

CERTIFICATE OF ANALYSIS

Work Order : **EW2300833**
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 : PO00019074
C-O-C number : ----
Sampler : Robert DaLio
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 : 24-Feb-2023 15:30
Date Analysis Commenced : 24-Feb-2023
Issue Date : 07-Mar-2023 17:37



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 | Environmental Services Representative | 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.**
- EK055G: LOR raised for Ammonia due to sample matrix
- EK059G: LOR raised for NOx due to sample matrix
- EK061G: LOR raised for TKN due to sample matrix
- EK067G: LOR raised for TP due to sample matrix
- TDS by method EA-015 may bias high for sample 2 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- TDS by method EA-015 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.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling High Flow 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 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 | | | | 24-Feb-2023 11:00 | 24-Feb-2023 10:45 | 24-Feb-2023 10:25 | 24-Feb-2023 11:35 | 24-Feb-2023 10:10 | |
| Compound | CAS Number | LOR | Unit | EW2300833-001 | EW2300833-002 | EW2300833-003 | EW2300833-004 | EW2300833-005 | |
| | | | | Result | Result | Result | Result | Result | |
| EA005FD: Field pH | | | | | | | | | |
| pH | ---- | 0.1 | pH Unit | 7.5 | 6.2 | 7.3 | 6.9 | 8.1 | |
| EA010FD: Field Conductivity | | | | | | | | | |
| Electrical Conductivity (Non Compensated) | ---- | 1 | µS/cm | 337 | 203 | 564 | 440 | 238 | |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 234 | 128 | 393 | 292 | 141 | |
| 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 | 190 | 45 | 282 | 260 | 120 | |
| Total Alkalinity as CaCO3 | ---- | 1 | mg/L | 190 | 45 | 282 | 260 | 120 | |
| EK055G: Ammonia as N by Discrete Analyser | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | 0.47 | 0.26 | 0.56 | 0.24 | 0.12 | |
| 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 | 0.20 | 0.09 | 0.02 | |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | <0.01 | <0.01 | 0.20 | 0.09 | 0.02 | |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 1.4 | 2.4 | 2.3 | 1.4 | 0.6 | |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 1.4 | 2.4 | 2.5 | 1.5 | 0.6 | |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 0.28 | 0.28 | 0.40 | 1.26 | 0.13 | |
| EP025FD: Field Dissolved Oxygen | | | | | | | | | |
| Dissolved Oxygen | ---- | 0.01 | mg/L | 1.40 | 2.30 | 2.70 | 2.13 | 2.40 | |
| FWI-EN/001: Groundwater Sampling - Depth | | | | | | | | | |
| Depth | ---- | 0.01 | m | 3.41 | 3.49 | 3.86 | 4.42 | 4.34 | |



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | | Sample ID | MW6D | MW6S | MW7D | MW7S | MW9 |
|---|-------------|------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| Sampling date / time | | | | 24-Feb-2023 09:20 | 24-Feb-2023 09:15 | 24-Feb-2023 09:53 | 24-Feb-2023 09:40 | 24-Feb-2023 00:00 | |
| Compound | CAS Number | LOR | Unit | EW2300833-006 | EW2300833-007 | EW2300833-008 | EW2300833-009 | EW2300833-010 | |
| | | | | Result | Result | Result | Result | Result | |
| EA005FD: Field pH | | | | | | | | | |
| pH | ---- | 0.1 | pH Unit | 7.2 | ---- | 7.3 | 7.4 | ---- | |
| EA010FD: Field Conductivity | | | | | | | | | |
| Electrical Conductivity (Non Compensated) | ---- | 1 | µS/cm | 1050 | ---- | 574 | 482 | ---- | |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 580 | ---- | 357 | 337 | ---- | |
| 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 | 459 | ---- | 226 | 238 | ---- | |
| Total Alkalinity as CaCO3 | ---- | 1 | mg/L | 459 | ---- | 226 | 238 | ---- | |
| EK055G: Ammonia as N by Discrete Analyser | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | 27.1 | ---- | 2.79 | 0.07 | ---- | |
| 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 | ---- | |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 30.4 | ---- | 3.6 | 2.2 | ---- | |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 30.4 | ---- | 3.6 | 2.2 | ---- | |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 4.07 | ---- | 0.94 | 0.52 | ---- | |
| EN67 PK: Field Tests | | | | | | | | | |
| Field Observations | ---- | 0.01 | -- | ---- | DRY | ---- | ---- | NO ACCESS | |
| EP025FD: Field Dissolved Oxygen | | | | | | | | | |
| Dissolved Oxygen | ---- | 0.01 | mg/L | 1.50 | ---- | 1.81 | 1.80 | ---- | |
| FWI-EN/001: Groundwater Sampling - Depth | | | | | | | | | |
| Depth | ---- | 0.01 | m | 4.81 | ---- | 4.56 | 4.42 | ---- | |



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | | Sample ID | MW10 | MW11 | ML-1 | ML-2 | ML-3 |
|---|-------------|------|---------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Sampling date / time | | | | 24-Feb-2023 00:00 | 24-Feb-2023 00:00 | 24-Feb-2023 12:25 | 24-Feb-2023 13:15 | 24-Feb-2023 00:00 | |
| Compound | CAS Number | LOR | Unit | EW2300833-011 | EW2300833-012 | EW2300833-013 | EW2300833-014 | EW2300833-015 | |
| | | | | Result | Result | Result | Result | Result | |
| EA005FD: Field pH | | | | | | | | | |
| pH | ---- | 0.1 | pH Unit | ---- | ---- | 7.0 | 7.5 | ---- | |
| EA010FD: Field Conductivity | | | | | | | | | |
| Electrical Conductivity (Non Compensated) | ---- | 1 | µS/cm | ---- | ---- | 1540 | 36600 | ---- | |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | ---- | ---- | 990 | 26300 | ---- | |
| 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 | ---- | ---- | 118 | 116 | ---- | |
| Total Alkalinity as CaCO3 | ---- | 1 | mg/L | ---- | ---- | 118 | 116 | ---- | |
| EK055G: Ammonia as N by Discrete Analyser | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | ---- | ---- | 0.35 | <0.10 | ---- | |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | ---- | ---- | <0.01 | 0.02 | ---- | |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | ---- | ---- | <0.01 | <0.10 | ---- | |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | ---- | ---- | <0.01 | <0.10 | ---- | |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | ---- | ---- | 1.4 | <1.0 | ---- | |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | ---- | ---- | 1.4 | <1.0 | ---- | |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | ---- | ---- | 0.05 | <0.10 | ---- | |
| EN67 PK: Field Tests | | | | | | | | | |
| Field Observations | ---- | 0.01 | -- | NO ACCESS | NO ACCESS | ---- | ---- | NO ACCESS | |
| EP025FD: Field Dissolved Oxygen | | | | | | | | | |
| Dissolved Oxygen | ---- | 0.01 | mg/L | ---- | ---- | 5.33 | 6.65 | ---- | |



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | Sample ID | | ML-4 | ML-5 | ---- | ---- | ---- |
|---|-------------|----------------------|---------|-------------------|-------------------|-------|-------|-------|
| | | Sampling date / time | | 24-Feb-2023 12:35 | 24-Feb-2023 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | EW2300833-016 | EW2300833-017 | ----- | ----- | ----- |
| | | | | Result | Result | ---- | ---- | ---- |
| EA005FD: Field pH | | | | | | | | |
| pH | ---- | 0.1 | pH Unit | 6.8 | ---- | ---- | ---- | ---- |
| EA010FD: Field Conductivity | | | | | | | | |
| Electrical Conductivity (Non Compensated) | ---- | 1 | µS/cm | 1000 | ---- | ---- | ---- | ---- |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 658 | ---- | ---- | ---- | ---- |
| 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 | 113 | ---- | ---- | ---- | ---- |
| Total Alkalinity as CaCO3 | ---- | 1 | mg/L | 113 | ---- | ---- | ---- | ---- |
| EK055G: Ammonia as N by Discrete Analyser | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | 0.22 | ---- | ---- | ---- | ---- |
| 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 | <0.01 | ---- | ---- | ---- | ---- |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | <0.01 | ---- | ---- | ---- | ---- |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 1.3 | ---- | ---- | ---- | ---- |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 1.3 | ---- | ---- | ---- | ---- |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 0.07 | ---- | ---- | ---- | ---- |
| EN67 PK: Field Tests | | | | | | | | |
| Field Observations | ---- | 0.01 | -- | ---- | NO ACCESS | ---- | ---- | ---- |
| EP025FD: Field Dissolved Oxygen | | | | | | | | |
| Dissolved Oxygen | ---- | 0.01 | mg/L | 3.27 | ---- | ---- | ---- | ---- |



Inter-Laboratory Testing

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

(WATER) EK059G: Nitrite plus Nitrate as N (NO_x) 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

(WATER) ED037P: Alkalinity by PC Titrator

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

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser