



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.**
- EP035 SF: LOR raised for Phenol sample 3 due to sample matrix.
- EK055G: LOR raised for NH3 on sample 15 due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK059G: LOR raised for NOx on sample 12 due to sample matrix.
- EP002: It has been noted that DOC is greater than TOC for various samples, however this difference is within the limits of experimental variation.
- EN055: Ionic Balance out of acceptable limits for sample EW2203842-#012 due to analytes not quantified in this report.
- 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 High Flow Method.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- 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	MD 1A	MD 1B	MD 2A	MD 2B	MD 2C
Sampling date / time				23-Aug-2022 00:00	23-Aug-2022 12:50	23-Aug-2022 11:30	23-Aug-2022 11:32	23-Aug-2022 11:42	
Compound	CAS Number	LOR	Unit	EW2203842-001	EW2203842-002	EW2203842-003	EW2203842-004	EW2203842-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	----	7.3	7.6	7.0	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	657	23600	10600	35800	
EA020FD: Field Salinity									
Salinity	----	0.2	g/L	----	0.3	14.4	6.0	22.7	
EA116: Temperature									
Temperature	----	0.1	°C	----	18.9	13.8	16.0	16.4	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	160	638	904	645	
Total Alkalinity as CaCO3	----	1	mg/L	----	160	638	904	645	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	33	1130	341	1280	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	81	7520	3050	9830	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	53	233	164	387	
Magnesium	7439-95-4	1	mg/L	----	10	490	208	749	
Sodium	7440-23-5	1	mg/L	----	55	4390	1740	6080	
Potassium	7440-09-7	1	mg/L	----	10	149	111	262	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	----	0.034	0.033	0.027	0.114	
Iron	7439-89-6	0.05	mg/L	----	0.30	1.16	0.34	1.14	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	0.2	1.1	0.7	0.6	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	----	8.00	0.13	24.4	7.36	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	0.96	0.11	<0.01	<0.01	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 1A	MD 1B	MD 2A	MD 2B	MD 2C
Sampling date / time				23-Aug-2022 00:00	23-Aug-2022 12:50	23-Aug-2022 11:30	23-Aug-2022 11:32	23-Aug-2022 11:42	
Compound	CAS Number	LOR	Unit	EW2203842-001	EW2203842-002	EW2203842-003	EW2203842-004	EW2203842-005	
				Result	Result	Result	Result	Result	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.96	0.11	<0.01	<0.01	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	----	6.17	248	111	317	
∅ Total Cations	----	0.01	meq/L	----	6.12	247	104	352	
∅ Ionic Balance	----	0.01	%	----	0.43	0.34	3.43	5.28	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	DESTROYED	----	----	----	----	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	----	5	84	47	30	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	6	86	50	33	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	----	1.81	6.42	1.25	1.54	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	----	19.6	67.9	13.2	18.2	
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L	----	<0.05	<0.05	<0.05	<0.05	
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m	----	1.35	0.43	0.62	0.74	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 4A	MD 4B	MD 4C	MD 6A	MD 6B
Sampling date / time				23-Aug-2022 10:35	23-Aug-2022 10:45	23-Aug-2022 10:53	23-Aug-2022 12:10	23-Aug-2022 12:12	
Compound	CAS Number	LOR	Unit	EW2203842-006	EW2203842-007	EW2203842-008	EW2203842-009	EW2203842-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.3	7.0	6.9	7.8	6.6	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	990	3580	18600	1740	1720	
EA020FD: Field Salinity									
Salinity	----	0.2	g/L	0.5	1.9	11.1	0.9	0.9	
EA116: Temperature									
Temperature	----	0.1	°C	14.6	16.2	16.6	16.1	17.6	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	367	875	853	774	757	
Total Alkalinity as CaCO3	----	1	mg/L	367	875	853	774	757	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	38	<1	719	9	64	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	88	678	6050	90	94	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	65	103	242	42	170	
Magnesium	7439-95-4	1	mg/L	43	67	378	19	57	
Sodium	7440-23-5	1	mg/L	76	445	3170	285	103	
Potassium	7440-09-7	1	mg/L	18	76	156	140	42	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.056	0.028	0.067	0.004	0.119	
Iron	7439-89-6	0.05	mg/L	0.41	0.44	0.72	0.77	0.22	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	0.5	0.8	1.8	0.4	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.66	50.6	20.0	0.05	11.7	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<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	0.02	0.93	0.02	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 4A	MD 4B	MD 4C	MD 6A	MD 6B
Sampling date / time				23-Aug-2022 10:35	23-Aug-2022 10:45	23-Aug-2022 10:53	23-Aug-2022 12:10	23-Aug-2022 12:12	
Compound	CAS Number	LOR	Unit	EW2203842-006	EW2203842-007	EW2203842-008	EW2203842-009	EW2203842-010	
				Result	Result	Result	Result	Result	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	0.93	0.02	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	10.6	36.6	203	18.2	19.1	
∅ Total Cations	----	0.01	meq/L	10.5	32.0	185	19.6	18.7	
∅ Ionic Balance	----	0.01	%	0.27	6.79	4.54	3.82	1.00	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	22	52	41	119	31	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	27	52	42	122	33	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	1.17	1.67	1.69	4.64	1.04	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	11.6	17.3	18.6	47.8	11.0	
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m	1.89	1.09	1.07	1.19	1.22	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 6C	MD 9A	MD 9B	MD 9C	MD 10A
Sampling date / time				23-Aug-2022 12:22	23-Aug-2022 09:20	23-Aug-2022 09:25	23-Aug-2022 09:30	23-Aug-2022 09:55	
Compound	CAS Number	LOR	Unit	EW2203842-011	EW2203842-012	EW2203842-013	EW2203842-014	EW2203842-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.0	7.0	6.7	6.7	6.7	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	23500	1150	3090	3310	17000	
EA020FD: Field Salinity									
Salinity	----	0.2	g/L	14.3	0.6	1.6	1.7	10.1	
EA116: Temperature									
Temperature	----	0.1	°C	18.3	14.2	17.1	18.4	15.0	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	399	221	978	1010	588	
Total Alkalinity as CaCO3	----	1	mg/L	399	221	978	1010	588	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1060	<100	<10	<10	604	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	7940	22	485	527	5750	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	329	16	152	145	434	
Magnesium	7439-95-4	1	mg/L	518	16	72	70	436	
Sodium	7440-23-5	1	mg/L	4180	242	300	286	2690	
Potassium	7440-09-7	1	mg/L	132	17	85	96	78	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.068	0.016	0.164	0.120	0.452	
Iron	7439-89-6	0.05	mg/L	16.2	0.37	2.21	2.04	0.35	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.2	0.5	0.4	0.6	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	18.3	0.63	52.2	76.6	<0.10	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.10	<0.01	<0.01	0.23	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 6C	MD 9A	MD 9B	MD 9C	MD 10A
Sampling date / time				23-Aug-2022 12:22	23-Aug-2022 09:20	23-Aug-2022 09:25	23-Aug-2022 09:30	23-Aug-2022 09:55	
Compound	CAS Number	LOR	Unit	EW2203842-011	EW2203842-012	EW2203842-013	EW2203842-014	EW2203842-015	
				Result	Result	Result	Result	Result	
EPK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.10	<0.01	<0.01	0.23	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	254	5.04	33.2	35.0	186	
∅ Total Cations	----	0.01	meq/L	----	----	----	33.4	----	
∅ Total Cations	----	0.01	meq/L	244	13.1	28.7	----	176	
∅ Ionic Balance	----	0.01	%	----	----	----	2.49	----	
∅ Ionic Balance	----	0.01	%	1.96	44.4	7.24	----	2.75	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	20	462	60	60	40	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	19	473	61	58	40	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.84	4.85	0.36	0.20	5.43	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	9.7	47.8	3.7	2.1	57.7	
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m	1.40	.41	0.78	0.71	0.67	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 10B	Rocklow Down	Rocklow Middle	Rocklow Up	BLANK
Sampling date / time				23-Aug-2022 10:00	23-Aug-2022 08:30	23-Aug-2022 10:15	23-Aug-2022 08:55	23-Aug-2022 08:15	
Compound	CAS Number	LOR	Unit	EW2203842-016	EW2203842-017	EW2203842-018	EW2203842-019	EW2203842-020	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.7	7.2	7.3	7.0	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1580	7220	6080	1340	----	
EA020FD: Field Salinity									
Salinity	----	0.2	g/L	0.9	4.0	3.3	0.7	----	
EA116: Temperature									
Temperature	----	0.1	°C	19.4	11.0	13.2	12.6	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	569	120	118	84	----	
Total Alkalinity as CaCO3	----	1	mg/L	569	120	118	84	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	345	315	63	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	148	2350	1750	362	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	66	----	----	----	----	
Magnesium	7439-95-4	1	mg/L	27	----	----	----	----	
Sodium	7440-23-5	1	mg/L	88	----	----	----	----	
Potassium	7440-09-7	1	mg/L	60	----	----	----	----	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	----	73	67	27	----	
Magnesium	7439-95-4	1	mg/L	----	141	121	27	----	
Sodium	7440-23-5	1	mg/L	----	1190	979	196	----	
Potassium	7440-09-7	1	mg/L	----	48	39	9	----	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.259	----	----	----	<0.001	
Iron	7439-89-6	0.05	mg/L	0.54	----	----	----	<0.05	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	----	0.046	0.052	0.112	----	
Iron	7439-89-6	0.05	mg/L	----	1.56	1.57	3.22	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MD 10B	Rocklow Down	Rocklow Middle	Rocklow Up	BLANK
Sampling date / time					23-Aug-2022 10:00	23-Aug-2022 08:30	23-Aug-2022 10:15	23-Aug-2022 08:55	23-Aug-2022 08:15
Compound	CAS Number	LOR	Unit		EW2203842-016	EW2203842-017	EW2203842-018	EW2203842-019	EW2203842-020
					Result	Result	Result	Result	Result
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.9	0.3	0.2	0.2	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		63.9	0.25	0.32	0.11	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.02	0.02	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	0.92	0.95	0.04	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	0.94	0.97	0.04	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		15.5	----	----	----	----
∅ Total Cations	----	0.01	meq/L		15.4	----	----	----	----
∅ Ionic Balance	----	0.01	%		0.36	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		56	7	8	8	<1
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		56	8	7	9	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		0.22	8.54	8.97	9.73	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation		24.0	80.2	87.7	92.7	----
EP035SF: Total Phenol by Segmented Flow Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m		0.74	----	----	----	----



Inter-Laboratory Testing

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

(WATER) EP002: Dissolved Organic Carbon (DOC)

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EP035SF: Total Phenol by Segmented Flow Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) ED093F: Dissolved Major Cations

(WATER) EN055: Ionic Balance

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO₄²⁻ by DA

(WATER) EG020T: Total Metals by ICP-MS

(WATER) ED093T: Total Major Cations