CERTIFICATE OF ANALYSIS

Work Order	: **EW2405441**	Page	: 1 of 10
Client	: **KIAMA COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Guy Stearn	Contact	: Aneta Prosaroski
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Telephone	: ----	Telephone	: 02 42253125
Project	: Gerroa Landfill Quarterly	Date Samples Received	: 27-Nov-2024 14:40
Order number	: PO32438	Date Analysis Commenced	: 27-Nov-2024
C-O-C number	: ----	Issue Date	: 18-Dec-2024 18:02
Sampler	: Michael Santos, Robert DaLio		
Site	: ----		
Quote number	: EW23KIACOU0003 V2		
No. of samples received	: 20		
No. of samples analysed	: 20		

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.

Signatories	*Position*	*Accreditation Category*
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.

- It has been noted that Ammonia is greater than TKN, however this difference is within the limits of experimental variation.
- TDS by method EA-015 sample 2,3 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- 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.
- ORP (Oxidation Reduction Potential) performed by ALS Wollongong via in-house method EA075FD 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.
- 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 EP025FD 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”.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW 1D	MW 1S	MW 3	MW 4	MW 5
			Sampling date / time	27-Nov-2024 11:00	27-Nov-2024 11:12	27-Nov-2024 10:28	27-Nov-2024 12:27	27-Nov-2024 10:07
Compound	CAS Number	LOR	Unit	EW2405441-001	EW2405441-002	EW2405441-003	EW2405441-004	EW2405441-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.5**	**5.9**	**7.4**	**6.9**	**7.8**
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.27**	**6.13**	**7.02**	**7.02**	**7.41**
EA010FD: Field Conductivity								
Conductivity @ 25oC	----	1	µS/cm	**415**	**135**	**533**	**516**	**309**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**263**	**130**	**366**	**308**	**196**
EA116: Temperature								
Temperature	----	0.5	°C	**18.3**	**18.5**	**17.4**	**18.2**	**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	**156**	**40**	**172**	**239**	**130**
Total Alkalinity as CaCO3	----	1	mg/L	**156**	**40**	**172**	**239**	**130**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.40**	**0.08**	**0.32**	**0.18**	**0.02**
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	<0.01	<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	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.7**	**1.8**	**1.2**	**0.6**	**0.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.7**	**1.8**	**1.2**	**0.6**	**0.3**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	**0.08**	**0.12**	<0.01	**0.04**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW 1D	MW 1S	MW 3	MW 4	MW 5
			Sampling date / time	27-Nov-2024 11:00	27-Nov-2024 11:12	27-Nov-2024 10:28	27-Nov-2024 12:27	27-Nov-2024 10:07
Compound	CAS Number	LOR	Unit	EW2405441-001	EW2405441-002	EW2405441-003	EW2405441-004	EW2405441-005
				Result	Result	Result	Result	Result
EP025FD: Field Dissolved Oxygen								
Dissolved Oxygen	----	0.01	mg/L	<0.01	**1.07**	<0.01	<0.01	<0.01
QWI-EN 67.11 Sampling of Groundwaters								
Depth	----	0.01	m	**3.44**	**3.50**	**3.79**	**4.27**	**4.13**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW 6D	MW 6S	MW 7D	MW 7S	MW 9
			Sampling date / time	27-Nov-2024 09:18	27-Nov-2024 00:00	27-Nov-2024 09:48	27-Nov-2024 09:36	27-Nov-2024 09:00
Compound	CAS Number	LOR	Unit	EW2405441-006	EW2405441-007	EW2405441-008	EW2405441-009	EW2405441-010
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.0**	**----**	**7.2**	**6.6**	**6.8**
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.30**	**----**	**7.33**	**6.72**	**6.79**
EA010FD: Field Conductivity								
Conductivity @ 25oC	----	1	µS/cm	**1550**	**----**	**62**	**335**	**2230**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**844**	**----**	**335**	**218**	**1330**
EA116: Temperature								
Temperature	----	0.5	°C	**18.5**	**----**	**17.8**	**17.6**	**19.3**
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	**615**	**----**	**270**	**106**	**152**
Total Alkalinity as CaCO3	----	1	mg/L	**615**	**----**	**270**	**106**	**152**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**21.2**	**----**	**4.19**	**0.06**	**0.27**
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	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	**----**	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**22.1**	**----**	**5.4**	**0.5**	**1.7**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**22.1**	**----**	**5.4**	**0.5**	**1.7**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	**----**	<0.01	**0.05**	**0.07**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW 6D	MW 6S	MW 7D	MW 7S	MW 9
				Sampling date / time	27-Nov-2024 09:18	27-Nov-2024 00:00	27-Nov-2024 09:48	27-Nov-2024 09:36	27-Nov-2024 09:00
Compound	CAS Number	LOR	Unit		EW2405441-006	EW2405441-007	EW2405441-008	EW2405441-009	EW2405441-010
					Result	Result	Result	Result	Result
EN67 PK: Field Tests									
Field Observations	----	0.01	--		**----**	**DRY**	**----**	**----**	**----**
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**0.11**	**----**	<0.01	<0.01	**1.53**
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m		**4.99**	**----**	**4.38**	**4.11**	**1.07**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW 10	MW 11	MW 12	MW 13	MW 14
			Sampling date / time	27-Nov-2024 09:25	27-Nov-2024 10:00	27-Nov-2024 12:00	27-Nov-2024 11:44	27-Nov-2024 10:47
Compound	CAS Number	LOR	Unit	EW2405441-011	EW2405441-012	EW2405441-013	EW2405441-014	EW2405441-015
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	**5.7**	**6.0**	**7.4**	**7.6**	**7.3**
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.74**	**6.04**	**7.58**	**7.58**	**7.63**
EA010FD: Field Conductivity								
Conductivity @ 25oC	----	1	µS/cm	**10600**	**7420**	**927**	**501**	**1770**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**7510**	**4870**	**499**	**260**	**846**
EA116: Temperature								
Temperature	----	0.5	°C	**19.2**	**19.2**	**18.2**	**18.1**	**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	**28**	**47**	**308**	**209**	**450**
Total Alkalinity as CaCO3	----	1	mg/L	**28**	**47**	**308**	**209**	**450**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.47**	**0.39**	**12.3**	**5.55**	**28.7**
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	**0.02**	<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	**0.02**	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**3.6**	**2.6**	**13.5**	**5.4**	**31.7**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**3.6**	**2.6**	**13.5**	**5.4**	**31.7**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.01**	**0.02**	**0.01**	**0.01**	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW 10	MW 11	MW 12	MW 13	MW 14
				Sampling date / time	27-Nov-2024 09:25	27-Nov-2024 10:00	27-Nov-2024 12:00	27-Nov-2024 11:44	27-Nov-2024 10:47
Compound	CAS Number	LOR	Unit		EW2405441-011	EW2405441-012	EW2405441-013	EW2405441-014	EW2405441-015
					Result	Result	Result	Result	Result
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**2.02**	**2.07**	<0.01	<0.01	<0.01
QWI-EN 67.11 Sampling of Groundwaters									
Depth	----	0.01	m		**1.47**	**1.50**	**3.15**	**3.39**	**2.89**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	ML-1	ML-2	ML-3	ML-4	ML-5
			Sampling date / time	27-Nov-2024 10:55	27-Nov-2024 10:18	27-Nov-2024 11:21	27-Nov-2024 11:08	27-Nov-2024 09:09
Compound	CAS Number	LOR	Unit	EW2405441-016	EW2405441-017	EW2405441-018	EW2405441-019	EW2405441-020
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.2	7.2	7.4	7.5	7.0
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.01	7.12	7.13	7.09	7.00
EA010FD: Field Conductivity								
Conductivity @ 25oC	----	1	µS/cm	38600	39600	8460	8860	37800
EA075FD: Field Redox Potential								
Redox Potential	----	0.1	mV	199	155	200	183	109
EA116: Temperature								
Temperature	----	0.5	°C	26.1	25.8	24.2	24.2	23.8
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	130	131	127	129	128
Total Alkalinity as CaCO3	----	1	mg/L	130	131	127	129	128
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.03	0.05	0.06	0.16
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	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.3	1.4	3.0	1.5
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	1.3	1.4	3.0	1.5
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.06	0.20	0.06	0.21	0.11

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ML-1	ML-2	ML-3	ML-4	ML-5
				Sampling date / time	27-Nov-2024 10:55	27-Nov-2024 10:18	27-Nov-2024 11:21	27-Nov-2024 11:08	27-Nov-2024 09:09
Compound	CAS Number	LOR	Unit		EW2405441-016	EW2405441-017	EW2405441-018	EW2405441-019	EW2405441-020
					Result	Result	Result	Result	Result
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**5.01**	**4.77**	**3.58**	**5.03**	**2.91**

Inter-Laboratory Testing

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

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EA005P: pH by PC Titrator

(WATER) EK071G: Reactive Phosphorus as P by discrete analyser

(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) 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) EA015: Total Dissolved Solids dried at 180 ± 5 °C

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