

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1904993**  
**Client** : **KIAMA COUNCIL**  
**Contact** : **MR PAUL CZULOWSKI**  
**Address** : **11 MANNING STREET**  
**KIAMA NSW, AUSTRALIA 2533**

**Telephone** : **+61 02 4232 0444**  
**Project** : **Gerroa Landfill**  
**Order number** : **126591**  
**C-O-C number** : **----**  
**Sampler** : **Duncan McIntosh**  
**Site** : **Gerroa Landfill**  
**Quote number** : **WO/016/18**  
**No. of samples received** : **17**  
**No. of samples analysed** : **17**

**Page** : 1 of 6  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Glenn Davies  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
 4/13 Geary Pl, North Nowra 2541  
 Australia NSW Australia

**Telephone** : 02 42253125  
**Date Samples Received** : 22-Nov-2019 15:51  
**Date Analysis Commenced** : 22-Nov-2019  
**Issue Date** : 29-Nov-2019 13:45



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 the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
^ = This result is computed from individual analyte detections at or above the level of reporting  
ø = ALS is not NATA accredited for these tests.  
~ = Indicates an estimated value.

- EK061G/EK062G: LOR raised for TKN/TN on various samples due to sample matrix.
- EK055G: It has been noted that Ammonia is greater than TKN on various samples, however this difference is within the limits of experimental variation.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling completed as per EN/67.11 Groundwater Sampling.
- Field tests completed on day of sampling/receipt.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW1D	MW1S	MW3	MW4	MW5
Client sampling date / time				22-Nov-2019 10:50	22-Nov-2019 10:55	22-Nov-2019 10:15	22-Nov-2019 08:45	22-Nov-2019 10:00	
Compound	CAS Number	LOR	Unit	EW1904993-001	EW1904993-002	EW1904993-003	EW1904993-004	EW1904993-005	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	7.2	----	7.4	7.0	7.8	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1760	----	526	821	390	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	879	----	337	436	236	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	479	----	253	364	154	
Total Alkalinity as CaCO3	----	1	mg/L	479	----	253	364	154	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	35.0	----	0.38	0.10	0.05	
<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	
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	<0.01	0.06	0.02	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	<0.01	0.06	0.02	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	34.2	----	0.8	0.7	0.6	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	34.2	----	0.8	0.8	0.6	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.22	----	0.19	1.06	0.10	
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	----	dry	----	----	----	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	1.22	----	3.12	3.90	3.72	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	3.89	----	4.25	4.78	4.02	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW6D	MW6S	MW7D	MW7S	MW9
Client sampling date / time				22-Nov-2019 09:10	22-Nov-2019 08:55	22-Nov-2019 09:30	22-Nov-2019 09:40	22-Nov-2019 13:40	
Compound	CAS Number	LOR	Unit	EW1904993-006	EW1904993-007	EW1904993-008	EW1904993-009	EW1904993-010	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	7.0	----	7.1	7.7	6.2	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1890	----	1140	691	27100	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	934	----	584	378	17800	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	769	----	435	210	65	
Total Alkalinity as CaCO3	----	1	mg/L	769	----	435	210	65	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	57.0	----	20.0	0.32	0.03	
<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	
<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	0.52	
<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	0.52	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	52.2	----	18.5	0.5	2.3	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	52.2	----	18.5	0.5	2.8	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	2.62	----	0.80	0.18	0.28	
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	----	dry	----	----	----	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	1.27	----	1.29	3.49	4.48	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	5.08	----	4.85	4.70	1.83	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW10	MW11	ML-1	ML-2	ML-3
Client sampling date / time				22-Nov-2019 13:50	22-Nov-2019 13:20	22-Nov-2019 12:15	22-Nov-2019 14:30	22-Nov-2019 12:30	
Compound	CAS Number	LOR	Unit	EW1904993-011	EW1904993-012	EW1904993-013	EW1904993-014	EW1904993-015	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	4.9	6.7	6.8	6.9	6.7	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	33000	5770	41700	46000	34400	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	23400	3030	28200	31000	22800	
<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	4	205	134	128	118	
Total Alkalinity as CaCO3	----	1	mg/L	4	205	134	128	118	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	4.24	0.47	0.03	0.16	
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.06	<0.01	<0.01	
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L	0.24	<0.01	0.03	<0.01	<0.01	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	0.24	<0.01	0.09	<0.01	<0.01	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	7.3	<0.5	<0.5	<0.5	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	7.3	<0.5	<0.5	<0.5	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.52	0.19	0.16	0.24	0.32	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	4.71	3.54	316	2.87	1.34	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	2.21	2.25	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			ML-4	ML-5	----	----	----
		Client sampling date / time			22-Nov-2019 12:20	22-Nov-2019 13:30	----	----	----
Compound	CAS Number	LOR	Unit	EW1904993-016	EW1904993-017	-----	-----	-----	
				Result	Result	----	----	----	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	6.7	6.8	----	----	----	
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	40200	41000	----	----	----	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	26100	28800	----	----	----	
<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	124	174	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	124	174	----	----	----	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.52	1.93	----	----	----	
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.09	----	----	----	
<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	0.02	0.10	----	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	2.1	----	----	----	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	2.2	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.22	0.32	----	----	----	
<b>EP025FD: Field Dissolved Oxygen</b>									
Dissolved Oxygen	----	0.01	mg/L	1.86	2.39	----	----	----	