Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EW1203241**	Page	: 1 of 8
Client	: **SHOALHAVEN CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
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Project	: West Nowra Landfill Quarterly Sampling	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 15425 16780		
C-O-C number	: ----	Date Samples Received	: 23-NOV-2012
Sampler	: Craig Wilson	Issue Date	: 04-DEC-2012
Site	: ----		
		No. of samples received	: 22
Quote number	: ----	No. of samples analysed	: 22

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

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 SW1, SW2, BH2, BH5, BH6, BH11, BH15, MW3a - Dry at time of sampling**
  Site BH4 - Found destroyed at time of sampling.

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
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Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID	SW 1	SW2	SW3	BH2	BH 3
				Client sampling date / time	23-NOV-2012 09:50	23-NOV-2012 08:25	23-NOV-2012 10:20	23-NOV-2012 10:10	23-NOV-2012 10:00
					EW1203241-001	EW1203241-002	EW1203241-003	EW1203241-004	EW1203241-005
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		----	----	**1700**	----	**240**
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		----	----	<1	----	<1
Total Alkalinity as CaCO3	----	1	mg/L		----	----	<1	----	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	**15**	----	**58**
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		----	----	**984**	----	**34**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	**11**	----	<1
Magnesium	7439-95-4	1	mg/L		----	----	**46**	----	**3**
Sodium	7440-23-5	1	mg/L		----	----	**520**	----	**46**
Potassium	7440-09-7	1	mg/L		----	----	**2**	----	<1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	**0.06**	----	**0.03**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	----	**28.1**	----	**2.17**
Total Cations	----	0.01	meq/L		----	----	**27.0**	----	**2.25**
Ionic Balance	----	0.01	%		----	----	**1.95**	----	----
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		----	----	**3.6**	----	**4.2**
Electrical Conductivity (Non Compensated)	----	1	µS/cm		----	----	**3140**	----	----
Dissolved Oxygen	----	0.01	mg/L		----	----	**4.39**	----	----
Field Observations	----	0.01	--		**DRY**	**DRY**	----	**DRY**	----
Standing Water Level	----	0.01	m AHD		----	----	----	----	**29.9**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	----	**7**	----	**5**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		----	----	<2	----	----

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID	BH 4	BH 5	BH 6	BH 7	BH 10
				Client sampling date / time	23-NOV-2012 09:55	23-NOV-2012 09:45	23-NOV-2012 09:25	23-NOV-2012 09:30	23-NOV-2012 09:10
					EW1203241-006	EW1203241-007	EW1203241-008	EW1203241-009	EW1203241-010
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		----	----	----	**518**	**632**
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		----	----	----	**9**	**70**
Total Alkalinity as CaCO3	----	1	mg/L		----	----	----	**9**	**70**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	**29**	<1
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		----	----	----	**309**	**364**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	----	**23**	**15**
Magnesium	7439-95-4	1	mg/L		----	----	----	**20**	**16**
Sodium	7440-23-5	1	mg/L		----	----	----	**146**	**166**
Potassium	7440-09-7	1	mg/L		----	----	----	**3**	**1**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	**0.05**	**1.37**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	----	----	**9.50**	**11.7**
Total Cations	----	0.01	meq/L		----	----	----	**9.22**	----
Total Cations	----	0.01	meq/L		----	----	----	----	**11.4**
Ionic Balance	----	0.01	%		----	----	----	**1.49**	----
Ionic Balance	----	0.01	%		----	----	----	----	**1.47**
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		----	----	----	**5.8**	**5.9**
Field Observations	----	0.01	--		**DESTROYED**	**DRY**	**DRY**	----	----
Standing Water Level	----	0.01	m AHD		----	----	----	**29.5**	**34.0**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	----	----	**7**	**9**

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID	BH 11	BH 12a	BH 13	BH 14	BH 15
				Client sampling date / time	23-NOV-2012 09:20	23-NOV-2012 09:40	23-NOV-2012 10:35	23-NOV-2012 11:15	23-NOV-2012 11:00
					EW1203241-011	EW1203241-012	EW1203241-013	EW1203241-014	EW1203241-015
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		----	**1670**	**1990**	**292**	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	**6**	**15**	<1	----
Total Alkalinity as CaCO3	----	1	mg/L		----	**6**	**15**	<1	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	**36**	**6**	**93**	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		----	**895**	**1170**	**70**	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	**47**	**4**	<1	----
Magnesium	7439-95-4	1	mg/L		----	**53**	**14**	**4**	----
Sodium	7440-23-5	1	mg/L		----	**500**	**461**	**82**	----
Potassium	7440-09-7	1	mg/L		----	<1	<1	<1	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	**0.01**	**1.02**	<0.01	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	**26.1**	**33.4**	**3.91**	----
Total Cations	----	0.01	meq/L		----	**28.5**	----	**3.90**	----
Total Cations	----	0.01	meq/L		----	----	**36.1**	----	----
Ionic Balance	----	0.01	%		----	**4.28**	----	**0.23**	----
Ionic Balance	----	0.01	%		----	----	**3.88**	----	----
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		----	**4.8**	**5.3**	**4.2**	----
Field Observations	----	0.01	--		**DRY**	----	----	----	**DRY**
Standing Water Level	----	0.01	m AHD		----	**29.6**	**33.0**	**36.5**	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	**4**	**8**	<1	----

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID: MW 1D	MW 1S	MW 2	MW 3a	MW 4
Client sampling date / time				23-NOV-2012 08:45	23-NOV-2012 08:50	23-NOV-2012 09:00	23-NOV-2012 08:35	23-NOV-2012 10:50
				EW1203241-016	EW1203241-017	EW1203241-018	EW1203241-019	EW1203241-020
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	<1	<1	54	----	26
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	54	----	26
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	10	12	----	29
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	213	272	638	----	749
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	12	6	36	----	<1
Magnesium	7439-95-4	1	mg/L	13	14	30	----	17
Sodium	7440-23-5	1	mg/L	95	146	325	----	461
Potassium	7440-09-7	1	mg/L	<1	<1	<1	----	<1
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	2.05	9.92	----	29.4
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.02	<0.01	0.02	----	0.02
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	6.01	7.88	19.3	----	22.2
Total Cations	----	0.01	meq/L	5.80	7.80	18.4	----	21.4
Ionic Balance	----	0.01	%	1.76	0.52	2.46	----	1.85
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	4.2	3.8	5.6	----	4.6
Electrical Conductivity (Non Compensated)	----	1	µS/cm	665	878	1890	----	2120
Field Observations	----	0.01	--	----	----	----	DRY	----
Standing Water Level	----	0.01	m AHD	37.4	37.4	36.2	----	35.4
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	<1	<1	----	7
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	<2	<2	<2	----	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	MW 1D	MW 1S	MW 2	MW 3a	MW 4
			Client sampling date / time	23-NOV-2012 08:45	23-NOV-2012 08:50	23-NOV-2012 09:00	23-NOV-2012 08:35	23-NOV-2012 10:50
Compound	CAS Number	LOR	Unit	EW1203241-016	EW1203241-017	EW1203241-018	EW1203241-019	EW1203241-020
EP035G: Total Phenol by Discrete Analyser								
Phenols (Total)	----	0.05	mg/L	<0.05	<0.05	<0.05	----	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Duplicate	Blank	----	----	----
				Client sampling date / time	23-NOV-2012 09:40	23-NOV-2012 09:45	----	----	----
Compound	CAS Number	LOR	Unit		EW1203241-021	EW1203241-022	----	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		**1790**	<1	----	----	----
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		**3**	<1	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**3**	<1	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**37**	<1	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		**909**	<1	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**47**	<1	----	----	----
Magnesium	7439-95-4	1	mg/L		**54**	<1	----	----	----
Sodium	7440-23-5	1	mg/L		**516**	<1	----	----	----
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	<0.01	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**26.5**	<0.01	----	----	----
Total Cations	----	0.01	meq/L		**29.2**	<0.01	----	----	----
Ionic Balance	----	0.01	%		**4.95**	----	----	----	----
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		**4.7**	**6.4**	----	----	----
Standing Water Level	----	0.01	m AHD		**29.6**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	<1	----	----	----