

CERTIFICATE OF ANALYSIS

Work Order : **EW2204031**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 05-Sep-2022 13:18
Date Analysis Commenced : 05-Sep-2022
Issue Date : 12-Sep-2022 19:26



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	----	----
Sampling date / time				05-Sep-2022 09:20	05-Sep-2022 10:15	05-Sep-2022 09:15	----	----	
Compound	CAS Number	LOR	Unit	EW2204031-001	EW2204031-002	EW2204031-003	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	8.5	8.1	8.0	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	54	7	29	----	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	59.3	8.6	62.8	----	----	
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	307	605	184	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	307	605	184	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	63	121	49	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	172	298	114	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	70	85	42	----	----	
Magnesium	7439-95-4	1	mg/L	32	51	16	----	----	
Sodium	7440-23-5	1	mg/L	147	260	79	----	----	
Potassium	7440-09-7	1	mg/L	22	25	47	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	<0.05	0.05	0.11	----	----	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.07	0.34	1.84	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.1	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	4.39	----	----	----	----	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	4.12	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.97	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	11.7	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	----	----
Sampling date / time				05-Sep-2022 09:20	05-Sep-2022 10:15	05-Sep-2022 09:15	----	----	
Compound	CAS Number	LOR	Unit	EW2204031-001	EW2204031-002	EW2204031-003	-----	-----	
				Result	Result	Result	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	12.7	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	12.3	23.0	7.91	----	----	
∅ Total Cations	----	0.01	meq/L	13.1	20.4	8.05	----	----	
∅ Ionic Balance	----	0.01	%	3.10	6.05	0.87	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	43	30	----	----	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	----	4	3	----	----	

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

(WATER) EK055G-NH4: Ammonium as N by DA

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EN055: Ionic Balance

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EP030: Biochemical Oxygen Demand (BOD)

CERTIFICATE OF ANALYSIS

Work Order : **EW2204032**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water EPL
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 7
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Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 05-Sep-2022 13:20
Date Analysis Commenced : 05-Sep-2022
Issue Date : 12-Sep-2022 19:41



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



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^ = This result is computed from individual analyte detections at or above the level of reporting
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~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Sampling date / time				05-Sep-2022 10:05	05-Sep-2022 08:50	05-Sep-2022 08:00	05-Sep-2022 08:20	05-Sep-2022 08:15	
Compound	CAS Number	LOR	Unit	EW2204032-001	EW2204032-002	EW2204032-003	EW2204032-004	EW2204032-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.6	7.4	7.4	7.4	7.4	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	585	1740	1370	1690	1990	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	----	1270	990	1260	1410	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	9	8	8	6	9	
EA045: Turbidity									
Turbidity	----	0.1	NTU	17.9	27.2	27.4	26.6	25.9	
EA116: Temperature									
Temperature	----	0.5	°C	12.1	12.7	11.8	12.5	12.5	
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	225	106	107	105	103	
Total Alkalinity as CaCO3	----	1	mg/L	225	106	107	105	103	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	44	95	74	88	104	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	93	671	469	614	754	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	52	43	38	41	43	
Magnesium	7439-95-4	1	mg/L	19	47	37	44	52	
Sodium	7440-23-5	1	mg/L	77	338	252	312	381	
Potassium	7440-09-7	1	mg/L	10	15	11	14	16	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.05	0.05	0.05	<0.05	<0.05	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.067	0.060	0.068	0.058	0.050	
Iron	7439-89-6	0.05	mg/L	0.96	1.71	2.01	1.84	1.24	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.1	0.2	0.2	0.2	0.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Sampling date / time				05-Sep-2022 10:05	05-Sep-2022 08:50	05-Sep-2022 08:00	05-Sep-2022 08:20	05-Sep-2022 08:15	
Compound	CAS Number	LOR	Unit	EW2204032-001	EW2204032-002	EW2204032-003	EW2204032-004	EW2204032-005	
				Result	Result	Result	Result	Result	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.82	0.46	0.15	0.35	0.19	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	1.80	0.46	0.15	0.35	0.19	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.40	0.01	0.01	0.01	0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	2.06	0.85	0.88	0.86	0.84	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	2.46	0.86	0.89	0.87	0.85	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	8.04	23.0	16.9	21.2	25.5	
∅ Total Cations	----	0.01	meq/L	7.76	21.1	16.2	19.6	23.4	
∅ Ionic Balance	----	0.01	%	1.72	4.36	2.19	4.05	4.26	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	19	8	8	8	8	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	8.70	9.01	9.60	9.37	9.54	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		Duplicate	----	----	----	----
Sampling date / time		05-Sep-2022 08:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2204032-006	-----	-----	-----	-----
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.4	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1370	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1280	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	9	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	26.3	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	11.8	----	----	----	----
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	112	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	112	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	93	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	637	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	43	----	----	----	----
Magnesium	7439-95-4	1	mg/L	47	----	----	----	----
Sodium	7440-23-5	1	mg/L	337	----	----	----	----
Potassium	7440-09-7	1	mg/L	15	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	0.06	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.058	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.65	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Duplicate	----	----	----	----
Sampling date / time				05-Sep-2022 08:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2204032-006	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.46	----	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.46	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.86	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.87	----	----	----	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	22.1	----	----	----	----	----
∅ Total Cations	----	0.01	meq/L	21.0	----	----	----	----	----
∅ Ionic Balance	----	0.01	%	2.52	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	8	----	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	9.60	----	----	----	----	----



Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NO_x) by Discrete Analyser

(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

(WATER) EK055G-NH₄: Ammonium as N by DA

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EN055: Ionic Balance

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED041G: Sulfate (Turbidimetric) as SO₄²⁻ by DA

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) ED093F: Dissolved Major Cations

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CERTIFICATE OF ANALYSIS

Work Order : **EW2204033**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 05-Sep-2022 13:16
Date Analysis Commenced : 05-Sep-2022
Issue Date : 12-Sep-2022 19:42



Accreditation No. 825
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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK057G: LOR raised for Nitrite due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		Leachate Sump	----	----	----	----
		Sampling date / time		05-Sep-2022 09:35	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2204033-001	-----	-----	-----	-----
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	8.8	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	8570	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	5320	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	14.2	----	----	----	----
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	896	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2760	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3660	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	1840	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	49	----	----	----	----
Potassium	7440-09-7	1	mg/L	369	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.127	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.33	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	792	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	124	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	124	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Sump	----	----	----	----
Sampling date / time				05-Sep-2022 09:35	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2204033-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	467	----	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	2.00	----	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation	19.7	----	----	----	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (WATER) ED093F: Dissolved Major Cations
- (WATER) EP005: Total Organic Carbon (TOC)
- (WATER) EK055G: Ammonia as N by Discrete Analyser
- (WATER) EG020T: Total Metals by ICP-MS
- (WATER) EK057G: Nitrite as N by Discrete Analyser
- (WATER) EK058G: Nitrate as N by Discrete Analyser
- (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
- (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
- (WATER) ED045G: Chloride by Discrete Analyser
- (WATER) ED037P: Alkalinity by PC Titrator
- (WATER) EK040P: Fluoride by PC Titrator
- (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CERTIFICATE OF ANALYSIS

Work Order : **EW2204034**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate Tank EPL
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 05-Sep-2022 13:15
Date Analysis Commenced : 05-Sep-2022
Issue Date : 12-Sep-2022 19:42



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

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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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK059G: LOR raised for NOx on sample 1 due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK057G: LOR raised for Nitrite due to sample matrix.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Leachate Storage Tank LP1	----	----	----	----
				Sampling date / time	05-Sep-2022 09:40	----	----	----
Compound	CAS Number	LOR	Unit	EW2204034-001	-----	-----	-----	-----
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	8.9	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	8230	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	5210	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	13.0	----	----	----	----
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	946	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2760	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3700	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	1840	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	44	----	----	----	----
Potassium	7440-09-7	1	mg/L	350	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.106	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.29	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	877	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<1.00	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<1.00	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Storage Tank LP1	----	----	----	----
Sampling date / time				05-Sep-2022 09:40	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2204034-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued									
Nitrite + Nitrate as N	----	0.01	mg/L	<1.00	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	401	----	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	7.14	----	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation	68.8	----	----	----	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO₄²⁻ by DA

CERTIFICATE OF ANALYSIS

Work Order : **EW2204038**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters EPL
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 14
No. of samples analysed : 13

Page : 1 of 8
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 06-Sep-2022 15:47
Date Analysis Commenced : 06-Sep-2022
Issue Date : 23-Sep-2022 15:52



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

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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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- ED041G: LOR raised for Sulfate on sample 1 & 10 due to sample matrix.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow & Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
Sampling date / time				06-Sep-2022 08:30	06-Sep-2022 12:50	06-Sep-2022 13:05	06-Sep-2022 08:00	06-Sep-2022 11:25	
Compound	CAS Number	LOR	Unit	EW2204038-001	EW2204038-002	EW2204038-003	EW2204038-004	EW2204038-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	7.4	7.3	7.2	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	7360	984	1000	3330	1410	
EA116: Temperature									
Temperature	----	0.5	°C	25.3	17.6	18.1	15.9	19.7	
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	2540	317	361	1650	554	
Total Alkalinity as CaCO3	----	1	mg/L	2540	317	361	1650	554	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	118	69	12	92	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	940	78	109	381	123	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	125	117	113	177	149	
Potassium	7440-09-7	1	mg/L	208	49	19	65	26	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.105	0.022	0.130	0.528	0.502	
Iron	7439-89-6	0.05	mg/L	7.76	0.07	2.90	0.70	7.24	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.4	0.2	0.1	0.4	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	376	2.18	2.76	130	4.75	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.13	0.01	0.05	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	6.37	0.05	0.02	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	6.50	0.06	0.07	<0.01	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	194	15	14	85	22	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
Sampling date / time				06-Sep-2022 08:30	06-Sep-2022 12:50	06-Sep-2022 13:05	06-Sep-2022 08:00	06-Sep-2022 11:25	
Compound	CAS Number	LOR	Unit	EW2204038-001	EW2204038-002	EW2204038-003	EW2204038-004	EW2204038-005	
				Result	Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	2.91	3.07	4.25	2.85	4.14	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
Sampling date / time				06-Sep-2022 11:45	06-Sep-2022 12:30	06-Sep-2022 11:00	06-Sep-2022 13:25	06-Sep-2022 10:10	
Compound	CAS Number	LOR	Unit	EW2204038-006	EW2204038-007	EW2204038-008	EW2204038-009	EW2204038-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.7	6.7	7.1	7.4	6.7	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1740	970	2350	838	822	
EA116: Temperature									
Temperature	----	0.5	°C	20.5	20.2	14.8	17.6	18.3	
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	754	409	420	308	412	
Total Alkalinity as CaCO3	----	1	mg/L	754	409	420	308	412	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	47	52	473	51	<10	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	199	58	442	101	65	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	176	100	104	88	88	
Potassium	7440-09-7	1	mg/L	15	15	190	36	12	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.288	0.094	0.290	0.082	0.087	
Iron	7439-89-6	0.05	mg/L	3.26	<0.05	9.45	1.19	2.34	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	0.5	0.2	0.2	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.78	0.59	10.2	3.11	1.09	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.01	0.02	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	1.91	<0.01	0.04	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.03	1.93	0.01	0.06	<0.01	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	31	25	42	21	19	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
Sampling date / time				06-Sep-2022 11:45	06-Sep-2022 12:30	06-Sep-2022 11:00	06-Sep-2022 13:25	06-Sep-2022 10:10	
Compound	CAS Number	LOR	Unit	EW2204038-006	EW2204038-007	EW2204038-008	EW2204038-009	EW2204038-010	
				Result	Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	4.15	4.56	0.64	4.60	1.91	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		BH21	BH22	Duplicate	----	----
		Sampling date / time		06-Sep-2022 10:35	06-Sep-2022 09:00	06-Sep-2022 09:00	----	----
Compound	CAS Number	LOR	Unit	EW2204038-011	EW2204038-012	EW2204038-013	-----	-----
				Result	Result	Result	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.1	7.0	7.0	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	2430	1810	1810	----	----
EA116: Temperature								
Temperature	----	0.5	°C	20.8	17.3	17.3	----	----
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	667	646	652	----	----
Total Alkalinity as CaCO3	----	1	mg/L	667	646	652	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	204	113	112	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	400	240	244	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	135	117	127	----	----
Potassium	7440-09-7	1	mg/L	20	30	32	----	----
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.597	0.108	0.119	----	----
Iron	7439-89-6	0.05	mg/L	0.44	0.14	0.15	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.3	0.2	0.2	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	4.85	24.4	24.2	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	37	50	51	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
Sampling date / time				06-Sep-2022 10:35	06-Sep-2022 09:00	06-Sep-2022 09:00	----	----	
Compound	CAS Number	LOR	Unit	EW2204038-011	EW2204038-012	EW2204038-013	-----	-----	
				Result	Result	Result	----	----	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level		----	0.01	m AHD	2.86	2.45	2.45	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (WATER) ED093F: Dissolved Major Cations
- (WATER) EP005: Total Organic Carbon (TOC)
- (WATER) EK055G: Ammonia as N by Discrete Analyser
- (WATER) EG020F: Dissolved Metals by ICP-MS
- (WATER) EK057G: Nitrite as N by Discrete Analyser
- (WATER) EK058G: Nitrate as N by Discrete Analyser
- (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
- (WATER) ED045G: Chloride by Discrete Analyser
- (WATER) ED037P: Alkalinity by PC Titrator
- (WATER) EK040P: Fluoride by PC Titrator
- (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CERTIFICATE OF ANALYSIS

Work Order : **EW2204039**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 6
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 07-Sep-2022 15:18
Date Analysis Commenced : 07-Sep-2022
Issue Date : 14-Sep-2022 11:41



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling High Flow & Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BHA	BH2	BH10	BH16	BH17R
Sampling date / time				07-Sep-2022 10:15	07-Sep-2022 08:50	07-Sep-2022 11:00	07-Sep-2022 12:05	07-Sep-2022 09:15	
Compound	CAS Number	LOR	Unit	EW2204039-001	EW2204039-002	EW2204039-003	EW2204039-004	EW2204039-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.7	7.0	6.6	7.5	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	717	2380	1820	1480	1150	
EA116: Temperature									
Temperature	----	0.5	°C	19.0	21.1	16.0	13.6	17.2	
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	264	681	325	749	354	
Total Alkalinity as CaCO3	----	1	mg/L	264	681	325	749	354	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	36	126	114	16	97	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	45	361	428	200	156	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	87	131	28	156	135	
Potassium	7440-09-7	1	mg/L	11	34	1	42	36	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.060	0.257	0.106	0.270	0.206	
Iron	7439-89-6	0.05	mg/L	7.48	4.34	0.59	0.06	10.5	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.2	0.6	0.2	0.1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.21	24.3	0.18	8.37	1.84	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	0.09	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	<0.01	0.09	<0.01	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	22	47	7	33	20	



Analytical Results

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

				Sample ID	BHA	BH2	BH10	BH16	BH17R
				Sampling date / time	07-Sep-2022 10:15	07-Sep-2022 08:50	07-Sep-2022 11:00	07-Sep-2022 12:05	07-Sep-2022 09:15
Compound	CAS Number	LOR	Unit		EW2204039-001	EW2204039-002	EW2204039-003	EW2204039-004	EW2204039-005
				Result	Result	Result	Result	Result	Result
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		2.65	3.65	0.25	0.55	3.10



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH18R	BH20	BH20s	----	----
Sampling date / time				07-Sep-2022 11:40	07-Sep-2022 08:30	07-Sep-2022 08:15	----	----	
Compound	CAS Number	LOR	Unit	EW2204039-006	EW2204039-007	EW2204039-008	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.7	7.3	7.2	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3120	1200	803	----	----	
EA116: Temperature									
Temperature	----	0.5	°C	16.4	17.6	15.8	----	----	
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	696	524	339	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	696	524	339	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	78	35	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	774	103	76	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	131	134	102	----	----	
Potassium	7440-09-7	1	mg/L	31	47	52	----	----	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.597	0.062	0.078	----	----	
Iron	7439-89-6	0.05	mg/L	0.34	1.79	0.63	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.8	0.2	0.1	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	4.18	10.5	5.62	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	2.16	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	2.16	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	40	30	19	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH18R	BH20	BH20s	----	----
Sampling date / time				07-Sep-2022 11:40	07-Sep-2022 08:30	07-Sep-2022 08:15	----	----	
Compound	CAS Number	LOR	Unit	EW2204039-006	EW2204039-007	EW2204039-008	-----	-----	
				Result	Result	Result	----	----	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level		----	0.01	m AHD	2.45	2.32	2.33	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (WATER) ED093F: Dissolved Major Cations
- (WATER) EP005: Total Organic Carbon (TOC)
- (WATER) EK055G: Ammonia as N by Discrete Analyser
- (WATER) EG020F: Dissolved Metals by ICP-MS
- (WATER) EK057G: Nitrite as N by Discrete Analyser
- (WATER) EK058G: Nitrate as N by Discrete Analyser
- (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
- (WATER) ED045G: Chloride by Discrete Analyser
- (WATER) ED037P: Alkalinity by PC Titrator
- (WATER) EK040P: Fluoride by PC Titrator
- (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CERTIFICATE OF ANALYSIS

Work Order : **EW2204040**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Dust
Order number : 147649
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER DUST
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 3
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 07-Sep-2022 15:10
Date Analysis Commenced : 09-Sep-2022
Issue Date : 16-Sep-2022 15:18



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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.

- **Analytical work for this work order will be conducted at ALS Newcastle.**
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth.
- Sample exposure period is 35 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Depositon Gauges.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Sample ID

				DDG1 03/08/2022 - 07/09/2022	DDG2 03/08/2022 - 07/09/2022	DDG3 03/08/2022 - 07/09/2022	DDG4 03/08/2022 - 07/09/2022	----
Sampling date / time				07-Sep-2022 10:40	07-Sep-2022 10:50	07-Sep-2022 08:40	07-Sep-2022 08:00	----
Compound	CAS Number	LOR	Unit	EW2204040-001	EW2204040-002	EW2204040-003	EW2204040-004	-----
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.5	0.3	0.4	1.1	----
Ash Content (mg)	----	2	mg	10	6	8	23	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.1	0.3	0.2	0.6	----
Combustible Matter (mg)	----	2	mg	3	6	5	12	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	0.6	0.6	0.6	1.7	----
Total Insoluble Matter (mg)	----	2	mg	13	12	13	35	----

Page : 3 of 3
Work Order : EW2204040
Client : SHELLHARBOUR CITY COUNCIL
Project : Dunmore Landfill Dust



Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter
