

CERTIFICATE OF ANALYSIS

Work Order : **EW2002506**
Client : **KIAMA COUNCIL**
Contact : **MS JULIE MILEVSKI**
Address : **11 MANNING STREET**
KIAMA NSW, AUSTRALIA 2533

Telephone : **+61 02 4232 0557**
Project : **Gerroa Landfill Quarterly**
Order number : **126590**
C-O-C number : **----**
Sampler : **Duncan McIntosh**
Site : **Gerroa Landfill**
Quote number : **WO/026/19**
No. of samples received : **17**
No. of samples analysed : **17**

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Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia

Telephone : +61 2 4225 3125
Date Samples Received : 28-May-2020 14:28
Date Analysis Commenced : 28-May-2020
Issue Date : 11-Jun-2020 13:59



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. 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>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, 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 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK067G: LOR raised for TP on samples 10 and 12 due to sample matrix.
- It has been noted that Ammonia is greater than TKN for various samples, however this difference is within the limits of experimental variation.
- 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 sample data supplied by ALS Wollongong.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- Field tests completed on day of sampling/receipt.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW1D	MW1S	MW3	MW4	MW5
Client sampling date / time				28-May-2020 10:45	28-May-2020 10:30	28-May-2020 10:15	28-May-2020 08:20	28-May-2020 10:00	
Compound	CAS Number	LOR	Unit	EW2002506-001	EW2002506-002	EW2002506-003	EW2002506-004	EW2002506-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.4	----	7.6	7.0	7.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1600	----	805	837	429	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	931	----	551	468	240	
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	542	----	213	371	173	
Total Alkalinity as CaCO3	----	1	mg/L	542	----	213	371	173	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	44.1	----	0.44	0.11	0.07	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	<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	----	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	0.11	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	43.2	----	1.1	0.9	0.5	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	43.2	----	1.1	1.0	0.5	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.16	----	0.11	0.91	0.11	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	DRY	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	1.81	----	4.03	5.10	4.29	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	3.80	----	4.16	4.68	3.90	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW6D	MW6S	MW7D	MW7S	MW9
Client sampling date / time				28-May-2020 09:00	28-May-2020 08:35	28-May-2020 09:40	28-May-2020 09:20	28-May-2020 13:00	
Compound	CAS Number	LOR	Unit	EW2002506-006	EW2002506-007	EW2002506-008	EW2002506-009	EW2002506-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	----	7.2	7.8	6.3	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1780	----	1100	796	27000	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	974	----	574	431	16800	
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	799	----	516	228	62	
Total Alkalinity as CaCO3	----	1	mg/L	799	----	516	228	62	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	56.0	----	21.0	0.22	<0.01	
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	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	<0.01	<0.01	0.31	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	<0.01	<0.01	0.31	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	52.3	----	21.8	0.8	1.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	52.3	----	21.8	0.8	2.0	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	2.52	----	0.81	0.21	<0.05	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	DRY	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	1.74	----	1.54	3.99	6.46	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	4.91	----	4.67	4.52	1.53	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW10	MW11	ML-1	ML-2	ML-3
Client sampling date / time				28-May-2020 13:15	28-May-2020 12:45	28-May-2020 11:40	28-May-2020 13:45	28-May-2020 12:05	
Compound	CAS Number	LOR	Unit	EW2002506-011	EW2002506-012	EW2002506-013	EW2002506-014	EW2002506-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	5.2	6.0	4.6	4.9	4.6	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	28900	19700	3380	5430	2590	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	18000	13800	2040	3140	1390	
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	6	77	<1	<1	<1	
Total Alkalinity as CaCO3	----	1	mg/L	6	77	<1	<1	<1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.14	2.55	0.10	0.13	0.06	
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	0.54	0.04	0.05	<0.01	0.04	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.54	0.04	0.05	<0.01	0.04	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	10.3	4.4	0.6	0.6	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	10.8	4.4	0.6	0.6	0.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.82	<0.05	<0.01	<0.01	<0.01	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	7.74	5.04	3.79	4.47	3.89	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.96	1.95	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			ML-4	ML-5	----	----	----
		Client sampling date / time			28-May-2020 11:50	28-May-2020 13:05	----	----	----
Compound	CAS Number	LOR	Unit	EW2002506-016	EW2002506-017	-----	-----	-----	
				Result	Result	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	4.7	4.7	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3090	3850	----	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	1920	2180	----	----	----	
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	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.12	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.04	0.02	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.02	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	0.6	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.02	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	3.82	4.11	----	----	----	