



CERTIFICATE OF ANALYSIS

<p>Work Order : EW1500588</p> <p>Client : WOLLONGONG CITY COUNCIL</p> <p>Contact : MR WAYDE PETERSON</p> <p>Address : 41 BURELLI STREET WOLLONGONG NSW, AUSTRALIA 2500</p> <p>E-mail : wpeterson@wollongong.nsw.gov.au</p> <p>Telephone : +61 02 4227 7111</p> <p>Facsimile : +61 02 4227 7277</p> <p>Project : Helensburgh Groundwater Quarterly</p> <p>Order number : 3032573</p> <p>C-O-C number : ----</p> <p>Sampler : Craig Wilson</p> <p>Site : ----</p> <p>Quote number : SY/454/14 Tender</p>	<p>Page : 1 of 4</p> <p>Laboratory : Environmental Division NSW South Coast</p> <p>Contact : Glenn Davies</p> <p>Address : 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA</p> <p>E-mail : glenn.davies@alsglobal.com</p> <p>Telephone : 02 4225 3125</p> <p>Facsimile : 02 4225 3128</p> <p>QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 18-FEB-2015</p> <p>Issue Date : 26-FEB-2015</p> <p>No. of samples received : 9</p> <p>No. of samples analysed : 9</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Shobhna Chandra	Metals Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Field tests completed on day of sampling/receipt.**
- **Sampling and sample data supplied by ALS Wollongong.**
- **Sampling completed as per FWI-EN001 Groundwater Sampling.**



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

Client sampling date / time

				BH 1	BH 2	BH 4	BH 5	BH 6
				18-FEB-2015 08:25	18-FEB-2015 09:40	18-FEB-2015 10:45	18-FEB-2015 11:15	18-FEB-2015 10:30
Compound	CAS Number	LOR	Unit	EW1500588-001	EW1500588-002	EW1500588-003	EW1500588-004	EW1500588-005
EA005FD: Field pH								
pH	----	0.1	pH Unit	4.9	5.9	4.1	4.0	6.6
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	1	mg/L	395	516	281	119	215
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	4	250	3	<1	130
Total Alkalinity as CaCO3	----	1	mg/L	4	250	3	<1	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	116	66	89	21	22
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	126	132	89	38	27
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	25	17	2	4	30
Magnesium	7439-95-4	1	mg/L	21	8	5	4	15
Sodium	7440-23-5	1	mg/L	72	175	98	26	27
Potassium	7440-09-7	1	mg/L	<1	27	2	<1	3
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.63	18.6	0.15	<0.01	0.02
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	4	22	2	<1	20
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	2.82	2.10	3.35	4.33	2.84



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

Client sampling date / time

				LGMB1	LGMB2	LGMB3	LGMB4	----
				18-FEB-2015 08:10	18-FEB-2015 08:45	18-FEB-2015 09:15	18-FEB-2015 09:00	----
Compound	CAS Number	LOR	Unit	EW1500588-006	EW1500588-007	EW1500588-008	EW1500588-009	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	5.3	4.9	4.8	4.3	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	1	mg/L	179	134	90	129	----
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	52	24	13	3	----
Total Alkalinity as CaCO3	----	1	mg/L	52	24	13	3	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	56	36	19	32	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	17	23	15	12	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	17	13	6	6	----
Magnesium	7439-95-4	1	mg/L	9	6	3	3	----
Sodium	7440-23-5	1	mg/L	28	19	12	10	----
Potassium	7440-09-7	1	mg/L	<1	2	4	23	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.35	<0.01	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	2	2	1	4	----
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	2.25	2.92	2.45	3.00	----