A: Reactive Phosphorus as P | 14265-44-2 | 2 mg/L | 97.5 | 80.0 | 120 |

QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|--------------|---|-------------------------|-------------------------|
| Work Order | : WN2111951 | Page | : 1 of 7 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Telephone | : +612 4014 2500 |
| Project | : 6919 ISCOs | Date Samples Received | : 14-Oct-2021 |
| Site | : ---- | Issue Date | : 19-Oct-2021 |
| Sampler | : SK | No. of samples received | : 1 |
| Order number | : ---- | No. of samples analysed | : 1 |

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

| Compound Group Name | Laboratory Sample ID | Client Sample ID | Analyte | CAS Number | Data | Limits | Comment |
|--|----------------------|------------------|------------------------|------------|----------------|--------|---|
| Matrix Spike (MS) Recoveries | | | | | | | |
| EK055A: Ammonia as N | WN2111886--001 | Anonymous | Ammonia as N | 7664-41-7 | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |
| EK059A: Nitrite and Nitrate as N (NOx) | WN2111886--001 | Anonymous | Nitrite + Nitrate as N | ---- | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |
| EK062A: Total Nitrogen as N | WN2111790--001 | Anonymous | Total Nitrogen as N | ---- | Not Determined | ---- | MS recovery not determined, background level greater than or equal to 4x spike level. |

Outliers : Analysis Holding Time Compliance

Matrix: WATER

| Method | Extraction / Preparation | | | Analysis | | | |
|---|---------------------------------|----------------|--------------------|--------------|---------------|------------------|--------------|
| | Container / Client Sample ID(s) | Date extracted | Due for extraction | Days overdue | Date analysed | Due for analysis | Days overdue |
| EK057A: Nitrite as N | | | | | | | |
| Clear Plastic Bottle - Natural 10216919003 | ---- | ---- | ---- | | 15-Oct-2021 | 14-Oct-2021 | 1 |
| EK071A: Reactive Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Natural 10216919003 | ---- | ---- | ---- | | 15-Oct-2021 | 14-Oct-2021 | 1 |

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|---------------------------------|----------------|--------------------|-------------|---------------|------------------|
| | | Container / Client Sample ID(s) | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis |
| ED041: Sulfate (Turbidimetric) as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED041A) 10216919003 | 12-Oct-2021 | ---- | ---- | ---- | 18-Oct-2021 | 09-Nov-2021 | ✓ |
| ED043: Total Oxidised Sulfur as SO4 2- | | | | | | | |
| Clear Plastic Bottle - Natural (ED043) 10216919003 | 12-Oct-2021 | 18-Oct-2021 | 09-Nov-2021 | ✓ | 18-Oct-2021 | 09-Nov-2021 | ✓ |



Matrix: **WATER** Evaluation: ✘ = Holding time breach ; ✔ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EG020T: Total Metals by ICP-MS | | | | | | | |
| Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919003 | 12-Oct-2021 | 18-Oct-2021 | 10-Apr-2022 | ✔ | 18-Oct-2021 | 10-Apr-2022 | ✔ |
| EK055A: Ammonia as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919003 | 12-Oct-2021 | ---- | ---- | ---- | 15-Oct-2021 | 09-Nov-2021 | ✔ |
| EK057A: Nitrite as N | | | | | | | |
| Clear Plastic Bottle - Natural (EK057A) 10216919003 | 12-Oct-2021 | ---- | ---- | ---- | 15-Oct-2021 | 14-Oct-2021 | ✘ |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919003 | 12-Oct-2021 | ---- | ---- | ---- | 15-Oct-2021 | 09-Nov-2021 | ✔ |
| EK062A: Total Nitrogen as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919003 | 12-Oct-2021 | 15-Oct-2021 | 09-Nov-2021 | ✔ | 15-Oct-2021 | 09-Nov-2021 | ✔ |
| EK067A: Total Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919003 | 12-Oct-2021 | 15-Oct-2021 | 09-Nov-2021 | ✔ | 15-Oct-2021 | 09-Nov-2021 | ✔ |
| EK071A: Reactive Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Natural (EK071A) 10216919003 | 12-Oct-2021 | ---- | ---- | ---- | 15-Oct-2021 | 14-Oct-2021 | ✘ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---|----------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Reaular | Actual | Expected | Evaluation | |
| Analytical Methods | | | | | | | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Ammonia as N | EK055A | 2 | 16 | 12.50 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 2 | 10 | 20.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 3 | 33.33 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 3 | 33.33 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 2 | 11 | 18.18 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 2 | 13 | 15.38 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 2 | 10 | 20.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 8 | 12.50 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 3 | 33.33 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 16 | 6.25 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 8 | 12.50 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Ammonia as N | EK055A | 1 | 16 | 6.25 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 8 | 12.50 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS) | | | | | | | |
| Ammonia as N | EK055A | 1 | 16 | 6.25 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Reactive Phosphorus as P | EK071A | 1 | 3 | 33.33 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Sulfate (Turbidimetric) | ED041A | 1 | 11 | 9.09 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 13 | 7.69 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---------------------------------------|--------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Regular | Actual | Expected | Evaluation | |
| Matrix Spikes (MS) - Continued | | | | | | | |
| Total Nitrogen as N | EK062A | 1 | 10 | 10.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Oxidised Sulfur as SO4 2- | ED043 | 1 | 8 | 12.50 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 3 | 33.33 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|----------------------------------|----------|--------|---|
| Sulfate (Turbidimetric) | ED041A | WATER | In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol. |
| Total Oxidised Sulfur as SO4 2- | ED043 | WATER | In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2-. |
| Total Metals by ICP-MS - Suite A | EG020A-T | WATER | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. |
| Ammonia as N | EK055A | WATER | In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochloramine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm. |
| Nitrite as N | EK057A | WATER | In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl)-ethylenediamine dihydrochloride which is measured at 520 nm. |
| Nitrate as N | EK058A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Nitrite and Nitrate as N (NOx) | EK059A | WATER | In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Total Kjeldahl Nitrogen as N | EK061A | WATER | In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA |
| Total Nitrogen as N | EK062A | WATER | In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method. |



| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|--|---------------|---------------|---|
| Total Phosphorus as P | EK067A | WATER | In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid. |
| Reactive Phosphorus as P | EK071A | WATER | In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm. |
| <i>Preparation Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
| Total Oxidisable Sulfur as SO4 2- Prep | ED043-PR | WATER | In house |
| Basic Persulfate Digestion for TN with FIA finish. | EK062-PA | WATER | In house: Referenced to APHA 24500 P - J. |
| Acid Persulfate Digestion for TP with FIA finish. | EK067-PA | WATER | # |
| Digestion for Total Recoverable Metals | EN25 | WATER | In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3) |



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111951

| | | | |
|--------------|---|--------------|--|
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : MS LAURA SCHOFIELD | Contact | : Hayley Worthington |
| Address | : 92 HILL STREET CARRINGTON NSW 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| E-mail | : lauras@rca.com.au | E-mail | : hayley.worthington@Alsglobal.com |
| Telephone | : +61 02 49029200 | Telephone | : +612 4014 2500 |
| Facsimile | : +61 02 4036 99112 | Facsimile | : +61 2 4967 7382 |
| Project | : 6919 ISCOs | Page | : 1 of 2 |
| Order number | : ---- | Quote number | : WN2016ROBCAR0005 (WN/087/16v2) |
| C-O-C number | : ---- | QC Level | : NEPM 2013 B3 & ALS QC Standard |
| Site | : ---- | | |
| Sampler | : SK | | |

Dates

| | | | |
|---------------------------|---------------------|--------------------------|----------------------|
| Date Samples Received | : 14-Oct-2021 15:48 | Issue Date | : 14-Oct-2021 |
| Client Requested Due Date | : 19-Oct-2021 | Scheduled Reporting Date | : 19-Oct-2021 |

Delivery Details

| | | | |
|----------------------|-------------|------------------------------------|-----------------|
| Mode of Delivery | : Undefined | Security Seal | : Not Available |
| No. of coolers/boxes | : ---- | Temperature | : ---- |
| Receipt Detail | : | No. of samples received / analysed | : 1 / 1 |

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

| Laboratory sample ID | Sampling date / time | Sample ID | WATER - ED041A Turbidimetric Sulfate | WATER - ED043 Total Oxidised Sulfur as SO4 2- | WATER - EG020A-T Total Metals by ICPMS - Suite A | WATER - EK067A - PO4 Total Phosphate | WATER - NT-08A.WN Total Nitrogen + NO2 + NO3 + NH3 + Total P + |
|----------------------|----------------------|-------------|--------------------------------------|---|--|--------------------------------------|--|
| WN2111951-001 | 12-Oct-2021 00:00 | 10216919003 | ✓ | ✓ | ✓ | ✓ | ✓ |

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV) Email administrator@rca.com.au

ENVIRO

- *AU Certificate of Analysis - NATA (COA) Email enviro@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email enviro@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email enviro@rca.com.au
- A4 - AU Tax Invoice (INV) Email enviro@rca.com.au
- Chain of Custody (CoC) (COC) Email enviro@rca.com.au
- EDI Format - ENMRG (ENMRG) Email enviro@rca.com.au
- EDI Format - ESDAT (ESDAT) Email enviro@rca.com.au

LAURA SCHOFIELD

- *AU Certificate of Analysis - NATA (COA) Email lauras@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email lauras@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email lauras@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email lauras@rca.com.au
- A4 - AU Tax Invoice (INV) Email lauras@rca.com.au
- Chain of Custody (CoC) (COC) Email lauras@rca.com.au
- EDI Format - ENMRG (ENMRG) Email lauras@rca.com.au
- EDI Format - ESDAT (ESDAT) Email lauras@rca.com.au

CERTIFICATE OF ANALYSIS

Work Order : **WN2112534**
Client : **ROBERT CARR & ASSOCIATES P/L**
Contact : LAURA SCHOFIELD
Address : PO BOX 175
 CARRINGTON NSW, AUSTRALIA 2294
Telephone : +61 2 4902 9200
Project : 6919 Wheel Wash
Order number : ----
C-O-C number : ----
Sampler : S King
Site : ----
Quote number : WN/088/16
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3
Laboratory : ALS Water - Newcastle
Contact : Andrea Swan
Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +61 2 4014 2500
Date Samples Received : 29-Oct-2021 14:28
Date Analysis Commenced : 01-Nov-2021
Issue Date : 05-Nov-2021 11:22



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> |
|--------------------|-------------------------|------------------------------------|
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

- EG020A-F, EG020A-T & EG035F conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | Sample ID | 10216919004 | ---- | ---- | ---- | ---- |
|---|------------|--------|----------------------|-------------------|-------|-------|-------|-------|
| | | | Sampling date / time | 29-Oct-2021 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | WN2112534-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- |
| EG020F: Dissolved Metals by ICP-MS | | | | | | | | |
| Arsenic | 7440-38-2 | 0.001 | mg/L | 0.293 | ---- | ---- | ---- | ---- |
| Cadmium | 7440-43-9 | 0.0001 | mg/L | 0.0012 | ---- | ---- | ---- | ---- |
| Copper | 7440-50-8 | 0.001 | mg/L | 0.214 | ---- | ---- | ---- | ---- |
| Nickel | 7440-02-0 | 0.001 | mg/L | 0.069 | ---- | ---- | ---- | ---- |
| Lead | 7439-92-1 | 0.001 | mg/L | <0.001 | ---- | ---- | ---- | ---- |
| Zinc | 7440-66-6 | 0.005 | mg/L | 0.435 | ---- | ---- | ---- | ---- |
| Molybdenum | 7439-98-7 | 0.001 | mg/L | 0.189 | ---- | ---- | ---- | ---- |
| EG020T: Total Metals by ICP-MS | | | | | | | | |
| Chromium | 7440-47-3 | 0.001 | mg/L | 0.010 | ---- | ---- | ---- | ---- |
| EG035F: Dissolved Mercury by FIMS | | | | | | | | |
| Mercury | 7439-97-6 | 0.0001 | mg/L | <0.0001 | ---- | ---- | ---- | ---- |
| EK057A: Nitrite as N | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.05 | mg/L | 13.5 | ---- | ---- | ---- | ---- |
| EK058A: Nitrate as N | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.05 | mg/L | 132 | ---- | ---- | ---- | ---- |
| EK059A: Nitrite and Nitrate as N (NOx) | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 145 | ---- | ---- | ---- | ---- |
| EK061A: Total Kjeldahl Nitrogen as N | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.2 | mg/L | 18400 | ---- | ---- | ---- | ---- |
| EK062A: Total Nitrogen as N | | | | | | | | |
| Total Nitrogen as N | ---- | 0.1 | mg/L | 18600 | ---- | ---- | ---- | ---- |
| EK067A: Total Phosphorus as P | | | | | | | | |
| Total Phosphorus as P | ---- | 0.05 | mg/L | 2000 | ---- | ---- | ---- | ---- |

Inter-Laboratory Testing

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

(WATER) EG035F: Dissolved Mercury by FIMS

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EG020T: Total Metals by ICP-MS

QUALITY CONTROL REPORT

| | | | |
|--------------------------------|--|--------------------------------|---|
| Work Order | : WN2112534 | Page | : 1 of 5 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : LAURA SCHOFIELD | Contact | : Andrea Swan |
| Address | : PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294 | Address | : 5/585 Maitland Road Newcastle West NSW Australia 2304 |
| Telephone | : +61 2 4902 9200 | Telephone | : +61 2 4014 2500 |
| Project | : 6919 Wheel Wash | Date Samples Received | : 29-Oct-2021 |
| Order number | : ---- | Date Analysis Commenced | : 01-Nov-2021 |
| C-O-C number | : ---- | Issue Date | : 05-Nov-2021 |
| Sampler | : S King | | |
| Site | : ---- | | |
| Quote number | : WN/088/16 | | |
| No. of samples received | : 1 | | |
| No. of samples analysed | : 1 | | |



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 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> |
|--------------------|-------------------------|------------------------------------|
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



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.

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 (%) |
| EG020F: Dissolved Metals by ICP-MS (QC Lot: 3991143) | | | | | | | | | |
| ET2105146-004 | Anonymous | EG020A-F: Cadmium | 7440-43-9 | 0.0001 | mg/L | <0.0001 | <0.0001 | 0.0 | No Limit |
| | | EG020A-F: Arsenic | 7440-38-2 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Copper | 7440-50-8 | 0.001 | mg/L | 0.004 | 0.004 | 0.0 | No Limit |
| | | EG020A-F: Lead | 7439-92-1 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Molybdenum | 7439-98-7 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Nickel | 7440-02-0 | 0.001 | mg/L | 0.001 | 0.001 | 0.0 | No Limit |
| | | EG020A-F: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | <0.005 | 0.0 | No Limit |
| EW2104541-001 | Anonymous | EG020A-F: Cadmium | 7440-43-9 | 0.0001 | mg/L | <0.0001 | <0.0001 | 0.0 | No Limit |
| | | EG020A-F: Arsenic | 7440-38-2 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Copper | 7440-50-8 | 0.001 | mg/L | 0.003 | 0.003 | 0.0 | No Limit |
| | | EG020A-F: Lead | 7439-92-1 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Molybdenum | 7439-98-7 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Nickel | 7440-02-0 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| | | EG020A-F: Zinc | 7440-66-6 | 0.005 | mg/L | 0.007 | 0.007 | 0.0 | No Limit |
| EG020T: Total Metals by ICP-MS (QC Lot: 3991259) | | | | | | | | | |
| EW2104555-006 | Anonymous | EG020A-T: Chromium | 7440-47-3 | 0.001 | mg/L | 0.002 | 0.002 | 0.0 | No Limit |
| EW2104555-016 | Anonymous | EG020A-T: Chromium | 7440-47-3 | 0.001 | mg/L | <0.001 | <0.001 | 0.0 | No Limit |
| EG035F: Dissolved Mercury by FIMS (QC Lot: 3991141) | | | | | | | | | |
| ES2139413-002 | Anonymous | EG035F: Mercury | 7439-97-6 | 0.0001 | mg/L | <0.0001 | <0.0001 | 0.0 | No Limit |
| EK057A: Nitrite as N (QC Lot: 3987126) | | | | | | | | | |
| WN2112534-001 | 10216919004 | EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | 13.5 | 16.4 | 19.9 | 0% - 20% |
| EK059A: Nitrite and Nitrate as N (NOx) (QC Lot: 3987125) | | | | | | | | | |
| WN2112534-001 | 10216919004 | EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | 145 | 135 | 6.6 | 0% - 20% |

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 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 Wheel Wash



Sub-Matrix: **WATER**

| | | | | <i>Laboratory Duplicate (DUP) Report</i> | | | | | |
|--|------------------|-------------------------------|-------------------|--|-------------|------------------------|-------------------------|----------------|---------------------------|
| <i>Laboratory sample ID</i> | <i>Sample ID</i> | <i>Method: Compound</i> | <i>CAS Number</i> | <i>LOR</i> | <i>Unit</i> | <i>Original Result</i> | <i>Duplicate Result</i> | <i>RPD (%)</i> | <i>Acceptable RPD (%)</i> |
| EK062A: Total Nitrogen as N (QC Lot: 3987248) | | | | | | | | | |
| WN2112534-001 | 10216919004 | EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | 18600 | 15800 | 16.1 | 0% - 20% |
| EK067A: Total Phosphorus as P (QC Lot: 3987250) | | | | | | | | | |
| WN2112534-001 | 10216919004 | EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | 2000 | 1940 | 3.1 | 0% - 20% |



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: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report | Laboratory Control Spike (LCS) Report | | | | |
|--|------------|--------|------|--------------------------|---------------------------------------|--------------------|------|-----------------------|--|
| | | | | Result | Spike Concentration | Spike Recovery (%) | | Acceptable Limits (%) | |
| | | | | | | LCS | Low | High | |
| EG020F: Dissolved Metals by ICP-MS (QCLot: 3991143) | | | | | | | | | |
| EG020A-F: Arsenic | 7440-38-2 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 94.7 | 85.0 | 114 | |
| EG020A-F: Cadmium | 7440-43-9 | 0.0001 | mg/L | <0.0001 | 0.1 mg/L | 94.6 | 84.0 | 110 | |
| EG020A-F: Copper | 7440-50-8 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 91.9 | 81.0 | 111 | |
| EG020A-F: Lead | 7439-92-1 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 93.5 | 83.0 | 111 | |
| EG020A-F: Molybdenum | 7439-98-7 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 95.2 | 79.0 | 113 | |
| EG020A-F: Nickel | 7440-02-0 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 92.3 | 82.0 | 112 | |
| EG020A-F: Zinc | 7440-66-6 | 0.005 | mg/L | <0.005 | 0.1 mg/L | 95.0 | 81.0 | 117 | |
| EG020T: Total Metals by ICP-MS (QCLot: 3991259) | | | | | | | | | |
| EG020A-T: Chromium | 7440-47-3 | 0.001 | mg/L | <0.001 | 0.1 mg/L | 96.0 | 86.0 | 116 | |
| EG035F: Dissolved Mercury by FIMS (QCLot: 3991141) | | | | | | | | | |
| EG035F: Mercury | 7439-97-6 | 0.0001 | mg/L | <0.0001 | 0.01 mg/L | 97.0 | 83.0 | 105 | |
| EK057A: Nitrite as N (QCLot: 3987126) | | | | | | | | | |
| EK057A: Nitrite as N | 14797-65-0 | 0.03 | mg/L | <0.03 | 1 mg/L | 103 | 90.0 | 110 | |
| EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3987125) | | | | | | | | | |
| EK059A: Nitrite + Nitrate as N | ---- | 0.05 | mg/L | <0.05 | 2 mg/L | 105 | 90.0 | 110 | |
| EK062A: Total Nitrogen as N (QCLot: 3987248) | | | | | | | | | |
| EK062A: Total Nitrogen as N | ---- | 0.1 | mg/L | <0.1 | 5 mg/L | 95.0 | 90.0 | 110 | |
| EK067A: Total Phosphorus as P (QCLot: 3987250) | | | | | | | | | |
| EK067A: Total Phosphorus as P | ---- | 0.05 | mg/L | <0.05 | 5 mg/L | 95.6 | 90.0 | 110 | |

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 | Spike Recovery (%) | Acceptable Limits (%) | |
| | | | | | | MS | Low |
| EG020F: Dissolved Metals by ICP-MS (QCLot: 3991143) | | | | | | | |
| ET2105146-003 | Anonymous | EG020A-F: Arsenic | 7440-38-2 | 1 mg/L | 89.7 | 70.0 | 130 |
| | | EG020A-F: Cadmium | 7440-43-9 | 0.25 mg/L | 91.0 | 70.0 | 130 |
| | | EG020A-F: Copper | 7440-50-8 | 1 mg/L | 90.5 | 70.0 | 130 |
| | | EG020A-F: Lead | 7439-92-1 | 1 mg/L | 96.1 | 70.0 | 130 |
| | | EG020A-F: Nickel | 7440-02-0 | 1 mg/L | 89.9 | 70.0 | 130 |

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 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 Wheel Wash



Sub-Matrix: **WATER**

| | | | | <i>Matrix Spike (MS) Report</i> | | | |
|---|------------------|--------------------------------|-------------------|---------------------------------|-------------------------|------------------------------|-------------|
| | | | | <i>Spike</i> | <i>SpikeRecovery(%)</i> | <i>Acceptable Limits (%)</i> | |
| <i>Laboratory sample ID</i> | <i>Sample ID</i> | <i>Method: Compound</i> | <i>CAS Number</i> | <i>Concentration</i> | <i>MS</i> | <i>Low</i> | <i>High</i> |
| EG020F: Dissolved Metals by ICP-MS (QCLot: 3991143) - continued | | | | | | | |
| ET2105146-003 | Anonymous | EG020A-F: Zinc | 7440-66-6 | 1 mg/L | 91.3 | 70.0 | 130 |
| EG020T: Total Metals by ICP-MS (QCLot: 3991259) | | | | | | | |
| EW2104555-007 | Anonymous | EG020A-T: Chromium | 7440-47-3 | 1 mg/L | 102 | 70.0 | 130 |
| EG035F: Dissolved Mercury by FIMS (QCLot: 3991141) | | | | | | | |
| ES2139413-001 | Anonymous | EG035F: Mercury | 7439-97-6 | 0.01 mg/L | 106 | 70.0 | 130 |
| EK057A: Nitrite as N (QCLot: 3987126) | | | | | | | |
| WN2112538-001 | Anonymous | EK057A: Nitrite as N | 14797-65-0 | 1 mg/L | 107 | 80.0 | 120 |
| EK059A: Nitrite and Nitrate as N (NO_x) (QCLot: 3987125) | | | | | | | |
| WN2112538-001 | Anonymous | EK059A: Nitrite + Nitrate as N | ---- | 2 mg/L | 103 | 80.0 | 120 |

QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|--------------|---|-------------------------|-------------------------|
| Work Order | : WN2112534 | Page | : 1 of 6 |
| Client | : ROBERT CARR & ASSOCIATES P/L | Laboratory | : ALS Water - Newcastle |
| Contact | : LAURA SCHOFIELD | Telephone | : +61 2 4014 2500 |
| Project | : 6919 Wheel Wash | Date Samples Received | : 29-Oct-2021 |
| Site | : ---- | Issue Date | : 05-Nov-2021 |
| Sampler | : S King | No. of samples received | : 1 |
| Order number | : ---- | No. of samples analysed | : 1 |

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

| Method Container / Client Sample ID(s) | Extraction / Preparation | | | Analysis | | |
|--|--------------------------|--------------------|--------------|---------------|------------------|--------------|
| | Date extracted | Due for extraction | Days overdue | Date analysed | Due for analysis | Days overdue |
| EK057A: Nitrite as N Clear Plastic Bottle - Natural 10216919004 | ---- | ---- | ---- | 01-Nov-2021 | 31-Oct-2021 | 1 |

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

| Quality Control Sample Type Method | Count | | Rate (%) | | Quality Control Specification |
|--|-------|---------|----------|----------|--------------------------------|
| | QC | Regular | Actual | Expected | |
| Matrix Spikes (MS) Total Nitrogen as N | 0 | 1 | 0.00 | 5.00 | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | 0 | 1 | 0.00 | 5.00 | NEPM 2013 B3 & ALS QC Standard |

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EG020F: Dissolved Metals by ICP-MS Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) 10216919004 | 29-Oct-2021 | ---- | ---- | ---- | 03-Nov-2021 | 26-Apr-2022 | ✓ |
| EG020T: Total Metals by ICP-MS Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919004 | 29-Oct-2021 | 03-Nov-2021 | 26-Apr-2022 | ✓ | 03-Nov-2021 | 26-Apr-2022 | ✓ |
| EG035F: Dissolved Mercury by FIMS Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) 10216919004 | 29-Oct-2021 | ---- | ---- | ---- | 04-Nov-2021 | 26-Nov-2021 | ✓ |
| EK057A: Nitrite as N Clear Plastic Bottle - Natural (EK057A) 10216919004 | 29-Oct-2021 | ---- | ---- | ---- | 01-Nov-2021 | 31-Oct-2021 | * |
| EK059A: Nitrite and Nitrate as N (NOx) Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919004 | 29-Oct-2021 | ---- | ---- | ---- | 01-Nov-2021 | 26-Nov-2021 | ✓ |

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 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 Wheel Wash



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EK062A: Total Nitrogen as N | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919004 | 29-Oct-2021 | 02-Nov-2021 | 26-Nov-2021 | ✓ | 02-Nov-2021 | 26-Nov-2021 | ✓ |
| EK067A: Total Phosphorus as P | | | | | | | |
| Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919004 | 29-Oct-2021 | 02-Nov-2021 | 26-Nov-2021 | ✓ | 02-Nov-2021 | 26-Nov-2021 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|---|----------|-------|---------|----------|----------|------------|--------------------------------|
| | | QC | Reaular | Actual | Expected | Evaluation | |
| Analytical Methods | | | | | | | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Dissolved Mercury by FIMS | EG035F | 1 | 6 | 16.67 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Dissolved Metals by ICP-MS - Suite A | EG020A-F | 2 | 17 | 11.76 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 3 | 33.33 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 2 | 17 | 11.76 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 1 | 100.00 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 1 | 100.00 | 10.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Dissolved Mercury by FIMS | EG035F | 1 | 6 | 16.67 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Dissolved Metals by ICP-MS - Suite A | EG020A-F | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 3 | 33.33 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 1 | 100.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 1 | 100.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Dissolved Mercury by FIMS | EG035F | 1 | 6 | 16.67 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Dissolved Metals by ICP-MS - Suite A | EG020A-F | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 3 | 33.33 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 1 | 1 | 100.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 1 | 1 | 100.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS) | | | | | | | |
| Dissolved Mercury by FIMS | EG035F | 1 | 6 | 16.67 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Dissolved Metals by ICP-MS - Suite A | EG020A-F | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite and Nitrate as N (NOx) | EK059A | 1 | 3 | 33.33 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Nitrite as N | EK057A | 1 | 2 | 50.00 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals by ICP-MS - Suite A | EG020A-T | 1 | 17 | 5.88 | 5.00 | ✔ | NEPM 2013 B3 & ALS QC Standard |
| Total Nitrogen as N | EK062A | 0 | 1 | 0.00 | 5.00 | ✖ | NEPM 2013 B3 & ALS QC Standard |
| Total Phosphorus as P | EK067A | 0 | 1 | 0.00 | 5.00 | ✖ | NEPM 2013 B3 & ALS QC Standard |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|---|----------|--------|--|
| Dissolved Metals by ICP-MS - Suite A | EG020A-F | WATER | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. |
| Total Metals by ICP-MS - Suite A | EG020A-T | WATER | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. |
| Dissolved Mercury by FIMS | EG035F | WATER | In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3). |
| Nitrite as N | EK057A | WATER | In house: referenced to APHA 4500 - NO ₃ I (no reduction). Nitrite (NO ₂ ⁻) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl)-ethylenediamine dihydrochloride which is measured at 520 nm. |
| Nitrate as N | EK058A | WATER | In house: referenced to APHA 4500 - NO ₃ I. This automated procedure for the determination of TON (NO ₂ ⁻ + NO ₃ ⁻) utilises the procedure whereby (NO ₃ ⁻) is reduced to nitrite (NO ₂ ⁻) at a pH 7.5 in a copper-cadmium reductor cell. The NO ₂ ⁻ reduced from NO ₃ ⁻ plus any free NO ₂ ⁻ present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Nitrite and Nitrate as N (NO _x) | EK059A | WATER | In house: referenced to APHA 4500 - NO ₃ I. This automated procedure for the determination of TON (NO ₂ ⁻ + NO ₃ ⁻) utilises the procedure whereby (NO ₃ ⁻) is reduced to nitrite (NO ₂ ⁻) at a pH 7.5 in a copper-cadmium reductor cell. The NO ₂ ⁻ reduced from NO ₃ ⁻ plus any free NO ₂ ⁻ present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm. |
| Total Kjeldahl Nitrogen as N | EK061A | WATER | In house 6. TKN is calculated by difference from Total Nitrogen and NO _x . Contributing method parameters are determined by FIA |
| Total Nitrogen as N | EK062A | WATER | In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method. |

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 Client : ROBERT CARR & ASSOCIATES P/L
 Project : 6919 Wheel Wash



| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|--|---------------|---------------|---|
| Total Phosphorus as P | EK067A | WATER | In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid. |
| <i>Preparation Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
| Basic Persulfate Digestion for TN with FIA finish. | EK062-PA | WATER | In house: Referenced to APHA 24500 P - J. |
| Acid Persulfate Digestion for TP with FIA finish. | EK067-PA | WATER | # |
| Digestion for Total Recoverable Metals | EN25 | WATER | In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3) |