CERTIFICATE OF ANALYSIS

Work Order	: **EW1602986**	Page	: 1 of 6
Client	: **WOLLONGONG CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: MR WAYDE PETERSON	Contact	: Glenn Davies
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Telephone	: +61 02 4227 7111	Telephone	: 02 42253125
Project	: Whytes Gully Stage 3 Bores Quarterly	Date Samples Received	: 08-Aug-2016 16:00
Order number	: 5058354	Date Analysis Commenced	: 08-Aug-2016
C-O-C number	: ----	Issue Date	: 15-Aug-2016 16:52
Sampler	: Craig Wilson		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 17		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong

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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Field tests completed on day of sampling/receipt.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	GMW102 (Point 9)	GMW103 (Point 10)	GMW104 (Point 11)	GMW105 (Point 12)	GMW106 (Point 13)
			Client sampling date / time	08-Aug-2016 12:00	08-Aug-2016 12:30	08-Aug-2016 11:40	08-Aug-2016 12:15	08-Aug-2016 12:20
Compound	CAS Number	LOR	Unit	EW1602986-001	EW1602986-002	EW1602986-003	EW1602986-004	EW1602986-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.0	7.5	7.1	7.0	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	262	1650	553	212	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	215	1180	422	173	----
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	107	486	318	45	----
Total Alkalinity as CaCO3	----	1	mg/L	107	486	318	45	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	10	124	39	13	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	14	348	50	24	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	22	174	39	5	----
Magnesium	7439-95-4	1	mg/L	6	56	24	2	----
Sodium	7440-23-5	1	mg/L	20	171	106	31	----
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
EN67 PK: Field Tests								
Field Observations	----	0.01	--	----	----	----	----	DRY
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	2	1	2	1	----
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	2.50	7.10	7.24	10.8	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	GMW108S (Point 14)	GMW108D (Point 15)	GMW109S (Point 16)	GMW109D (Point 19)	GMW110 (Point 17)
			Client sampling date / time	08-Aug-2016 14:10	08-Aug-2016 14:20	08-Aug-2016 09:40	08-Aug-2016 09:50	08-Aug-2016 10:10
Compound	CAS Number	LOR	Unit	EW1602986-006	EW1602986-007	EW1602986-008	EW1602986-009	EW1602986-010
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.5	7.9	5.9	7.2	7.7
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	620	3080	1540	1710	3970
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	369	1880	1010	1080	2660
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	288	567	263	256	677
Total Alkalinity as CaCO3	----	1	mg/L	288	567	263	256	677
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	19	172	103	24	276
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	32	659	368	434	870
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	46	126	94	90	207
Magnesium	7439-95-4	1	mg/L	17	84	51	46	152
Sodium	7440-23-5	1	mg/L	68	432	173	190	486
Potassium	7440-09-7	1	mg/L	5	1	2	1	1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.01	0.30	<0.01	<0.01
EN67 PK: Field Tests								
Field Observations	----	0.01	--	----	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	10	2	5	<1	2
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	2.60	2.10	3.03	2.92	4.06

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	GMW111 (Point 18)	GABH01 (Point 2)	GABH02 (Point 5)	GABH03 (Point 6)	GABH06S (Point 7)
			Client sampling date / time	08-Aug-2016 10:00	08-Aug-2016 11:50	08-Aug-2016 11:20	08-Aug-2016 11:05	08-Aug-2016 13:00
Compound	CAS Number	LOR	Unit	EW1602986-011	EW1602986-012	EW1602986-013	EW1602986-014	EW1602986-015
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.5	----	7.4	7.5	7.6
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	2990	----	5200	5160	2880
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	1770	----	3390	3930	1740
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	555	----	1200	772	495
Total Alkalinity as CaCO3	----	1	mg/L	555	----	1200	772	495
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	166	----	156	184	193
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	639	----	1130	1300	621
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	119	----	313	354	86
Magnesium	7439-95-4	1	mg/L	91	----	190	214	74
Sodium	7440-23-5	1	mg/L	418	----	639	530	464
Potassium	7440-09-7	1	mg/L	1	----	3	2	<1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	0.03	0.01	0.02
EN67 PK: Field Tests								
Field Observations	----	0.01	--	----	DESTROYED	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	----	98	10	3
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	6.27	----	4.99	0.50	2.24

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	GABH06D (Point 8)	BH6 (Point 20)	----	----	----
			Client sampling date / time	08-Aug-2016 13:10	08-Aug-2016 10:25	----	----	----
Compound	CAS Number	LOR	Unit	EW1602986-016	EW1602986-017	--------	--------	--------
				Result	Result	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.6	7.5	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	2660	4810	----	----	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	1580	5460	----	----	----
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	370	814	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	370	814	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	113	238	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	604	1090	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	96	123	----	----	----
Magnesium	7439-95-4	1	mg/L	55	119	----	----	----
Sodium	7440-23-5	1	mg/L	401	818	----	----	----
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	----	----	----
EN67 PK: Field Tests								
Field Observations	----	0.01	--	----	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	2	9	----	----	----
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	1.73	1.46	----	----	----