17 April 2023

Mr Tom Robertson
Senior Environmental Business Partner – SA NT VIC TAS
Cleanaway Waste Management Limited
20 George Street
Wingfield, South Australia 5013

RE: March 2023 Stormwater Sampling Event – Cleanaway Depot, 2 Murray Street, Katherine, Northern Territory

Dear Tom,

Land & Water Consulting (LWC) was engaged by Cleanaway Waste Management Limited (Cleanaway) to undertake a stormwater sampling event at the Cleanaway Depot located at 2 Murray Street, Katherine, Northern Territory (the Site).

1. SCOPE OF WORKS, APPROACH AND METHODOLOGY

The adopted scope of works comprised the following:

- Development of a site-specific Work Health and Safety Management Plant (WHSMP) including Job Safety Environmental Analysis (JSEA);
- Collection of a stormwater control (SW_Control – up-gradient of the Site) and stormwater discharge (SW_Discharge – down-gradient of the Site) samples; and
- Preparation of a factual report including a summary of the sampling methodology, comparison of laboratory results against trade waste criteria and a data quality assessment.

Two stormwater samples were collected from within the up-gradient portion of the site to collect stormwater flowing onto the Site (SW_ Control) and down-gradient of the Site to collect stormwater discharging off-Site (SW_Discharge). The location of the samples was consistent with historical sampling events as advised by site personnel, with exception of SW_ Control which was observed as dry. Subsequently, SW_ Control was sampled from a puddle across from Victoria Road. This stormwater sample was later considered not to be representative of stormwater flowing onto the Site and was not analysed.

All stormwater samples were collected on 8 March 2023, with the sampling locations shown in Figure 1-1. Field parameters including pH, electrical conductivity, redox and temperature were recorded prior to sampling using a calibrated water quality metre. Refer to Attachment A for the water quality metre calibration certificate and Attachment B for the field sampling records.

The adopted analytical schedule for the stormwater samples included pH, TDS/ EC, TSS, nutrients, metals, TRH and BTEX compounds.

2. RESULTS/ FIELD OBSERVATIONS

The stormwater sampled was light brown/ brown with low to moderate turbidity, no odour or sheen was observed.

The certified laboratory analytical results are presented as Attachment C. Interpretation of these results was outside the scope of works.

Figure 1-1 Stormwater Discharge Sample – SW_Discharge (left), Stormwater Control S ample – SW_Control (right).

3. DATA QUALITY ASSESSMENT

The quality of analytical data produced for this project has been assessed with reference to the following issues:

- Sampling technique;
- Preservation and storage of samples upon collection and during transport to the laboratory;
- Sample holding times;
- Analytical procedures;
- Laboratory limits of reporting;
- Field duplicate agreement;
- Laboratory quality assurance/quality control (QA/QC) procedures; and
- The occurrence of apparently unusual or anomalous results.

RPDs were assessed where the reported concentrations were greater than the laboratory limits of reporting in accordance with the following acceptance criteria:

- Where both reported concentrations are greater than 20 times the LOR: RPD% <30%;
- Where the higher of the two concentrations is between 10 and 20 times the LOR: RPD% <50%; and
- Where both concentrations are less than 10 time the LOR: RPD% has no limit.

The overall assessment of data quality was undertaken in accordance with the Data Quality Objective (DQO) and Data Quality Indicator (DQI) processes.

Laboratory QA/QC procedures and results are detailed in the certified laboratory results contained in Attachment C. A summary of the data quality assessment and a summary of the field duplicate sample relative percentage differences (RPD) are included as Attachment D.

Laboratory data was considered suitably robust for the purposes of the assessment, subject to the comments and limitations in Attachment D.

4. CONCLUSION

Stormwater sampling was undertaken at the Site on 8 March 2023. Two stormwater samples were collected (SW_Control and SW_Discharge), with only the discharge sample analysed due to the control sample not considered to be representative. Laboratory results were considered to be of a suitable quality for interpretation.

A statement of limitations is provided as Attachment E.

If you require further information, please do not hesitate to contact the undersigned.

Yours sincerely,

Land & Water Consulting

Vanessa De Chellis
Senior Environmental Engineer

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Attachments

Attachment A – Equipment Calibration Certificate

Attachment B – Field Sampling Sheets

Attachment C – Certified Laboratory Analytical Results

Attachment D – Data Quality Assessment

Attachment E – Statement of Limitations

ATTACHMENT A

EQUIPMENT CALIBRATION CERTIFICATE

EQUIPMENT CERTIFICATION REPORT

KENNARDS HIRE

PGN9003871 WATER QUALITY METER – MULTIFUNCTION (YSI PRO PLUS)

Plant Number: 1088643 **Serial Number:** 21H104244

SENSOR	CONCENTRATION	SPAN 1	SPAN 2	TRACEABILITY	PASS
pH	pH 7.00 / pH 4.00	7.00 pH	4.00 pH	330737 380327	☑
Conductivity	12.88 mS/cm	12.88 mS/cm	—	364737	☑
Dissolved Oxygen	Sodium Sulphite / Air	0.0% in Sodium Sulphite	% Saturation in Air	10465	☑
ORP	240mV @ 20°C	240mV	-	338782 337308	☑

Battery Status 90 %	Temperature 24,6 °C
Electrodes Cleaned and Checked	

Note: Calibration solution traceability information is available upon request.

Checked By: Wilma Fouché Date: 28/2/23 Signed: _____

Accessories List:

User's Manual	pH Sensor	Conductivity/ Temp Sensor
Dissolved Oxygen Sensor	Redox (ORP) Sensor	Flow Cell
User Guide	Stainless Steel Restrictor	Spare Batteries
Calibration Cup		

ATTACHMENT B

FIELD SAMPLING SHEETS

Surface Water Sampling Data Sheet

General Information			
Project:	BE-61		
Job Number:	Katherine Depot	Site Locked (Y/N):	N
Client:	Cleanaway	Sample ID:	SW_Discharge
Location:	Katherine	Equip Calibrated:	yes

Weather Conditions			
Rain:	-	Wind Direction:	N/A
Temperature:	30C	Wind Speed:	N/A
Cloud Cover:	80%	Upwind Activities:	N/A
Location Conditions:	Puddle		

Purging Information

Date: 8/3/23		Name:	A Vaughan			Pump Depth:	-
Method: Grab sample		Sampling Material:	Stormwater			Pumping Details:	-
Start Time: 10:55		Finish Time:	11:07			Total Volumes (litres):	0.8L
Sample Volume (L): 0.8		No Times Sampled:	4				

Time	Volume Removed (L)	pH	E.C. (µS/cm or mS/cm)	Redox (mV)	Dissolved Oxygen (ppm	Temp (°C)	Appearance (Colour / Odour / Turbidity)
10:55	0.2	8.67	221.7	98.1	9.58	35.2	light brown, low to
10:57	0.2	8.69	221.0	89.3	9.40	35.2	moderate turbidity
10:59	0.2	8.71	215.1	80.2	7.90	35.2	no odour or sheen.
11:01	0.2	8.74	223.2	71.3	7.77	35.2	
							*DUP1_SW

Purging should continue until measurements for pH are within 0.05 pH unit; conductivity within 3%, DO within 10%, Redox within 10 mV and Temperature is within 0.5 degC over three successive measurements

General Information			
Project:	BE-61		
Job Number:	Katherine Depot	Site Locked (Y/N):	N
Client:	Cleanaway	Sample ID:	SW_Control
Location:	Katherine	~~Chem Kit No.~~	

Weather Conditions			
Rain:	N/A	Wind Direction:	-
Temperature:	31°C	Wind Speed:	-
Cloud Cover:	80%	Upwind Activities:	-
Location Conditions:	off-site (across Puddle Road)		

Purging Information

Date: 8/3/23		Name:	A Vaughan			Pump Depth:	-
Method: grab sample		Sampling Material:	Stormwater			Pump Speed:	-
Start Time: 12:05		Finish Time:	12:25			Total Volumes (litres):	0.8L
Sample Volume (L) 0.8		No Times Sampled:	4				

Time	Volume Removed (L)	pH	E.C. (mS/cm)	Redox (mV)	Dissolved Oxygen (ppm or %)	Temp (Cels)	Appearance (Colour / Odour / Turbidity)
12:05	0.2	8.30	200.0	1.4	5.04	38.1	light brown/brown
12:10	0.2	8.27	197.7	-3.6	7.30	38.0	moderate turbidity,
12:15	0.2	8.09	186.1	-6.1	4.80	38.0	no odour or sheen.
12:20	0.2	8.02	186.9	-6.8	4.83	38.0	↓

ATTACHMENT C

CERTIFIED LABORATORY ANALYTICAL RESULTS

CERTIFICATE OF ANALYSIS

Work Order	: **ES2307810-AB**	Page	: 1 of 5
Amendment	: **3**		
Client	: **LWC MANAGEMENT PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VANESSA DECHELLIS	Contact	: Shirley LeCornu
Address	: SUITE 3 4-8 GOODWOOD ROAD WAYVILLE SOUTH AUSTRALIA 5034	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 08 8271 5255	Telephone	: +6138549 9630
Project	: BE-61	Date Samples Received	: 10-Mar-2023 10:00
Order number	: ----	Date Analysis Commenced	: 10-Mar-2023
C-O-C number	: ----	Issue Date	: 05-Apr-2023 16:55
Sampler	: ALISTAIR VAUGHAN		
Site	: ----		
Quote number	: ME/221/18		
No. of samples received	: 2		
No. of samples analysed	: 2		

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
- Surrogate Control Limits

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.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, 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 Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- ED041G: LOR raised for Sulfate on sample 1 & 2 due to sample matrix.
- ED093: Results for samples ES2307810-#001 and #002 have been confirmed by reanalysis.
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EN055: Ionic Balance out of acceptable limits due to analytes not quantified in this report.
- Amendment (23/03/23): This report has been amended and re-released to allow the reporting of additional analytical data(TPH silica gel added to sample 1)
- Amendment (5/4/23):This report has been amended to split reports.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW_Discharge	DUP1_SW	----	----	----
			Sampling date / time	08-Mar-2023 00:00	08-Mar-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2307810-003	ES2307810-004	--------	--------	--------
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.01**	**8.11**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**176**	**173**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**109**	**113**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**202**	**246**	----	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	**0.002**	**0.002**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	**0.0001**	**0.0001**	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.004**	**0.004**	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.017**	**0.014**	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.004**	**0.004**	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.012**	**0.012**	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.066**	**0.062**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.05**	**0.04**	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.4**	**1.2**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**1.4**	**1.2**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.21**	**0.17**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW_Discharge	DUP1_SW	----	----	----
				Sampling date / time	08-Mar-2023 00:00	08-Mar-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2307810-003	ES2307810-004	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**113**	**79.5**	----	----	----
Toluene-D8	2037-26-5	2	%		**93.8**	**80.5**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**108**	**78.0**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QUALITY CONTROL REPORT

Work Order	: **ES2307810-AB**	Page	: 1 of 8
Amendment	: **3**		
Client	: **LWC MANAGEMENT PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VANESSA DECHELLIS	Contact	: Shirley LeCornu
Address	: SUITE 3 4-8 GOODWOOD ROAD WAYVILLE SOUTH AUSTRALIA 5034	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 08 8271 5255	Telephone	: +6138549 9630
Project	: BE-61	Date Samples Received	: 10-Mar-2023
Order number	: ----	Date Analysis Commenced	: 10-Mar-2023
C-O-C number	: ----	Issue Date	: 05-Apr-2023
Sampler	: ALISTAIR VAUGHAN		
Site	: ----		
Quote number	: ME/221/18		
No. of samples received	: 2		
No. of samples analysed	: 2		

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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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, 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 (%)*
EA005P: pH by PC Titrator (QC Lot: 4923566)									
ES2307802-005	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	4.66	5.28	12.5	0% - 20%
ES2307802-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	5.75	5.92	2.9	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4923567)									
ES2307802-005	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	12	12	0.0	0% - 50%
ES2307974-024	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	6850	6900	0.7	0% - 20%
ES2307974-006	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	5860	5660	3.4	0% - 20%
ES2307802-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	13	12	0.0	0% - 50%
ES2307974-017	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	5970	5970	0.0	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4931290)									
ES2307630-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	39100	38000	3.0	0% - 20%
ES2307860-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	11	<10	9.5	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 4931291)									
ES2307630-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
ES2307860-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4926193)									
ES2307252-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.006	<0.001	140	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.0	No Limit
ES2307741-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4926193) - continued									
ES2307741-001	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.002	35.5	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.007	0.006	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4925284)									
ES2307810-003	SW_Discharge	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EW2300983-005	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4928867)									
ES2307541-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.04	29.6	No Limit
ES2307860-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.12	0.0	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4922910)									
ES2307798-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2307805-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4928868)									
ES2307541-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2307860-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4928872)									
ES2307541-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.4	0.0	No Limit
ES2307860-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4928871)									
ES2307541-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	0.0	No Limit
ES2307860-005	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4922733)									
ES2307950-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
ES2307856-026	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	290	190	41.6	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4924295)									
ES2307810-003	SW_Discharge	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2307811-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4922733)									
ES2307950-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4922733) - continued									
ES2307856-026	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	330	260	22.9	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4924295)									
ES2307810-003	SW_Discharge	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2307811-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4924295)									
ES2307810-003	SW_Discharge	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2307811-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4923566)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.8	101
				----	7 pH Unit	99.6	99.2	101
EA010P: Conductivity by PC Titrator (QCLot: 4923567)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	105	89.9	110
				<1	2100 µS/cm	94.3	90.2	111
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4931290)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	90.2	87.0	109
				<10	293 mg/L	101	75.2	126
				<10	2340 mg/L	97.1	83.0	124
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 4931291)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	97.7	83.0	129
				<5	1000 mg/L	93.7	82.0	110
				<5	987 mg/L	95.4	83.0	118
EG020T: Total Metals by ICP-MS (QCLot: 4926193)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	90.0	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.8	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.8	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.3	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.1	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.6	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	87.0	79.0	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4925284)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.9	77.0	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4928867)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4922910)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	97.9	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4928868)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4928872)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4928872) - continued								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	89.5	69.0	101
				<0.1	1 mg/L	100.0	70.0	118
				<0.1	5 mg/L	90.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4928871)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.9	71.3	126
				<0.01	0.442 mg/L	94.5	71.3	126
				<0.01	1 mg/L	93.6	71.3	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4922733)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	77.1	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	87.6	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	102	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4924295)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.1	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4922733)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	70.9	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	84.9	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	72.6	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4924295)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	86.0	75.0	127
EP080: BTEXN (QCLot: 4924295)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.5	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	89.4	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.8	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	101	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	102	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	96.0	70.0	120

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4926193)							
ES2307252-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	91.3	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	95.4	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	96.3	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	93.6	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	105	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	91.4	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	91.5	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4925284)							
ES2307810-003	SW_Discharge	EG035T: Mercury	7439-97-6	0.01 mg/L	84.3	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4928867)							
ES2307541-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	82.1	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4922910)							
ES2307798-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	101	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4928868)							
ES2307541-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	90.7	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4928872)							
ES2307541-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.1	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4928871)							
ES2307541-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	99.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4922733)							
ES2307950-001	Anonymous	EP071: C10 - C14 Fraction	----	200 µg/L	108	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	125	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	119	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4924295)							
ES2307810-003	SW_Discharge	EP080: C6 - C9 Fraction	----	325 µg/L	94.7	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4922733)							
ES2307950-001	Anonymous	EP071: >C10 - C16 Fraction	----	250 µg/L	109	70.0	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	122	75.0	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	119	67.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4924295)							
ES2307810-003	SW_Discharge	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	94.3	70.0	130
EP080: BTEXN (QCLot: 4924295)							
ES2307810-003	SW_Discharge	EP080: Benzene	71-43-2	25 µg/L	85.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	88.0	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 4924295) - continued							
ES2307810-003	SW_Discharge	EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	103	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	102	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	87.6	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2307810**	Page	: 1 of 10
Amendment	: **3**		
Client	: **LWC MANAGEMENT PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VANESSA DECHELLIS	Telephone	: +6138549 9630
Project	: BE-61	Date Samples Received	: 10-Mar-2023
Site	: ----	Issue Date	: 05-Apr-2023
Sampler	: ALISTAIR VAUGHAN	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 5

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

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

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							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2307669--014	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES2307669--014	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK055G: Ammonia as N by Discrete Analyser	ES2307810--001	VGS	**Ammonia as N**	7664-41-7	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
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
SW_Discharge, DUP1_SW	----	----	----	11-Mar-2023	08-Mar-2023	**3**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	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

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
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
SW_Discharge,	DUP1_SW	**08-Mar-2023**	**----**	----	----	**11-Mar-2023**	08-Mar-2023	×
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
SW_Discharge,	DUP1_SW	**08-Mar-2023**	**----**	----	----	**11-Mar-2023**	05-Apr-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
VGS,	DUP1,	**08-Mar-2023**	**----**	----	----	**15-Mar-2023**	15-Mar-2023	✓
SW_Discharge,	DUP1_SW							
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025H)								
VGS,	DUP1,	**08-Mar-2023**	**----**	----	----	**15-Mar-2023**	15-Mar-2023	✓
SW_Discharge,	DUP1_SW							
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
VGS,	DUP1	**08-Mar-2023**	**----**	----	----	**11-Mar-2023**	22-Mar-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
VGS,	DUP1	**08-Mar-2023**	**----**	----	----	**14-Mar-2023**	05-Apr-2023	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
VGS,	DUP1	**08-Mar-2023**	**----**	----	----	**14-Mar-2023**	05-Apr-2023	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
VGS,	DUP1	**08-Mar-2023**	**----**	----	----	**13-Mar-2023**	15-Mar-2023	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T)								
SW_Discharge,	DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	04-Sep-2023	✓	**14-Mar-2023**	04-Sep-2023	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)								
SW_Discharge,	DUP1_SW	**08-Mar-2023**	**----**	----	----	**15-Mar-2023**	05-Apr-2023	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
VGS,	DUP1,	**08-Mar-2023**	**----**	----	----	**15-Mar-2023**	05-Apr-2023	✓
SW_Discharge,	DUP1_SW							
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
SW_Discharge,	DUP1_SW	**08-Mar-2023**	**----**	----	----	**10-Mar-2023**	10-Mar-2023	✓

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
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
SW_Discharge, DUP1_SW	**08-Mar-2023**	**----**	----	**----**	**15-Mar-2023**	05-Apr-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
SW_Discharge, DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	05-Apr-2023	✓	**15-Mar-2023**	05-Apr-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
SW_Discharge, DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	05-Apr-2023	✓	**15-Mar-2023**	05-Apr-2023	✓
EP030: Biochemical Oxygen Demand (BOD)							
Clear Plastic Bottle - Natural (EP030)							
VGS, DUP1	**08-Mar-2023**	**----**	----	**----**	**10-Mar-2023**	10-Mar-2023	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
VGS	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**28-Mar-2023**	24-Apr-2023	✓
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
VGS	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**28-Mar-2023**	24-Apr-2023	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
VGS	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**28-Mar-2023**	24-Apr-2023	✓
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
VGS	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**28-Mar-2023**	24-Apr-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
VGS, DUP1, SW_Discharge, DUP1_SW	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**17-Mar-2023**	24-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**14-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
VGS, DUP1, SW_Discharge	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**15-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
Tripblank	**09-Mar-2023**	**14-Mar-2023**	23-Mar-2023	✓	**15-Mar-2023**	23-Mar-2023	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) VGS, DUP1, SW_Discharge, DUP1_SW	**08-Mar-2023**	**15-Mar-2023**	15-Mar-2023	✓	**17-Mar-2023**	24-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**14-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) VGS, DUP1, SW_Discharge	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**15-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Tripblank	**09-Mar-2023**	**14-Mar-2023**	23-Mar-2023	✓	**15-Mar-2023**	23-Mar-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) DUP1_SW	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**14-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) VGS, DUP1, SW_Discharge	**08-Mar-2023**	**14-Mar-2023**	22-Mar-2023	✓	**15-Mar-2023**	22-Mar-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) Tripblank	**09-Mar-2023**	**14-Mar-2023**	23-Mar-2023	✓	**15-Mar-2023**	23-Mar-2023	✓

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		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	5	43	**11.63**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	8	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**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 Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	43	**9.30**	**8.33**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**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

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	43	**2.33**	**1.67**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**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 Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**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 Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	0	1	**0.00**	**5.00**	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	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
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 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).

Analytical Methods	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Biochemical Oxygen Demand (BOD)	EP030	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	WATER	In house: Referenced to USEPA SW 846 - 8015 Sample extracts cleaned up using silica gel and are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
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)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2307810**

Client	: **LWC MANAGEMENT PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VANESSA DECHELLIS	Contact	: Shirley LeCornu
Address	: SUITE 3 4-8 GOODWOOD ROAD WAYVILLE SOUTH AUSTRALIA 5034	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vdechellis@lwconsulting.com.au	E-mail	: shirley.lecornu@Alsglobal.com
Telephone	: 08 8271 5255	Telephone	: +6138549 9630
Facsimile	: 08 8357 1307	Facsimile	: +61-2-8784 8500
Project	: BE-61	Page	: 1 of 3
Order number	: ----	Quote number	: EM2018LANWAT0003 (ME/221/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ALISTAIR VAUGHAN		

Dates

Date Samples Received	: 10-Mar-2023 10:00	Issue Date	: 10-Mar-2023
Client Requested Due Date	: 17-Mar-2023	Scheduled Reporting Date	: **17-Mar-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 25.2'C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 6 / 5

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
- **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(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- 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.

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 - EA005P pH (Auto Titrator)	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EP030 BOD	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity	WATER - W-04 TRH/BTEXN
ES2307810-001	08-Mar-2023 00:00	VGS		✓	✓	✓	✓	✓	✓
ES2307810-002	08-Mar-2023 00:00	DUP1		✓	✓	✓	✓	✓	✓
ES2307810-003	08-Mar-2023 00:00	SW_Discharge	✓	✓	✓				
ES2307810-004	08-Mar-2023 00:00	DUP1_SW	✓	✓	✓				

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) WATER No analysis requested	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - NT-08 Total Nitrogen + NO2 + NO3 + NH3 + Total P	WATER - W-05T TRH/BTEXN/8 Metals (Total)	WATER - W-18 TRH(C6 - C9)/BTEXN
ES2307810-003	08-Mar-2023 00:00	SW_Discharge		✓	✓	✓	
ES2307810-004	08-Mar-2023 00:00	DUP1_SW		✓	✓	✓	
ES2307810-005	08-Mar-2023 00:00	SW_Control	✓				
ES2307810-006	09-Mar-2023 00:00	Tripblank					✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

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

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
DUP1_SW	Clear Plastic Bottle - Natural	----	08-Mar-2023	10-Mar-2023	×	----	----
SW_Discharge	Clear Plastic Bottle - Natural	----	08-Mar-2023	10-Mar-2023	×	----	----

Requested Deliverables

INVOICES ADDRESS

- A4 - AU Tax Invoice (INV)	Email	admin@lwconsulting.com.au

RESULTS/INVOICES ADDRESS

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

VANESSA DECHELLIS

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

Jonathon 10/3/23 0830

CHAIN OF CUSTODY FORM

ALS

From : Land & Water Consulting Pty Ltd
Suite 3, 4-8 Goodwood Road, WAYVILLE, SA, 5034
ph: (08) 8271 5255 fax: (08) 8357 1307

LAB Quote Number: ME/221/18

LWC Contact Information:
Contact Name:
V De Chellis
Contact Email:
laboratoryresults@lwconsulting.com.au
vdechellis@lwconsulting.com.au

Phone Number:
08 8271 5255

LWC Project No: BE-61

Project Manager:
V De Chellis

Date Samples Sent:
9/3/23

COC Checked by: A Vaughan

Sample Analysis

Lab ID	Date	Matrix	Sample ID	No. Bottles	SW Control + Discharge Suite*	Vertical Gravity Seperator Suite**	BOD, Major Cations + Anions (incl. Alkalinity)					TRH C6-C10 / BTEX	HOLD
					Tick required analytes								
01	8/3/23	W	VGS	6		X	X						
02	8/3/23		[redacted] DUP1	6		X	X						
03	8/3/23		SW_Discharge	6	X								
04	8/3/23		DUP1_SW	6	X								
05	8/3/23		SW_Control	6									X
06	9/3/23		Triplblank	2								X	
				TOTAL 32	2	2	2					1	1

Environmental Division
Sydney
Work Order Reference
ES2307810

Telephone : + 61-2-8784 8555

ADDITIONAL COMMENTS:

* Stormwater Control & Discharge Suite - pH, TDS/ EC, TSS, nutrients (ammonia, nitrite, TKN, total nitrogen, total phosphorus - B19D), 8 metals/ TRH/ TPH/ BTEX (B5).

** Vertical Gravity Seperator Suite - TDS, TSS, major cations + anions (including alkalinity suite), ammonia, TRH/ TPH/ BTEX (B1), BOD.

LAB OF ORIGIN
DARWIN
09 MAR 2023

Lana ALS 1220

LWC Management Pty Ltd
Suite 3/ 4-8 Goodwood Road
Wayville
SA 5034

Attention: **Vanessa De Chellis**

Report **970342-W**
Project name
Project ID BE-61
Received Date Mar 09, 2023

Client Sample ID			**DUP1**	**DUP1_SW**	**Trip Blank**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins Sample No.			**M23-Ma0021878**	**M23-Ma0021879**	**M23-Ma0021880**
Date Sampled			**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	0.02	mg/L	0.27	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	4.3	< 0.05	-
TRH C15-C28	0.1	mg/L	27	< 0.1	-
TRH C29-C36	0.1	mg/L	32	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	63.3	< 0.1	-
TRH C6-C10	0.02	mg/L	0.81	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	0.63	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	5.9	< 0.05	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	5.9	< 0.05	-
TRH >C16-C34	0.1	mg/L	50	< 0.1	-
TRH >C34-C40	0.1	mg/L	24	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	79.9	< 0.1	-
BTEX					
Benzene	0.001	mg/L	< 0.01	< 0.001	< 0.001
Toluene	0.001	mg/L	0.017	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	0.017	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	0.10	< 0.002	< 0.002
o-Xylene	0.001	mg/L	0.049	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	0.15	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	115	117	115
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.01	mg/L	< 0.1	< 0.01	-
Ammonia (as N)	0.01	mg/L	6.0	0.06	-
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	190	-	-
Chloride	1	mg/L	17	-	-
Nitrate (as N)	0.02	mg/L	< 0.25	< 0.02	-
Sulphate (as SO4)	5	mg/L	< 5	-	-
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	670	130	-
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	94	15	-
Conductivity (at 25 °C)	10	uS/cm	-	150	-
Nitrate & Nitrite (as N)	0.05	mg/L	-	< 0.05	-
Nitrite (as N)	0.02	mg/L	-	< 0.02	-
pH (at 25 °C)	0.1	pH Units	-	7.7	-
Phosphate total (as P)	0.01	mg/L	-	0.09	-

Client Sample ID			DUP1	DUP1_SW	Trip Blank
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M23-Ma0021878	M23-Ma0021879	M23-Ma0021880
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit			
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	-	0.3	-
Total Nitrogen (as N)*	0.2	mg/L	-	0.3	-
Alkalinity (speciated)					
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	160	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	-	-
Alkali Metals					
Calcium	0.5	mg/L	28	-	-
Magnesium	0.5	mg/L	4.3	-	-
Potassium	0.5	mg/L	10	-	-
Sodium	0.5	mg/L	49	-	-
Heavy Metals					
Arsenic	0.001	mg/L	-	0.002	-
Cadmium	0.0002	mg/L	-	< 0.0002	-
Chromium	0.001	mg/L	-	0.003	-
Copper	0.001	mg/L	-	0.015	-
Lead	0.001	mg/L	-	0.011	-
Mercury	0.0001	mg/L	-	0.0003	-
Nickel	0.001	mg/L	-	0.003	-
Zinc	0.005	mg/L	-	0.059	-
Volatile Organics					
Naphthalene[N02]	0.01	mg/L	-	-	< 0.01

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 10, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 10, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Melbourne	Mar 10, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Mar 10, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Eurofins Suite B5			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 10, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M7	Melbourne	Mar 10, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P			
Ammonia (as N)	Melbourne	Mar 10, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate (as N)	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate & Nitrite (as N)	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Mar 10, 2023	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 10, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Biochemical Oxygen Demand (BOD-5 Day)	Melbourne	Mar 10, 2023	2 Days
- Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Mar 10, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Conductivity (at 25 °C)	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4030 Conductivity			
pH (at 25 °C)	Melbourne	Mar 10, 2023	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Heavy Metals	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Major Anions			
Chloride	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Mar 10, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Mar 10, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Major Cations			
Alkali Metals	Melbourne	Mar 10, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals Sulfur Silicon Phosphorus by ICP-AES			

eurofins

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Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: LWC Management Pty Ltd
Address: Suite 3/ 4-8 Goodwood Road
Wayville
SA 5034

Project Name:
Project ID: BE-61

Order No.:
Report #: 970342
Phone: 08 8271 5255
Fax:

Received: Mar 9, 2023 11:50 AM
Due: Mar 17, 2023
Priority: 5 Day
Contact Name: Vanessa De Chellis

Eurofins Analytical Services Manager : Amy Meunier

Sample Detail						Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	Mercury	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Major Anions	Major Cations	Eurofins Suite B1	Eurofins Suite B5	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	DUP1	Mar 08, 2023		Water	M23-Ma0021878	X				X	X	X	X			X
2	DUP1_SW	Mar 08, 2023		Water	M23-Ma0021879		X	X	X	X				X	X	X
3	Trip Blank	Mar 08, 2023		Water	M23-Ma0021880								X			
Test Counts						1	1	1	1	2	1	1	2	1	1	2

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

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 SRA.

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.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
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.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	mg/L	< 5			5	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons							
TRH C6-C9	%	117			70-130	Pass	
TRH C10-C14	%	95			70-130	Pass	
TRH C6-C10	%	116			70-130	Pass	
TRH >C10-C16	%	90			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	119			70-130	Pass	
Ethylbenzene	%	117			70-130	Pass	
m&p-Xylenes	%	111			70-130	Pass	
Xylenes - Total*	%	112			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	108			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	103			70-130	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	%	94			85-115	Pass	
Chloride	%	96			70-130	Pass	
Nitrate (as N)	%	100			70-130	Pass	
Sulphate (as SO4)	%	105			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	105			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	100			70-130	Pass	
Conductivity (at 25 °C)	%	83			70-130	Pass	
Nitrate & Nitrite (as N)	%	121			70-130	Pass	
Nitrite (as N)	%	100			70-130	Pass	
Phosphate total (as P)	%	107			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	85			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	77			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	101			80-120	Pass	
Magnesium	%	88			80-120	Pass	
Potassium	%	97			80-120	Pass	
Sodium	%	94			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	96			80-120	Pass	
Cadmium	%	99			80-120	Pass	
Chromium	%	96			80-120	Pass	
Copper	%	96			80-120	Pass	
Lead	%	98			80-120	Pass	
Mercury	%	82			80-120	Pass	
Nickel	%	96			80-120	Pass	
Zinc	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M23-Ma0019933	NCP	%	126			70-130	Pass	
TRH >C10-C16	M23-Ma0019933	NCP	%	127			70-130	Pass	
Spike - % Recovery									
				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ammonia (as N)	B23-Ma0021897	NCP	%	91			70-130	Pass	
Chloride	M23-Ma0023473	NCP	%	83			70-130	Pass	
Nitrate (as N)	B23-Ma0021897	NCP	%	94			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	M23-Ma0023280	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M23-Ma0004025	NCP	%	109			75-125	Pass	
Magnesium	M23-Ma0004025	NCP	%	91			75-125	Pass	
Potassium	M23-Ma0004025	NCP	%	93			75-125	Pass	
Sodium	M23-Ma0004025	NCP	%	95			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M23-Ma0021879	CP	%	118			70-130	Pass	
TRH C6-C10	M23-Ma0021879	CP	%	117			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M23-Ma0021879	CP	%	102			70-130	Pass	
Toluene	M23-Ma0021879	CP	%	123			70-130	Pass	
Ethylbenzene	M23-Ma0021879	CP	%	113			70-130	Pass	
m&p-Xylenes	M23-Ma0021879	CP	%	111			70-130	Pass	
o-Xylene	M23-Ma0021879	CP	%	111			70-130	Pass	
Xylenes - Total*	M23-Ma0021879	CP	%	111			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M23-Ma0021879	CP	%	91			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	M23-Ma0022170	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M23-Ma0023542	NCP	%	98			75-125	Pass	
Cadmium	M23-Ma0023542	NCP	%	101			75-125	Pass	
Chromium	M23-Ma0023542	NCP	%	93			75-125	Pass	
Copper	M23-Ma0023542	NCP	%	92			75-125	Pass	
Lead	M23-Ma0023542	NCP	%	94			75-125	Pass	
Mercury	M23-Ma0023542	NCP	%	102			75-125	Pass	
Nickel	M23-Ma0023542	NCP	%	93			75-125	Pass	
Zinc	M23-Ma0023542	NCP	%	103			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M23-Ma0019932	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	M23-Ma0019932	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M23-Ma0019932	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M23-Ma0019932	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M23-Ma0019932	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M23-Ma0019932	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M23-Ma0019932	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M23-Ma0019932	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M23-Ma0019932	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	B23-Ma0021894	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	M23-Ma0022143	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Chloride	M23-Ma0021878	CP	mg/L	17	16	3.5	30%	Pass	
Nitrate (as N)	B23-Ma0021894	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Sulphate (as SO4)	M23-Ma0021878	CP	mg/L	< 5	< 5	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	M23-Ma0023279	NCP	mg/L	630	540	15	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	M23-Ma0023279	NCP	mg/L	9.2	10	12	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M23-Ma0023474	NCP	mg/L	360	310	16	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M23-Ma0023474	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M23-Ma0004025	NCP	mg/L	5.7	5.9	3.6	30%	Pass	
Magnesium	M23-Ma0004025	NCP	mg/L	10	10	3.9	30%	Pass	
Potassium	M23-Ma0004025	NCP	mg/L	1.2	1.1	5.2	30%	Pass	
Sodium	M23-Ma0004025	NCP	mg/L	1.5	1.7	11	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M23-Ma0021879	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M23-Ma0021879	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M23-Ma0021879	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M23-Ma0021879	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M23-Ma0021879	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M23-Ma0021879	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25 °C)	M23-Ma0021999	NCP	uS/cm	4600	4700	2.8	30%	Pass	
Nitrate & Nitrite (as N)	M23-Ma0021411	NCP	mg/L	0.09	0.09	3.3	30%	Pass	
Nitrite (as N)	M23-Ma0021411	NCP	mg/L	0.09	0.09	2.7	30%	Pass	
pH (at 25 °C)	M23-Ma0021999	NCP	pH Units	7.2	7.1	pass	30%	Pass	
Phosphate total (as P)	M23-Ma0021412	NCP	mg/L	0.02	0.02	7.8	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Ma0021411	NCP	mg/L	1.5	2.1	32	30%	Fail	Q15
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Ma0023542	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	M23-Ma0023542	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M23-Ma0023542	NCP	mg/L	0.002	0.002	2.1	30%	Pass	
Copper	M23-Ma0023542	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	M23-Ma0023542	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	M23-Ma0023542	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M23-Ma0023542	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	M23-Ma0023542	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Amy Meunier	Analytical Services Manager
Carroll Lee	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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IANZ# 1290

Company Name: LWC Management Pty Ltd
Address: Suite 3/ 4-8 Goodwood Road
Wayville
SA 5034

Project Name:
Project ID: BE-61

Order No.:
Report #: 970342
Phone: 08 8271 5255
Fax:

Received: Mar 9, 2023 11:50 AM
Due: Mar 17, 2023
Priority: 5 Day
Contact Name: Vanessa De Chellis

Eurofins Analytical Services Manager : Amy Meunier

Sample Detail						Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	Mercury	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Major Anions	Major Cations	Eurofins Suite B1	Eurofins Suite B5	Eurofins Suite B19D: Total N, TKN, NOx, NO2, NO3, NH3, Total P	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	DUP1	Mar 08, 2023		Water	M23-Ma0021878	X				X	X	X	X			X
2	DUP1_SW	Mar 08, 2023		Water	M23-Ma0021879		X	X	X	X				X	X	X
3	Trip Blank	Mar 08, 2023		Water	M23-Ma0021880								X			
Test Counts						1	1	1	1	2	1	1	2	1	1	2

eurofins | Environment Testing

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Sample Receipt Advice

Company name:	LWC Management Pty Ltd
Contact name:	Vanessa De Chellis
Project name:	Not provided
Project ID:	BE-61
Turnaround time:	5 Day
Date/Time received	Mar 9, 2023 11:50 AM
Eurofins reference	970342

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Amy Meunier on phone : or by email: AmyMeunier@eurofins.com

Results will be delivered electronically via email to Vanessa De Chellis - vdechellis@lwconsulting.com.au.

Global Leader - Results you can trust

CHAIN OF CUSTODY FORM

eurofins

From : Land & Water Consulting Pty Ltd
Suite 3, 4-8 Goodwood Road, WAYVILLE, SA, 5034
ph: (08) 8271 5255 fax: (08) 8357 1307

LAB Quote Number:

LWC Contact Information:
Contact Name:
V De Chellis
Contact Email:
laboratoryresults@lwconsulting.com.au
vdechellis@lwconsulting.com.au

Phone Number:
08 8271 5255

LWC Project No:
~~BE-61~~ BE-61

Project Manager:
V De Chellis

Date Samples Sent:
9/3/23

COC Checked by:
A Vaughan

Lab ID	Date	Matrix	Sample ID	No. Bottles	Sample Analysis: SW Control + Discharge Suite*	Vertical Gravity Seperator Suite**	BOD, Major Cations + Anions (incl. Alkalinity)				B1 - TRH C6-C10/ BTEXN	HOLD
			Tick required analytes									
	8/3/23	W	DUP1	~~38~~		X	X					
	8/3/23	W	DUP1_SW	7	X							
	9/3/23	W	Trip blank	2							X	
			TOTAL									

received 11:50 AM 09/3/23

temp: 23.7°c

report 970342

ADDITIONAL COMMENTS:

* Stormwater Control & Discharge Suite - pH, TDS/ EC, TSS, nutrients (ammonia, nitrite, TKN, total nitrogen, total phosphorus - B19D), 8 metals/ TRH/ TPH/ BTEX (B5).

** Vertical Gravity Seperator Suite - TDS, TSS, major cations + anions (including alkalinity suite), ammonia, TRH/ TPH/ BTEX (B1), BOD.

ATTACHMENT D

DATA QUALITY ASSESSMENT

DATA QUALITY ASSESSMENT

The quality of analytical data produced for this project has been assessed with reference to the following issues:

- Sampling technique;
- Preservation and storage of samples upon collection and during transport to the laboratory;
- Sample holding times;
- Analytical procedures;
- Laboratory limits of reporting;
- Field duplicate agreement;
- Laboratory quality assurance/quality control (QA/QC) procedures; and
- The occurrence of apparently unusual or anomalous results.

RPDs were assessed where the reported concentrations were greater than the laboratory limits of reporting in accordance with the following acceptance criteria:

- Where both reported concentrations are greater than 20 times the LOR: RPD% <30%;
- Where the higher of the two concentrations is between 10 and 20 times the LOR: RPD% <50%; and
- Where both concentrations are less than 10 time the LOR: RPD% has no limit.

The overall assessment of data quality was undertaken in accordance with the Data Quality Objective (DQO) and Data Quality Indicator (DQI) processes.

Laboratory QA/QC procedures and results are detailed in the certified laboratory results contained in Attachment C. A summary of the data quality assessment and a summary of the field duplicate sample relative percentage differences (RPD) are included at the rear of this appendix. A review of the quality assurance and control data is presented in Table 1-1.

Laboratory data is considered suitably robust for the purposes of the assessment, subject to the comments and limitations outlined above and in the relevant appendices.

It is considered that quality control information indicates an acceptable degree of QA/QC information was collected and reported for waters providing confidence in the accuracy and precision of reported results subject to the limitations discussed.

Table 1-1 Summary of Quality Assurance and Control

Component	Frequency	Frequency Acceptable?	Acceptance Criteria	Criteria met?	Reference/ Appendix
Field QC					
Field Replicate (intra)	1 in 20 primary samples or 1 per batch.	✓	RPD <30% if both results >20 LOR RPD <50% if the higher of the two results <>10-20 LOR No limit for RPD if both results <10 LOR	✓	At rear of this Attachment
Field Replicate (inter)	1 in 20 primary samples or 1 per batch.	✓	RPD <30% if both results >20 LOR RPD <50% if the higher of the two results <>10-20 LOR No limit for RPD if both results <10 LOR	**Eurofins Laboratory Report 970342** The RPD criteria was exceeded between the primary and intra-laboratory duplicate sample DUP1_SW for the following analytes: • Total Suspended Solids (172%) • TKN (129%) • Total Nitrogen as N (129%) • Total Phosphorous as P (80%) These breaches are not considered to significantly impact upon the overall interpretation of results as either: • The analyte is an indicator species and not a chemical of concern; and/ or • The results are generally consistent with historical concentrations.	At rear of this Attachment
Rinsate Blanks	1 per day, per matrix, per item of equipment	✓	<LOR	Rinsate blanks were not required as dedicated disposable plastic bailers were utilised during the sampling program.	At rear of this Attachment
Trip Blanks (water samples for volatile organic marker compounds only – to assess potential for contamination of the	1 per esky or 1 per laboratory batch.	Only 1 trip blank was analysed by the seconday laboratory (Eurofins). This is not considered to imapct the overall interpretation of the results as all TRH Fractions reported below LOR.	<LOR	✓	At rear of this Attachment

Component	Frequency	Frequency Acceptable?	Acceptance Criteria	Criteria met?	Reference/ Appendix
samples by volatile compounds during transfer to the laboratory)					
Laboratory QC					
Primary Laboratory Batch Reference					ES2307810
Secondary Laboratory Batch Reference					970342
Analysis undertaken in specific holding times			Variable depending on the chemical substance.	✓	Attachment C
Method blanks	1 analysed per process batch of 20 samples.	✓	<LOR	✓	Attachment C
Duplicates	1 in 10 primary samples or 2 per batch of 20 samples.	**ALS Laboratory Report ES2307810** The frequency of laboratory duplicates analysed did not meet the required criteria for TRH semi volatile fraction. This was not considered to significantly impact upon the overall interpretation of results due to the small number of samples analysed within the batch.	RPD <50% if results >10 LOR	**Eurofins Laboratory Report 970342** The laboratory duplicate RPD for Total Kjeldahl Nitrogen (32%) marginally breached the adopted laboratory criterion of 30%. This is not considered to significantly impact on the overall interpretation of the results as the RPD reported passed the Eurofins Environment Testing's QC - Acceptance Criteria.	Attachment C
Matrix spikes	1 analysed per process batch of 20 samples.	**ALS Laboratory Report ES2307810** The frequency of matrix spikes analysed did not meet the required criteria for TRH semi volatile fraction. This was not considered to significantly impact upon the overall interpretation of results due to the small number of samples analysed within the batch.	Recovery 70 -130%	**ALS Laboratory Report ES2307810** The matrix spike for sulfate and chloride was not determined as the background level was greater than or equal to 4 x spike level. Noting that reported concentrations of these analytes were generally consistent with historical results and anonymous samples were analysed for sulfate and chloride analytes, this breach is not considered to significantly impact upon the overall interpretation of results.	Attachment C
Laboratory control sample spikes	1 analysed per process batch of 20 samples.	✓	Recovery 70 -130%	✓	Attachment C
Surrogate spikes	Each analysis undertaken by GC-MS (all organics except TRH >C_{10}).	✓	Recovery 50 – 150%	✓	Attachment C

Summary of RPD Results

Project: Katherine Depot, Stormwater Sampling
Job: BE-61
Client: Cleanaway Waste Management Limited

Exceedance of RPD% Criterion of 30% of mean concentration where higher concentration >20 x LOR	Field ID	SW_Discharge	DUP1_SW		DUP1_SW	
	Lab Report	8/03/2023	8/03/2023		8/03/2023	
Exceedance of RPD% Criterion of 50% of mean concentration where higher concentration 10-20 x LOR	Lab Name	ALS	ALS	RPD%	Eurofins	RPD%
	Date	ES2307810	ES2307810		970342	
	Duplicate	Primary	Intra-Laboratory		Inter-Laboratory	

Analyte	Units	ALS LOR	MGT LOR					
Arsenic	mg/L	0.001	0.001	**0.002**	**0.002**	0	**0.002**	0
Cadmium	mg/L	0.0001	0.0002	**0.0001**	**0.0001**	0	< 0.0002	67
Chromium	mg/L	0.001	0.001	**0.004**	**0.004**	0	**0.003**	29
Copper	mg/L	0.001	0.001	**0.017**	**0.014**	19	**0.015**	13
Lead	mg/L	0.001	0.001	**0.012**	**0.012**	0	**0.011**	9
Nickel	mg/L	0.001	0.001	**0.004**	**0.004**	0	**0.003**	29
Zinc	mg/L	0.005	0.001	**0.066**	**0.062**	6	**0.059**	11
Mercury	mg/L	0.0001	0.0001	<0.0001	<0.0001	-	**0.0003**	100
General								
Total Dissolved Solids	mg/L	10	10	**109**	**113**	4	**130**	18
Total Suspended Solids	mg/L	5	1	**202**	**246**	20	**15**	**172**
pH	pH Units	0.01	0.1	**8.01**	**8.11**	1	**7.7**	4
Electrical Conductivity	uS/cm	1	1	**176**	**173**	2	**150**	16
Nutrients								
Ammonia as N	mg/L	0.01	0.01	**0.05**	**0.04**	22	**0.06**	18
Nitrite as N	mg/L	0.01	0.02	<0.01	<0.01	-	< 0.02	-
Nitrate as N	mg/L	0.01	0.02	<0.01	<0.01	-	< 0.02	-
Nitrite + Nitrate as N	mg/L	0.01	0.05	<0.01	<0.01	-	< 0.05	-
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.1	**1.4**	**1.2**	15	**0.3**	**129**
Total Nitrogen as N	mg/L	0.1	0.1	**1.4**	**1.2**	15	**0.3**	**129**
Total Phosphorus as P	mg/L	0.01	0.01	**0.21**	**0.17**	21	**0.09**	**80**
Total Petroleum Hydrocarbons - NEPM 1999 Fractions								
C6 - C9 Fraction	µg/L	20	20	<20	<20	-	< 0.02	-
C10 - C14 Fraction	µg/L	50	50	<50	<50	-	< 0.05	-
C15 - C28 Fraction	µg/L	100	100	<100	<100	-	< 0.1	-
C29 - C36 Fraction	µg/L	50	100	<50	<50	-	< 0.1	-
C10 - C36 Fraction (sum)	µg/L	50	100	<50	<50	-	< 0.1	-
Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	µg/L	20	20	<20	<20	-	<20	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	20	<20	<20	-	<20	-
C10 - C16 Fraction	µg/L	100	50	<100	<100	-	<50	-
C16 - C34 Fraction	µg/L	100	100	<100	<100	-	<100	-
C34 - C40 Fraction	µg/L	100	100	<100	<100	-	<100	-
C10 - C40 Fraction (sum)	µg/L	100	100	<100	<100	-	<100	-
C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	50	<100	<100	-	<50	-
BTEXN								
Benzene	µg/L	1	1	<1	<1	-	<1	-
Toluene	µg/L	2	1	<2	<2	-	<1	-
Ethylbenzene	µg/L	2	1	<2	<2	-	<1	-
meta- & para-Xylene	µg/L	2	2	<2	<2	-	<2	-
ortho-Xylene	µg/L	2	1	<2	<2	-	<1	-
Total Xylenes	µg/L	2	3	<2	<2	-	<3	-
Sum of BTEX	µg/L	1	-	<1	<1	-	-	-
Naphthalene	µg/L	5	10	<5	<5	-	<10	-

Summary of Tripblank Results

Project: Katherine Depot, Stormwater Sampling
Job: BE-61
Client: Cleanaway Waste Management Limited

Field ID	TRIP BLANK
Date	8/03/2023
Lab Report	970342
Lab Name	Eurofins

Analyte	ALS LOR	MGT LOR	Units	
BTEX				
Benzene	0.001	0.001	mg/L	<0.001
Ethylbenzene	0.002	0.001	mg/L	<0.001
Meta&Para-Xylene	0.002	0.002	mg/L	<0.002
Ortho- Xylene	0.002	0.001	mg/L	<0.001
Toluene	0.001	0.001	mg/L	<0.001
Xylenes - Total	0.002	0.003	mg/L	<0.002
Sum of BTEX	0.001	-	mg/L	<0.001
TRHs				
TRH C6-C9	0.02	0.02	mg/L	<0.002
TRH C6-C10	0.02	0.02	mg/L	<0.002
TRH C6-C10 Fraction F1	0.02	0.02	mg/L	<0.002
Naphthalene	0.005	0.01	mg/L	<0.01

ATTACHMENT E

STATEMENT OF LIMITATIONS

STATEMENT OF LIMITATIONS & IMPORTANT INFORMATION REGARDING YOUR REPORT

INTRODUCTION

This report has been prepared by Land & Water Consulting for you, as Land & Water Consulting's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Land & Water Consulting may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Land & Water Consulting has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

No warranty or guarantee of the site conditions is intended.

This report was prepared for the sole use of you, the Client and may not contain sufficient information for purposes of other parties or for other uses. Any reliance on this report by third parties shall be at such parties sole risk. This report shall only be presented in full and may not be used to support any other objectives than those set out in the report, except where written approval with comments are provided by Land & Water Consulting.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

LIMITATIONS OF THE REPORT

The scope of works undertaken and the report prepared to complete the assessment was in accordance with the information provided by the client and the specifications for works required under the contract. As such, works undertaken and statements made are based on those specifications (such as levels of risks and significance of any contamination) and should be considered and interpreted within this context. The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

Your environmental report should not be used without reference to Land & Water Consulting in the first instance:

- When the nature of the proposed development is changed, for example if a residential development is proposed instead of a commercial one;
- When the size or configuration of the proposed development is altered;
- When the location or orientation of the proposed structures are modified;
- When there is a change in ownership;
- For application to an adjacent site.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

ENVIRONMENTAL ASSESSMENT "FINDINGS" ARE PROFESSIONAL ESTIMATES

The information in this report is considered to be accurate with respect to conditions encountered at the site at the time of investigation and considering the inherent limitations associated with extrapolating information from a sample set. Note however that site assessment identifies actual subsurface conditions only at those specific points where samples are taken, when they are taken. Environmental data derived through sampling and analysis are interpreted by consultants who then render an opinion about overall subsurface conditions, the nature and extent of contamination and potential impacts on the use of the land. Actual conditions may differ from those inferred to exist as no professional and no subsurface assessment program can reveal every detail within the ground across a site. Subsurface conditions can vary across a particular site and no practical degree of sampling can ever eliminate the possibility that conditions may be present at a site that have not been represented though sampling.

SUBSURFACE CONDITIONS CAN CHANGE

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Land & Water Consulting should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions. Since subsurface conditions (including contamination concentrations) can change within a limited period of time and space, this inherent limitation to the representation of site conditions provided by this report should always be taken into consideration particularly if the report is used after a delay in time.

DATA SHOULD NOT BE SEPARATED FROM THE REPORT

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

RESPONSIBILITY

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.