

Environmental Division

CERTIFICATE OF ANALYSIS

<p>Work Order : EW1300435</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 : Whytes Gully Groundwater Quarterly</p> <p>Order number : 3001821</p> <p>C-O-C number : ----</p> <p>Sampler : Craig Wilson</p> <p>Site : ----</p> <p>Quote number : WL/001/11 Whytes Gully Groundwater Quarterly</p>	<p>Page : 1 of 5</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 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 14-FEB-2013</p> <p>Issue Date : 26-FEB-2013</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Craig Wilson	Sampler / Login Officer	Laboratory - Wollongong
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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.

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

- Sites BH1A, BH2A, BH3A, BH5 & BH7A - Dry at time of sampling.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

				BH1	BH1A	BH2A	BH3	BH3A
				14-FEB-2013 11:20	14-FEB-2013 10:40	14-FEB-2013 10:50	14-FEB-2013 12:35	14-FEB-2013 10:45
				EW1300435-001	EW1300435-002	EW1300435-003	EW1300435-004	EW1300435-005
Compound	CAS Number	LOR	Unit					
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	1	mg/L	2090	----	----	2690	----
ED037P: Alkalinity by PC Titrator								
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	225	----	----	965	----
Total Alkalinity as CaCO3	----	1	mg/L	225	----	----	965	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	213	----	----	152	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	975	----	----	967	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	78	----	----	140	----
Magnesium	7439-95-4	1	mg/L	75	----	----	180	----
Sodium	7440-23-5	1	mg/L	669	----	----	762	----
Potassium	7440-09-7	1	mg/L	<1	----	----	<1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.01	----	----	0.08	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	36.4	----	----	49.7	----
Total Cations	----	0.01	meq/L	39.2	----	----	55.0	----
Ionic Balance	----	0.01	%	3.61	----	----	4.97	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	6.2	----	----	6.8	----
Electrical Conductivity (Non Compensated)	----	1	µS/cm	379	----	----	4760	----
Depth	----	0.01	m	4.51	----	----	2.49	----
Field Observations	----	0.01	--	----	DRY	DRY	----	DRY
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	4	----	----	74	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				BH4	BH4A	BH5	BH5A	BH6
				14-FEB-2013 11:15	14-FEB-2013 10:35	14-FEB-2013 12:20	14-FEB-2013 10:25	14-FEB-2013 10:00
Compound	CAS Number	LOR	Unit	EW1300435-006	EW1300435-007	EW1300435-008	EW1300435-009	EW1300435-010
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	1	mg/L	268	564	----	4760	2860
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	159	200	----	472	685
Total Alkalinity as CaCO3	----	1	mg/L	159	200	----	472	685
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	96	----	542	303
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	24	120	----	2110	1080
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	35	53	----	102	127
Magnesium	7439-95-4	1	mg/L	10	26	----	205	143
Sodium	7440-23-5	1	mg/L	29	112	----	1420	855
Potassium	7440-09-7	1	mg/L	19	4	----	<1	<1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.18	----	<0.01	0.09
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	4.15	9.38	----	80.2	50.5
Total Cations	----	0.01	meq/L	4.32	9.76	----	8.37	55.3
Ionic Balance	----	0.01	%	1.99	1.96	----	2.12	4.56
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	6.9	7.5	----	6.8	6.7
Electrical Conductivity (Non Compensated)	----	1	µS/cm	356	933	----	7880	5000
Depth	----	0.01	m	2.44	2.37	----	2.72	1.52
Field Observations	----	0.01	--	----	----	DRY	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	11	21	----	<1	2



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

				BH6A	BH7A	---	---	---
				14-FEB-2013 10:15	14-FEB-2013 09:20	---	---	---
Compound	CAS Number	LOR	Unit	EW1300435-011	EW1300435-012	---	---	---
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	---	1	mg/L	5400	---	---	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	932	---	---	---	---
Total Alkalinity as CaCO3	---	1	mg/L	932	---	---	---	---
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1280	---	---	---	---
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	1600	---	---	---	---
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	225	---	---	---	---
Magnesium	7439-95-4	1	mg/L	353	---	---	---	---
Sodium	7440-23-5	1	mg/L	1340	---	---	---	---
Potassium	7440-09-7	1	mg/L	<1	---	---	---	---
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.01	---	---	---	---
EN055: Ionic Balance								
Total Anions	---	0.01	meq/L	90.4	---	---	---	---
Total Cations	---	0.01	meq/L	98.6	---	---	---	---
Ionic Balance	---	0.01	%	4.31	---	---	---	---
EN67 PK: Field Tests								
pH	---	0.1	pH Unit	6.8	---	---	---	---
Electrical Conductivity (Non Compensated)	---	1	µS/cm	7980	---	---	---	---
Depth	---	0.01	m	3.23	---	---	---	---
Field Observations	---	0.01	--	---	DRY	---	---	---
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	---	1	mg/L	1	---	---	---	---