

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW2205083**  
**Client** : **KIAMA COUNCIL**  
**Contact** : **MS JULIE MILEVSKI**  
**Address** : **11 MANNING STREET**  
**KIAMA NSW, AUSTRALIA 2533**  
**Telephone** : **+61 02 4232 0557**  
**Project** : **Gerroa Landfill**  
**Order number** : **16302**  
**C-O-C number** : **----**  
**Sampler** : **Michael Santos, Tom Roose**  
**Site** : **Gerroa Landfill**  
**Quote number** : **WO/010/2021**  
**No. of samples received** : **17**  
**No. of samples analysed** : **17**

**Page** : 1 of 7  
**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** : 04-Nov-2022 15:36  
**Date Analysis Commenced** : 04-Nov-2022  
**Issue Date** : 15-Nov-2022 17:00



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>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	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 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.**
- It has been noted that Nitrite is greater than NO<sub>x</sub>, however this difference is within the limits of experimental variation #6
- It has been noted that Ammonia is greater than TKN, however this difference is within the limits of experimental variation #8
- 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 and Bailer Method.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1D	MW1S	MW3	MW4	MW5
Sampling date / time				04-Nov-2022 12:30	04-Nov-2022 13:00	04-Nov-2022 12:20	04-Nov-2022 10:30	04-Nov-2022 12:00	
Compound	CAS Number	LOR	Unit	EW2205083-001	EW2205083-002	EW2205083-003	EW2205083-004	EW2205083-005	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	8.2	6.8	7.8	7.3	8.3	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	376	148	649	502	389	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	202	82	345	282	242	
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	200	34	313	245	200	
Total Alkalinity as CaCO3	----	1	mg/L	200	34	313	245	200	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.57	0.09	1.25	0.18	0.02	
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02	
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	<0.01	0.02	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.6	2.2	0.6	0.4	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	0.6	2.2	0.6	0.4	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.24	0.20	0.62	1.30	0.10	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	3.57	2.05	3.01	4.36	3.55	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	2.42	2.48	2.78	3.37	3.33	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6D	MW6S	MW7D	MW7S	MW9
Sampling date / time				04-Nov-2022 10:46	04-Nov-2022 10:50	04-Nov-2022 11:25	04-Nov-2022 11:42	04-Nov-2022 11:30	
Compound	CAS Number	LOR	Unit	EW2205083-006	EW2205083-007	EW2205083-008	EW2205083-009	EW2205083-010	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	7.5	6.8	7.6	7.2	7.4	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	843	327	791	253	576	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	464	174	414	138	310	
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	426	87	266	107	153	
Total Alkalinity as CaCO3	----	1	mg/L	426	87	266	107	153	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	11.0	<0.01	4.32	<0.01	0.14	
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01	
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	<0.01	0.02	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	12.1	0.9	4.2	0.9	1.9	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	12.1	0.9	4.2	0.9	1.9	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	18.2	0.16	1.04	0.30	0.36	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	5.40	6.27	1.98	3.35	3.43	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	4.00	3.75	3.78	3.60	1.50	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW10	MW11	ML-1	ML-2	ML-3
Sampling date / time				04-Nov-2022 13:35	04-Nov-2022 13:18	04-Nov-2022 14:15	04-Nov-2022 13:45	04-Nov-2022 14:09	
Compound	CAS Number	LOR	Unit	EW2205083-011	EW2205083-012	EW2205083-013	EW2205083-014	EW2205083-015	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	6.7	6.6	7.4	6.9	7.5	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	156	217	416	1810	423	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	94	130	237	905	214	
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	36	59	59	79	63	
Total Alkalinity as CaCO3	----	1	mg/L	36	59	59	79	63	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.10	0.20	0.69	0.23	
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.04	<0.01	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	0.04	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.8	2.0	1.1	1.5	1.1	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	2.8	2.0	1.1	1.5	1.1	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.84	0.36	0.10	0.10	0.18	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	4.17	3.01	4.67	4.63	3.24	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	1.90	1.92	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	ML-4	ML-5	----	----	----
Sampling date / time			04-Nov-2022 14:20	04-Nov-2022 13:25	----	----	----	
Compound	CAS Number	LOR	Unit	EW2205083-016	EW2205083-017	-----	-----	-----
				Result	Result	----	----	----
<b>EA005FD: Field pH</b>								
pH	----	0.1	pH Unit	7.2	7.0	----	----	----
<b>EA010FD: Field Conductivity</b>								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	415	515	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	262	292	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	60	77	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	60	77	----	----	----
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	0.20	1.05	----	----	----
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	----	----	----
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	----	----	----
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.9	----	----	----
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	1.9	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	----	0.01	mg/L	0.11	0.08	----	----	----
<b>EP025FD: Field Dissolved Oxygen</b>								
Dissolved Oxygen	----	0.01	mg/L	2.99	3.17	----	----	----

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Work Order : EW2205083  
Client : KIAMA COUNCIL  
Project : Gerroa Landfill

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### ***Inter-Laboratory Testing***

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

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK062G: Total Nitrogen as N (TKN + NO<sub>x</sub>) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NO<sub>x</sub>) by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser

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