

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW2204897**  
**Client** : **WINGECARRIBEE SHIRE COUNCIL**  
**Contact** : Resource  
**Address** : PO BOX 141  
 MOSSVALE NSW  
 AUSTRALIA  
  
**Telephone** : ----  
**Project** : Biannual Surface and Ground Waters  
**Order number** : ----  
**C-O-C number** : ----  
**Sampler** : Michael Santos, Robert DaLio  
**Site** : ----  
**Quote number** : WO/019/13  
**No. of samples received** : 17  
**No. of samples analysed** : 17

**Page** : 1 of 16  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Aneta Prosaroski  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia  
  
**Telephone** : 02 42253125  
**Date Samples Received** : 26-Oct-2022 15:38  
**Date Analysis Commenced** : 26-Oct-2022  
**Issue Date** : 03-Nov-2022 13:36



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO<sub>2</sub> and Fluoride to the Anions.
- EG035: Positive Mercury result EW2204897 #1 has been confirmed by reanalysis.
- EK055G/EK061G: It has been noted that Ammonia is greater than TKN on sample 9, however this difference is within the limits of experimental variation.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via Bailer Method.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 1 WELM-01	Point 2 WELM-02	Point 3 WELM-04	Point 4 WELM-05	Point 5 WELM-06D
Sampling date / time				26-Oct-2022 11:00	26-Oct-2022 11:50	26-Oct-2022 11:20	26-Oct-2022 12:45	26-Oct-2022 12:35	
Compound	CAS Number	LOR	Unit	EW2204897-001	EW2204897-002	EW2204897-003	EW2204897-004	EW2204897-005	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	5.7	6.0	6.7	----	----	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	234	1910	1120	----	----	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	121	1100	630	----	----	
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	61	233	424	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	61	233	424	----	----	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	27	376	68	----	----	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	11	282	74	----	----	
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L	22	109	113	----	----	
Magnesium	7439-95-4	1	mg/L	4	40	32	----	----	
Sodium	7440-23-5	1	mg/L	10	202	59	----	----	
Potassium	7440-09-7	1	mg/L	<1	52	53	----	----	
<b>EG020T: Total Metals by ICP-MS</b>									
Arsenic	7440-38-2	0.001	mg/L	0.009	0.001	0.003	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	0.006	0.001	0.014	----	----	
Nickel	7440-02-0	0.001	mg/L	0.005	0.002	0.004	----	----	
Lead	7439-92-1	0.001	mg/L	0.006	0.016	0.010	----	----	
Zinc	7440-66-6	0.005	mg/L	0.114	0.045	0.022	----	----	
Iron	7439-89-6	0.05	mg/L	18.0	1.86	3.23	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	0.0004	<0.0001	<0.0001	----	----	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									



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Sampling date / time				26-Oct-2022 11:00	26-Oct-2022 11:50	26-Oct-2022 11:20	26-Oct-2022 12:45	26-Oct-2022 12:35	
Compound	CAS Number	LOR	Unit	EW2204897-001	EW2204897-002	EW2204897-003	EW2204897-004	EW2204897-005	
				Result	Result	Result	Result	Result	
<b>EK055G: Ammonia as N by Discrete Analyser - Continued</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.13	0.03	----	----	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	0.16	1.08	1.30	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	0.8	1.9	----	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	2.09	20.4	12.0	----	----	
∅ Total Cations	----	0.01	meq/L	1.86	18.8	12.2	----	----	
∅ Ionic Balance	----	0.01	%	----	4.05	0.91	----	----	
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	----	----	----	DRY	DRY	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	----	1	mg/L	17	12	22	----	----	
<b>EP035SF: Total Phenol by Segmented Flow Analyser</b>									
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	----	----	
<b>EP068A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----	
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----	



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Sample ID

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Sampling date / time				26-Oct-2022 11:00	26-Oct-2022 11:50	26-Oct-2022 11:20	26-Oct-2022 12:45	26-Oct-2022 12:35
Compound	CAS Number	LOR	Unit	EW2204897-001	EW2204897-002	EW2204897-003	EW2204897-004	EW2204897-005
				Result	Result	Result	Result	Result
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>								
4.4'-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	<2.0	----	----
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
<b>EP068B: Organophosphorus Pesticides (OP)</b>								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Sample ID

				Point 1 WELM-01	Point 2 WELM-02	Point 3 WELM-04	Point 4 WELM-05	Point 5 WELM-06D
Sampling date / time				26-Oct-2022 11:00	26-Oct-2022 11:50	26-Oct-2022 11:20	26-Oct-2022 12:45	26-Oct-2022 12:35
Compound	CAS Number	LOR	Unit	EW2204897-001	EW2204897-002	EW2204897-003	EW2204897-004	EW2204897-005
				Result	Result	Result	Result	Result
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>								
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
<b>EP080: BTEXN</b>								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----



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Compound	CAS Number	LOR	Unit	EW2204897-001	EW2204897-002	EW2204897-003	EW2204897-004	EW2204897-005	
				Result	Result	Result	Result	Result	
<b>EP080: BTEXN - Continued</b>									
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
<b>QWI-EN 67.11 Sampling of Groundwaters</b>									
Depth	----	0.01	m	1.79	2.33	1.30	----	----	
<b>EP068S: Organochlorine Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.5	%	112	94.3	70.7	----	----	
<b>EP068T: Organophosphorus Pesticide Surrogate</b>									
DEF	78-48-8	0.5	%	112	99.6	75.7	----	----	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	14.0	36.9	32.6	----	----	
2-Chlorophenol-D4	93951-73-6	1.0	%	26.3	80.9	72.1	----	----	
2,4,6-Tribromophenol	118-79-6	1.0	%	61.5	54.6	41.0	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	40.2	104	77.5	----	----	
Anthracene-d10	1719-06-8	1.0	%	87.8	97.6	92.2	----	----	
4-Terphenyl-d14	1718-51-0	1.0	%	110	98.5	89.0	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	110	112	106	----	----	
Toluene-D8	2037-26-5	2	%	110	113	107	----	----	
4-Bromofluorobenzene	460-00-4	2	%	103	108	101	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 6 WELM-06S	Point 7 WELM-07D	Point 8 WELM-07S	Point 9 WELM LEACH-01	Point 10 WELMSW-01
Sampling date / time				26-Oct-2022 12:25	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 13:20	26-Oct-2022 13:55	
Compound	CAS Number	LOR	Unit	EW2204897-006	EW2204897-007	EW2204897-008	EW2204897-009	EW2204897-010	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	4.8	----	----	7.2	7.2	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1820	----	----	8690	204	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	964	----	----	3560	----	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	15	
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	25	----	----	2800	----	
Total Alkalinity as CaCO3	----	1	mg/L	25	----	----	2800	----	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	348	----	----	144	----	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	330	----	----	1030	----	
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L	55	----	----	194	----	
Magnesium	7439-95-4	1	mg/L	45	----	----	106	----	
Sodium	7440-23-5	1	mg/L	187	----	----	546	----	
Potassium	7440-09-7	1	mg/L	42	----	----	381	----	
<b>EG020T: Total Metals by ICP-MS</b>									
Arsenic	7440-38-2	0.001	mg/L	0.005	----	----	0.008	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	0.0004	----	
Chromium	7440-47-3	0.001	mg/L	0.007	----	----	0.016	----	
Nickel	7440-02-0	0.001	mg/L	0.004	----	----	0.098	----	
Lead	7439-92-1	0.001	mg/L	0.011	----	----	0.045	----	
Zinc	7440-66-6	0.005	mg/L	0.036	----	----	0.416	----	
Iron	7439-89-6	0.05	mg/L	4.78	----	----	40.5	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	<0.0001	----	
<b>EK040P: Fluoride by PC Titrator</b>									





## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 6 WELM-06S	Point 7 WELM-07D	Point 8 WELM-07S	Point 9 WELM LEACH-01	Point 10 WELMSW-01
Sampling date / time				26-Oct-2022 12:25	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 13:20	26-Oct-2022 13:55	
Compound	CAS Number	LOR	Unit	EW2204897-006	EW2204897-007	EW2204897-008	EW2204897-009	EW2204897-010	
				Result	Result	Result	Result	Result	
<b>EK040P: Fluoride by PC Titrator - Continued</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	0.3	----	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	9.35	----	----	564	0.12	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	21.2	----	----	0.03	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	9.5	----	----	494	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	17.0	----	----	88.0	----	
∅ Total Cations	----	0.01	meq/L	----	----	----	87.2	----	
∅ Total Cations	----	0.01	meq/L	15.6	----	----	----	----	
∅ Ionic Balance	----	0.01	%	----	----	----	0.50	----	
∅ Ionic Balance	----	0.01	%	4.27	----	----	----	----	
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	----	NO ACCESS	NO ACCESS	----	----	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	----	1	mg/L	11	----	----	323	----	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	----	----	----	----	9.39	
<b>EP030: Biochemical Oxygen Demand (BOD)</b>									
Biochemical Oxygen Demand	----	2	mg/L	----	----	----	----	3	
<b>EP035SF: Total Phenol by Segmented Flow Analyser</b>									
Phenols (Total)	----	0.05	mg/L	<0.05	----	----	<0.05	----	
<b>EP068A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.5	µg/L	<0.5	----	----	<0.5	----	
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	----	----	<0.5	----	
beta-BHC	319-85-7	0.5	µg/L	<0.5	----	----	<0.5	----	
gamma-BHC	58-89-9	0.5	µg/L	<0.5	----	----	<0.5	----	
delta-BHC	319-86-8	0.5	µg/L	<0.5	----	----	<0.5	----	
Heptachlor	76-44-8	0.5	µg/L	<0.5	----	----	<0.5	----	
Aldrin	309-00-2	0.5	µg/L	<0.5	----	----	<0.5	----	
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	----	----	<0.5	----	
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	----	----	<0.5	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 6 WELM-06S	Point 7 WELM-07D	Point 8 WELM-07S	Point 9 WELM LEACH-01	Point 10 WELMSW-01
Sampling date / time				26-Oct-2022 12:25	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 13:20	26-Oct-2022 13:55	
Compound	CAS Number	LOR	Unit	EW2204897-006	EW2204897-007	EW2204897-008	EW2204897-009	EW2204897-010	
				Result	Result	Result	Result	Result	
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>									
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	----	----	<0.5	----	
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	----	----	<0.5	----	
Dieldrin	60-57-1	0.5	µg/L	<0.5	----	----	<0.5	----	
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	----	----	<0.5	----	
Endrin	72-20-8	0.5	µg/L	<0.5	----	----	<0.5	----	
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	----	----	<0.5	----	
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	----	----	<0.5	----	
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	----	----	<0.5	----	
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	----	----	<0.5	----	
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	----	----	<2.0	----	
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	----	----	<0.5	----	
Methoxychlor	72-43-5	2.0	µg/L	<2.0	----	----	<2.0	----	
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	----	----	<0.5	----	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.5	µg/L	<0.5	----	----	<0.5	----	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	----	----	<0.5	----	
<b>EP068B: Organophosphorus Pesticides (OP)</b>									
Dichlorvos	62-73-7	0.5	µg/L	<0.5	----	----	<0.5	----	
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	----	----	<0.5	----	
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	----	----	<2.0	----	
Dimethoate	60-51-5	0.5	µg/L	<0.5	----	----	<0.5	----	
Diazinon	333-41-5	0.5	µg/L	<0.5	----	----	<0.5	----	
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	----	----	<0.5	----	
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	----	----	<2.0	----	
Malathion	121-75-5	0.5	µg/L	<0.5	----	----	<0.5	----	
Fenthion	55-38-9	0.5	µg/L	<0.5	----	----	<0.5	----	
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	----	----	<0.5	----	
Parathion	56-38-2	2.0	µg/L	<2.0	----	----	<2.0	----	
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	----	----	<0.5	----	
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	----	----	<0.5	----	
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	----	----	<0.5	----	
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	----	----	<0.5	----	
Prothiofos	34643-46-4	0.5	µg/L	<0.5	----	----	<0.5	----	
Ethion	563-12-2	0.5	µg/L	<0.5	----	----	<0.5	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 6 WELM-06S	Point 7 WELM-07D	Point 8 WELM-07S	Point 9 WELM LEACH-01	Point 10 WELMSW-01
Sampling date / time				26-Oct-2022 12:25	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 13:20	26-Oct-2022 13:55	
Compound	CAS Number	LOR	Unit	EW2204897-006	EW2204897-007	EW2204897-008	EW2204897-009	EW2204897-010	
				Result	Result	Result	Result	Result	
<b>EP068B: Organophosphorus Pesticides (OP) - Continued</b>									
Carbophenothion	786-19-6	0.5	µg/L	<0.5	----	----	<0.5	----	
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	----	----	<0.5	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	3.8	----	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	<1.0	----	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	<1.0	----	
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	<1.0	----	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	<1.0	----	
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	<1.0	----	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	<1.0	----	
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	<1.0	----	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	<1.0	----	
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	<1.0	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	<1.0	----	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	<1.0	----	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	<0.5	----	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	<1.0	----	
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	<1.0	----	
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	<1.0	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	3.8	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	<0.5	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	40	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	920	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	2140	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	180	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	3240	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	70	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	60	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	1160	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	1980	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	<100	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 6 WELM-06S	Point 7 WELM-07D	Point 8 WELM-07S	Point 9 WELM LEACH-01	Point 10 WELMSW-01	
Sampling date / time				26-Oct-2022 12:25	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 13:20	26-Oct-2022 13:55		
Compound	CAS Number	LOR	Unit	EW2204897-006	EW2204897-007	EW2204897-008	EW2204897-009	EW2204897-010		
				Result	Result	Result	Result	Result		
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	----	3140	----
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	----	1150	----
<b>EP080: BTEXN</b>										
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	4	----
ortho-Xylene				95-47-6	2	µg/L	<2	----	<2	----
^ Total Xylenes				----	2	µg/L	<2	----	4	----
^ Sum of BTEX				----	1	µg/L	<1	----	5	----
Naphthalene				91-20-3	5	µg/L	<5	----	8	----
<b>QWI-EN 67.11 Sampling of Groundwaters</b>										
Depth				----	0.01	m	6.58	----	----	----
<b>EP068S: Organochlorine Pesticide Surrogate</b>										
Dibromo-DDE				21655-73-2	0.5	%	74.6	----	79.9	----
<b>EP068T: Organophosphorus Pesticide Surrogate</b>										
DEF				78-48-8	0.5	%	80.6	----	77.5	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>										
Phenol-d6				13127-88-3	1.0	%	32.0	----	34.6	----
2-Chlorophenol-D4				93951-73-6	1.0	%	66.4	----	67.7	----
2,4,6-Tribromophenol				118-79-6	1.0	%	52.1	----	94.1	----
<b>EP075(SIM)T: PAH Surrogates</b>										
2-Fluorobiphenyl				321-60-8	1.0	%	82.3	----	83.9	----
Anthracene-d10				1719-06-8	1.0	%	95.1	----	66.3	----
4-Terphenyl-d14				1718-51-0	1.0	%	92.0	----	96.7	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
1,2-Dichloroethane-D4				17060-07-0	2	%	107	----	108	----
Toluene-D8				2037-26-5	2	%	109	----	107	----
4-Bromofluorobenzene				460-00-4	2	%	102	----	101	----



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Point 11 WELMSW-02	Point 12 DAM 1	Point 13 DAM 2	Point 14 DAM 3	Point 15 DAM 4
Sampling date / time				26-Oct-2022 00:00	26-Oct-2022 10:55	26-Oct-2022 00:00	26-Oct-2022 00:00	26-Oct-2022 12:40	
Compound	CAS Number	LOR	Unit	EW2204897-011	EW2204897-012	EW2204897-013	EW2204897-014	EW2204897-015	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	----	7.4	----	----	----	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	1160	----	----	----	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	----	8	----	----	----	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	----	0.10	----	----	----	
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	NO ACCESS	----	NO ACCESS	NO ACCESS	DRY	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	----	5.89	----	----	----	
<b>EP030: Biochemical Oxygen Demand (BOD)</b>									
Biochemical Oxygen Demand	----	2	mg/L	----	3	----	----	----	



### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		Point 16 DAM 5	Point 17 DAM 6	----	----	----
Sampling date / time		26-Oct-2022 11:45		26-Oct-2022 11:25		----	----	----
Compound	CAS Number	LOR	Unit	EW2204897-016	EW2204897-017	-----	-----	-----
				Result	Result	---	---	---
<b>EA005FD: Field pH</b>								
pH	----	0.1	pH Unit	7.6	7.3	----	----	----
<b>EA010FD: Field Conductivity</b>								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1160	905	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	21	10	----	----	----
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.78	----	----	----
<b>EP025FD: Field Dissolved Oxygen</b>								
Dissolved Oxygen	----	0.01	mg/L	13.1	6.82	----	----	----
<b>EP030: Biochemical Oxygen Demand (BOD)</b>								
Biochemical Oxygen Demand	----	2	mg/L	3	3	----	----	----



## Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP068S: Organochlorine Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	67	111
<b>EP068T: Organophosphorus Pesticide Surrogate</b>			
DEF	78-48-8	67	111
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128



### **Inter-Laboratory Testing**

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

- (WATER) ED037P: Alkalinity by PC Titrator
- (WATER) EK040P: Fluoride by PC Titrator
- (WATER) ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub><sup>2-</sup> by DA
- (WATER) EP080/071: Total Petroleum Hydrocarbons
- (WATER) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions
- (WATER) EP080: BTEXN
- (WATER) EP080S: TPH(V)/BTEX Surrogates
- (WATER) EP075(SIM)B: Polynuclear Aromatic Hydrocarbons
- (WATER) EP075(SIM)T: PAH Surrogates
- (WATER) EP075(SIM)S: Phenolic Compound Surrogates
- (WATER) EP068A: Organochlorine Pesticides (OC)
- (WATER) EP068B: Organophosphorus Pesticides (OP)
- (WATER) EP068S: Organochlorine Pesticide Surrogate
- (WATER) EP068T: Organophosphorus Pesticide Surrogate
- (WATER) EN055: Ionic Balance
- (WATER) EG035T: Total Recoverable Mercury by FIMS
- (WATER) EP005: Total Organic Carbon (TOC)
- (WATER) EP035SF: Total Phenol by Segmented Flow Analyser
- (WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
- (WATER) EK059G: Nitrite plus Nitrate as N (NO<sub>x</sub>) by Discrete Analyser
- (WATER) EK055G: Ammonia as N by Discrete Analyser
- (WATER) EG020T: Total Metals by ICP-MS
- (WATER) ED093F: Dissolved Major Cations
- (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
- (WATER) ED045G: Chloride by Discrete Analyser
- (WATER) EP030: Biochemical Oxygen Demand (BOD)
- (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C