

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>EW1301421</b></p> <p><b>Client</b> : <b>WOLLONGONG CITY COUNCIL</b></p> <p><b>Contact</b> : <b>MR WAYDE PETERSON</b></p> <p><b>Address</b> : <b>41 BURELLI STREET</b> WOLLONGONG NSW, AUSTRALIA 2500</p> <p><b>E-mail</b> : <b>wpeterson@wollongong.nsw.gov.au</b></p> <p><b>Telephone</b> : <b>+61 02 4227 7111</b></p> <p><b>Facsimile</b> : <b>+61 02 4227 7277</b></p> <p><b>Project</b> : <b>Whytes Gully Groundwater Quarterly</b></p> <p><b>Order number</b> : <b>3001821</b></p> <p><b>C-O-C number</b> : <b>----</b></p> <p><b>Sampler</b> : <b>Craig Wilson</b></p> <p><b>Site</b> : <b>----</b></p> <p><b>Quote number</b> : <b>WL/001/11 Whytes Gully Groundwater Quarterly</b></p>	<p><b>Page</b> : 1 of 5</p> <p><b>Laboratory</b> : Environmental Division NSW South Coast</p> <p><b>Contact</b> : Glenn Davies</p> <p><b>Address</b> : 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA</p> <p><b>E-mail</b> : <b>glenn.davies@alsglobal.com</b></p> <p><b>Telephone</b> : 02 4225 3125</p> <p><b>Facsimile</b> : 02 4225 3128</p> <p><b>QC Level</b> : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p><b>Date Samples Received</b> : 15-MAY-2013</p> <p><b>Issue Date</b> : 23-MAY-2013</p> <p><b>No. of samples received</b> : 12</p> <p><b>No. of samples analysed</b> : 12</p>
---	--

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
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Hoa Nguyen	Senior Inorganic Chemist	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.

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

- **ED041G:LOR raised for Sulfate analysis on sample ID(BH4) due to sample matrix.**
  - **Sites BH2A, BH3A & BH7A - Dry at time of sampling.**
-



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

				BH1	BH1A	BH2A	BH3	BH3A
Client sampling date / time				15-MAY-2013 08:55	15-MAY-2013 08:21	15-MAY-2013 08:19	15-MAY-2013 08:35	15-MAY-2013 08:17
Compound	CAS Number	LOR	Unit	EW1301421-001	EW1301421-002	EW1301421-003	EW1301421-004	EW1301421-005
<b>EA015: Total Dissolved Solids</b>								
Total Dissolved Solids @180°C	—	1	mg/L	2450	—	—	2740	—
<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	242	—	—	960	—
Total Alkalinity as CaCO3	—	1	mg/L	242	—	—	960	—
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	325	—	—	179	—
<b>ED045G: Chloride Discrete analyser</b>								
Chloride	16887-00-6	1	mg/L	978	—	—	871	—
<b>ED093T: Total Major Cations</b>								
Calcium	7440-70-2	1	mg/L	80	—	—	131	—
Magnesium	7439-95-4	1	mg/L	76	—	—	153	—
Sodium	7440-23-5	1	mg/L	685	—	—	663	—
Potassium	7440-09-7	1	mg/L	<1	—	—	<1	—
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	—	—	0.13	—
<b>EN67 PK: Field Tests</b>								
pH	—	0.1	pH Unit	6.2	—	—	6.8	—
Electrical Conductivity (Non Compensated)	—	1	µS/cm	4290	—	—	4650	—
Depth	—	0.01	m	4.10	—	—	2.11	—
Field Observations	—	0.01	—	—	DRY	DRY	—	DRY
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon	—	1	mg/L	4	—	—	15	—



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH4	BH4A	BH5	BH5A	BH6
Client sampling date / time				15-MAY-2013 08:45	15-MAY-2013 08:15	15-MAY-2013 08:25	15-MAY-2013 08:05	15-MAY-2013 07:30	
Compound	CAS Number	LOR	Unit	EW1301421-006	EW1301421-007	EW1301421-008	EW1301421-009	EW1301421-010	
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids @180°C	—	1	mg/L	167	698	670	4670	2990	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	99	450	273	674	702	
Total Alkalinity as CaCO3	—	1	mg/L	99	450	273	674	702	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	42	32	482	323	
<b>ED045G: Chloride Discrete analyser</b>									
Chloride	16887-00-6	1	mg/L	9	132	170	1590	960	
<b>ED093T: Total Major Cations</b>									
Calcium	7440-70-2	1	mg/L	24	66	19	115	108	
Magnesium	7439-95-4	1	mg/L	6	30	13	186	122	
Sodium	7440-23-5	1	mg/L	9	142	216	1320	838	
Potassium	7440-09-7	1	mg/L	19	5	2	<1	<1	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	8.74	0.52	<0.01	0.04	
<b>EN67 PK: Field Tests</b>									
pH	—	0.1	pH Unit	7.2	7.4	6.9	6.8	7.2	
Electrical Conductivity (Non Compensated)	—	1	µS/cm	269	1350	1080	7810	5130	
Depth	—	0.01	m	2.19	2.28	7.90	2.64	1.48	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	—	1	mg/L	10	20	17	1	4	



**Analytical Results**

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

				BH6A	BH7A	---	---	---
				15-MAY-2013 07:55	15-MAY-2013 07:20	---	---	---
Compound	CAS Number	LOR	Unit	EW1301421-011	EW1301421-012	----	---	----
<b>EA015: Total Dissolved Solids</b>								
Total Dissolved Solids @180°C	---	1	mg/L	5050	---	---	---	---
<b>ED037P: Alkalinity by PC Titrator</b>								
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	900	---	---	---	---
Total Alkalinity as CaCO3	---	1	mg/L	900	---	---	---	---
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1200	---	---	---	---
<b>ED045G: Chloride Discrete analyser</b>								
Chloride	16887-00-6	1	mg/L	1310	---	---	---	---
<b>ED093T: Total Major Cations</b>								
Calcium	7440-70-2	1	mg/L	183	---	---	---	---
Magnesium	7439-95-4	1	mg/L	284	---	---	---	---
Sodium	7440-23-5	1	mg/L	1250	---	---	---	---
Potassium	7440-09-7	1	mg/L	1	---	---	---	---
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	0.02	---	---	---	---
<b>EN67 PK: Field Tests</b>								
pH	---	0.1	pH Unit	6.8	---	---	---	---
Electrical Conductivity (Non Compensated)	---	1	µS/cm	7810	---	---	---	---
Depth	---	0.01	m	3.21	---	---	---	---
Field Observations	---	0.01	-	---	DRY	---	---	---
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon	---	1	mg/L	3	---	---	---	---