2022/2023 ANNUAL MONITORING REPORT - CRESWICK LANDFILL

Hepburn Shire Council

17/01/2024

Author:
Lucy Edwards
Ping Yao

COMMERCIAL IN CONFIDENCE

Issue/Rev	Date	Revision Description	By	Checked	Approved
Rpt0627 – 0.1	17/01/2024	Draft	Lucy Edwards Ping Yao	Lucy Edwards Ping Yao	Bryan Woods
Rpt0627 – 0.2	9/02/2024	Final - Client to Review	Lucy Edwards Ping Yao	Lucy Edwards Ping Yao	Bryan Woods

Table of Contents

EXECUTIVE SUMMARY

Ventia Utility Services Pty Ltd has been engaged by the Hepburn Shire Council to undertake groundwater and landfill gas monitoring and reporting at the Creswick landfill site. This report summarises the major findings of the 2022/2023 monitoring program and provides further interpretation of results.

The monitoring program is required to satisfy specific Environmental Performance Conditions detailed in the Creswick Landfill, Aftercare Management Plan, Part 2: Environmental Risk Assessment and Monitoring Program, prepared by Mackenzie Environmental in 2015 for the Hepburn Shire Council.

The environmental monitoring program comprises of quarterly gas bore monitoring, groundwater and surface water monitoring and surface emissions and underground services monitoring, with an annual cap walk over. The monitoring network consists of ten groundwater monitoring locations, three leachate bores and five surface water sites (three creek sites, one wetland, one dredge hole and one leachate pond), four subsurface gas bore monitoring locations, as well as landfill cap surface emissions, building and underground services monitoring.

GROUNDWATER

All groundwater sites exceeded at least one of the adopted assessment criteria during each monitoring event (ANZECC 2000 guidelines for Fresh Water 95%, Irrigation and Livestock and the groundwater quality objectives as nominated by the Aftercare Management Plan). Results were in line with historic trends at the majority of monitoring bores.

ANZECC 2000 Fresh Water 95% guideline had zinc exceedances at all bores and all events in the 2022/2023 monitoring period. The ANZECC 2000 Irrigation guidelines had groundwater bore exceedances throughout the monitoring events for the following analytes: Chloride at all sites (except BH8), sodium at all sites (except B6 and B10) and chromium (III+VI) at BH8 in February 2023. The only TDS exceedance was detected at BH3 in May 2023, which breached the ANZECC 2000 Livestock guidelines.

SURFACE WATER

During the 2022/2023 monitoring program all surface water sites exceeded one or more of the surface water quality objectives adopted for assessment criteria (nominated by the Aftercare Management Plan). There were no exceedances for these quality objectives throughout the program for TDS, calcium, magnesium or sulphate.

All surface water locations had chloride exceedances above the ANZECC Irrigation 2000 Guidelines, and the Leachate Pond, Wetland and Dredge Hole also had exceedances in sodium. All sites also had exceedances against the ANZECC 2000 Freshwater guidelines for zinc during at least one sampling event (except the Dredge hole). Results throughout 2022/2023 were generally consistent with historical data. It is difficult to determine the impact of the landfill in isolation of surrounding land uses.

LEACHATE

LB2 and LB3 had leachate levels that exceeded the maximum allowable leachate levels during the 2022/2023 events. LB2 was 0.1 m above these levels in May 2023 while LB3 exceeded during all monitoring events. The average exceedance at LB3 was 0.71 m and the highest exceedance was 0.91 m in November 2022.

Subsurface Landfill Gas

Subsurface landfill gas monitoring was performed in September and November 2022 and February and May 2023. There are four dedicated gas bores gauged, however BH12 landfill gas concentration results are not compared against the adopted action levels given its location within the waste mass. Peak Methane concentrations at BH9, BH10 and BH11 did not exceed the assessment criteria levels during any of the monitoring events. Peak carbon dioxide concentrations exceeded the assessment criteria levels at BH9 and BH10 in November 2022. During the other three gauging events in 2022/2023 there were no further exceedances in BH9, BH10 or BH11. BH12, (located within the waste mass), displays expected high levels of methane and carbon dioxide.

Surface Emmisson Landfill Gas

All methane surface emission readings recorded for the capped landfill surface, buildings, structures and underground services during the 2022/2023 monitoring events were below the prescribed Landfill BPEM action levels indicating very low surface emission methane levels onsite.

1. INTRODUCTION

Ventia Utility Services Pty Ltd (Ventia) was engaged by Hepburn Shire Council to undertake groundwater and landfill gas monitoring and reporting at the former Creswick Landfill located at 32 Anne Street, Creswick, Victoria (the site) and current Creswick Transfer Station located on the Ring Road in Creswick, approximately 1.4 km north-west of the city centre.

The landfill operated from the 1960s and is believed to have closed in 2001. When licensed, the landfill could accept a range of wastes including municipal solid waste. It was in the void of a former gold mine and gravel quarry and after it closed, the landfill was capped in 2001. The site is now the location of a transfer station.

2. MONITORING PROGRAM OVERVIEW

2.1. Site Context

Landfill monitoring is undertaken at this site in response to EPA Pollution Abatement Notices (PANs ID 9003558 and 9003559) issued in relation to the rehabilitation of the site. The original PANs were to prepare a hydrogeological assessment and the preparation of a landfill cap assessment. The assessments (Mackenzie Environmental, 2015a; 2015b; 2015c, and Senversa, 2016) were satisfied by EPA in 2016 (PAN ID 90006899). The monitoring program is a response to the assessments. The monitoring program is required to satisfy specific Environmental Performance Conditions detailed in the Creswick Landfill Aftercare Management Plan Part 2: Environmental Risk Assessment and Monitoring Program, prepared by Mackenzie Environmental in 2015 for the Hepburn Shire Council.

The landfill is in a former gold mine and gravel quarry and operated from the 1960s and closed in 2001. The landfill was capped in 2001 and now operates as a waste transfer station. The site is located approximately one kilometre from the Creswick town centre and is bounded by unoccupied land to the west and north-west which includes a flooded mine. Creswick Creek is 70 meters north of the site. There is privately owned semi-rural land to the south.

2.2. Scope of Works

Ventia was engaged to undertake groundwater, surface water and landfill gas monitoring at the Creswick landfill comprising:

- Quarterly monitoring of the 10 groundwater bores;
- Quarterly monitoring of the 3 leachate bores and the leachate pond;
- Quarterly monitoring of the 3 creek sites, dredge hole and wetland;
- Quarterly monitoring of 4 landfill gas bores;
- Quarterly monitoring of the buildings and services; and
- Annual surface emissions monitoring of the landfill cap.

A map of the landfill gas bores, buildings and service locations, walk over grid, groundwater and surface Water sites is provided in Figure 1, Figure 2, Figure 3 and Figure 4.

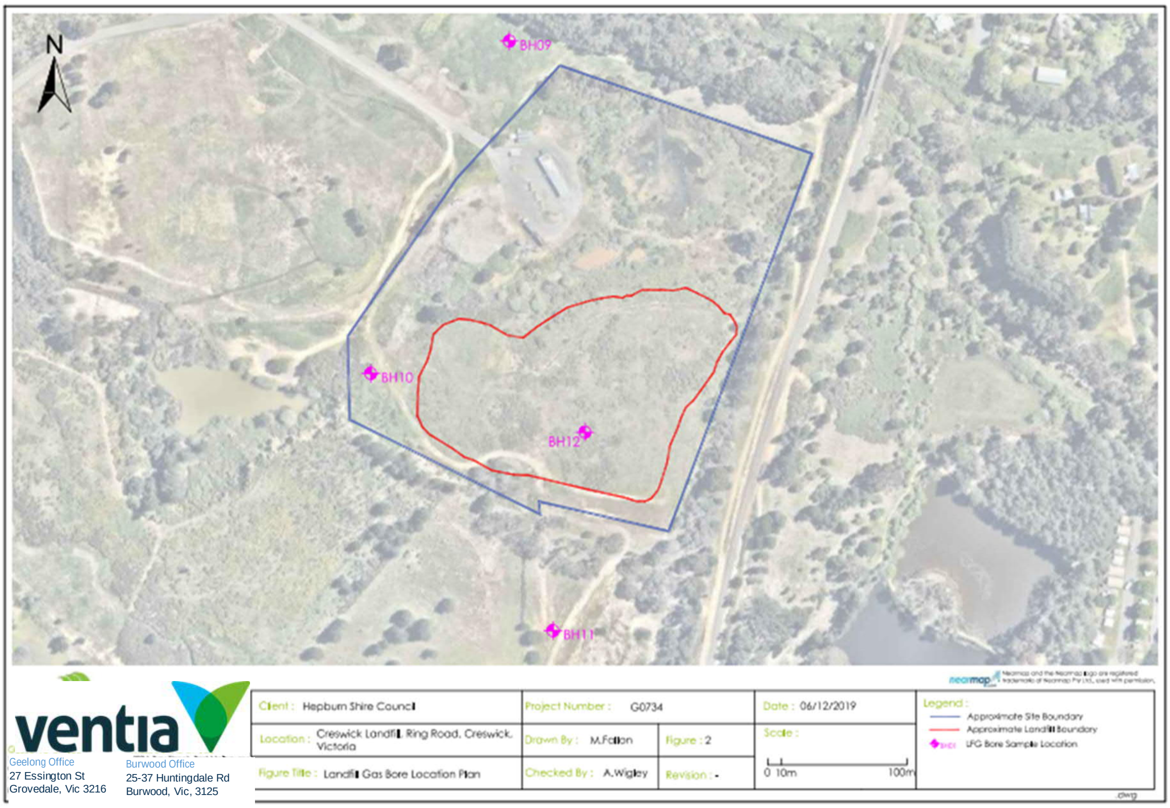


Figure 1 Site location and Landfill Gas Bores

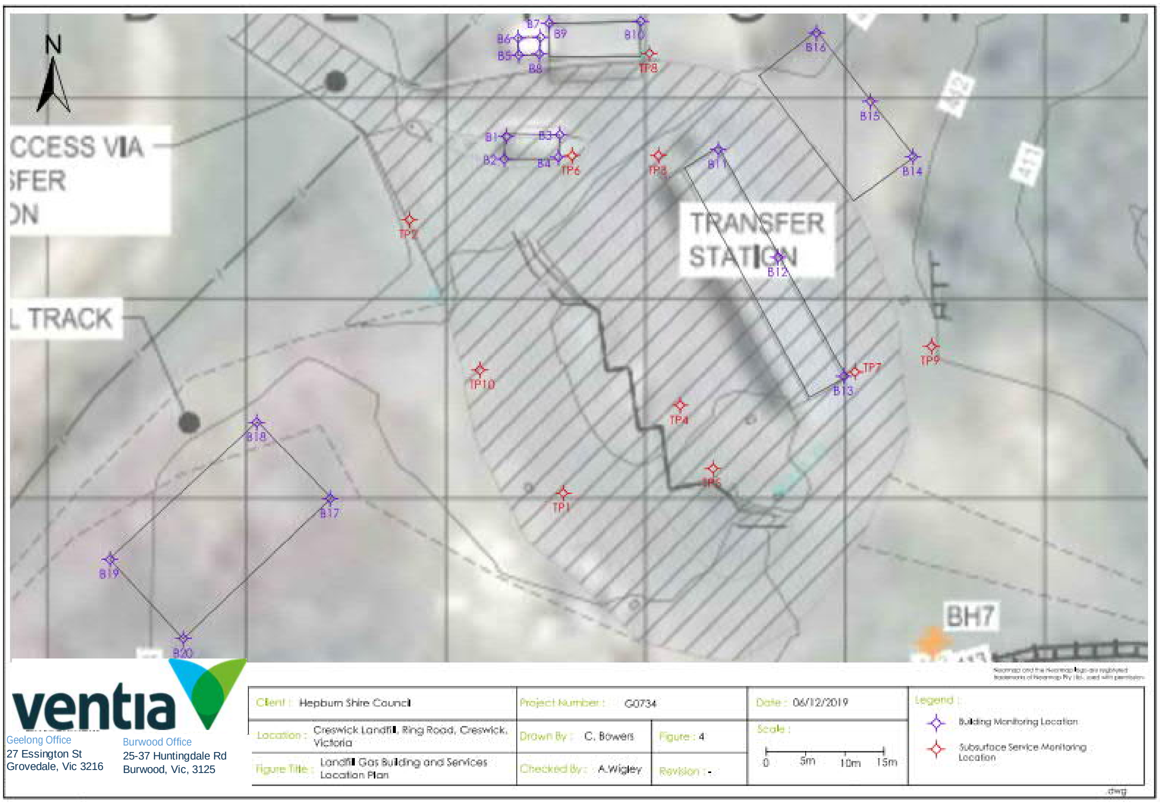


Figure 2 Buildings and Service Pits Gas Monitoring Locations

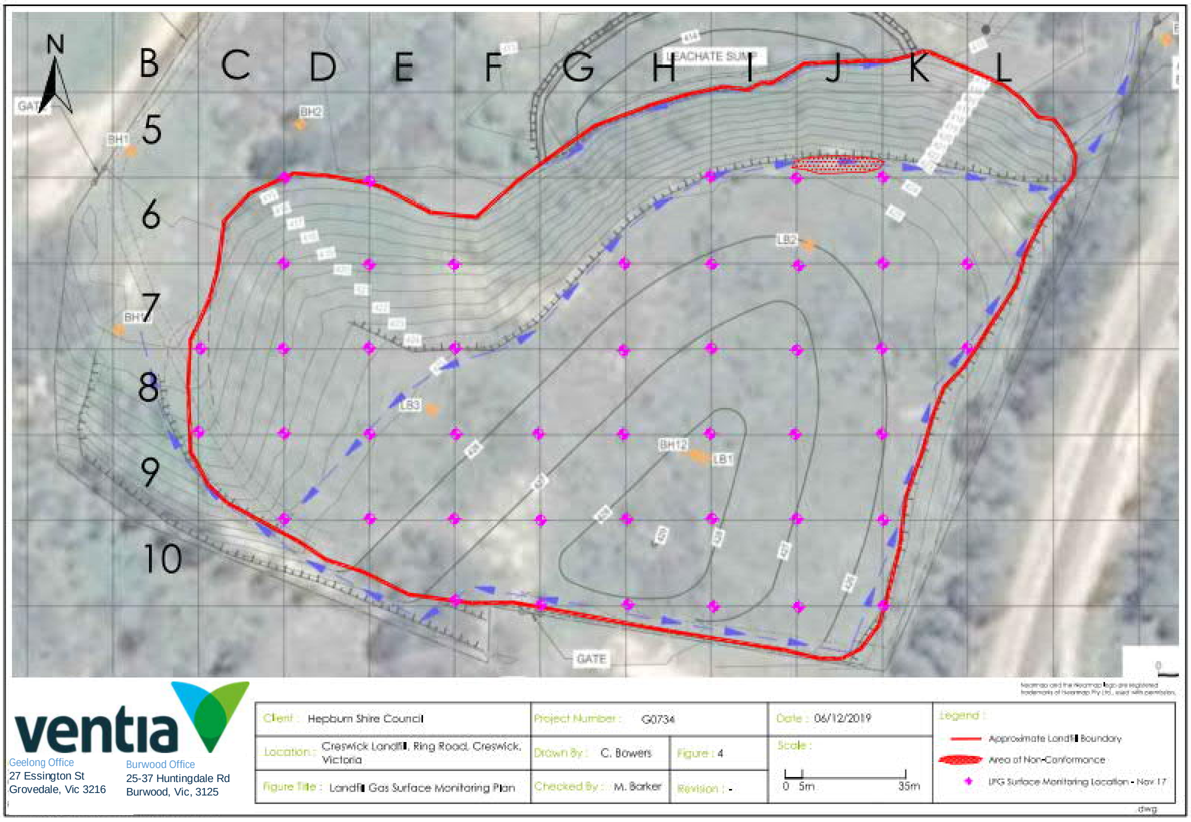


Figure 3 Landfill Gas Walkover grid

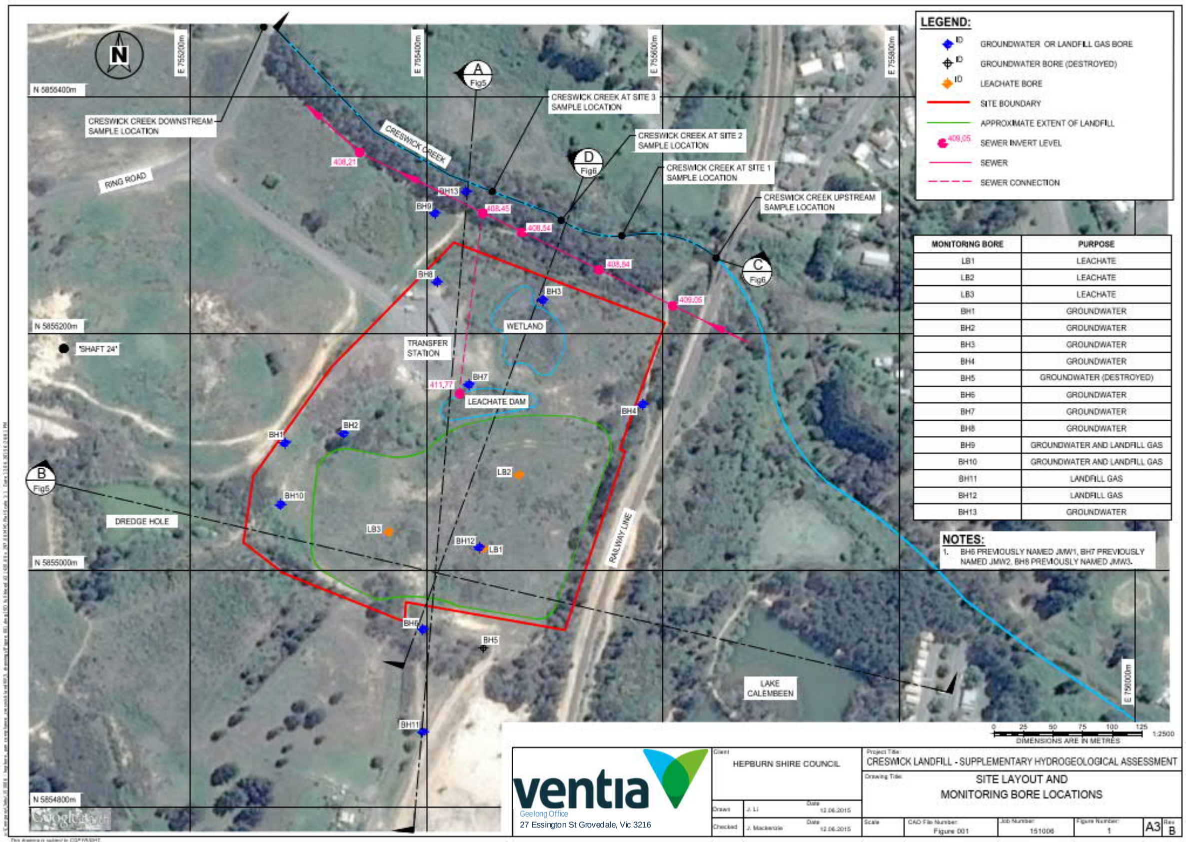


Figure 4 Groundwater and Surface Water sites

3. SAMPLING AND ANALYSIS SCHEDULE

3.1. GROUNDWATER

Ten groundwater bores were monitored in 2022/2023 monitoring program (Table 1). Quarterly groundwater monitoring was undertaken during August/September and November in 2022 and February and May in 2023.

All bores, except the ones with limitations, were sampled via low flow techniques. BH2 which is usually bailed as there is restricted access to this bore and there is a bend in the bore casing. BH9 is usually dry and is sampled only if water is present.

Table 1 Groundwater Bore Sites

NO	Bore	Installation Date	Northing (Zone 54)	Eastings (Zone 54)	Screen Depth (mBGL)	Installation Depth (mBGL)	Elevation, TOC (mAHD)
1	BH1#	-	5855118.996	755287.058	-	15.9	414.68
2	BH2	-	5855119.969	755327.845	-	5.0	415.62
3	BH3	-	5855234.647	755500.589	0.8-3.8	3.8	410.96
4	BH4	-	5855143.450	755576.651	-	4.1	417.35
5	BH6	21/10/2014	5854950.561	755397.535	10.8-13.8	14.6	429.16
6	BH7	21/10/2014	5855157.901	755436.982	2.8-5.8	7.0	412.97
7	BH8	22/10/2014	5855244.875	755409.825	3.0-6.0	7.0	414.12
8	BH10	19/03/2015	5855055.470	755276.630	1.0-6.0	6.0	416.80
9	BH12	19/03/2015	5855019.340	755444.920	1.0-4.0	4.0	427.06
10	BH14	25/10/2017	5855322.800	755416.600	1.5-5.5	5.5	412.47
*	BH5	Destroyed					
*	BH9	19/03/2015	5855301.770	755407.130	1.0-6.4	6.4	414.80
*	BH11	19/03/2015	5854863.420	755397.000	1.0-10.0	10.0	429.80
*	BH13	25/03/2015	5855326.160	755433.950	1.0-2.25	2.25	409.26

Notes:
Bore location was lost since February 2021 due to road resurfacing;
* Decommissioned bores.

3.2. LEACHATE SITES

Three leachate monitoring bores (LB1-LB3) were gauged during September and November in 2022 and February and May in 2023 (see Table 2).

LB1 and LB2 were not able to be sampled during the 2022/2023 monitoring period as they were blocked. LB3 was measured for standing water level only as per the Management Plan 2015. When possible, a sample is taken from the Leachate Pond when there is water present, during the 2022/2023 monitoring program the Leachate Pond was able to be sampled in all four events.

Table 2 Leachate Bore Sites

Bore	Easting	Northing	Bore Elevation* mAHD	Maximum Leachate Levels mAHD
LB1	755448.3	5855018.1	427.10	414.9
LB2	755478.6	5855081.2	426.57	412.3
LB3	755368.4	5855032.8	426.10	414.8

* Top of the PVC

3.3. Surface Water Sampling

Surface water sampling is undertaken at Creswick at five locations including upstream of BH03, at BH03, downstream of BH03, the dredge hole and the wetlands. The sampling occurs on a quarterly basis. During the 2022/2023 monitoring program, surface water samples were able to be taken from the five dedicated points for all four events (August/September and November 2022 and February and May in 2023).

3.4. Subsurface Landfill Gas

Dedicated subsurface landfill gas bores included within the monitoring program are detailed in Table 3. Landfill gas monitoring was undertaken during September and November in 2022 and February and May in 2023.

Table 3 Landfill Gas Bore Details

Bore	Location	Bore Depth (m BGL)	Screened Interval (m BGL)
BH09	Offsite, adjacent to northern corner boundary	6.5	1.0-6.5
BH10	Adjacent to the west of the landfill, within site boundary	6.0	1.0-6.0
BH11	Offsite, beyond the southern site boundary	10.0	1.0-10.0
BH12	Within the landfill waste mass, towards centre of cap	4.0	1.0-4.0

Notes: mBGL – metres Below Ground Level

3.5. Surface Emission Landfill Gas

Surface emission landfill gas monitoring includes quarterly monitoring of the buildings and structures and underground services on site in addition to an annual walkover of the capped surface. The quarterly surface emission gas monitoring events of buildings and structures were undertaken during September and November in 2022 and February and May in 2023, while the annual walkover of the capped surface was performed in September and November 2022.

Areas targeted during surface emission monitoring include:

- Surface cracking, fissures and / or depressions;
- Stressed vegetation;
- Landfill edges and side slopes;
- Gas wells and monitoring points; and
- Pathways where pipework may be buried in trenches.

4. SAMPLING METHODOLOGY

4.1. Field Measurements

Groundwater quality parameters were recorded using a calibrated multi-parameter water quality instrument.

Field record sheets are included as Appendix A.

Groundwater quality measurements recorded include:

- Electrical Conductivity;
- pH;
- Temperature;
- Oxidation Reduction Potential (ORP, or Redox); and
- Dissolved Oxygen.

4.2. Low Flow Sampling

All bores, excluding BH2, were sampled using low flow methods during the August/September and November 2022 and February and May 2023 monitoring events as per the Ventia low flow groundwater sampling procedures which are based on the EPA's Groundwater Sampling Guidelines (Publication 669, April 2000). Sample tubing is left in the bore and replaced every year.

A flow through cell was utilised for field stabilisation measurements during the purging cycle. Measurements were taken at approximate five-minute intervals depending on the flow rate during the purging cycle and recorded on the Ventia Groundwater Sampling Field Sheet provided within the individual monitoring event reports.

Samples were considered stable after three successive measurements were recorded within a defined range as per Table 4.

Table 4 Stabilisation Parameters

Parameter	Range
EC	+/- 3%
pH	+/- 0.05
Redox	+/-10mV
Temperature	+/-10%
Dissolved Oxygen	+/-10%

Signed chain of custodies and laboratory sample receipt records are included within Appendix E.

4.3. Grab Sampling

BH2 has been sampled via bailer as there is a kink in the well which negates the use of low flow techniques.

4.4. Subsurface Landfill Gas Monitoring

All landfill gas bore monitoring was conducted in accordance with Ventia's Landfill Gas Bore Monitoring procedures which are based on EPA Landfill Gas Fugitive Emissions Monitoring Guidelines (Publication 1684,2018) and Landfill BPEM guidelines. Landfill Gas Monitoring was conducted with the use of a factory calibrated gas analyser (GeoTech, GA5000). The gas analyser was calibrated against a known calibration standard, certificates can be found in the individual event monitoring reports. Field observations that were noted throughout the monitoring program include:

- Concentrations, peak and stabilised;
- Pressure, atmospheric and differential;
- Pump time;
- Stabilised flow; and
- Weather conditions.

Parameters utilised for reporting on landfill gas concentrations include: Methane (CH_4), Carbon Dioxide (CO_2); Carbon Monoxide (CO); Oxygen (O_2) and Hydrogen Sulfide (H_2S).

4.5. Surface Emission Landfill Gas Monitoring

All surface emissions methane monitoring was conducted in accordance with the Ventia Landfill Gas Walkover standard operating procedure which are based on the EPA Landfill Gas Fugitive Emissions Monitoring Guidelines (Publication 1684,2018); and Landfill BPEM guidelines.

A calibrated Inspectra-Laser methane detector was used for the surface emissions walkover along a grid consisting of transects spaced at 25 m intervals, measurements were taken 50 mm above the surface. The active areas of the landfill were not sampled due to safety reasons.

Monitoring of buildings and enclosed structures focused on those areas where gas is likely to accumulate including, cupboards, water pipes, cracks in brickwork and gaps in flooring. The peak readings were recorded, please see Appendix A.

5. REPORTING

5.1. Assessment Criteria

5.1.1. Groundwater and Surface Water Quality Objectives

Beneficial uses for the site were assessed against the Environmental Reference Standard (ERS, DELWP 2021, previously SEPP, Waters). Protected beneficial uses applicable to the site along with the screening criteria that have been adopted in relation to each of the identified potential beneficial uses, is supplied in Table 5.

Table 5 Beneficial Uses and Adopted Assessment Criteria

Beneficial Use Classification	Adopted Assessment Criteria
Maintenance of ecosystems	ANZECC (2000) 95% protection for slightly to moderately modified freshwater aquatic ecosystems
Livestock	ANZECC (2000) Livestock
Irrigation	ANZECC (2000) Irrigation
Buildings and structures	Varied: No guideline applied
Primary contact recreation	Varied: No guideline applied

Requirements outlined in the Creswick Landfill, Aftercare Management Plan, Part 2: Environmental Risk Assessment and Monitoring Program (Mackenzie Environmental, June 2015), are tabulated below (Table 6).

Table 6 Water Quality Objectives from Aftercare Management Plan

Analytes	Detection Limit	Groundwater Quality Objectives	Surface Water Quality Objectives
pH	0.01 pH units	6.5 to 8.0	6.5 to 8.0
Electrical conductivity (EC)	1 µS/cm	-	-
Total dissolved solids (TDS)	10 mg/L	2,000 mg/L	2,000 mg/L
Calcium (CA)	1 mg/L	1,000 mg/L	1,000 mg/L
Magnesium (Mg)	1 mg/L	2,000 mg/L	2,000 mg/L
Sodium (Na)	1 mg/L	115 mg/L	-
Potassium (K)	1 mg/L	-	-
Chloride (Cl)	1 mg/L	25-700 mg/L	-
Sulphate (SO4)	1 mg/L	250 mg/L	1,000 mg/L
Bicarbonate alkalinity (as CaCO3)	1 mg/L	-	-
Total organic carbon (TOC)	1 mg/L	-	-
Chemical oxygen demand (COD)	10 mg/L	-	-
Ammonia (NH3)	0.01 mg/L	0.9 mg/L (as NH3)	0.9 mg/L (as NH3)
Nitrate (NO3)	0.01 mg/L	0.16 mg/L (as N)	0.7 mg/L (as N)
Total Kjeldahl nitrogen (TKN)	0.1 mg/L	25 mg/L	-
Volatile fatty acids (VFA)	5 mg/L	-	-
Chromium (Cr)	0.001 mg/L	0.001 mg/L	0.001 mg/L
Iron (Fe)	0.05 mg/L	0.3 mg/L	-
Zinc (Zn)	0.005 mg/L	0.008 mg/L	0.008 mg/L

5.1.2. Landfill Gas Bore Action Levels

Action levels for methane have been adopted from the Landfill BPEM guidelines and are set at 1% v/v within the subsurface geology at the landfill boundary. For carbon dioxide, the action level is set at 10% v/v, taken from the Mackenzie 2016 Creswick Landfill Monitoring Program report.

5.1.3. Landfill Gas Surface Emission Action Levels

The Landfill BPEM guidelines outline surface emission action levels for methane concentrations according to their location. Relevant action levels are provided in Table 7.

Table 7 Surface Emission Action Levels

Location	Parameters	Action Level
Landfill surface final cap	Methane concentration in air[1]	100 ppm
Within 50 mm of penetrations through the final cap	Methane concentration in air[2]	100 ppm
Landfill surface intermediate cover areas[3]	Methane concentration in air[1]	200 ppm
Within 50 mm of penetrations through the intermediate cover	Methane concentration in air[2]	1,000 ppm
Building/structures on and adjacent to the landfill site	Methane concentration in air	5,000 ppm

Notes:

1 - Point of measurement is 50 mm above the landfill surface.
2 - Point of measurement is 50 mm from the point of discharge.
3 - Intermediate cover areas are those that do not have an engineered landfill cap and are not scheduled to receive waste during the next three months.

6. WATER MONITORING RESULTS

6.1. GROUNDWATER MONITORING RESULTS

6.1.1 Groundwater Gauging

Standing Water Levels (SWLs) were measured in all accessible groundwater monitoring bores during the August/September and November 2022 and February and May 2023 monitoring events. Groundwater gauging data is presented in Table 8.

Table 8 Groundwater Gauging Data

ID	Date	SWL (mBTOC)	SWL (mAHD)
BH1	31/08/2022	Bore location lost due to road resurfacing	
	17/11/2022	Bore location lost due to road resurfacing	
	17/02/2023	Bore location lost due to road resurfacing	
	10/05/2023	Bore location lost due to road resurfacing	
BH2	31/08/2022	2.12	414.06
	17/11/2022	1.93	414.25
	17/02/2023	2.98	413.20
	10/05/2023	2.90	413.28
BH3	31/08/2022	0.45	410.92
	17/11/2022	0.59	410.78
	14/02/2023	0.87	410.50
	10/05/2023	0.60	410.77
BH4	01/09/2022	4.52	413.40
	16/11/2022	3.25	414.67
	13/02/2023	4.88	413.04
	10/05/2023	5.33	412.59
BH6	02/09/2022	11.72	417.44
	17/11/2022	11.20	417.96
	14/02/2023	11.65	417.51
	10/05/2023	11.96	417.20
BH7	31/08/2022	2.42	410.55
	17/11/2022	2.42	410.55
	14/02/2023	2.69	410.28
	10/05/2023	2.31	410.66
BH8	31/08/2022	2.25	411.87
	17/11/2022	3.18	410.94
	14/02/2023	3.02	411.10
	10/05/2023	3.00	411.12
BH10	01/09/2022	2.26	414.54
	17/11/2022	2.06	414.74
	14/02/2023	2.44	414.36
	09/05/2023	2.44	414.36
BH14	01/09/2022	2.23	410.24
	16/11/2022	2.01	410.46
	13/02/2023	3.19	409.28
	11/05/2023	2.84	409.63

Notes:

SWL – Standing Water Level
mBTOC – Metres Below Top of Casing
mAHD – Metres Australian Height Datum

6.1.2 Groundwater Quality

Table 12, below, provides a summary of groundwater exceedances against the adopted ANZECC 2000 Freshwater 95% Species Protection, ANZECC 2000 Irrigation and ANZECC 2000 Livestock guidelines. A complete results table is provided in Appendix B, while copies of the laboratory analysis certificates are provided in Appendix D.

Table 9 Groundwater Exceedances

			Solids	Major Ions		Metals	
			TDS	Chloride	Sodium (filtered)	Chromium (III+VI)	Zinc
			mg/L	mg/L	mg/L	mg/L	mg/L
EQL			10	1	0.5	0.001	0.005
ANZECC 2000 FW 95%							0.008
ANZECC 2000 Irrigation				175	115	0.1	2
ANZECC 2000 Livestock			2,000			1	20
Field ID	Date	Lab Report Number					
BH2	31 Aug 2022	EM2216860	417	209	96	<0.001	0.04
BH2	17 Nov 2022	EM2222858	342	181	97	<0.001	0.044
BH2	17 Feb 2023	EM2302775	385	199	103	<0.001	0.053
BH2	10 May 2023	EM2308315	469	226	117	<0.001	0.057
BH3	31 Aug 2022	EM2216860	1,830	932	423	<0.001	0.061
BH3	17 Nov 2022	EM2222858	1,820	991	431	0.002	0.159
BH3	14 Feb 2023	EM2302525	1,380	669	304	0.01	0.09
BH3	10 May 2023	EM2308315	2,030	917	406	0.003	0.045
BH4	01 Sep 2022	EM2217005	1,380	570	253	0.019	0.061
BH4	16 Nov 2022	EM2222748	1,410	688	283	0.03	0.077
BH4	13 Feb 2023	EM2302400	1,060	550	239	0.012	0.035
BH4	10 May 2023	EM2308315	1,510	720	303	0.012	0.017
BH6	02 Sep 2022	EM2217005	439	215	94	0.001	0.059
BH6	17 Nov 2022	EM2222858	375	197	91	0.001	0.077
BH6	14 Feb 2023	EM2302525	395	182	91	0.003	0.043
BH6	10 May 2023	EM2308315	425	180	90	0.001	0.034
BH7	31 Aug 2022	EM2216860	588	263	119	0.002	0.037
BH7	17 Nov 2022	EM2222858	462	168	100	0.004	0.018
BH7	14 Feb 2023	EM2302525	573	205	111	0.035	0.07
BH7	10 May 2023	EM2308315	500	210	106	0.003	0.013
BH8	31 Aug 2022	EM2216860	521	139	116	0.013	0.072
BH8	16 Nov 2022	EM2222748	455	100	101	0.01	0.023
BH8	14 Feb 2023	EM2302525	656	96	114	0.102	0.098
BH8	10 May 2023	EM2308315	489	94	112	0.011	0.009
BH10	01 Sep 2022	EM2217005	764	150	85	0.021	0.108
BH10	18 Nov 2022	EM2222858	566	206	96	0.016	0.071
BH10	14 Feb 2023	EM2302525	563	215	103	0.005	0.062
BH10	09 May 2023	EM2308222	459	200	95	0.003	0.028
BH14	01 Sep 2022	EM2217005	1,240	517	187	0.014	0.046
BH14	16 Nov 2022	EM2222748	820	409	168	0.024	0.073
BH14	13 Feb 2023	EM2302400	978	363	163	0.048	0.059
BH14	11 May 2023	EM2308446	893	378	158	0.004	0.016

All groundwater sites exceeded at least one of the adopted assessment criteria including ANZECC 2000 Fresh Water 95% guideline, ANZECC 2000 Irrigation, ANZECC 2000 Livestock and groundwater quality objectives (as nominated by the Aftercare Management Plan), during each monitoring event. Zinc was the most consistent exceedance, though sodium and chloride also had multiple detects.

Zinc exceeded the ANZECC 2000 Fresh Water 95% guideline at all groundwater bores at all events in the 2022/2023 monitoring period. Chloride had at least one exceedance against the ANZECC 2000 Irrigation guideline at all sites except BH8, while sodium exceeded the ANZECC 2000 Irrigation guideline at all groundwater bores except B6 and B10. Chromium (III+VI) had one exceedance at BH8 in February 2023 against the ANZECC 2000 Irrigation guideline. The only TDS exceedance was detected at BH3 in May 2023, which breached the ANZECC 2000 Livestock guidelines. All laboratory results from the 2022/2023 program are located in Appendix B.

Results were in line with historic trends at the majority of monitoring bores. However, BH8 reached its highest iron concentration (162 mg/L) during the February 2023 monitoring event, and BH10 had its highest potassium and total alkalinity records (19 mg/L and 95 mg/L respectively) in August 2022. Chloride concentrations were lowest when compared with historic results at BH6 and BH7 (168 mg/L and 180 mg/L respectively) while BH2 had its lowest alkalinity concentrations (32 mg/L) in November 2022.

A summary of the yearly exceedances against the ANZECC 2000 guidelines for the bores is presented in Table 10.

Table 10 Summary of Exceedances for Groundwater Quality for the 2022/2023 Monitoring Period

Exceedances	Groundwater Bores							
	BH2	BH3	BH4	BH6	BH7	BH8	BH10	BH14
TDS	✓	×	✓	✓	✓	✓	✓	✓
Chloride	×	×	×	×	×	✓	×	×
Sodium	×	×	×	✓	×	×	✓	×
Ammonia as N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate as N	✓	✓	✓	✓	✓	✓	✓	✓
Chromium (III+VI)	✓	✓	✓	✓	✓	×	✓	✓
Zinc	×	×	×	×	×	×	×	×

Notes: × indicates potential impact to the protected Beneficial Use
✓ indicates no identified impact to protected Beneficial Use

A summary of exceedances of groundwater samples collected from the 2022/2023 monitoring period against the Water Quality Objectives nominated by the Aftercare Management Plan is given in Table 11.

Table 11 Water Quality Objective Exceedances

Analytes	Groundwater Quality Exceedances
pH	Bores with detects outside of 6.5-8 09/2022 – BH6, BH10 11/2022 – BH2, BH4, BH6, BH10 02/2023 – BH2, BH4, BH6, BH10 05/2023 – BH2, BH3, BH7, BH8, BH10
Total dissolved solids (TDS)	09/2022 – BH3 No detects in other monitoring events
Calcium (CA)	No bores
Magnesium (Mg)	No bores
Sodium (Na)	09/2022 – BH3, BH4, BH7, BH8, BH14 11/2022 – BH3, BH4, BH14 02/2023 – BH3, BH4, BH14 05/2023 – BH2, BH3, BH4, BH14
Chloride (Cl)	Bores with detects outside of 25-700 mg/L 09/2022 – BH3 11/2022 – BH3 02/2023 – No bores 05/2023 – BH3, BH4
Sulphate (SO4)	No bores
Ammonia (NH3)	09/2022 – BH8, BH10 11/2022 – BH8, BH10 02/2023 – BH8, BH10 05/2023 – BH7, BH8, BH10
Nitrate (NO3)	09/2022 – BH6, BH10 11/2022 – BH6 02/2023 – BH2, BH6 05/2023 – BH2, BH6, BH10
Total Kjeldahl nitrogen (TKN)	No bores
Chromium (Cr)	All bores, every monitoring round except BH3 in August 2022 and BH2 in all monitoring events.
Iron (Fe)	All bores, every monitoring round except BH6 in the November 2022 and May 2023 monitoring events.
Zinc (Zn)	All bores in every monitoring round.

6.1.3 Groundwater Trend Graphs

Groundwater historical trend graphs are provided below. The graphs indicate the groundwater results for the 2022/2023 monitoring program to be relatively consistent with historical data. The historical groundwater results table is provided in Appendix E.

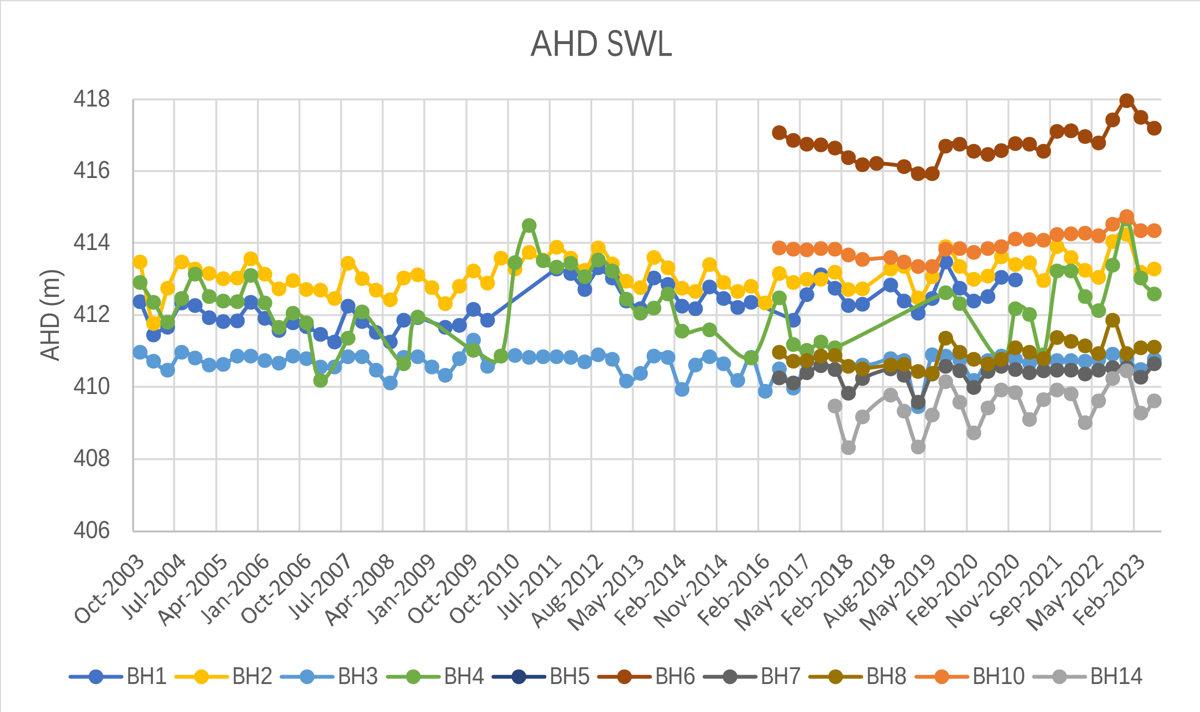


Figure 5 Groundwater historical trend graph – Standing Water Level (SWL)

Groundwater standing water levels (SWL) were mostly similar to historically recorded values, while a slight increasing trend was observed at BH6, BH8 and BH10 since August 2019. In November 2022 the majority of bores were at the highest SWL seen throughout historic and current sampling events.

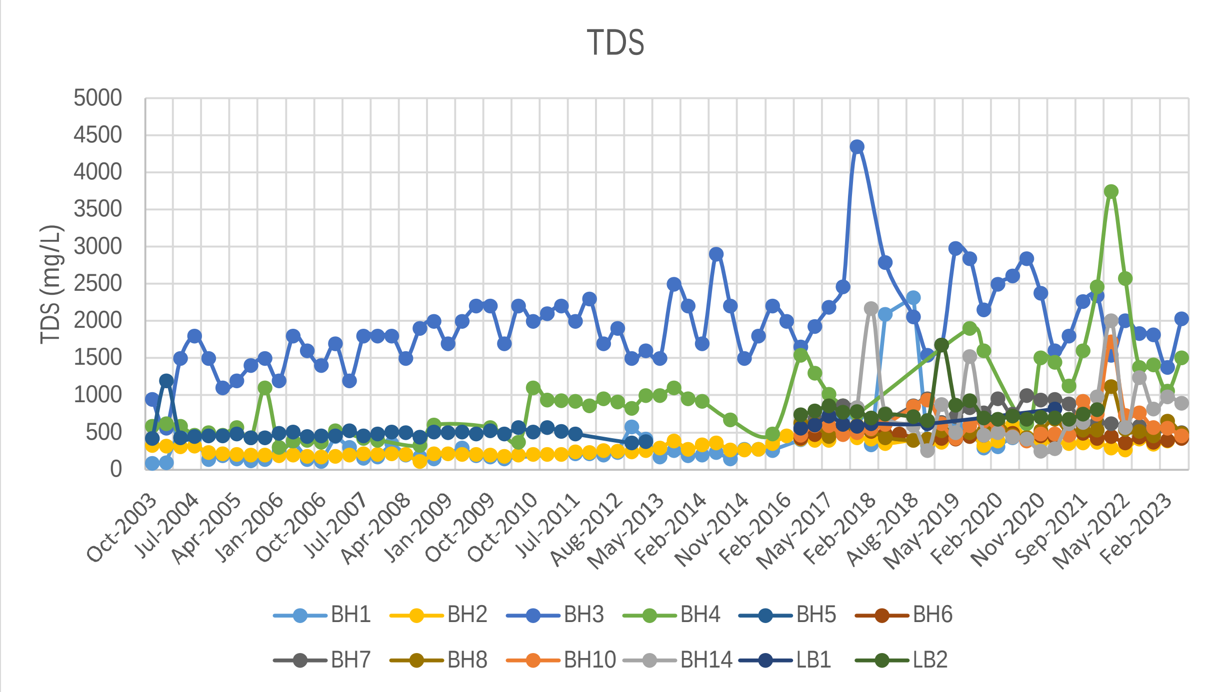


Figure 6 Groundwater historical trend graph – Total Dissolved Solids (TDS)

Groundwater total dissolved solids (TDS) corresponded to historic values at all bores during all sampling events in 2022/2023. TDS spikes were observed at BH4, BH8, BH10, and BH14 during the February 2022 monitoring event, with the highest value of 3740 mg/L detected at BH4.

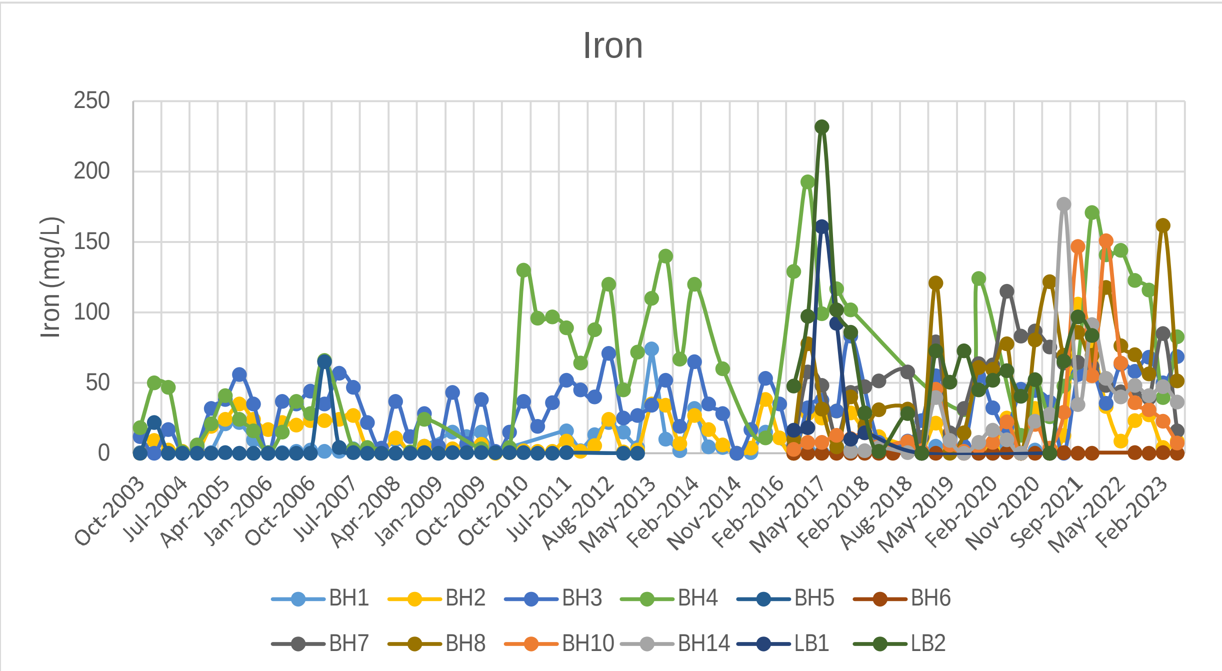


Figure 7 Groundwater historical trend graph – Iron

Iron at BH2 and BH10 returned to historic levels after the peak events in September 2021. BH8 reached its highest concentration of 162 mg/L during the February 2023 monitoring event. BH6 consistently has the lowest iron levels of all groundwater locations, while BH4 tends to have the highest. Concentrations at all other locations vary over most rounds with no noticeable trends.

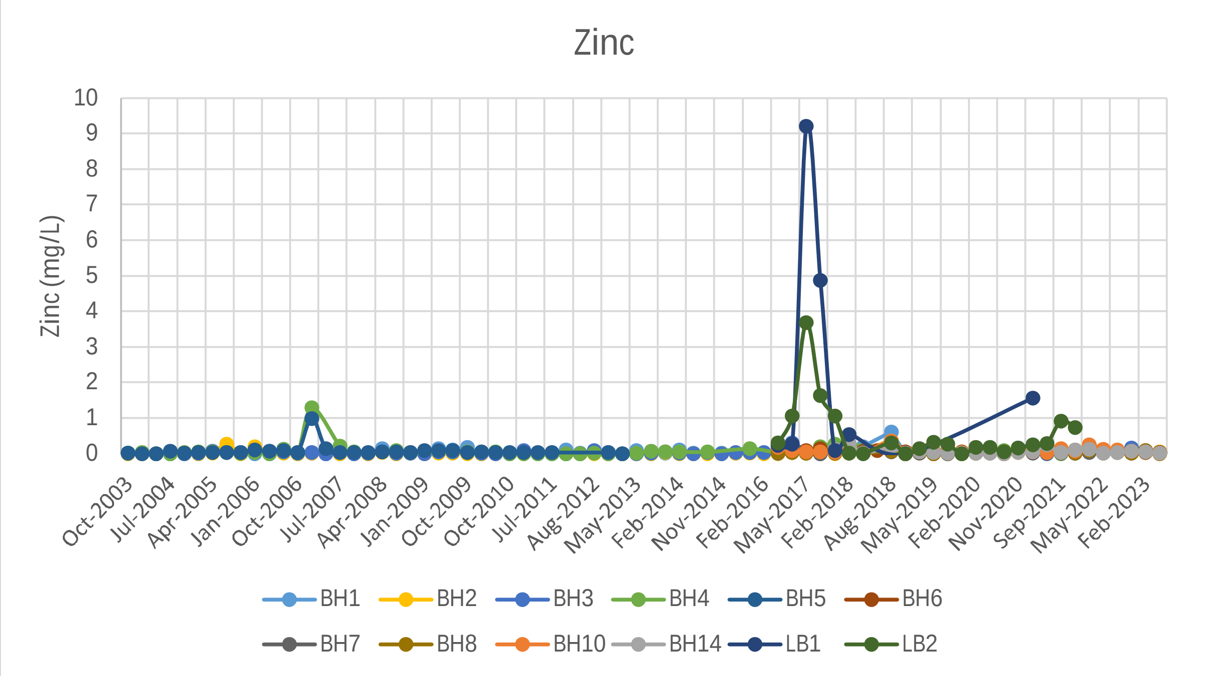


Figure 8 Groundwater historical trend graph – Zinc

Concentrations of zinc at groundwater sites were within historic ranges with no noticeable trends. Zinc concentrations in LB1 and LB2 peaked in May 2017 to maximum values seen at any sites (9.21 mg/L and 3.69 mg/L respectively), both locations became blocked (in May 2021 and February 2022 respectively) and no further results are available.

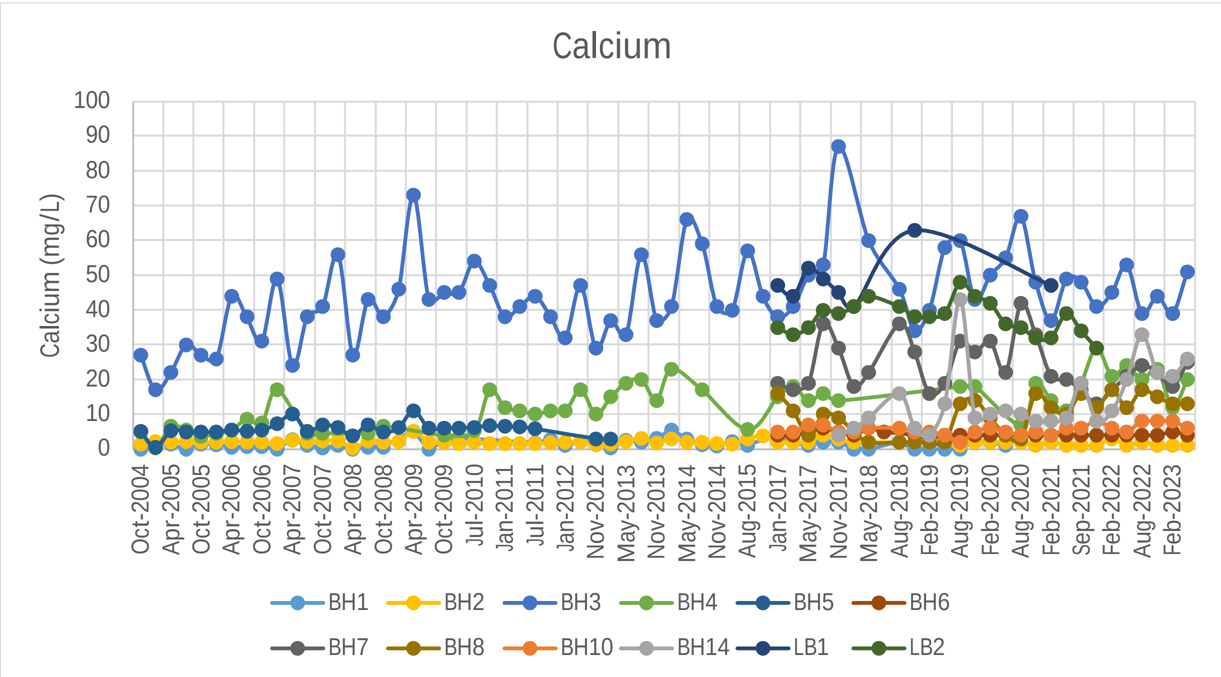


Figure 9 Groundwater historical trend graph – Calcium

Groundwater calcium concentrations were steady in relation to historic-values. BH14 had the second highest value of 33 mg/L in August 2022 compared with the historical high of 43 mg/L in August 2019. BH2, BH6 and BH10 have the lowest concentrations in calcium across the site and tend to have quite steady results, while BH3 has the highest concentrations.

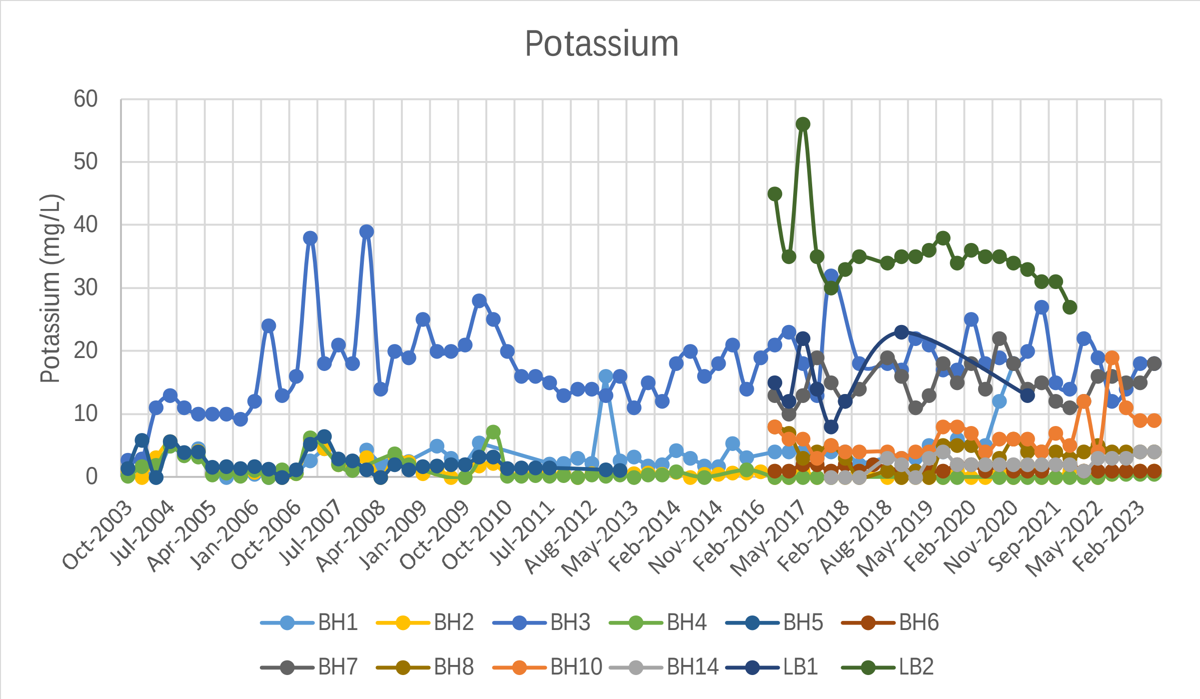


Figure 10 Groundwater historical trend graph – Potassium

Potassium concentrations remained steady at all bores throughout the 2022/2023 program and were within historic ranges at all bores, except BH10, which reached its highest value of 19 mg/L in August 2022.

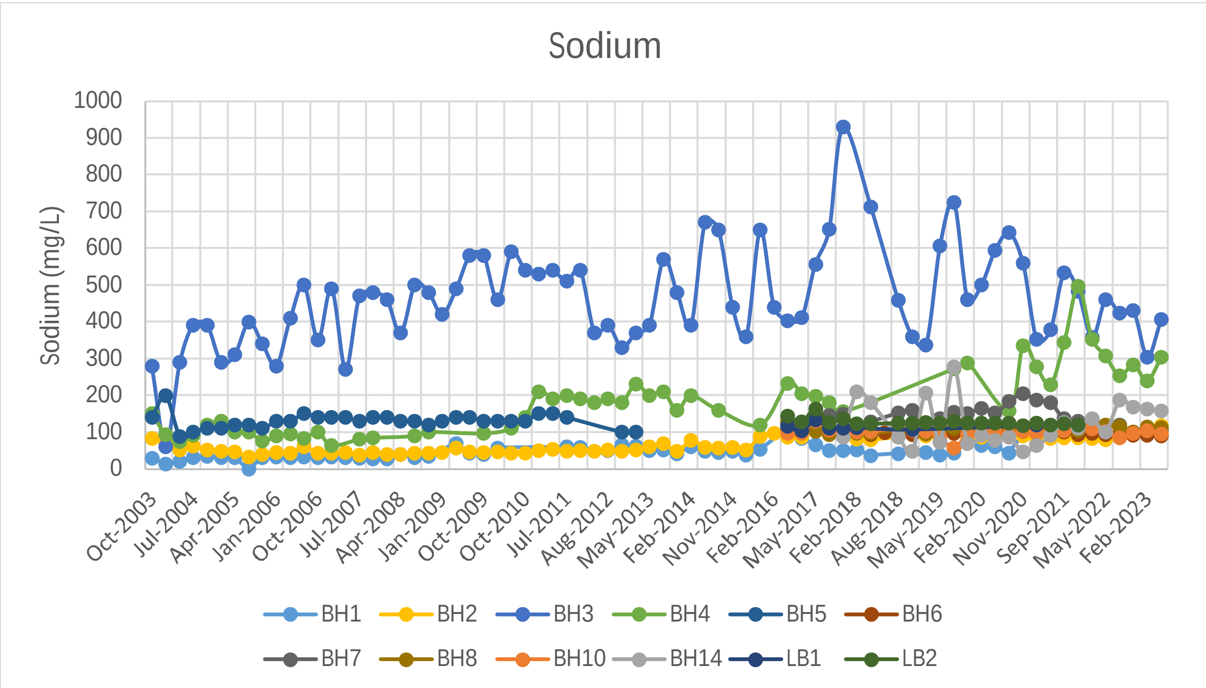


Figure 11 Groundwater historical trend graph – Sodium

A long-term increasing trend for sodium can be seen from January 2011 at BH4 with the peak reading of 497 mg/L in November 2021, this site consistently has the highest values. BH14 had its highest sodium concentrations in the 2022/2023 monitoring program since August 2019.

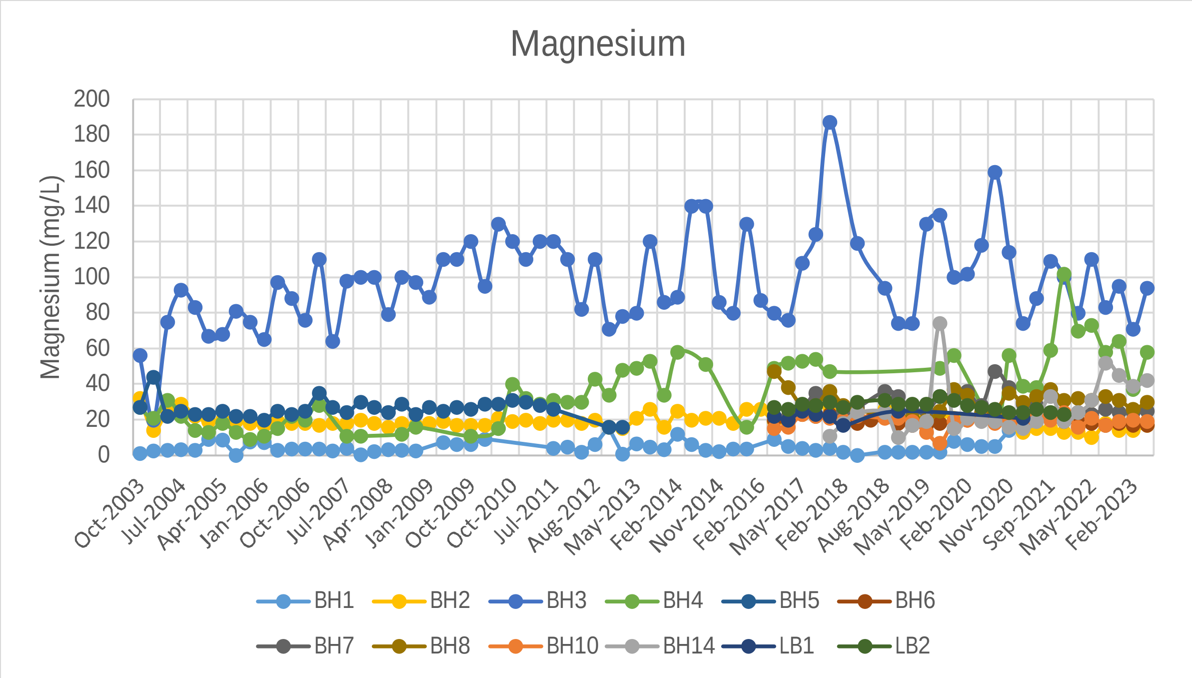


Figure 12 Groundwater historical trend graph – Magnesium

Magnesium in all bores was in line with historically recorded values. BH14 results were elevated in the 2022/2023 monitoring program, with the second highest value (52 mg/L) in August 2022 compared with the maximum record of 74 mg/L in August 2019. BH3 tends to show the highest concentrations.

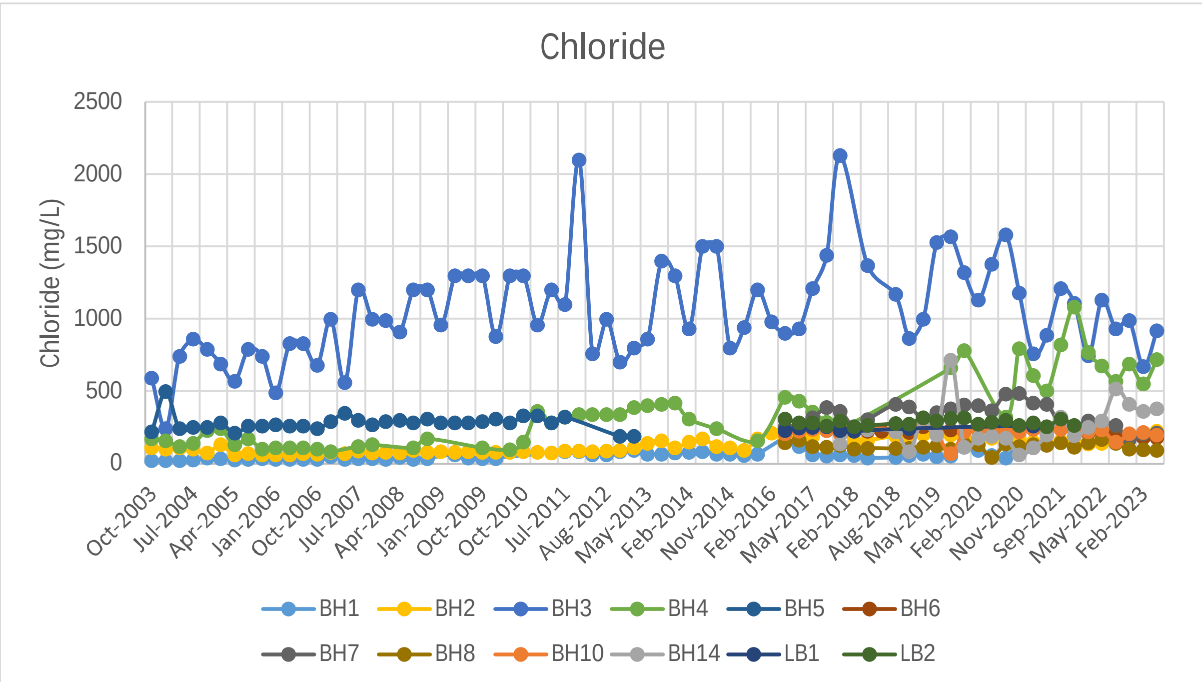


Figure 13 Groundwater historical trend graph – Chloride

Groundwater chloride readings were in line with historically recorded values. A long-term increasing trend can be seen from January 2011 at BH4 with a peak value of 1080 mg/L in November 2021. Chloride at BH7 has decreased since September 2021 and reached its lowest value of 168 mg/L in November 2022. This decreasing trend can was also observed at BH6, BH8 and BH10 during the 2022/2023 monitoring program.

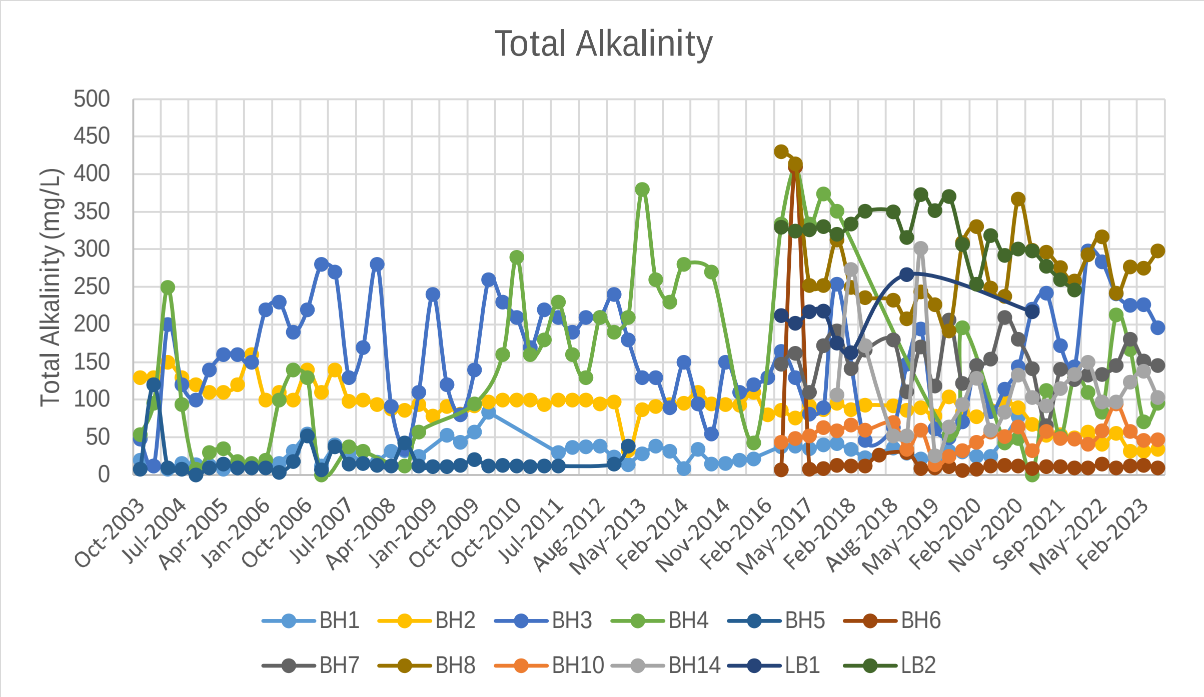


Figure 14 Groundwater historical trend graph – Total Alkalinity

Some noticeable historic spikes in total alkalinity can be seen at BH6 and BH14, while BH10 had its highest total alkalinity concentration of 95 mg/L in the August 2022 monitoring event. Concentrations of total alkalinity at BH2 have decreased since February 2021 and reached the lowest value at this location (32 mg/L) in November 2022 and February 2023.

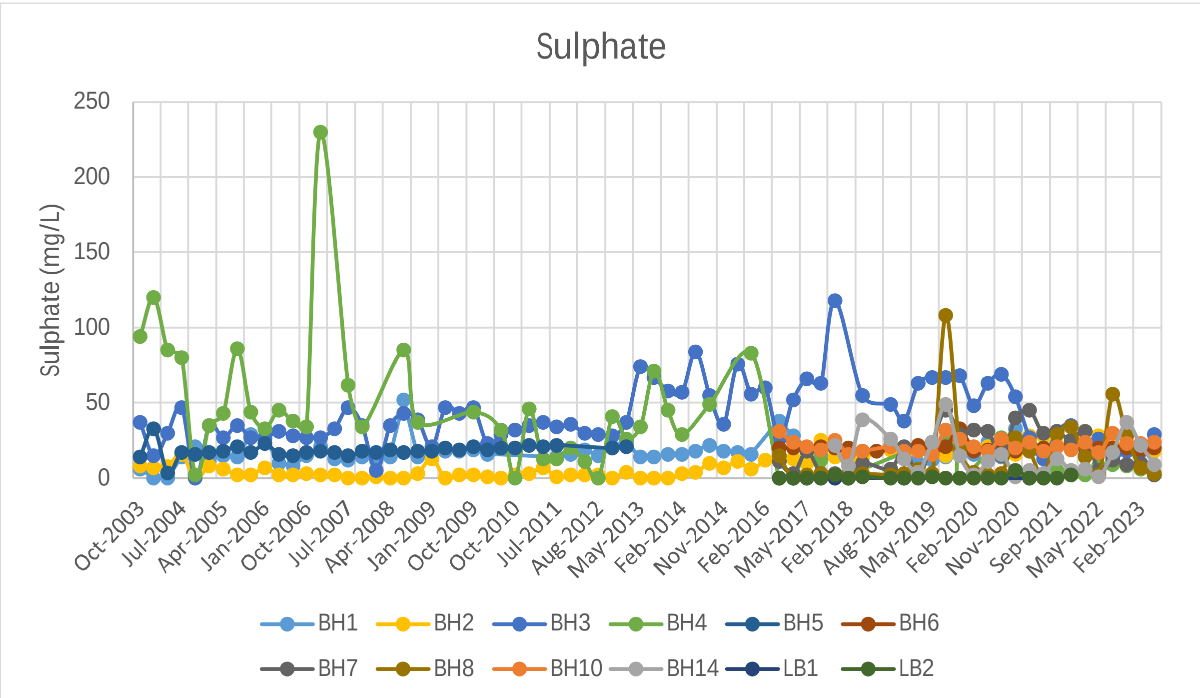


Figure 15 Groundwater historical trend graph – Sulphate

Sulphate concentrations conformed to historic values. BH2 has shown a long-term increase in sulphate concentrations since August 2014, while BH3 and BH4 are both showing decreased concentrations over time.

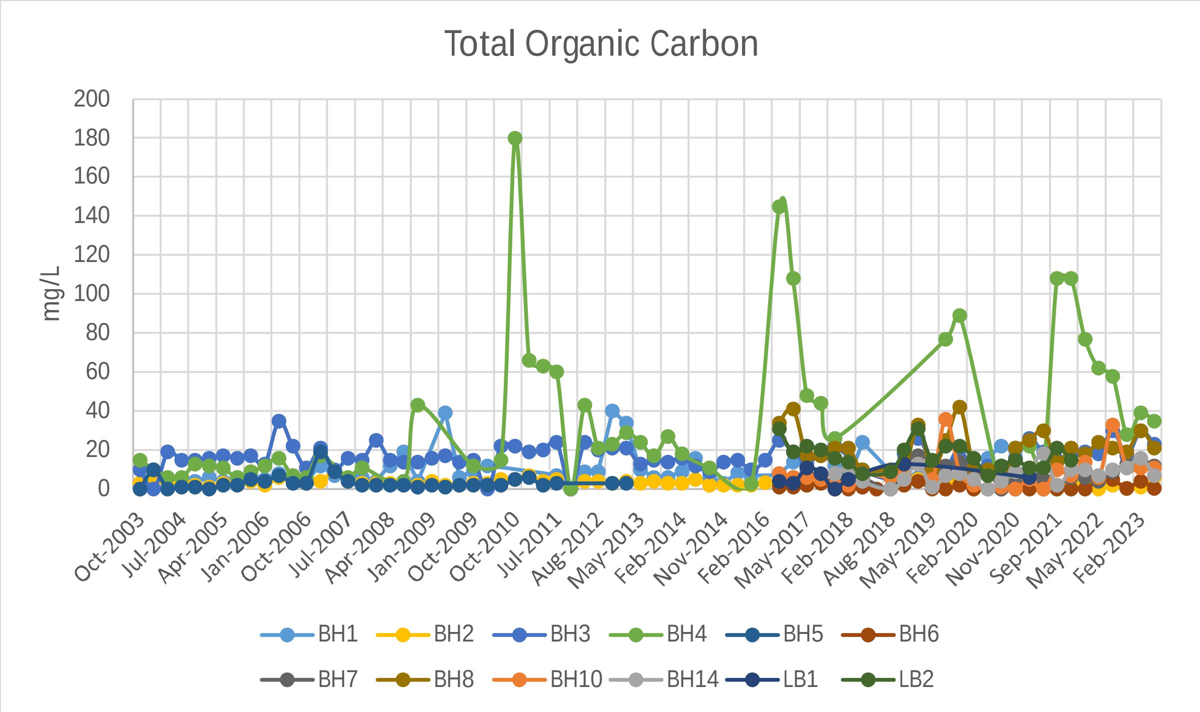


Figure 16 Groundwater historical trend graph – Total Organic Carbon (TOC)

Total organic carbon concentrations (TOC) were in line with historic results at most bores. BH10 saw some elevated concentrations of 33 mg/L in August 2022. BH2 reached 6 mg/L in May 2023, the highest result seen at this monitoring location since February 2019. Across the groundwater sites at Creswick BH2 and BH6 show the lowest concentrations, while BH4 consistently has the highest results. No irregular results were noted in the 2022/2023 program.

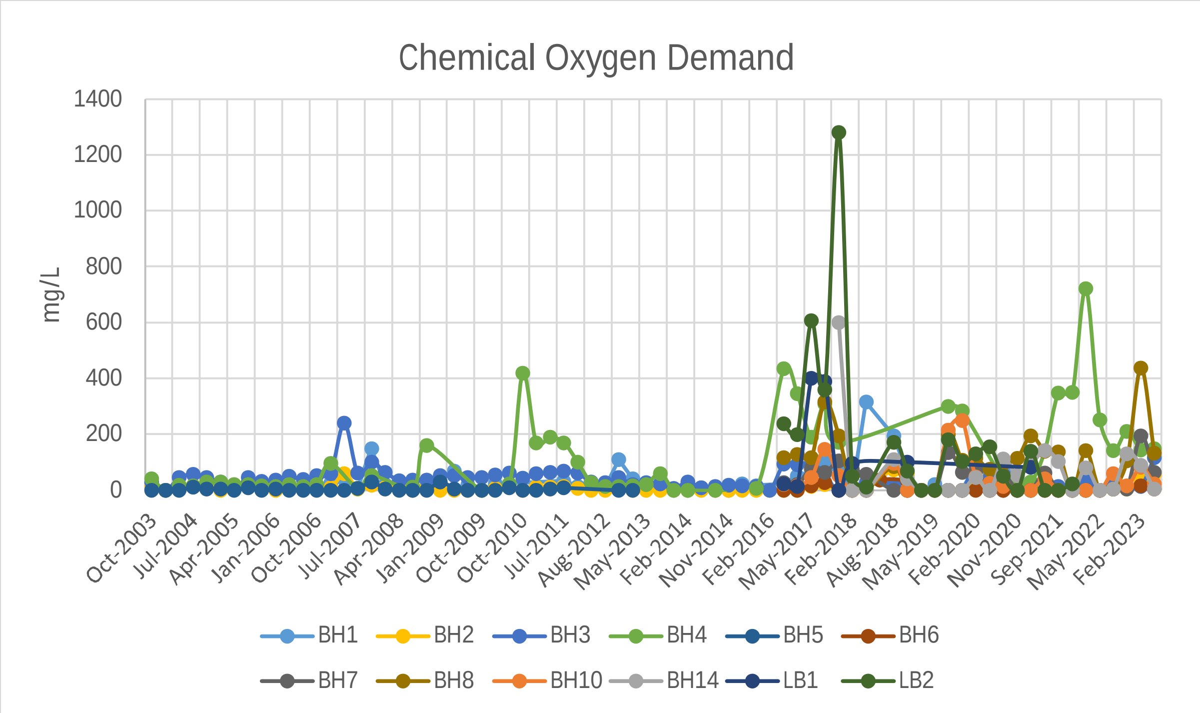


Figure 17 Groundwater historical trend graph – Chemical Oxygen Demand (COD)

Chemical oxygen demand (COD) peak values were seen at many bores in 2017. BH4 reached the highest level (721 mg/L) in February 2022, while BH2, BH3, BH6, BH7 and BH8 saw elevated concentrations in February 2023.

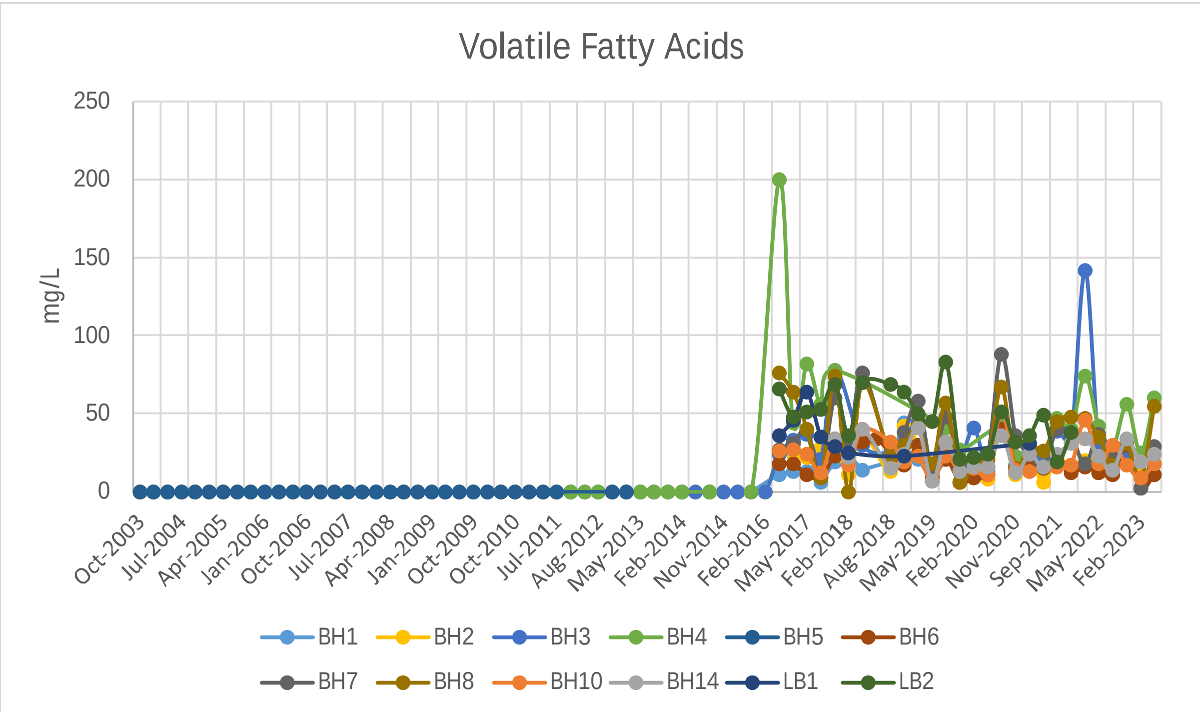


Figure 18 Groundwater historical trend graph – Volatile Fatty Acids

Two obvious spikes of volatile fatty acids (VFA) have occurred at the site (200 mg/L in BH4 and 142 mg/L in BH3). BH3, BH6 and BH7 all had concentrations of 2.5 mg/L in February 2023 which are generally the lowest results for any of the groundwater bores since 2016.

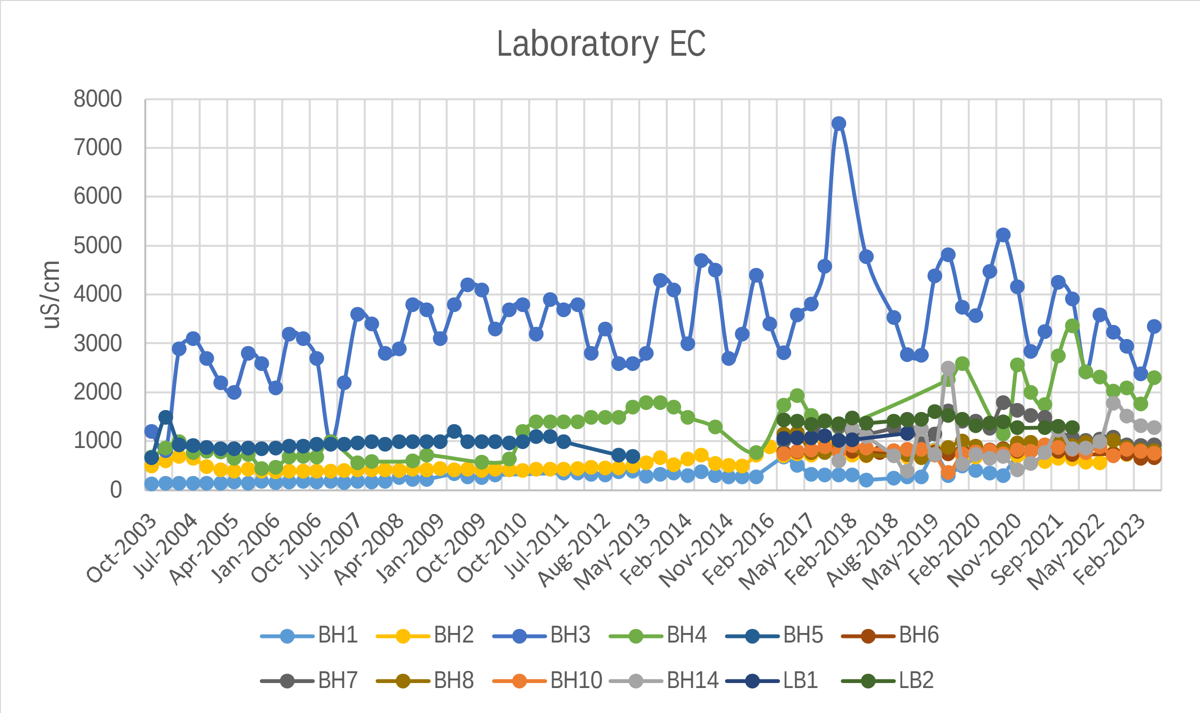


Figure 19 Groundwater historical trend graph – Laboratory EC

Groundwater EC corresponded to historic trends. BH3 has the highest level of EC among all the monitoring bores since sampling began, with a peak value of 7500 us/cm in November 2017, it consistently has the highest results.

6.2. Surface Water and Leachate Monitoring Results

6.2.1 Surface Water Quality

Table 12, below, provides a summary of surface water exceedances against the adopted ANZECC (2000) 95% Species Protection Freshwater Ecosystem Guideline, ANZECC (2000) Irrigation and ANZECC (2000) Livestock. Complete surface water results are provided in Appendix B while copies of the laboratory analysis certificates are provided in Appendix D.

Table 12 Surface Water Exceedances

			Major Ions		Metals
			Chloride	Sodium (filtered)	Zinc
			mg/L	mg/L	mg/L
EQL			1	0.5	0.005
ANZECC 2000 FW 95%					0.008
ANZECC 2000 Irrigation			175	115	2
ANZECC 2000 Livestock					20
Field ID	Date	Lab Report Number			
U/S BH3	01 Sep 2022	EM2217005	34	24	<0.005
U/S BH3	16 Nov 2022	EM2222748	30	19	0.012
U/S BH3	13 Feb 2023	EM2302400	172	77	<0.005
U/S BH3	11 May 2023	EM2308446	189	84	0.011
@ BH3	01 Sep 2022	EM2217005	34	24	<0.005
@ BH3	16 Nov 2022	EM2222748	31	19	0.012
@ BH3	13 Feb 2023	EM2302400	205	84	<0.005
@ BH3	11 May 2023	EM2308446	220	80	0.01
D/S BH3	31 Aug 2022	EM2216860	39	25	<0.005
D/S BH3	16 Nov 2022	EM2222748	31	19	0.013
D/S BH3	13 Feb 2023	EM2302400	122	55	<0.005
D/S BH3	11 May 2023	EM2308446	186	108	0.01
Leachate	31 Aug 2022	EM2216860	132	72	0.033
Leachate	17 Nov 2022	EM2222858	136	73	0.036
Leachate	14 Feb 2023	EM2302525	264	130	<0.005
Leachate	09 May 2023	EM2308222	210	100	<0.005
Wetland	31 Aug 2022	EM2216860	123	67	<0.005
Wetland	17 Nov 2022	EM2222858	55	38	0.006
Wetland	14 Feb 2023	EM2302525	404	207	0.01
Wetland	09 May 2023	EM2308222	236	108	<0.005
Dredge	31 Aug 2022	EM2216860	235	99	0.007
Dredge	18 Nov 2022	EM2222858	248	118	0.005
Dredge	16 Feb 2023	EM2302773	286	126	<0.005
Dredge	09 May 2023	EM2308222	246	113	<0.005

There were exceedances for Zinc, Chloride and Sodium for the surface water sites in the 2022/2023 monitoring period.

Chloride had at least one exceedance at each site against the ANZECC 2000 Irrigation guideline during the 2022/2023 monitoring program, with the Dredge site exceeding during all four events. Sodium exceedances against the ANZECC 2000 Irrigation guideline occurred at the Leachate Pond, Wetland and Dredge Hole. Zinc exceeded the ANZECC 2000 Fresh Water 95% guideline at all surface water sites at least once during the 2022/2023 monitoring period except at the Dredge Hole, where no exceedances were noted. No exceedances at any surface water sites were detected against the ANZECC 2000 Livestock guideline. A summary of the exceedances against the ANZECC 2000 guidelines is given in Table 13.

Table 13 Summary of Exceedances for Surface Water Quality for the 2022/2023 Monitoring Period

Exceedances	Surface Water Sites					
	Leachate Pond	Creek U/S BH3	Creek @ BH3	Creek D/S BH3	Wetland	Dredge Hole
pH	✓	✓	✓	✓	✓	✓
TDS	✓	✓	✓	✓	✓	✓
Chloride	×	×	×	×	×	×
Sodium	×	✓	✓	✓	×	×
Ammonia as N	✓	✓	✓	✓	✓	✓
Nitrate (as N)	✓	✓	✓	✓	✓	✓
Chromium (III+VI)	✓	✓	✓	✓	✓	✓
Zinc	×	×	×	×	×	✓

Notes: × indicates potential impact to the protected Beneficial Use
✓ indicates no identified impact to protected Beneficial Use

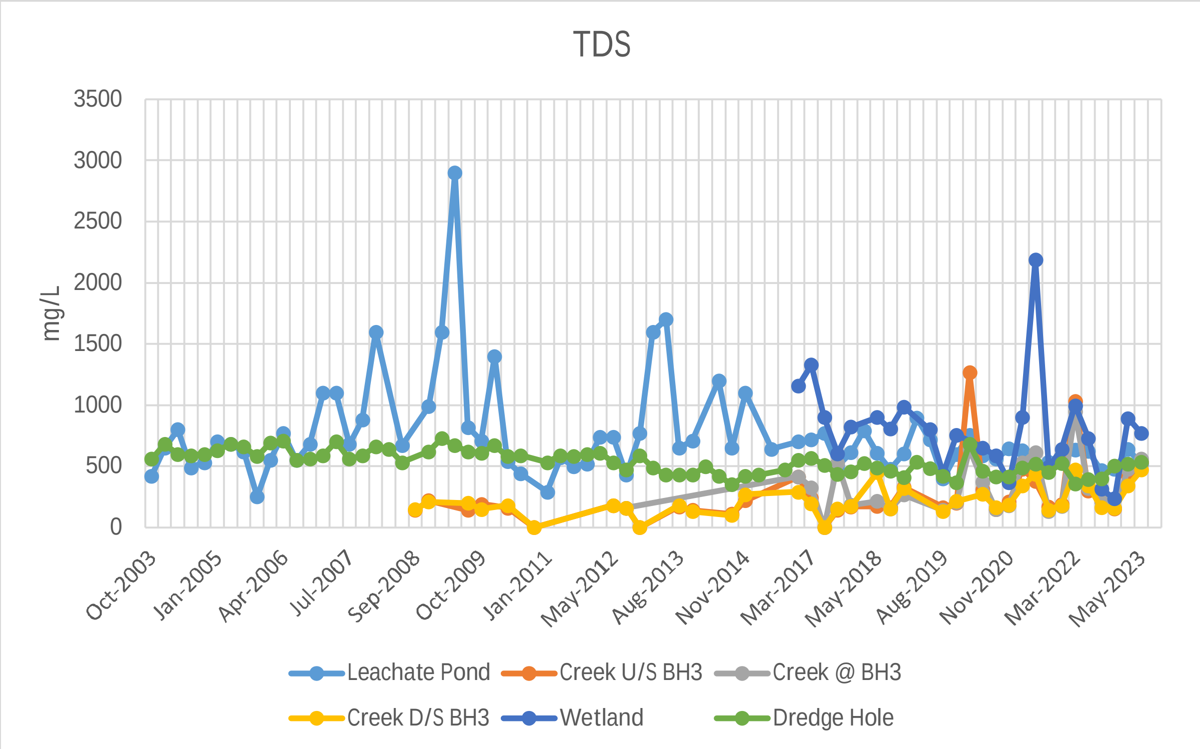
A summary of exceedances of surface water samples collected from the 2022/2023 monitoring period against the Water Quality Objectives nominated by the Aftercare Management Plan is given in Table 14.

Table 14 Exceedances from nominated detect values

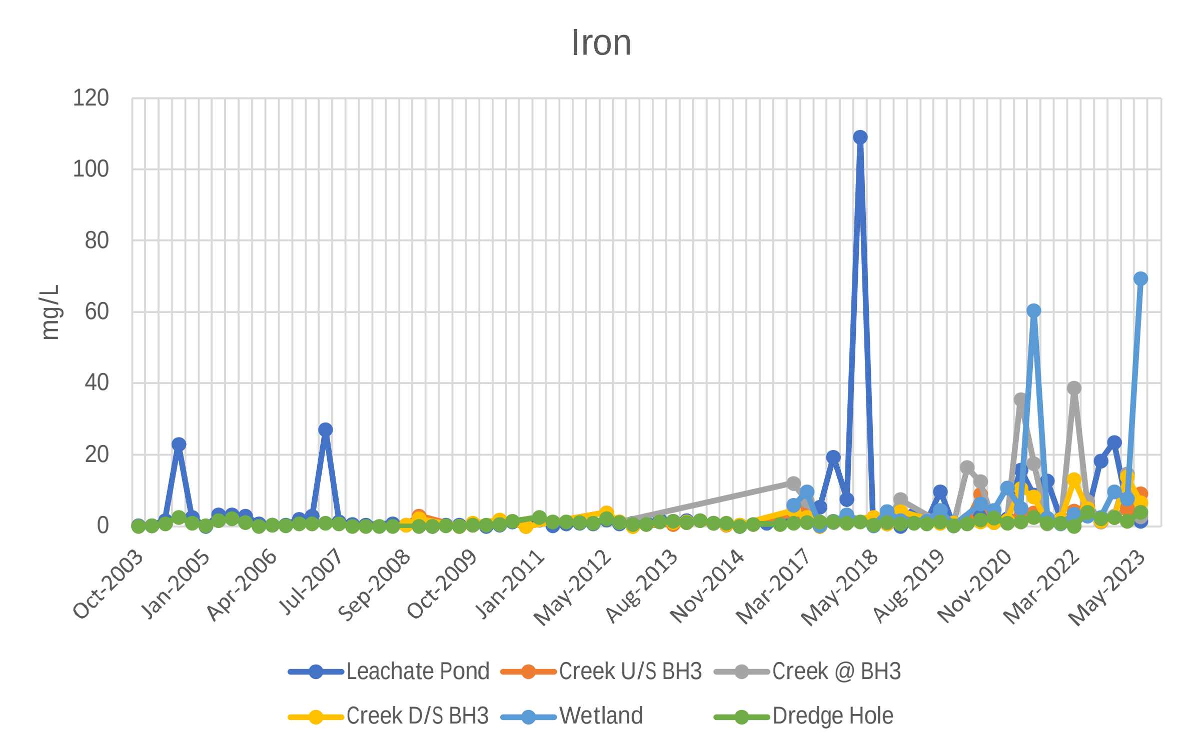
Analytes	Surface Water Quality Objectives
pH	Surface Water Location with detects outside of 6.5-8 11/2022 – Dredge Hole 02/2023 – Creek @ BH3
Total dissolved solids (TDS)	No detects in monitoring events
Calcium (CA)	No detects in monitoring events
Magnesium (Mg)	No detects in monitoring events
Sodium (Na)	No water quality objective
Chloride (Cl)	No water quality objective
Sulphate (SO4)	No detects in monitoring events
Ammonia (NH3)	09/2022 – Leachate Pond 11/2022 – Leachate Pond 02/2023 – Leachate Pond 05/2023 – Creek D/S BH3, Leachate Pond, Wetland
Nitrate (NO3)	09/2022 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3 11/2022 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3
Total Kjeldahl nitrogen (TKN)	No water quality objective
Chromium (Cr)	09/2022 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3, Leachate Pond, Wetland 11/2022 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3, Leachate Pond, Wetland
Iron (Fe)	No water quality objective
Zinc (Zn)	09/2022 – Leachate Pond 11/2022 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3, Leachate Pond 02/2023 – Wetland 05/2023 – Creek U/S BH3, Creek @ BH3, Creek D/S BH3

6.2.2 Surface Water Trend Graphs

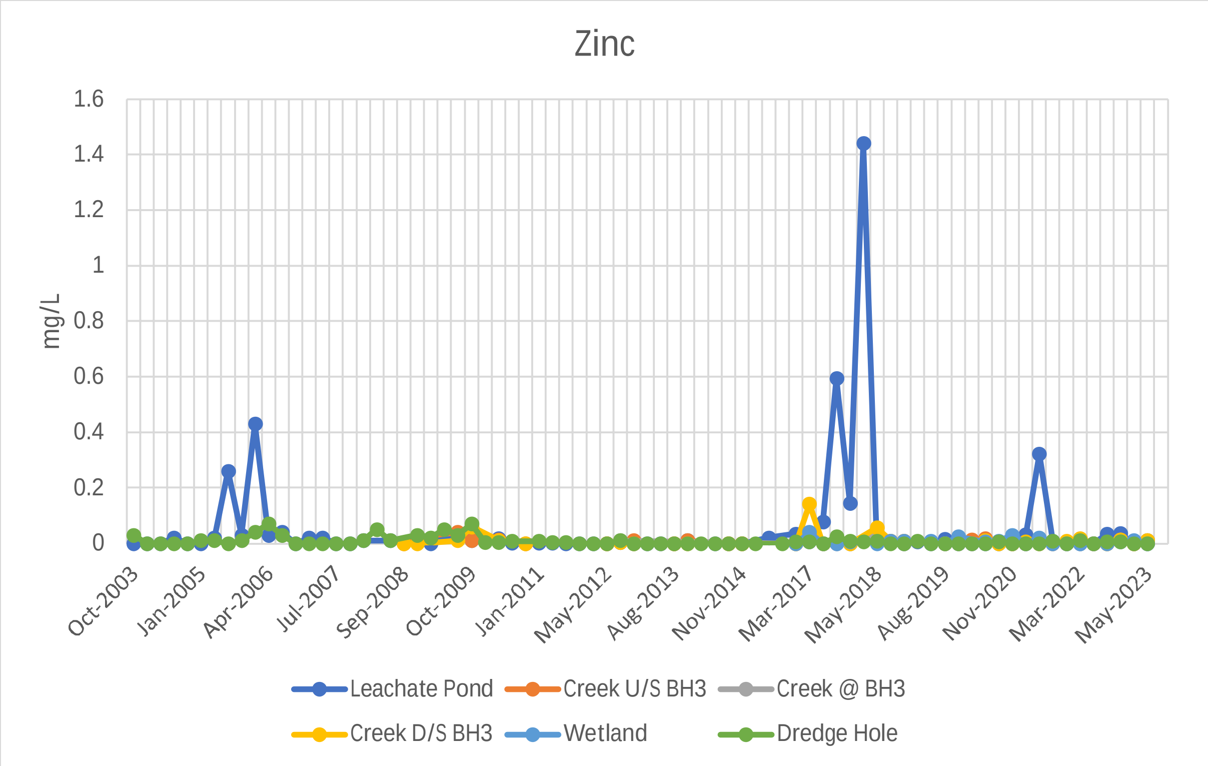
Surface historical trend graphs are provided below. The graphs indicate the surface water results for the 2022/2023 monitoring program to be relatively consistent with historical data. The historical groundwater results table is provided in Appendix E.



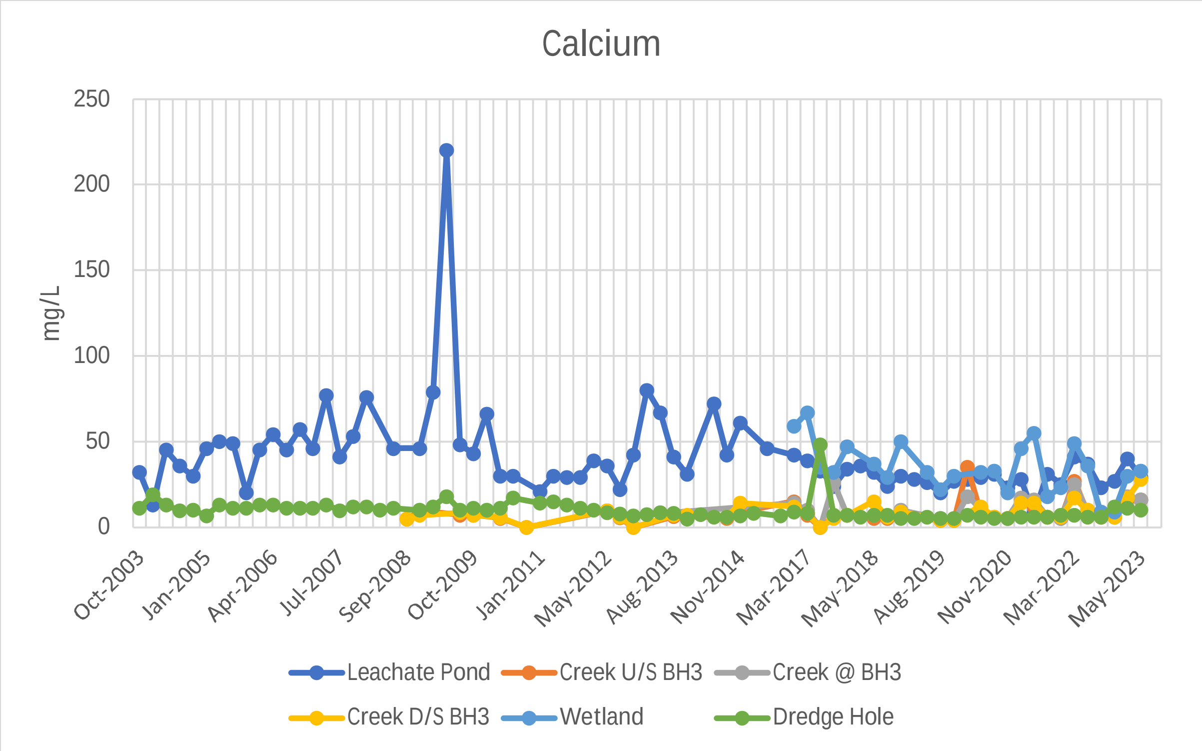
Surface water TDS corresponded to historic values. During this latest monitoring period sites tended to have lower levels in the second half of the year (September and November 2022 events) and higher levels at the beginning of the year (February and May 2023 events). Surface water site at the Creek D/S of BH3 showed the lowest TDS for three of the four events and the Wetland site displayed a noticeable increase during the February and May 2023 monitoring events (from 313 and 236 mg/L to 892 and 768 mg/L). Over the course of sampling the three creek sites (D/S BH3, @ BH3 and U/S BH3) tended to have much lower TDS levels than the other three sites. The Dredge Hole has the most stable levels.



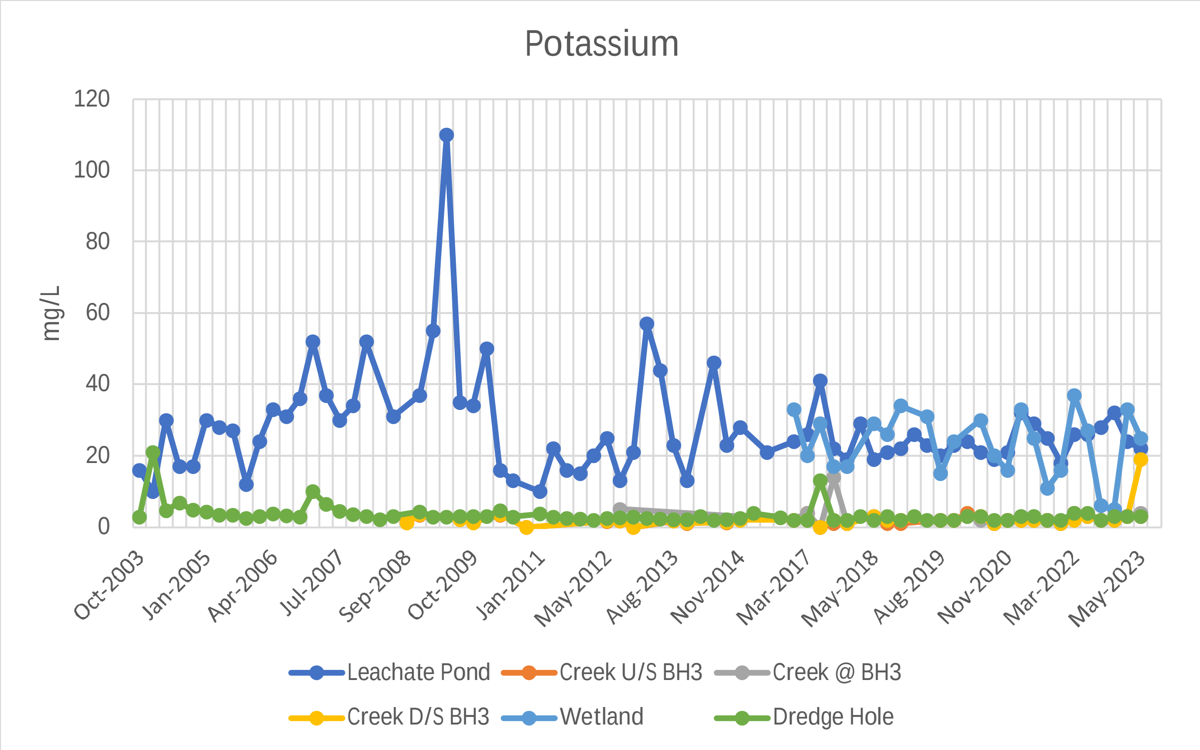
As per TDS, the Dredge hole tends to show the lowest and most stable iron levels across the surface water sites. Iron at the other five sites were quite different throughout the four events with no single event showing similarities in ranges across the sites. During the May 2023 event the Wetland reached peak iron levels of 69.4 mg/L, the only other noticeable spike at this site was in May 2021 of 60.5 mg/L. In September and November 2022, the Leachate Pond experienced high levels of iron (18.3 and 23.5 mg/L respectively) before dropping back to more average values in March and May 2023 (5.48 and 1.42 mg/L). The Leachate Pond shows several spikes throughout sampling history, the most noticeable occurring in February 2018 (the highest results seen across all sites), with levels reaching 109 mg/L.



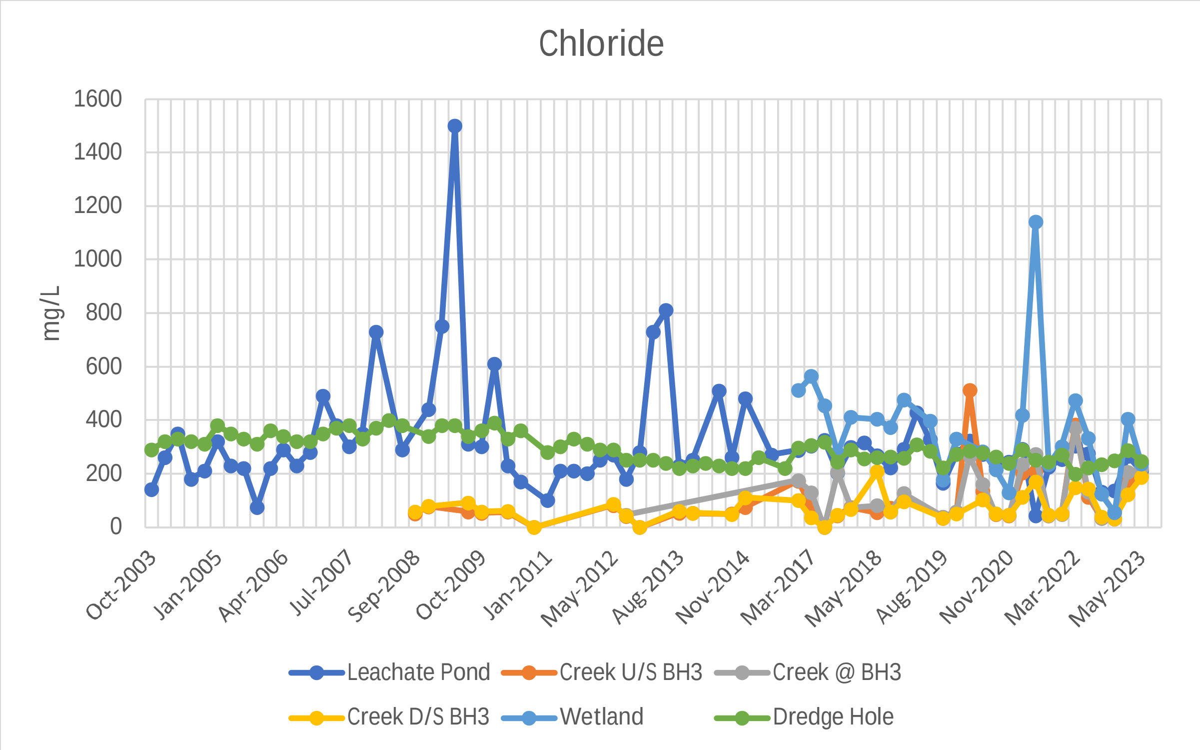
Zinc levels were relatively low across all surface water sites during the 2022/2023 sampling program. There were no noticeable spikes at any of the sampled sites. The Leachate Pond had the highest levels in the September and November events (0.033 and 0.036 mg/L respectively), which correlates with historic results. Zinc levels at this surface water site have shown several historic and noticeable spikes and the highest zinc values noted at any of the surface water locations. During the 2017/2018 sampling program zinc at the Leachate Pond was 0.594 mg/L in August and 1.44 mg/L in February.



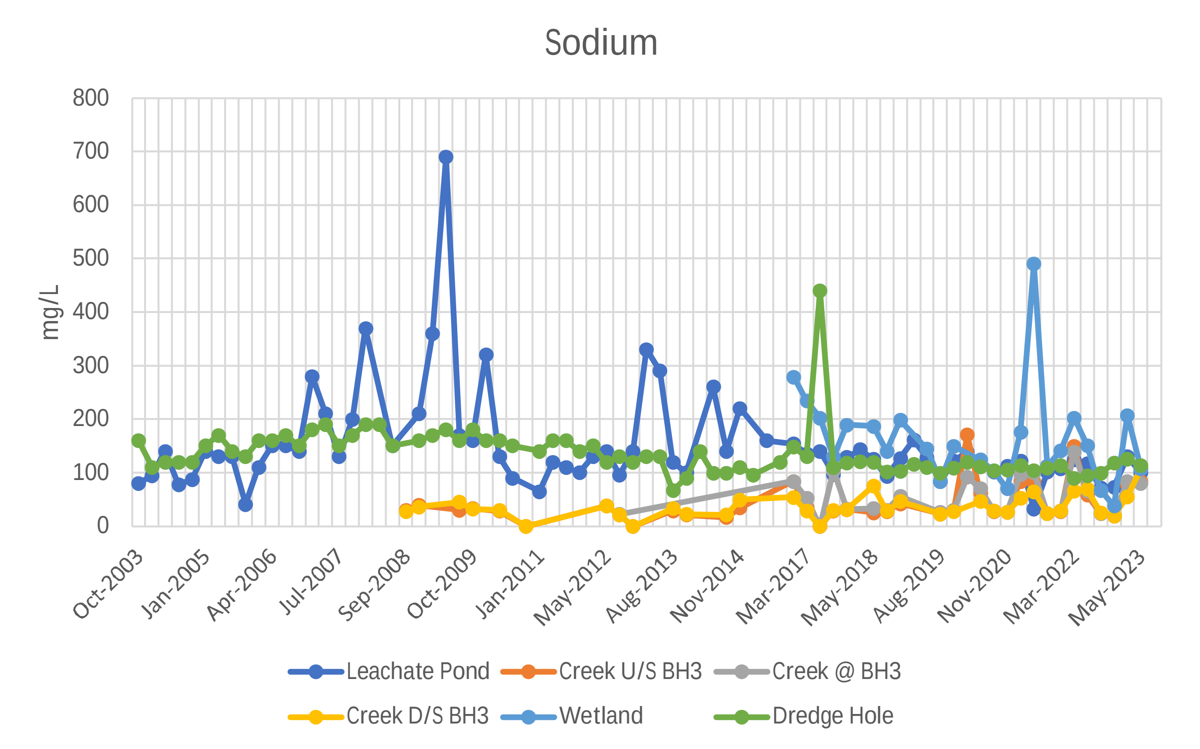
Surface water calcium levels were within historic trends, with the Leachate Pond and the Wetland generally showing the highest levels across all sites. The Creek D/S of BH3 showed a spike in zinc levels during the May 2023 sampling event, reaching 28 mg/L (the highest levels noted at this location since monitoring began in September 2008). Since August 2019 most sites tend to show some minor seasonal variance with most sites having higher zinc levels at the beginning of the year, which aligns with TDS levels.



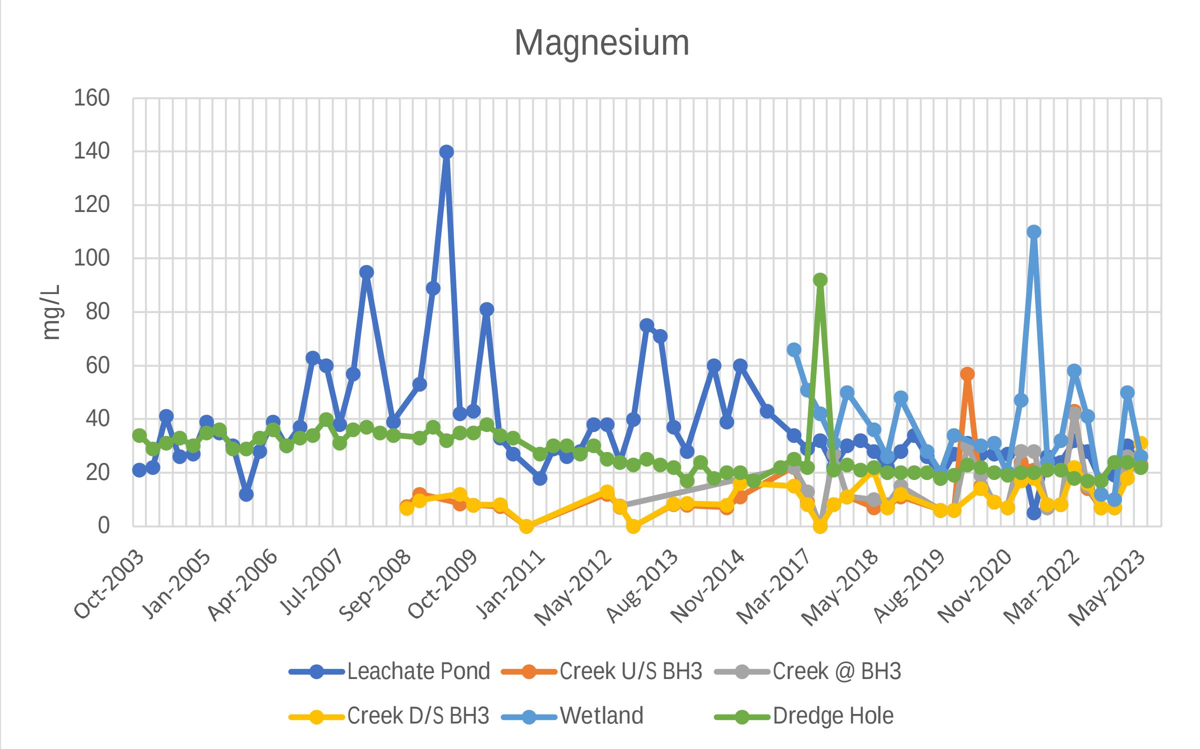
Historically the Leachate Pond and the Wetland have the highest potassium levels across the site (which is similar across several measured analytes) and this remained consistent during the 2022/2023 sampling program. However, in September and November 2022 the Wetland returned uncharacteristically low zinc results of 6 and 5 mg/L respectively, these are the lowest results seen at this location since monitoring began in January 2017. The Creek location D/S of BH3 experienced peak levels of potassium in May 2023 of 19 mg/L, all other rounds it remained relatively low and within historic values.



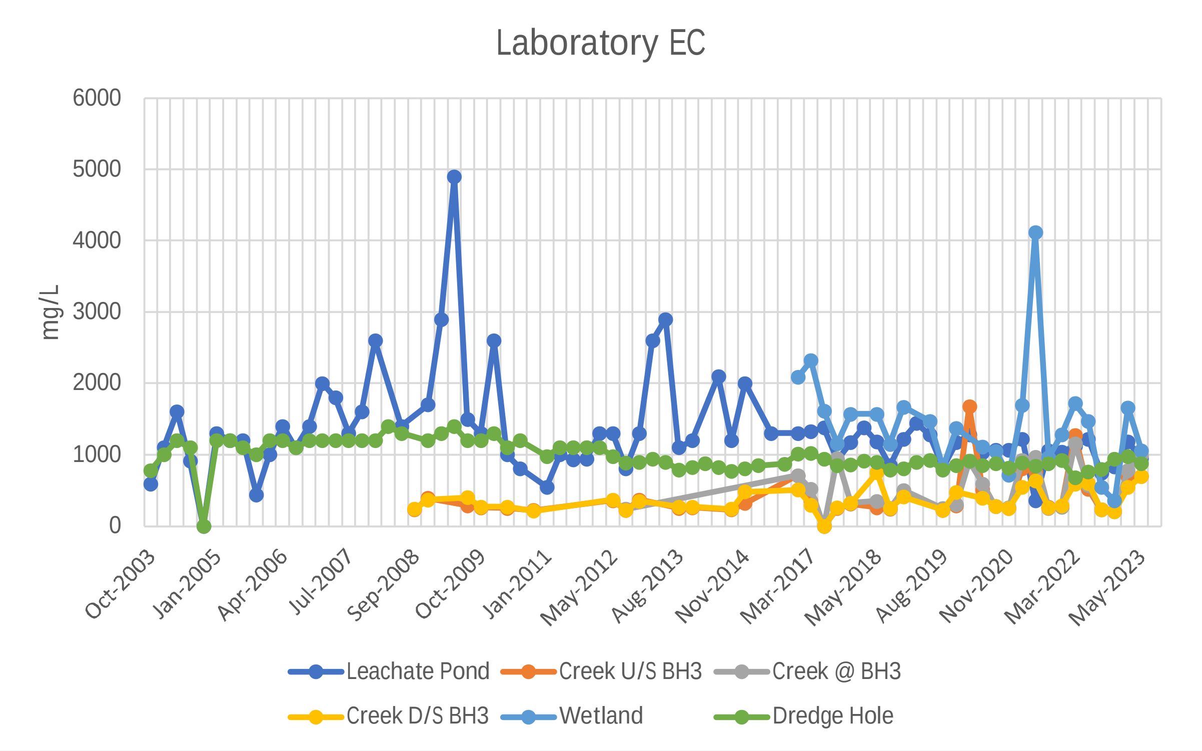
Surface water chloride levels were all within historic ranges except for one reading from the Wetland, which dropped to very low levels in November 2022 (55 mg/L), which is the lowest seen at this location. In the next two sampling events (March and May) chloride rose again and was similar to historic values. The three creek locations generally show the lowest chloride levels, and the Dredge Hole site remains the most static. The Leachate Pond has had the highest chloride levels across the site (1500 mg/L in April 2009) followed by the Wetland (1140 mg/L in May 2021).



Sodium concentrations at all six sites remained in line with historic results during the 2022/2023 sampling event. The lowest Sodium results were at Creek @ BH3 and Creek D/S of BH3 (both 19 mg/L in November 2022), while the highest result for the year was seen the Wetland (207 mg/L in March 2023). The Wetland had a marked increase in results between the end of 2022 and the beginning of 2023, going from 38 mg/L to 207 mg/L, with 38 mg/L being the lowest concentration of sodium at the Wetland. In May 2023 the Creek D/S from BH3 reached its peak value, since sampling began at the site in September 2008, of 108 mg/L.



All surface water sites had concentrations of magnesium that were within historic levels apart from the Creek location D/S of BH3 which had a magnesium concentration of 31 mg/L (its peak value since September 2008). As with several other analytes Magnesium is showing some seasonality over the last couple of years of the sampling program with results becoming higher at the beginning of the year (March and May) and lower towards the end of the year (September and November). Although the Dredge Hole site tends to remain relatively stable across sampling events there is one noticeable peak at this site in May 2017 of 92 mg/L. The Leachate Pond and the Wetland sites have historically had the highest values.



EC concentrations across the majority of surface water sites were within historic trends, with no noticeable results received during the 2022/2023 program, except for the Wetlands site. In November 2022 the Wetland EC was 361 mg/L, which is incredibly low for this particular site (and the lowest seen for this site since sampling started) and rose to 1660 mg/L in March 2023 (similar to historic). This increase of results at the Wetland between November 2022 and March 2023 is seen across several different analytes. The highest EC concentrations have generally been at the Leachate Pond, it reached 4900 mg/L in April 2009.

6.3. Leachate Monitoring Results

Three Leachate bores LB1, LB2 and LB3 were visited quarterly during the 2022/2023 monitoring period. However, LB1 and LB2 were not sampled as the bores were blocked. Leachate results have been calculated from the gauging results of leachate bores for the 2022/23 monitoring program and are provided in Table 15.

Table 15 Leachate gauging results

ID	Date	SWL (mBTOC)	SWL (mAHD)	Maximum Leachate Levels (mAHD)	Exceedances (m)
LB1	01/09/2022	13.22	413.88	414.90	-1.02
	18/11/2022	12.99	414.11	414.90	-0.79
	13/02/2023	13.52	413.58	414.90	-1.32
	10/05/2023	13.33	413.77	414.90	-1.13
LB2	01/09/2022	14.48	412.09	412.30	-0.21
	18/11/2022	14.37	412.20	412.30	-0.10
	13/02/2023	14.48	412.09	412.30	-0.21
	10/05/2023	14.17	412.40	412.30	0.10
LB3	01/09/2022	10.59	415.51	414.80	0.71
	18/11/2022	10.39	415.71	414.80	0.91
	13/02/2023	10.69	415.41	414.80	0.61
	10/05/2023	10.70	415.40	414.80	0.60

In May 2023 the leachate level at LB2 was 0.1 m higher than the maximum allowable leachate level, while LB3 exceeded the maximum leachate levels during all 2022/2023 monitoring events. The average of leachate exceedances at LB3 was 0.71 m, and the highest exceedance noted was 0.91 m in November 2022.

7. SUBSURFACE GAS BORE MONITORING RESULTS

There are four landfill gas monitoring bores, BH10 and BH12 are onsite and BH09 and BH11 are offsite. Of the onsite bores, one is directly into the waste mass (BH12) and is not used to monitor fugitive gas emissions. It is an indicator of the landfill gas source concentration. Results of landfill gas monitoring events in 2022/2023 is presented in Table 16. Peak methane and carbon dioxide results that are highlighted red exceed the allowable % v/v for these gases.

Table 16 Landfill Gas Monitoring Bore Results

Site	Date	Peak Methane % v/v	Peak Carbon Dioxide % v/v
Assessment Criteria		1	10
BH9	1/09/2022	0	10.3
	16/11/2022	0	0.2
	13/02/2023	0	5.5
	18/05/2023	0.1	6.3
BH10	1/09/2022	0.9	10.3
	17/11/2022	0	3.2
	13/02/2023	0	5.1
	18/05/2023	0	9.9
BH11	1/09/2022	0	4
	18/11/2022	0	5.3
	17/02/2023	0	2.2
	18/05/2023	1	3.5
BH12*	1/09/2022	37.5	16.3
	18/11/2022	37.3	17.4
	17/02/2023	45	17.1
	18/05/2023	45.8	18.5

* Bore is into the waste mass and is therefore not used to monitor fugitive emissions

8. SURFACE EMISSION MONITORING RESULTS

The buildings and services were monitored during September and November in 2022 and February and May in 2023. The landfill cap walkover was carried out in September and November 2022. Surface monitoring emission results are located within the field sheets in Appendix A of this report.

8.1. Buildings and Services

According to the Landfill BPEM guidelines, for buildings and services on and adjacent to the landfill site, the acceptable methane concentration in the air is 5,000 ppm. No exceedances were recorded during the 2022-2023 monitoring program, the highest level recorded was 2.9 ppm at TP11 in August 2022 which is located in front of the green waste pile.

8.2. Landfill Cap Walk Over

The landfill cap walk over was conducted in September and November 2022. According to the Landfill BPEM guidelines, assessment criteria is 100 ppm over a final cap, and 1000 ppm within 50mm of any penetrations through the final cap. All recorded values were below 4 ppm, indicating that the surface cap condition is acceptable as per the exceedance criteria. The highest methane concentration noted was 3.2 ppm in November 2022. Observation of the capped area of the landfill indicates minor cracking of the surface area.

9. QUALITY CONTROL / QUALITY ASSURANCE

9.1. PROGRAM

A summary of the QA/QC procedures adopted for the monitoring program are provided in Table 17.

Table 17 Quality Assurance and Quality Control program

Item	Description
Laboratory accreditation	Groundwater samples were submitted to laboratories that are accredited by NATA for the analytes tested. All primary samples were submitted to ALS Springvale and secondary samples to Eurofins.
Sample collection and transport	All samples were collected by suitably qualified Ventia personnel trained in the relevant procedures. Samples were sealed into laboratory prepared containers then transferred to the laboratory using the correct sample preservation and chain of custody protocols.
Field and inter-lab duplicates	Blind and split duplicate samples were collected at greater than the nominated rate of 1 in 20 primary samples. One duplicate set was taken for each groundwater monitoring event in the 2022/2023 period.
Relative percentage difference (RPD)	The relative percentage difference (RPD) is assessed to evaluate the sampling methodology and the analytical techniques used. The RPD is calculated using the following formula: $$RPD = \frac{(Result\ 1 - Result\ 2)}{(Result\ 1 + Result\ 2)/2}\ X\ 100\%$$ RPD's have been assessed under the following criteria: 1. RPDs have only been considered where a concentration is greater than 1 times the EQL 2. Acceptable RPDs for each EQL multiplier range are: 81 (1-10 x EQL); 50 (10-30 x EQL); 20 (> 30 x EQL) 3. The significance of RPD of results should be evaluated on the basis of sampling technique, sample variability, absolute concentration relative to criteria and laboratory performance 4. This variation can be expected to be higher for organic analysis than for inorganics, and for low concentration of analytes.
Sample blanks	Sample blanks were submitted to verify that no cross contamination had occurred during sampling or in the transfer of samples to the laboratory (Table I2): • Equipment rinsate samples were collected at the nominated rate of 1 in 20 primary samples or one per sample type, which ever was greater. The frequency of sample blanks was considered suitable to satisfy the data quality objectives of the program. One rinsate was taken for each groundwater monitoring event in the 2022/2023 period.

Item	Description
Laboratory quality control procedures	All analytical laboratories used by Ventia are required to adhere to NATA endorsed methodologies and conduct regular control checks on their analyses. Ventia requires these laboratories to regularly provide results of control method blanks, repeat blind replicates and recoveries. The following summarises pertinent acceptance limits for internal laboratory analysis: • Surrogates: 75 - 125% recovery • Matrix spikes: 70% - 130% • Laboratory control samples: 75% - 125% • Laboratory Duplicate Samples: Acceptable RPDs for each EQL multiplier range are: Not Applicable (1-10 x EQL); 50 (10-30 x EQL)*; 20 (> 30 x EQL)*. • Method Blanks: 0 to <PQL *Unless sample heterogeneity is established.

9.2. Results

The QA/QC program consisted of the collection of duplicate samples and rinsate samples. A summary of the QA/QC results is provided in Appendix C. All samples were collected by suitably qualified Ventia personnel and the sampling methods, including sample preservation, transport and decontamination, were consistent with Ventia procedures.

Across the sampling programs, 56 primary samples were collected during the 2022/2023 monitoring program. Four field and four inter-lab duplicate samples were collected (blinds and splits), in accordance with the data quality objective. This exceeds the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) recommended minimum rate of one per 20 samples.

A review of exceedances indicates that where RPDs were above the adopted criteria, differences can generally be attributed to two different categories. Table 18 (below) displays all high RPD's, results that are coloured yellow are those that are less than 10 times the Estimated Quantitation Limit (EQL). Results coloured green are where the primary samples were higher than the secondary value which provides a more conservative observation of the analyte. In the November 2022 monitoring event, total organic carbon (TOC) in the inter-lab sample was higher than the primary sample, taken at BH8. There are no nominated exceedance values for the ANZECC guidelines or nominated water quality objectives, but for a more conservative observation the secondary sample results should be used.

The Relative Percentage Difference (RPD) for field duplicates and inter-lab duplicates were calculated for all results and are summarised in Appendix C.

Table 18 RPD Exceedances

Site	Secondary Sample	Date	Primary Lab Report	Secondary Lab Report	Analyte	Units	EQL	Primary Result	Secondary Result	RPD
BH8	Blind	31/08/2022	EM2216860	EM2216860	Chromium (III+VI)	mg/L	0.001	0.013	0.005	89
BH8	Split	31/08/2022	EM2216860	920032	COD	mg/L	10	<10	69	149
					Chromium (III+VI)	mg/L	0.001	0.013	0.006	74
					Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	17,000	<5,000	109
BH8	Split	16/11/2022	EM2222748	942675	Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	25	185
					TOC	mg/L	1	19	35	59
					Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	31,000	<5,000	144
BH14	Blind	13/02/2023	EM2302400	EM2302400	Ammonia as N	mg/L	0.01	0.51	0.21	83
					Kjeldahl Nitrogen Total	mg/L	0.1	0.9	0.5	57
BH14	Split	13/02/2023	EM2302400	963891	Alkalinity (Bicarbonate as CaCO3)	mg/L	1	138	<20	149
					Alkalinity (total) as CaCO3	mg/L	1	138	<20	149
					Chloride	mg/L	1	363	200	58
					Ammonia as N	mg/L	0.01	0.51	0.24	72
					Chromium (III+VI)	mg/L	0.001	0.048	0.004	169
					COD	mg/L	10	90	42	73
					Zinc	mg/L	0.005	0.059	0.020	99
					Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	19,000	<5,000	117
BH6	Split	10/05/2023	EM2308315	989018	TDS	mg/L	10	425	280	41
					Ammonia as N	mg/L	0.01	<0.01	0.03	100
					Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	11,000	<5,000	75

There were detects in the rinsate samples at all visits except the November 2022 monitoring round. The results are displayed in Appendix C. No rinsate exceedance is more than 10 times the Limit of reporting (LOR). The highest detect was for electrical conductivity (9 uS/cm in August 2022). Alkalinity and total anions were detected in three of the four rinsate samples, TOC and zinc were detected in August 2022, while Volatile Fatty Acids were detected in February 2023. The results indicate care needs to be taken when cleaning the equipment used, however, rinsate results have been compared against primary samples and results are in line with historic, showing this has not adversely impacted results.

Based on the QA/QC program, the analytical data is sufficient for the purposes of this monitoring program.

10. CONCLUSIONS

10.1. GROUNDWATER

All groundwater sites exceeded at least one of the adopted assessment criteria during each monitoring event (ANZECC 2000 guidelines for Fresh Water 95%, Irrigation and Livestock and the groundwater quality objectives as nominated by the Aftercare Management Plan). Results were in line with historic trends at the majority of monitoring bores.

ANZECC 2000 Fresh Water 95% guideline had zinc exceedances at all bores and all events in the 2022/2023 monitoring period. The ANZECC 2000 Irrigation guidelines had groundwater bore exceedances throughout the monitoring events for the following analytes: Chloride at all sites (except BH8), sodium at all sites (except B6 and B10) and chromium (III+VI) at BH8 in February 2023. The only TDS exceedance was detected at BH3 in May 2023, which breached the ANZECC 2000 Livestock guidelines. Results were in line with historic trends at the majority monitoring groundwater bores.

10.2. SURFACE WATER

There were exceedances at all surface water locations throughout the monitoring event that related to surface water quality objectives (as nominated by the Aftercare Management Plan) as well as against the ANZECC 2000 Irrigation guidelines. All sites but the Dredge Hole also had exceedances against the ANZECC 2000 Freshwater 95% guidelines for zinc during at least one sampling event.

The results from the 2022/2023 monitoring program were consistent with historical monitoring data. It is difficult to determine the impact of the landfill in isolation of surrounding land uses.

10.3. LEACHATE

Leachate levels at LB1, LB2 and LB3 were monitored quarterly. Leachate levels at LB2 was 0.1 m above than the maximum leachate level in May 2023, while LB3 in all 2022-2023 monitoring events exceeded the maximum allowable leachate levels. Average the exceedance at LB3 was 0.71 m with the highest exceedance (0.91 m) occurring in November 2022.

10.4. SUBSURFACE LANDFILL GAS

Subsurface landfill gas monitoring performed in September and November 2022 and February and May 2023 indicate that there were no peak methane concentrations exceeding the assessment criteria levels at BH9, BH10 and BH11. Peak Carbon Dioxide levels exceeded in November 2022 for BH9 and BH10, there were no other exceedances throughout the rest of the monitoring events for these bores or for BH11. BH12 displays expected high levels of methane and carbon showing that the site is still producing these gases, however results are not compared against adopted action levels due to its location in the waste mass.

10.5. SURFACE EMISSION LANDFILL GAS

The landfill cap walk over was completed in September and November 2022. All observed values were below 4 ppm, which is below the assessment criteria of 100 ppm.

All methane surface emission readings recorded for the landfill cap surface, buildings, structures and underground services during the 2022/2023 monitoring program were below the prescribed Landfill BPEM action levels indicating very low surface emission methane levels onsite.

10.6. DATA UNCERTAINTY AND STATEMENT OF LIMITATIONS

Ventia has used a degree of skill and care ordinarily exercised by reputable members of our profession practising in the same or similar locality. The conclusions presented in this report are relevant to the condition of the site and the state of legislation currently enacted as at the date of this report. Ventia does not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

11. DECLARATION

This declaration acknowledges that Ventia has been requested by Hepburn Shire Council to undertake an Environmental Monitoring Program in accordance with Creswick Landfill Aftercare Management Plan, Part 2: Environmental Risk Assessment and Monitoring Program (2015).

Ventia sampling procedures were adopted for all environmental monitoring undertaken. All groundwater and surface water monitoring was conducted in accordance with EPA Victoria's Groundwater Sampling Guidelines (Publication 669; April 2000) and Sampling and Analysis of Waters, Wastewaters, Soils and Wastes (IWRG701; EPA, 2009). All landfill gas bore and surface emissions monitoring were conducted in accordance with the EPA Landfill Gas Fugitive Emissions Monitoring Guidelines (Publication 1684,2018).

This report provides a summary of the analysis conducted under the monitoring program, an assessment of the likely offsite water quality and air quality impacts associated with the landfill as well as recommendations for improvements to the monitoring program.

Ventia is of the opinion that this report prepared on behalf of Hepburn Shire Council and titled '2021/2022 Annual Monitoring Report – Creswick Landfill' contains adequate information of suitable quality to enable the Hepburn Shire Council to fulfill its monitoring requirements.

12. REFERENCES

DELWP 2021. Environment Reference Standard 2021. Department of Environment, Land, Water and Planning, State Government of Victoria.

EPA 2000. A Guide to the Sampling and Analysis of Waters, Wastewaters, Soils and Wastes. Publication 441.7, Environmental Protection Authority, State Government of Victoria.

EPA 2000. Groundwater Sampling Guidelines. Publication 669. Environmental Protection Authority, State Government of Victoria.

EPA 2009. Industrial Waste Resource Guidelines: Sampling & Analysis of Waters, Wastewaters, Soils & Wastes. Publication IWRG701 – June 2009. Environmental Protection.

EPA 2016. Post-Closure Pollution Abatement Notice. Notice ID: 90006899

EPA 2018. Landfill Gas Fugitive Emissions Monitoring Guidelines. Publication 1684, February 2018. Authorised and published by EPA Victoria.

EPA 2015. Siting, Design, Operation and Rehabilitation of Landfills Publication 788.3, August 2015. Authorised and published by EPA Victoria.

Mackenzie Environmental 2015a, Creswick Landfill Aftercare Management Plan Part 1: Inspection and Maintenance Plan

Mackenzie Environmental 2015b, Creswick Landfill Aftercare Management Plan Part 2: Environmental Risk Assessment and Monitoring Program

Mackenzie Environmental 2015c, Creswick Landfill Supplementary Hydrogeological Assessment.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013)

Senversa 2016. Auditor Verification Report – Former Creswick Landfill, 32 Anne Street, Creswick, VIC.

SEPP 2018. State Environment Protection Policy (Waters). Victorian Government Gazette S 493. Environment Protection Act 1970, Act No. 8056/1970.

APPENDICES

Appendix A – Field Record Sheets

SAMPLING RESULTS SUBMISSION SHEET (SAMPLING UNDERTAKEN BY VENTIA)

Client: Hepburn Shire Council
Site: Creswick Landfill
Program: Groundwater/Surface Water Sampling

Sampling Period: AUG 22
Sampler: A Callander
Phone: 427529051

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
LB1	1/09/2022	14:25	17.28	13.22	N/A	N/A	N/A	N/A	N/A	Bore blocked no sample possible
LB2	1/09/2022	14:05	15.41	14.48	N/A	N/A	N/A	N/A	N/A	Bore blocked no sample possible
LB3	1/09/2022	13:45		10.59						SWL only
Creek U/S BH3	1/09/2022	10:55			219	7.52	8.9	26.4	10.65	High flow conditions
Creek @ BH3	31/08/2022	10:15			216	7.55	8.7	-36.0	10.42	Outflow from wetland flowing into creek
Creek D/S BH3	31/08/2022	10:30			214	7.24	10.3	93.8	10.26	High flow conditions
Leachate Pond	31/08/2022	16:05			708	7.15	14.4	-61.2	3.94	Thick orange turbidity
Wetland	31/08/2022	13:30			482	7.21	11.5	-44.2	10.91	Sampled near wetland outflow
Dredge hole	31/08/2022	9:03			746	6.68	9.9	82.3	9.54	Increase in shoreline vegetation
BH1	31/08/2022									Bore location lost due to road resurfacing
BH2	31/08/2022	9:35	5.00	2.12	635	6.12	14.1	72.3	4.13	Bailed sample due to partial blockage of bore
BH3	31/08/2022	13:06	3.89	0.45	3364	6.67	10.9	-75.4	0.2	Yellow brown turbidity nil odour
BH4	1/09/2022	13:12	7.92	4.52	2378	6.36	12.7	-82.3	0.1	Yellow silver colour turbidity slight odour

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
BH6	2/09/2022	7:29	15.48	11.72	713	5.03	13.8	242.0	0.34	Slightly white-grey turbidity
BH7	31/08/2022	15:13	7.18	2.42	1127	6.42	12.4	-42.1	0.21	light yellow brown turbidity with nil odour
BH8	31/08/2022	10:28	7.57	2.25	1122	6.71	12.2	-96.6	0.33	Grey-brown thick turbidity nil odour. Duplicate samples taken
BH10	1/09/2022	16:15	6.70	2.26	691	5.99	12.6	96.6	0.35	High yellow-brown turbidity nil odour.
BH14	1/09/2022	9:46	6.30	2.23	1608	6.42	10.7	-30.7	0.63	Brown turbidity nil odour

NOTES:

1 Groundwater samples taken using the low-flow method (as per EPA Publication 669) unless otherwise noted

2 All depths measured from the top of the PVC casing

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH2	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua Troll
Date	31/08/2022	Project No		WQ. Meter Serial #	.844337.

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	9:35	Total Depth (m)	5.00	Mid-screen accessible?	Clear	Depth pump set at (m)	
Static Water Level (m)	2.12	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	

Well Purging Details

Purge Method		Pump Type	
Time Pump in		Pump in' WL	
Time Started		WL m (start)	
Time Stopped	10:00	WL m (end)	2.12
Volume Removed (l)	4		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	bailed		
Time Started		WL m (start)	
Time Stopped		WL m (end)	
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal		WL m(post-removal)		Bore Depth at end (m)	

Pump Settings

Fill / Discharge used		CPM		Air/Gas Pressure (kPa)	

Comments

Bore Bailed

Bore partially blocked

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

	17	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
10:00	4	2.27	Keep purging	635	6.12	14.08	72.3	4.13	turbid red colour nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH3	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	31/08/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	12:20	Total Depth (m)	3.89	Mid-screen accessible?	Clear	Depth pump set at (m)	2.50
Static Water Level (m)	0.45	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	2.50

Well Purging Details

Purge Method	LF	Pump Type	Micro purge
Time Pump in	12:25	Pump in' WL	0.44
Time Started	12:26	WL m (start)	0.45
Time Stopped	13:03	WL m (end)	0.45
Volume Removed (l)	4.5		
Discharge Rate (l/m)	0.12		

Sampling Details

Sampling Method	LF		
Time Started	13:06	WL m (start)	0.45
Time Stopped	13:11	WL m (end)	0.45
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	13:21	WL m(post-removal)	0.45	Bore Depth at end (m)	3.89

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: measured to top of casing not cover

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	20	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
12:30	0.1	0.45	Keep purging	3199	6.70	10.84	-41.9	3.63	Yellow brown turbid nil odour
12:33	0.5	0.44	Keep purging	3404	6.65	10.82	-51.9	0.85	Yellow brown turbid nil odour
12:36	0.9	0.45	Keep purging	3430	6.64	10.99	-65.6	0.44	Yellow brown turbid nil odour
12:39	1.3	0.45	Keep purging	3437	6.65	11.13	-67.8	0.46	Yellow brown turbid nil odour
12:42	1.7	0.44	Keep purging	3434	6.65	10.99	-70.0	0.40	Yellow brown turbid nil odour
12:45	2.1	0.45	Keep purging	3392	6.66	10.96	-72.1	0.35	Yellow brown turbid nil odour
12:48	2.5	0.45	Keep purging	3396	6.66	10.98	-73.4	0.34	Yellow brown turbid nil odour
12:51	2.9	0.45	Keep purging	3395	6.65	10.96	-73.7	0.31	Yellow brown turbid nil odour
12:54	3.3	0.45	Keep purging	3385	6.66	11.00	-74.5	0.30	Yellow brown turbid nil odour
12:57	3.7	0.45	Keep purging	3370	6.67	10.98	-74.8	0.22	Yellow brown turbid nil odour
13:00	4.1	0.45	Keep purging	3363	6.67	10.84	-75.4	0.24	Yellow brown turbid nil odour
13:03	4.5	0.450	OK to sample	3364	6.67	10.91	-75.4	0.23	Yellow brown turbid nil odour

Hidden formulas here --> <-- Hidden

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH4	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	1/09/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:25	Total Depth (m)	7.92	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	4.52	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	low flow	Pump Type	micro
Time Pump in	11:32	Pump in' WL	4.52
Time Started	11:33	WL m (start)	4.52
Time Stopped	13:09	WL m (end)	4.52
Volume Removed (l)	3.7		
Discharge Rate (l/m)	0.04		

Sampling Details

Sampling Method	low flow		
Time Started	13:12	WL m (start)	4.52
Time Stopped	13:21	WL m (end)	4.52
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	13:30	WL m(post-removal)	4.52	Bore Depth at end (m)	7.92

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

20 = vol required for 3V method (L)

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C (+/- 3%)	pH (+/- 0.05 pH)	Temp. (°C) (+/- 10%)	Redox ORP (mV) (+/- 10mV)	DO (mg/L) (+/- 10%)	Comments (colour, turbidity, odours, other)
12:42	0.1	4.52	Keep purging	2278	6.35	11.00	-36.3	2.86	Pumping delayed by pump failure
12:45	0.5	4.52	Keep purging	2343	6.35	11.77	-46.1	1.61	yellow silver turbidity very slight odour
12:48	0.9	4.52	Keep purging	2341	6.36	11.71	-50.7	0.88	yellow silver turbidity very slight odour
12:51	1.3	4.52	Keep purging	2339	6.34	12.10	-58.6	0.31	yellow silver turbidity very slight odour
12:54	1.7	4.52	Keep purging	2349	6.34	12.42	-65.1	0.15	yellow silver turbidity very slight odour
12:57	2.1	4.52	Keep purging	2359	6.35	12.56	-71.2	0.09	yellow silver turbidity very slight odour
13:00	2.5	4.52	Keep purging	2375	6.36	12.67	-77.1	0.06	yellow silver turbidity very slight odour
13:03	2.9	4.52	Keep purging	2386	6.37	12.70	-81.2	0.05	yellow silver turbidity very slight odour
13:06	3.3	4.52	Keep purging	2378	6.36	12.72	-82.1	0.05	yellow silver turbidity very slight odour
13:09	3.7	4.52	OK to sample	2378	6.36	12.70	-82.3	0.05	yellow silver turbidity very slight odour

Hidden formulas here --> <-- Hidden

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH6	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	2/09/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	6:45	Total Depth (m)	15.48	Mid-screen accessible?	Clear	Depth pump set at (m)	15.00
Static Water Level (m)	11.72	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	15.00

Well Purging Details

Purge Method	LF	Pump Type	Bladder
Time Pump in	6:55	Pump in' WL	11.71
Time Started	6:55	WL m (start)	11.71
Time Stopped	7:26	WL m (end)	11.74
Volume Removed (l)	3.3		
Discharge Rate (l/m)	0.11		

Sampling Details

Sampling Method	LF		
Time Started	7:29	WL m (start)	11.74
Time Stopped	7:35	WL m (end)	11.73
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	7:40	WL m(post-removal)	11.74	Bore Depth at end (m)	15.50

Pump Settings

Fill / Discharge used	22/8	CPM		Air/Gas Pressure (kPa)	40

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	22	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
7:02	0.1	11.74	Keep purging	702	5.16	12.42	154.2	2.34	clear nil odour
7:05	0.5	11.73	Keep purging	712	5.07	13.07	187.6	1.13	Slight white turbidity nil odour
7:08	0.9	11.74	Keep purging	713	5.10	13.02	190.8	1.08	Slight white turbidity nil odour
7:11	1.3	11.74	Keep purging	715	5.06	13.57	213.9	0.62	Slight white turbidity nil odour
7:14	1.7	11.74	Keep purging	715	4.99	13.80	221.8	0.58	Slight white turbidity nil odour
7:17	2.1	11.73	Keep purging	714	5.04	13.79	230.2	0.48	Slight white turbidity nil odour
7:20	2.5	11.74	Keep purging	713	5.04	13.89	236.4	0.36	Slight white turbidity nil odour
7:23	2.9	11.74	Keep purging	714	5.04	13.84	240.2	0.35	Slight white turbidity nil odour
7:26	3.3	11.74	OK to sample	713	5.03	13.82	242.0	0.34	Slight white turbidity nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH7	Project Name	HEPBURN GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	31/08/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	14:05	Total Depth (m)	7.18	Mid-screen accessible?	Clear	Depth pump set at (m)	6.50
Static Water Level (m)	2.42	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	6.50

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	14:40	Pump in' WL	2.42
Time Started	14:41	WL m (start)	2.42
Time Stopped		WL m (end)	2.43
Volume Removed (l)	4		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	LF		
Time Started	15:13	WL m (start)	2.43
Time Stopped	15:21	WL m (end)	2.43
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1Ltr green	1		
0ml filtered meta	1		
60ml COD	1		
50ml glass	1		

Pump Removal

Time of removal	15:28	WL m(post-removal)	2.44	Bore Depth at end (m)	7.18

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	28	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
14:46	0.1	2.42		1089	6.56	11.63	-14.9	5.74	Light Yellow Brown turbidity. No odour.
14:49	0.6	2.43		1125	6.45	11.90	-31.1	0.86	Light Yellow Brown turbidity. No odour.
14:52	1	2.44		1128	6.44	12.12	-35.7	0.35	Light Yellow Brown turbidity. No odour.
14:55	1.5	2.43		1126	6.43	12.18	-37.9	0.26	Light Yellow Brown turbidity. No odour.
14:58	2.1	2.43		1123	6.43	12.21	-39.4	0.28	Light Yellow Brown turbidity. No odour.
15:01	2.5	2.43		1129	6.41	12.28	-39.9	0.35	Light Yellow Brown turbidity. No odour.
15:04	3	2.43		1129	6.42	12.43	-40.2	0.23	Light Yellow Brown turbidity. No odour.
15:07	3.5	2.43		1128	6.43	12.45	-41.9	0.22	Light Yellow Brown turbidity. No odour.
15:10	4	2.43	OK to sample	1127	6.42	12.41	-42.1	0.21	Light Yellow Brown turbidity. No odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH8	Project Name	HEPBURN SHIRE GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	31/08/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	10:55	Total Depth (m)	7.57	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	2.25	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	10:05	Pump in' WL	2.08
Time Started	10:07	WL m (start)	2.12
Time Stopped	10:25	WL m (end)	2.30
Volume Removed (l)	0		
Discharge Rate (l/m)	0.00		

Sampling Details

Sampling Method	LF		
Time Started	10:28	WL m (start)	2.31
Time Stopped	10:45	WL m (end)	2.34
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1ltr	1		
)ml METALS filtere	1		
60ml COD	1		
50ml GLASS	1		

Pump Removal

Time of removal	10:52	WL m(post-removal)	2.38	Bore Depth at end (m)	7.57

Pump Settings

Fill / Discharge used	50/10	CPM		Air/Gas Pressure (kPa)	30

Comments: Dups and blanks taken

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	31	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
10:10		2.33	Keep purging	1113	6.70	10.87	-66.9	2.64	grey brown, thick turb, no odour.
10:13		2.31	Keep purging	1119	6.70	11.34	-79.2	0.79	grey brown, thick turb, no odour.
10:16		2.30	Keep purging	1121	6.71	11.79	-90.6	0.20	grey brown, thick turb, no odour.
10:19		2.30	Keep purging	1122	6.70	12.05	-92.9	0.35	grey brown, thick turb, no odour.
10:22		2.30	Keep purging	1123	6.71	12.16	-95.5	0.33	grey brown, thick turb, no odour.
10:25		2.30	OK to sample	1122	6.71	12.24	-96.6	0.33	grey brown, thick turb, no odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH10	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	1/09/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	14:15	Total Depth (m)	6.70	Mid-screen accessible?	Clear	Depth pump set at (m)	5.70
Static Water Level (m)	2.26	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.70

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	14:25	Pump in' WL	2.26
Time Started	14:25	WL m (start)	2.26
Time Stopped	16:12	WL m (end)	2.36
Volume Removed (l)	3.3		
Discharge Rate (l/m)	0.03		

Sampling Details

Sampling Method	LF		
Time Started	16:15	WL m (start)	2.35
Time Stopped	16:22	WL m (end)	2.35
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	16:30	WL m(post-removal)	2.37	Bore Depth at end (m)	6.73

Pump Settings

Fill / Discharge used	5/3	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	26	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
15:48	0.1	2.31	Keep purging	710	6.08	12.07	74.7	3.73	Pump issuses delayed pumping
15:51	0.5	2.33	Keep purging	695	6.03	12.63	88.3	0.72	Highly turbid, yellow/brown nil odour
15:54	0.9	2.35	Keep purging	690	6.02	12.65	89.2	0.63	Highly turbid, yellow/brown nil odour
15:57	1.3	2.35	Keep purging	687	5.98	12.71	92.4	0.36	Highly turbid, yellow/brown nil odour
16:00	1.7	2.35	Keep purging	687	5.93	12.68	94.3	0.33	Highly turbid, yellow/brown nil odour
16:03	2.1	2.35	Keep purging	687	5.99	12.66	94.2	0.41	Highly turbid, yellow/brown nil odour
16:06	2.5	2.35	Keep purging	688	5.99	12.66	98.6	0.35	Highly turbid, yellow/brown nil odour
16:09	2.9	2.35	Keep purging	690	5.99	12.64	94.5	0.36	Highly turbid, yellow/brown nil odour
16:12	3.3	2.36	OK to sample	691	5.99	12.61	96.6	0.35	Highly turbid, yellow/brown nil odour

Hidden formulas here --> <-- Hidden

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH14	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	1/09/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	8:02	Total Depth (m)	6.30	Mid-screen accessible?	Clear	Depth pump set at (m)	5.90
Static Water Level (m)	2.23	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.90

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	8:12	Pump in' WL	2.23
Time Started	8:15	WL m (start)	2.23
Time Stopped	9:43	WL m (end)	2.23
Volume Removed (l)	4.5		
Discharge Rate (l/m)	0.05		

Sampling Details

Sampling Method	LF		
Time Started	9:46	WL m (start)	2.23
Time Stopped	9:55	WL m (end)	2.23
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	10:02	WL m(post-removal)	2.23	Bore Depth at end (m)	6.29

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

good recharge

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	24	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
9:10	0.1	2.23	Keep purging	1545	6.57	8.27	-38.8	2.83	Pump malfunction delayed pumping
9:13	0.5	2.23	Keep purging	1626	6.52	9.29	-37.1	1.60	Thick brown turbidity nil odour
9:16	0.9	2.23	Keep purging	1599	6.49	9.99	-36.2	0.93	Thick brown turbidity nil odour
9:19	1.3	2.23	Keep purging	1589	6.49	10.17	-36.1	0.89	Thick brown turbidity nil odour
9:22	1.7	2.23	Keep purging	1551	6.49	10.26	-36.5	0.81	Thick brown turbidity nil odour
9:25	2.1	2.23	Keep purging	1539	6.48	10.32	-36.5	0.75	Thick brown turbidity nil odour
9:28	2.5	2.23	Keep purging	1534	6.46	10.60	-34.2	0.68	Thick brown turbidity nil odour
9:31	2.9	2.23	Keep purging	1539	6.45	10.66	-34.0	0.66	Thick brown turbidity nil odour
9:34	3.3	2.23	Keep purging	1553	6.45	10.75	-33.8	0.56	Thick brown turbidity nil odour
9:37	3.7	2.23	Keep purging	1612	6.45	10.68	-33.6	0.61	Thick brown turbidity nil odour
9:40	4.1	2.23	Keep purging	1602	6.44	10.62	-32.5	0.64	Thick brown turbidity nil odour
9:43	4.5	2.23	OK to sample	1608	6.42	10.68	-30.7	0.63	Thick brown turbidity nil odour

AND CALIBRATION

Serial no.: 07510	Centre:
Model no.: Aquatroll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results						Comments	Staff initials
	Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV		
29/8/22	4.01	4.02	Y				pH	AC
29/8/22	7.00	6.98	Y				pH	AC
29/8/22	10.01	9.88	Y				pH	AC
29/8/22	0	3	N				EC	AC
29/8/22	1413	1421	Y				EC	AC
29/8/22	100%	96.4	Y				DO	AC
29/8/22	246.8	248.1	Y				REDOX	AC
/ /								
30/8/22	4.01	4.00	Y				pH	AC
30/8/22	7.00	6.99	Y				pH	AC
30/8/22	10.01	9.93	Y				pH	AC
30/8/22	0	0	N				EC	AC
30/8/22	1413	1414	Y				EC	AC
30/8/22	100%	101.0	Y				DO	AC
30/8/22	246.8	247.4	Y				REDOX	AC
/ /								
31/8/22	4.01	4.00	Y				pH	AC
31/8/22	7.00	7.01	Y				pH	AC
31/8/22	10.01	10.03	Y				pH	AC
31/8/22	0	1	N				EC	AC
31/8/22	1413	1416	Y				EC	AC
31/8/22	100%	99.6	Y				DO	AC
31/8/22	249.0	248.1	Y				REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH	Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1	Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 µS/cm < 1,000	4 3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 µS/cm > 1,000	7 6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l (0-20mg/l)	
	10 9.9 - 10.1	0 - 1000 = 10.00 NTU		

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

ventia

INSTRUMENTATION - INTERMEDIATE VERIFICATION AND CALIBRATION

Serial no.: 07510	Centre: Burwood
Model no.: Aqua troll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results						Comments	Staff initials
	Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV		
1/9/22	4.01	4.00	Y				pH	AC
1/9/22	7.00	6.99	Y				pH	AC
1/9/22	10.01	9.95	Y				pH	AC
1/9/22	0	0	N				EC	AC
1/9/22	1413	1414	Y				EC	AC
1/9/22	100%	1006	Y				DO	AC
1/9/22	250.4	249.9	Y				REDOX	AC
/ /								
2/9/22	4.01	3.98	Y				pH	AC
2/9/22	7.00	7.01	Y				pH	AC
2/9/22	10.01	10.09	Y				pH	AC
2/9/22	0	0	N				EC	AC
2/9/22	1413	1413	N				EC	AC
2/9/22	100%	99.8	Y				DO	AC
2/9/22	249.9	250.1	Y				REDOX	AC
/ /								
/ /	4.01						pH	AC
/ /	7.00						pH	AC
/ /	10.01						pH	AC
/ /	0						EC	AC
/ /	1413						EC	AC
/ /	100%						DO	AC
/ /							REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH	Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1	Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 µS/cm < 1,000	4 3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 µS/cm > 1,000	7 6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l	
	10 9.9 - 10.1	0 - 1000 = 10.00 NTU	(0-20mg/l)	

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

Ventia Landfill Surface Gas Monitoring - Field Sheet

ventia

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y/	Y
Date	6/09/2022
Weather and Temperature	17 degrees / 15 km wind
Site Ground Conditions	Dry to moist conitions
Barometric Pressure	974

General Comments
Dry to slightly moist conditions

Reading #	Time	CH_4 Concentration (ppm)	Comment i.e. batter / penetration / sump
B7	13:45	1.4	
B8	13:46	1.4	
C5	13:50	1.6	
C6	13:50	1.2	
C7	13:51	1.1	
C8	13:51	1.3	
C9	13:51	1.8	
D5	13:55	1.3	
D6	13:55	1.2	
D7	13:54	1.5	
D8	13:53	1.9	
D9	13:53	2	
E6	13:58	2.3	
E7	13:58	2.2	
E8	13:59	2.3	
E9	14:00	2.1	
E10	14:01	1.5	
F6	14:06	1.9	
F7	14:06	1.8	
F8	14:05	1.6	
F9	14:05	2.1	
F10	14:04	2	
G6	14:08	1.8	
G7	14:08	2.1	
G8	14:09	2	
G9	14:09	2.3	
G10	14:09	1.8	
H5	14:11	1.4	
H6	14:11	1.2	
H7	14:12	1.5	
H8	14:12	1.3	
H9	14:13	1.8	
H10	14:14	2.2	
I5	14:18	1.8	
I6	14:17	1.7	
I7	14:17	2.4	
I8	14:16	2.6	
I9	14:16	2.4	
I10	14:16	2.4	
J5	14:20	2.3	
J6	14:20	2.2	
J7	14:20	2	
J8	14:21	2.2	
J9	14:21	2.6	
J10	14:22	2.7	
K5	14:25	2.5	
K6	14:25	2.1	
K7	14:27	2.2	

Ventia Landfill Subsurface Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Creswick Landfill
Sampling Staff	Andrew Callander
Instrument Type	GA 5000
Instrument Serial Number	G504479
Calibration Record Supplied (Y/N)	Y
Weather & Temperature	14 degrees / 12 km wind
Site Ground Conditions	Moist
Barometric Pressure	970

General Comments
BH 12's J plug was not sealed properly which may have affected readings from this bore

LFG ID	Date	Time	Peak Flow (l/hr)	Stabilised Flow (l/hr)	SWL (mBTOC)	Depth (mBTOC)	Bore & Headworks Condition	Comments
BH11	1/09/2022	15:17	0	0	DRY	10.33	Good cond	
BH12	1/09/2022	13:50	0.1	0.1	DRY	6.57	J Plug does not seal properly	J plug needs replacing
BH10	1/09/2022	14:08	0	0	2.26	6.7	Good cond	
BH9	1/09/2022	10:38	0	0	DRY	6.84	Good cond	

Instrumentation Gas Readings recorded on instrument data export

Table 1: Subsurface Gas Bore Results (September 2022)

ID	DATE and TIME	CH4	CO2	O2	PEAKCH4	PEAKCO2	MIN O2	BARO	REL.PRESSURE	TERNAL FL(	CO	H2S
		%	%	%	%	%	%	mb	mb	l/h	ppm	ppm
BH12*	1/09/2022 13:50	37.4	16.1	0	37.5	16.3	0	973	0.05	0.1	1	0
BH9	1/09/2022 10:38	0	10.3	8.9	0	10.3	8.9	976	-0.38	0	0	0
BH11	1/09/2022 15:17	0	4	9.5	0	4	9.5	973	0.33	0	0	0
BH10	1/09/2022 14:08	0	10.3	4.8	0.9	10.3	4.8	974	-0.22	0	0	0

Notes: Exceedance of Adopted Assesment Criteria

Methane 1% v/v (EPA Victoria, Best Practice Environmental Management, Siting, design, operation and rehabilitation of landfills, 2015)

Carbon Dioxide 10% v/v (Mackenzie 2016)

* not applicable due to location within waste mass

Ventia Landfill Building Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y/N)	Y
Weather and Temperature	15 degrees / 15 km wind
Site Ground Conditions	Dry
Barometric Pressure	473

General Comments
Locations as per Landserv Service location map

970

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
B1	6/09/2022	13:58	0.9	Good condition	Taken at foot of office building
B2	6/09/2022	14:00	1.3	Good condition	-
B3	6/09/2022	14:01	1.5	Good condition	-
B4	6/09/2022	14:02	1.1	Good condition	-
B5	6/09/2022	14:03	1.3	Good condition	Taken at foot of office building
B6	6/09/2022	14:04	1.8	Good condition	-
B7	6/09/2022	14:05	1.5	Good condition	-
B8	6/09/2022	14:06	1.1	Good condition	-
B9	6/09/2022	14:07	0.9	Good condition	taken on inside edge of open shed
B10	6/09/2022	14:08	0.7	Good condition	-
B11	6/09/2022	14:09	0.8	Good condition	taken on inside edge of open shed
B12	6/09/2022	14:10	0.7	Good condition	-
B13	6/09/2022	14:11	0.9	Good condition	-
B14	6/09/2022	14:12	2.1	Good condition	could not access shed - taken at base of slab
B15	6/09/2022	14:13	2.2	Good condition	-
B16	6/09/2022	14:14	1.8	Good condition	-
B17	6/09/2022	14:15	0.8	Good condition	Taken under outer edge of shed / slab
B18	6/09/2022	14:16	1.2	Good condition	-
B19	6/09/2022	14:17	1.3	Good condition	-
B20	6/09/2022	14:18	1.4	Good condition	-

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
TP1	6/09/2022	14:19	1.1	Good condition	drain / pit
TP2	6/09/2022	14:20	1	Good condition	-
TP3	6/09/2022	14:21	1.8	Good condition	-
TP4	6/09/2022	14:22	1.5	Good condition	-
TP5	6/09/2022	14:23	1.4	Good condition	-
TP6	6/09/2022	14:24	1.4	unknown	cannot locate taken in area
TP7	6/09/2022	14:25	1.5	Good condition	-
TP8	6/09/2022	14:26	1.8	Good condition	-
TP9	6/09/2022	14:27	1.7	Good condition	-
TP10	6/09/2022	14:28	1.5	Good condition	-
TP11 (new)	6/09/2022	14:32	2.9	Good condition	in front of green waste pile

EQUIPMENT QUALITY REPORT

GA5000

Equipment Code: MLG-275 **Serial Number: G500275**

The equipment has been issued as follows:

☑ Equipment is clean ☑ Pump and battery voltage check ☑ Clear Data

Calibration Results				Calibration Gas (Expiry Date)
Parameter	Standard	Result	Error Range	
CH_4	Methane by Volume 60%	60%	± 2%	5521-1-6 Exp. 27/08/2026
CO_2	Carbon Dioxide by volume 40%	40%	± 2%	5521-1-6 Exp. 27/08/2026
H_2S	Hydrogen Sulphide 25 ppm	25ppm	± 2 ppm	WO312609-2 Exp. 24/08/2023
O_2	Oxygen 18%	18%	± 0.2%	WO312609-2 Exp. 24/08/2023
CO	Carbon Monoxide 50 ppm	50ppm	± 2ppm	WO279607-2 Exp. 17/12/2025

Date: 30/08/2022

Calibrated by: Lachlan Ward

Please check that the following items are received, and all items are returned. Please clean equipment before returning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of this form)	HT Id No.	Sent?	Returned?	Comments
1	Blue tubing with an inlet barb fitting	N/A	✓		
2	Clear tubing with an inlet Brass Ex-cap Female Fitting (filter attached)	N/A	✓		
3	Spare water trap filter(s) Qty 1	N/A	✓		
4	Yellow tubing with an inlet barb fitting	N/A	✓		
5	Clear tubing	N/A	✓		
6	Charger 240/110V to 12V 500mA	N/A	✓		
7	GA5000 with a carry bag	MLG-275	✓		
8	Hard case	N/A	✓		
9	Instruction Manual	N/A	✓		
10	Well cap fitting	N/A	✓		
-	Test & Tag	N/A			

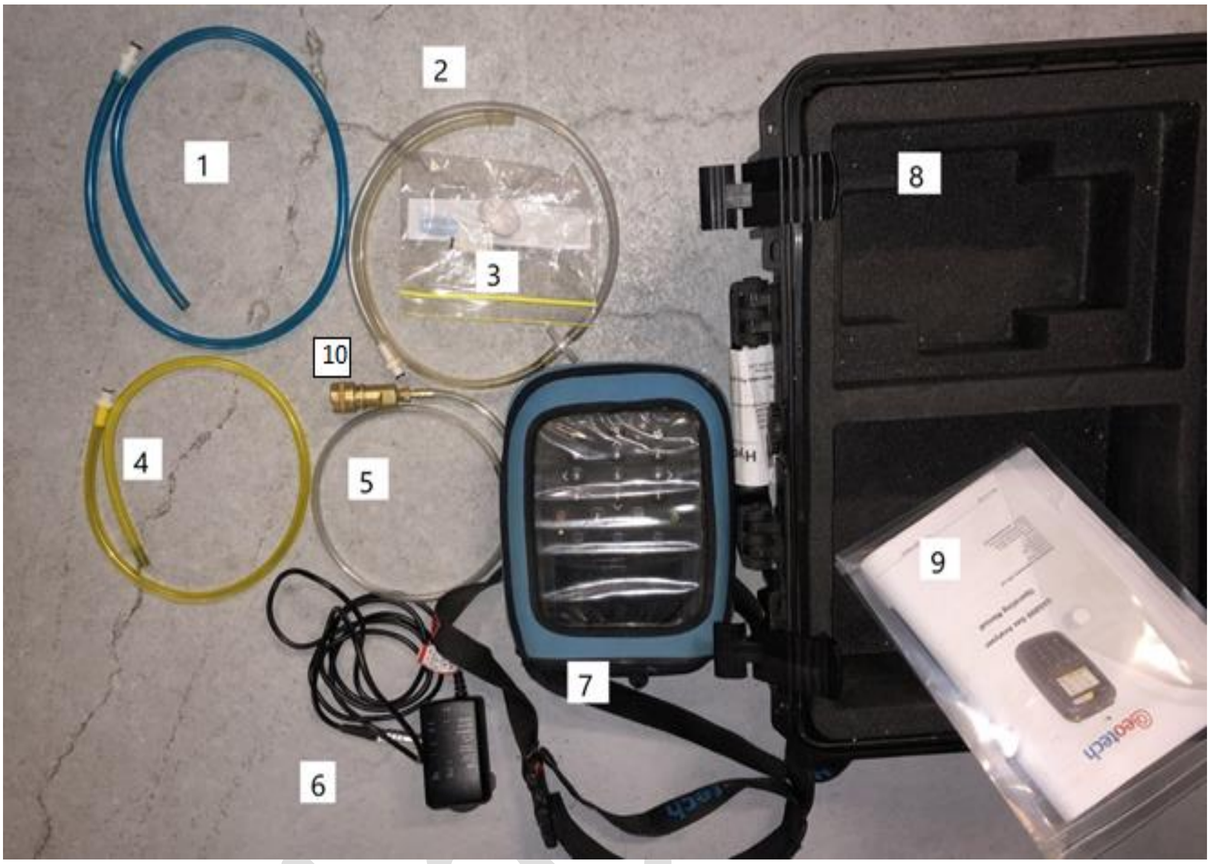
☑ Equipment voltage ☑ Pre-delivery Calibration Test Complete

Date: 30/08/2022

Checked by: Lachlan Ward

HT JOB NO: 19894 CLIENTS REF: P/O No: TBC

RETURN DATE: / / TIME: CONDITION ON RETURN:



1
2
3
4
5
6
7
8
9
10

SAMPLING RESULTS SUBMISSION SHEET (SAMPLING UNDERTAKEN BY VENTIA)

Client: Hepburn Shire Council
Site: Creswick Landfill
Program: Groundwater/Surface Water Sampling

Samping Period: November 2022
Sampler: A Callander
Phone: 427529051

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
LB1	18/11/2022	8:05	17.32	12.99						NO sample bore blocked
LB2	18/11/2022	8:25	15.43	14.37						Bore blocked at 5.8m
LB3	18/11/2022	9:01		10.39						level only no odour, appears to be misslabled BH3
Creek U/S BH3	16/11/2022	11:30			179	7.02	13.1	145.6	9.57	see photos
Creek @ BH3	16/11/2022	11:07			179	7.01	13.0	151.2	9.54	see photos
Creek D/S BH3	16/11/2022	10:35			179	7.04	12.6	157.6	9.55	see photos
Leachate Pond	17/11/2022	10:40			741	6.94	14.1	-79.0	3.78	see photos
Wetland	17/11/2022	9:35			300	6.89	14.5	-69.2	8.20	see photos
Dredge hole	18/11/2022	7:30			875	6.44	13.8	3.7	5.92	No access through gate
BH1	17/11/2022	-	-	-	-	-	-	-	-	Bore location lost due to road resurfacing
BH2	17/11/2022	12:05	4.98	1.93	639	5.68	15.0	47.3	0.53	Orange turbid, Bailed sample due to resricted access to bore and bend in bore casing
BH3	17/11/2022	9:10	3.88	0.59	3353	6.39	14.1	-42.6	0.1	Yellow redish brown slightly turbid nil odour
BH4	16/11/2022	12:23	7.92	3.25	2512	6.05	13.0	-74.9	0.0	yellow silver turbidity very slight odour
BH6	17/11/2022	16:48	15.48	11.20	654	4.91	15.1	194.7	0.36	Clear nil odour
BH7	17/11/2022	10:22	7.18	2.42	880	6.35	14.5	-31.1	0.09	Light Yellow Brown. No odour.

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
BH8	17/11/2022	12:54	7.57	3.18	1173	6.68	14.4	-90.1	0.08	Light brown, thick turb, no odour.
BH10	17/11/2022	14:02	6.70	2.06	777	5.72	14.5	68.3	0.21	Highly turbid,dark yellow/brown nil odour
BH14	16/11/2022	13:16	6.30	2.01	1541	6.15	12.3	6.4	0.14	Very thick brown turbidity nil odour

NOTES:
1 Groundwater samples taken using the low-flow method (as per EPA Publication 669) unless otherwise noted
2 All depths measured from the top of the PVC casing

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH2	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua Troll
Date	17/11/2022	Project No		WQ. Meter Serial #	.844337.

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	12:05	Total Depth (m)	4.98	Mid-screen accessible?	Clear	Depth pump set at (m)	
Static Water Level (m)	1.93	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	

Well Purging Details

Purge Method		Pump Type	
Time Pump in		Pump in' WL	
Time Started		WL m (start)	
Time Stopped	12:30	WL m (end)	1.93
Volume Removed (l)	4		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	bailed		
Time Started		WL m (start)	
Time Stopped		WL m (end)	
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal		WL m(post-removal)		Bore Depth at end (m)	

Pump Settings

Fill / Discharge used		CPM		Air/Gas Pressure (kPa)	

Comments

Bore Bailed

Bore partially blocked

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	18 = vol required for 3V method (L)			+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
12:30	4	2.27	Keep purging	639	5.68	15.00	47.3	0.53	Orange turbid

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH3	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	17/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	8:18	Total Depth (m)	3.90	Mid-screen accessible?	Clear	Depth pump set at (m)	2.50
Static Water Level (m)	0.59	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	2.50

Well Purging Details

Purge Method	LF	Pump Type	Micro purge
Time Pump in	12:25	Pump in' WL	0.44
Time Started	12:26	WL m (start)	0.45
Time Stopped	9:07	WL m (end)	0.59
Volume Removed (l)	6.1		
Discharge Rate (l/m)	-0.03		

Sampling Details

Sampling Method	LF		
Time Started	9:10	WL m (start)	0.59
Time Stopped	9:16	WL m (end)	0.59
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	9:22	WL m(post-removal)	0.59	Bore Depth at end (m)	3.89

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: measured to top of casing not cover

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	19	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
8:31	0.1	0.590	Keep purging	3390	6.92	13.40	1.3	4.12	Yellow brown turbid nil odour
8:34	0.6	0.590	Keep purging	3381	6.87	13.80	-0.8	2.39	Yellow brown turbid nil odour
8:37	1.1	0.590	Keep purging	3371	6.61	15.40	-8.2	0.89	Yellow brown turbid nil odour
8:40	1.6	0.590	Keep purging	3368	6.57	15.17	-21.3	0.74	Yellow brown turbid nil odour
8:43	2.1	0.590	Keep purging	3369	6.49	14.22	-27.2	0.68	Yellow brown turbid nil odour
8:46	2.6	0.590	Keep purging	3368	6.48	14.18	-29.1	0.52	Yellow brown turbid nil odour
8:49	3.1	0.590	Keep purging	3370	6.44	14.22	-31.8	0.49	Yellow brown turbid nil odour
8:52	3.6	0.590	Keep purging	3361	6.42	14.21	-34.8	0.22	Yellow brown turbid nil odour
8:55	4.1	0.590	Keep purging	3355	6.42	14.51	-38.1	0.18	Yellow brown turbid nil odour
8:58	4.6	0.590	Keep purging	3357	6.41	14.17	-41.8	0.14	Yellow brown turbid nil odour
9:01	5.1	0.590	Keep purging	3354	6.40	14.25	-42.2	0.11	Yellow brown turbid nil odour
9:04	5.6	0.590	Keep purging	3354	6.40	14.20	-42.4	0.10	Yellow brown turbid nil odour
9:07	6.1	0.590	OK to sample	3353	6.39	14.10	-42.6	0.10	Yellow brown turbid nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH4	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	16/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:41	Total Depth (m)	7.90	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	3.25	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	low flow	Pump Type	micro
Time Pump in	11:46	Pump in' WL	3.25
Time Started	11:46	WL m (start)	3.25
Time Stopped	12:20	WL m (end)	3.25
Volume Removed (l)	4.6		
Discharge Rate (l/m)	0.14		

Sampling Details

Sampling Method	low flow		
Time Started	12:23	WL m (start)	3.25
Time Stopped	12:29	WL m (end)	3.25
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	12:35	WL m(post-removal)	3.25	Bore Depth at end (m)	7.90

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	27	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
11:53	0.1	3.25	Keep purging	1304	6.89	11.90	1.8	1.94	Pumping delayed by pump failure
11:56	0.6	3.25	Keep purging	2594	6.47	12.80	-14.3	1.27	yellow silver turbidity very slight odour
11:59	1.1	3.25	Keep purging	2528	6.19	12.90	-28.7	0.95	yellow silver turbidity very slight odour
12:02	1.6	3.25	Keep purging	2521	6.19	13.30	-32.1	0.21	yellow silver turbidity very slight odour
12:05	2.1	3.25	Keep purging	2518	6.18	13.20	-39.7	0.12	yellow silver turbidity very slight odour
12:08	2.6	3.25	Keep purging	2516	6.13	13.20	-47.2	0.10	yellow silver turbidity very slight odour
12:11	3.1	3.25	Keep purging	2524	6.11	12.40	-51.7	0.06	yellow silver turbidity very slight odour
12:14	3.6	3.25	Keep purging	2515	6.06	12.80	-71.7	0.04	yellow silver turbidity very slight odour
12:17	4.1	3.25	Keep purging	2513	6.05	12.90	-75.0	0.04	yellow silver turbidity very slight odour
12:20	4.6	3.25	OK to sample	2512	6.05	13.00	-74.9	0.04	yellow silver turbidity very slight odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH6	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	17/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	6:45	Total Depth (m)	15.48	Mid-screen accessible?	Clear	Depth pump set at (m)	15.00
Static Water Level (m)	11.20	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	15.00

Well Purging Details

Purge Method	LF	Pump Type	Bladder
Time Pump in	6:55	Pump in' WL	11.20
Time Started	6:55	WL m (start)	11.20
Time Stopped	16:45	WL m (end)	11.20
Volume Removed (l)	4.3		
Discharge Rate (l/m)	0.01		

Sampling Details

Sampling Method	LF		
Time Started	16:48	WL m (start)	11.20
Time Stopped	16:58	WL m (end)	11.20
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	17:10	WL m(post-removal)	11.20	Bore Depth at end (m)	15.50

Pump Settings

Fill / Discharge used	22/8	CPM		Air/Gas Pressure (kPa)	40

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

	25	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
16:24	0.1	11.20	Keep purging	687	5.24	15.84	29.5	2.17	clear nil odour
16:27	0.7	11.20	Keep purging	669	5.10	15.24	96.3	0.96	Slight white turbidity nil odour
16:30	1.3	11.20	Keep purging	661	5.04	15.36	151.3	0.58	Slight white turbidity nil odour
16:33	1.9	11.20	Keep purging	654	5.01	15.34	168.0	0.44	Slight white turbidity nil odour
16:36	2.5	11.20	Keep purging	653	4.95	15.30	187.0	0.40	Slight white turbidity nil odour
16:39	3.1	11.20	Keep purging	655	4.92	15.24	192.1	0.38	Slight white turbidity nil odour
16:42	3.7	11.20	Keep purging	654	4.91	15.11	193.8	0.36	Slight white turbidity nil odour
16:45	4.3	11.20	OK to sample	654	4.91	15.10	194.7	0.36	Slight white turbidity nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH7	Project Name	HEPBURN GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	17/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	
Additional Information							

Bore Field Measurements

Time of SWL	10:22	Total Depth (m)	7.18	Mid-screen accessible?	Clear	Depth pump set at (m)	6.50
Static Water Level (m)	2.42	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	6.50

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	9:55	Pump in' WL	2.42
Time Started	10:19	WL m (start)	2.42
Time Stopped		WL m (end)	2.42
Volume Removed (l)	5.7		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	LF		
Time Started	10:22	WL m (start)	2.42
Time Stopped	10:29	WL m (end)	2.42
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1Ltr green	1		
0ml filtered meta	1		
60ml COD	1		
50ml glass	1		

Pump Removal

Time of removal	10:36	WL m(post-removal)	2.43	Bore Depth at end (m)	7.18

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	28 = vol required for 3V method (L)			+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
9:55	0.1	2.42		995	6.61	14.90	-58.6	2.68	Light Yellow Brown turbidity. No odour.
9:58	0.8	2.42		941	6.48	14.60	-45.8	0.68	Light Yellow Brown turbidity. No odour.
10:01	1.5	2.42		892	6.45	14.70	-41.7	0.48	Light Yellow Brown turbidity. No odour.
10:04	2.2	2.44		887	6.44	14.70	-39.5	0.36	Light Yellow Brown turbidity. No odour.
10:07	2.9	2.43		874	6.42	14.40	-36.9	0.15	Light Yellow Brown turbidity. No odour.
10:10	3.6	2.43		869	6.40	14.80	-35.4	0.11	Light Yellow Brown turbidity. No odour.
10:13	4.3	2.43		879	6.36	14.50	-33.1	0.09	Light Yellow Brown turbidity. No odour.
10:16	5	2.42		878	6.35	14.60	-31.8	0.09	Light Yellow Brown turbidity. No odour.
10:19	5.7	2.42	OK to sample	880	6.35	14.50	-31.1	0.09	Light Yellow Brown turbidity. No odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH8	Project Name	HEPBURN SHIRE GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	17/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	12:25	Total Depth (m)	7.57	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	3.18	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	12:31	Pump in' WL	3.16
Time Started	12:31	WL m (start)	3.16
Time Stopped	12:51	WL m (end)	2.30
Volume Removed (l)	2.6		
Discharge Rate (l/m)	0.13		

Sampling Details

Sampling Method	LF		
Time Started	12:54	WL m (start)	2.31
Time Stopped	13:15	WL m (end)	2.34
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1ltr	1		
)ml METALS filtere	1		
60ml COD	1		
50ml GLASS	1		

Pump Removal

Time of removal	13:20	WL m(post-removal)	2.36	Bore Depth at end (m)	7.57

Pump Settings

Fill / Discharge used	50/10	CPM		Air/Gas Pressure (kPa)	30

Comments: Dups and blanks taken

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	26	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
12:36	0.1	2.29	Keep purging	1184	6.75	14.20	-62.5	0.37	grey brown, thick turb, no odour.
12:39	0.6	2.30	Keep purging	1179	6.72	14.60	-69.7	0.19	grey brown, thick turb, no odour.
12:42	1.1	2.30	Keep purging	1178	6.71	14.50	-78.6	0.13	grey brown, thick turb, no odour.
12:45	1.6	2.30	Keep purging	1186	6.70	14.30	-86.8	0.08	grey brown, thick turb, no odour.
12:48	2.1	2.30	Keep purging	1174	6.69	14.40	-88.9	0.08	grey brown, thick turb, no odour.
12:51	2.6	2.30	OK to sample	1173	6.68	14.40	-90.1	0.08	grey brown, thick turb, no odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH10	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	17/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	14:15	Total Depth (m)	6.70	Mid-screen accessible?	Clear	Depth pump set at (m)	5.70
Static Water Level (m)	2.06	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.70

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	14:25	Pump in' WL	2.26
Time Started	14:25	WL m (start)	2.26
Time Stopped	13:59	WL m (end)	2.36
Volume Removed (l)	3.3		
Discharge Rate (l/m)	-0.13		

Sampling Details

Sampling Method	LF		
Time Started	14:02	WL m (start)	2.35
Time Stopped	14:10	WL m (end)	2.35
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	14:22	WL m(post-removal)	2.37	Bore Depth at end (m)	6.70

Pump Settings

Fill / Discharge used	5/3	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	27	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
13:35	0.1	2.31	Keep purging	713	6.18	12.80	38.6	2.47	Pump issuses delayed pumping
13:38	0.5	2.33	Keep purging	759	6.09	13.30	44.4	0.95	Highly turbid, yellow/brown nil odour
13:41	0.9	2.35	Keep purging	761	5.94	14.80	48.3	0.67	Highly turbid, yellow/brown nil odour
13:44	1.3	2.35	Keep purging	764	5.84	14.70	51.5	0.48	Highly turbid, yellow/brown nil odour
13:47	1.7	2.35	Keep purging	768	5.79	14.50	58.4	0.31	Highly turbid, yellow/brown nil odour
13:50	2.1	2.35	Keep purging	771	5.76	14.70	61.3	0.25	Highly turbid, yellow/brown nil odour
13:53	2.5	2.35	Keep purging	775	5.73	14.30	66.7	0.21	Highly turbid, yellow/brown nil odour
13:56	2.9	2.35	Keep purging	779	5.73	14.40	68.4	0.21	Highly turbid, yellow/brown nil odour
13:59	3.3	2.36	OK to sample	777	5.72	14.50	68.3	0.21	Highly turbid, yellow/brown nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH14	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	16/11/2022	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	8:02	Total Depth (m)	6.30	Mid-screen accessible?	Clear	Depth pump set at (m)	5.90
Static Water Level (m)	2.01	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.90

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	8:12	Pump in' WL	2.23
Time Started	8:15	WL m (start)	2.23
Time Stopped	13:13	WL m (end)	2.01
Volume Removed (l)	6.7		
Discharge Rate (l/m)	0.02		

Sampling Details

Sampling Method	LF		
Time Started	13:16	WL m (start)	2.01
Time Stopped	13:22	WL m (end)	2.01
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	13:30	WL m(post-removal)	2.02	Bore Depth at end (m)	6.30

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

good recharge

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	25	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
12:40	0.1	2.01	Keep purging	1596	6.87	12.99	-22.0	4.99	Pump malfunction delayed pumping
12:43	0.7	2.01	Keep purging	1587	6.55	12.84	-19.7	3.87	Thick brown turbidity nil odour
12:46	1.3	2.01	Keep purging	1572	6.41	12.74	-17.6	2.89	Thick brown turbidity nil odour
12:49	1.9	2.01	Keep purging	1567	6.34	12.69	-13.8	1.42	Thick brown turbidity nil odour
12:52	2.5	2.01	Keep purging	1559	6.27	12.68	-10.8	0.97	Thick brown turbidity nil odour
12:55	3.1	2.01	Keep purging	1554	6.17	12.57	-6.2	0.84	Thick brown turbidity nil odour
12:58	3.7	2.01	Keep purging	1549	6.17	12.51	-5.4	0.47	Thick brown turbidity nil odour
13:01	4.3	2.01	Keep purging	1547	6.16	12.43	-1.2	0.39	Thick brown turbidity nil odour
13:04	4.9	2.01	Keep purging	1545	6.16	12.41	0.1	0.31	Thick brown turbidity nil odour
13:07	5.5	2.01	Keep purging	1544	6.16	12.40	4.7	0.15	Thick brown turbidity nil odour
13:10	6.1	2.01	Keep purging	1542	6.16	12.31	5.8	0.14	Thick brown turbidity nil odour
13:13	6.7	2.01	OK to sample	1541	6.15	12.30	6.4	0.14	Thick brown turbidity nil odour

![ventia]

INSTRUMENTATION - INTERMEDIATE VERIFICATION AND CALIBRATION

Serial no.: 07510	Centre: Burwood
Model no.: Aqua troll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results						Comments	Staff initials
	Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV		
14/11/22	4.01	4.22	—		120.7		pH	AC
14/11/22	7.00	7.24	✓		1.9		pH	AC
14/11/22	10.01	9.94	✓				pH	AC
14/11/22	0	2	×				EC	AC
14/11/22	1413	1424	✓				EC	AC
14/11/22	100%	98.3	✓				DO	AC
/ /							REDOX	AC
/ /								
16/11/22	4.01	4.09	Y				pH	AC
16/11/22	7.00	7.08	Y				pH	AC
16/11/22	10.01	10.03	Y				pH	AC
16/11/22	0	2	Y				EC	AC
16/11/22	1413	1419	Y				EC	AC
16/11/22	100%	99.6	Y				DO	AC
16/11/22	249.3	250.8	Y				REDOX	AC
/ /								
17/11/22	4.01	4.00	Y				pH	AC
17/11/22	7.00	6.99	Y				pH	AC
17/11/22	10.01	9.97	Y				pH	AC
17/11/22	0	1.8	Y				EC	AC
17/11/22	1413	1416	Y				EC	AC
17/11/22	100%	99.8	Y				DO	AC
17/11/22	249.5	249.4	Y				REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH	Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1	Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 μS/cm < 1,000	4 3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 μS/cm > 1,000	7 6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l (0-20mg/l)	
	10 9.9 - 10.1	0 - 1000 = 10.00 NTU		

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

ventia

INSTRUMENTATION - INTERMEDIATE VERIFICATION AND CALIBRATION

Serial no.: 07510	Centre: Burwood
Model no.: Aqua troll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results						Comments	Staff initials
	Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV		
18/11/22	4.01	4.05	Y				pH	AC
18/11/22	7.00	7.01	Y				pH	AC
18/11/22	10.01	9.97	Y				pH	AC
18/11/22	0	2	N				EC	AC
18/11/22	1413	1418	Y				EC	AC
18/11/22	100%	98.9	Y				DO	AC
18/11/22	249.6	248.9	Y				REDOX	AC
/ /								
/ /	4.01						pH	AC
/ /	7.00						pH	AC
/ /	10.01						pH	AC
/ /	0						EC	AC
/ /	1413						EC	AC
/ /	100%						DO	AC
/ /							REDOX	AC
/ /								
/ /	4.01						pH	AC
/ /	7.00						pH	AC
/ /	10.01						pH	AC
/ /	0						EC	AC
/ /	1413						EC	AC
/ /	100%						DO	AC
/ /							REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH		Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1		Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 µS/cm < 1,000	4	3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 µS/cm > 1,000	7	6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l (0-20mg/l)	
	10	9.9 - 10.1	0 - 1000 = 10.00 NTU		

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

Ventia Landfill Subsurface Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Creswick Landfill
Sampling Staff	Andrew Callander
Instrument Type	GA 5000
Instrument Serial Number	G500274
Calibration Record Supplied (Y/N)	Y
Weather & Temperature	16 degrees / 5 km wind
Site Ground Conditions	Moist
Barometric Pressure	964

General Comments
BH 12's J plug was not sealed properly which may have affected readings from this bore

LFG ID	Date	Time	Peak Flow (l/hr)	Stabilised Flow (l/hr)	SWL (mBTOC)	Depth (mBTOC)	Bore & Headworks Condition	Comments
BH11	18/11/2022	10:37	0	0	DRY	10.33	Good cond	
BH12	18/11/2022	9:58	0	0	DRY	6.57	J Plug does not seal properly	J plug needs replacing
BH10	17/10/2022	13:32	0	0	2.06	6.7	Good cond	
BH9	16/11/2022	14:46	0	0	DRY	6.84	Good cond	

Instrumentation Gas Readings recorded on instrument data export

Table 1: Subsurface Gas Bore Results (November 2022)

ID	DATE and TIME	CH4	CO2	O2	PEAKCH4	PEAKCO2	MIN O2	BARO	REL.PRESSURE	TERNAL FL(	CO	H2S
		%	%	%	%	%	%	mb	mb	l/h	ppm	ppm
BH12*	18/11/2022 21:58	37.3	17.4	0	37.3	17.4	0	965	-0.18	0	2	0
BH9	16/11/2022 13:32:00 PM	0	0.2	22	0	0.2	22	966	-0.26	0	0	0
BH11	18/11/2022 10:37	0	5.3	3.5	0	5.3	3.5	964	-0.18	-2.3	0	0
BH10	17/11/2022 13:32:00 PM	0	3.1	19.3	0	3.2	19.2	969	0.04	-0.5	0	0

Notes: Exceedance of Adopted Assesment Criteria

Methane 1% v/v (EPA Victoria, Best Practice Environmental Management, Siting, design, operation and rehabilitation of landfills, 2015)

Carbon Dioxide 10% v/v (Mackenzie 2016)

* not applicable due to location within waste mass

Ventia Landfill Building Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y/N)	Y
Weather and Temperature	16 degrees / 5 km wind
Site Ground Conditions	Dry
Barometric Pressure	469
	970

General Comments
Locations as per Landserv Service location map

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
B1	16/11/2022	13:48	1.1	Good condition	Taken at foot of office building
B2	16/11/2022	13:49	1	Good condition	-
B3	16/11/2022	13:49	0.8	Good condition	-
B4	16/11/2022	13:49	0.6	Good condition	-
B5	16/11/2022	13:50	0.5	Good condition	Taken at foot of office building
B6	16/11/2022	13:50	0.8	Good condition	-
B7	16/11/2022	13:51	0.9	Good condition	-
B8	16/11/2022	13:51	1.2	Good condition	-
B9	16/11/2022	13:53	0.8	Good condition	taken on inside edge of open shed
B10	16/11/2022	13:53	0.6	Good condition	-
B11	16/11/2022	13:55	0.4	Good condition	taken on inside edge of open shed
B12	16/11/2022	13:56	0.4	Good condition	-
B13	16/11/2022	13:56	0.4	Good condition	-
B14	16/11/2022	14:22	1.5	Good condition	could not access shed - taken at base of slab
B15	16/11/2022	14:23	1.8	Good condition	-
B16	16/11/2022	14:24	1.7	Good condition	-
B17	16/11/2022	14:06	1	Good condition	Taken under outer edge of shed / slab
B18	16/11/2022	14:06	0.9	Good condition	-
B19	16/11/2022	14:07	1	Good condition	-
B20	16/11/2022	14:07	0.9	Good condition	-

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
TP1	16/11/2022	14:02	1.2	Good condition	drain / pit
TP2	16/11/2022	14:04	0.7	Good condition	-
TP3	16/11/2022	14:03	0.6	Good condition	-
TP4	16/11/2022	14:03	0.4	Good condition	-
TP5	16/11/2022	14:03	0.8	Good condition	-
TP6	16/11/2022	13:59	0.6	unknown	cannot locate taken in area
TP7	16/11/2022	13:59	1.1	Good condition	-
TP8	16/11/2022	13:59	1.2	Good condition	-
TP9	16/11/2022	13:59	0.8	Good condition	-
TP10	16/11/2022	13:59	1.1	Good condition	-
TP11 (new)	16/11/2022	14:28	1.8	Good condition	in front of green waste pile

Ventia Landfill Surface Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y	Y
Date	16/11/2022
Weather and Temperature	17 degrees /5 km wind
Site Ground Conditions	moist conitions
Barometric Pressure	969

General Comments
Moist conditions

Reading #	Time	CH_4 Concentration (ppm)	Comment i.e. batter / penetration / sump
B7	14:58	1.1	
B8	14:58	1	
C5	15:06	1	
C6	15:06	3.1	
C7	15:07	3.2	
C8	15:07	1.1	
C9	15:08	1.2	
D5	15:11	1.8	
D6	15:10	1.6	
D7	15:10	0.5	
D8	15:09	0.6	
D9	15:09	0.7	
E6	15:10	0.8	
E7	15:10	0.8	
E8	15:11	0.4	
E9	15:11	0.9	
E10	15:12	1.1	
F6	15:14	1.8	
F7	15:15	1.7	
F8	15:15	1.5	
F9	15:15	1.4	
F10	15:16	1.7	
G6	15:18	1.3	
G7	15:19	1.5	
G8	15:19	1.2	
G9	15:19	1.4	
G10	15:20	1.1	
H5	15:22	1	
H6	15:22	1.2	
H7	15:22	1.8	
H8	15:22	1.4	
H9	15:23	0.9	
H10	15:23	0.8	
I5	15:26	1	
I6	15:26	0.9	
I7	15:26	0.7	
I8	15:27	0.8	
I9	15:27	0.9	
I10	15:28	0.8	
J5	15:30	1.1	
J6	15:30	1.3	
J7	15:30	0.9	
J8	15:29	0.8	
J9	15:29	2	
J10	15:29	2.1	
K5	15:33	1.5	
K6	15:33	0.9	
K7	15:32	1.1	

EQUIPMENT QUALITY REPORT

GA5000

Equipment Code: MLG-274 **Serial Number: 9500274**

The equipment has been issued as follows:

☑ Equipment is clean ☑ Pump and battery voltage check ☑ Clear Data

Calibration Results				Calibration Gas (Expiry Date)
Parameter	Standard	Result	Error Range	
CH4	Methane by Volume 60%	60.0%	± 2%	Exp: 24/8/26
CO2	Carbon Dioxide by volume 40%	40.0%	± 2%	Exp: 24/8/26
H2S	Hydrogen Sulphide 25 ppm	25ppm	± 2 ppm	Exp. 13/01/23
O2	Oxygen 18%	18.0%	± 0.2%	Exp. 13/01/23
CO	Carbon Monoxide 50 ppm	50ppm	± 2ppm	Exp: 17/12/25

Date: 14/11/2022

Calibrated by: Lachlan Ward

Please check that the following items are received, and all items are returned. Please clean equipment before retuning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of this form)	HT Id No.	Sent?	Returned?	Comments
1	Blue tubing with an inlet barb fitting	N/A	✓		
2	Clear tubing with an inlet Brass Ex-cap Female Fitting (filter attached)	N/A	✓		
3	Spare water trap filter(s) Qty 1	N/A	✓		
4	Yellow tubing with an inlet barb fitting	N/A	✓		
5	Clear tubing	N/A	✓		
6	Charger 240/110V to 12V 500mA	N/A	✓		
7	GA5000 with a carry bag	MLG-274	✓		
8	Hard case	N/A	✓		
9	Instruction Manual	N/A	✓		
10	Well cap fitting	N/A	✓		
-	Test & Tag	N/A			

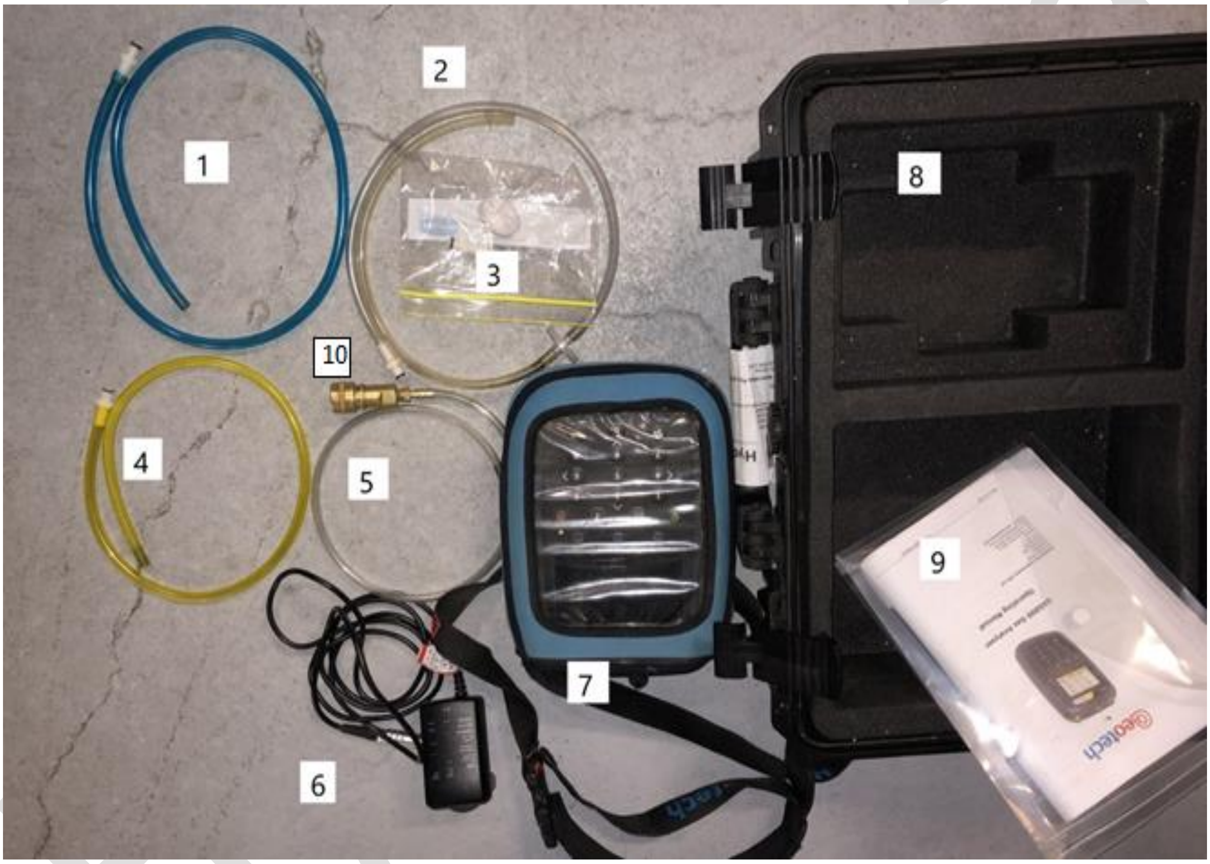
☑ Equipment voltage ☑ Pre-delivery Calibration Test Complete

Date: 14/11/2022

Checked by: Lachlan Ward

HT JOB NO: 20221 CLIENTS REF: P/O No: 4700645497

RETURN DATE: / /	TIME:	CONDITION ON RETURN:


1
2
3
4
5
6
7
8
9
10

EQUIPMENT QUALITY REPORT

Inspectra Laser

Equipment Code: MIL-1217 Serial Number: 4531217

☑ Equipment is clean ☑ Pump and battery voltage check ☑ Clear Data

Calibration Results				**Calibration Gas Expiry Date**
Parameter	**Standard**	**Result**	**Error Range**	
CH4	Methane by 500ppm	487ppm	± 25 ppm	WO284877-1 Exp.25/01/2026

Date: 14/11/2022

Calibrated by: Lachlan Ward

*For quality control purposes HydroTerra can supply gas calibration data

Please check that the following items are received and all items are returned. Please clean equipment before retuning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of the form)	HT id No.	Sent?	Return?	Comments
1	Carry Case	N/A	✓		
2	Inspectra Laser	MIL-1217	✓		
3	Sampling Probe joint	N/A	✓		
4	Sampling Probe 600mm	N/A	✓		
5	Telescopic rod with Suction cup	N/A	✓		
6	Spare Battery & charger 240/110V to 12V 500mA	N/A	✓		
7	Spare filter	N/A	✓		
8	Tools – Screw driver	N/A	✓		
-	Test & Tag	N/A	✓		

☑ Equipment voltage ☑ Pre-delivery Calibration Test Complete

Date: 14/11/2022

Calibrated by: Lachlan

HT JOB NO: 20221 CLIENTS REF: P/O No: 4700645497

RETURN DATE: / /	TIME:	CONDITION ON RETURN:

SAMPLING RESULTS SUBMISSION SHEET (SAMPLING UNDERTAKEN BY VENTIA)

Client: Hepburn Shire Council
Site: Creswick Landfill
Program: Groundwater/Surface Water Sampling

Samping Period: Feb 23
Sampler: A Callander
Phone: 427529051

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
LB1	13/02/2023	13:15	17.32	13.52						NO sample bore blocked
LB2	13/02/2023	12:55	15.43	14.48						NO sample bore blocked at 6.1m
LB3	13/02/2023	10:50		10.69						level only no odour, appears to be misslabled BH3
Creek U/S BH3	13/02/2023	13:15			689	6.83	19.4	20.4	4.96	see photos
Creek @ BH3	13/02/2023	12:55			799	6.04	15.6	2.5	0.69	see photos
Creek D/S BH3	13/02/2023	10:50			550	6.66	16.5	-7.7	1.12	see photos
Leachate Pond	14/02/2023	14:15			1158	7.32	23.1	-28.9	12.09	see photos
Wetland	14/02/2023	12:40			1240	7.44	21.7	14.9	8.72	see photos
Dredge hole	16/02/2023	16:15			914	6.85	22.0	63.6	7.53	No access through gate
BH1	17/02/2023	-	-	-	-	-	-	-	-	Not accesable due to road resurfacing
BH2	17/02/2023	7:30	5.00	2.98	685	5.73	19.7	122.2	2.69	Bailed sample due to resricting bend in bore casing.
BH3	14/02/2023	12:06	3.88	0.87	2481	6.52	17.2	-17.2	0.2	Yellow brown slightly turbid nil odour
BH4	13/02/2023	14:02	7.92	4.88	1840	5.77	14.4	6.5	0.4	Grey turbidity very slight odour

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	Electrical Conductivity (us/cm @ 25°C)	pH	Temp. (°C)	Redox (mV)	DO (mg/L)	Comments
BH6	14/02/2023	9:15	15.48	11.65	632	5.05	14.9	220.1	0.28	Slight white turbidity nil odour
BH7	14/02/2023	13:51	7.18	2.69	975	6.54	15.3	-8.5	0.16	Light Yellow Brown. No odour.
BH8	14/02/2023	11:06	7.57	3.02	928	6.68	16.7	-47.7	0.13	Thick brown turbidity nil odour
BH10	14/02/2023	10:24	6.70	2.44	795	5.61	16.2	114.7	0.25	Highly turbid yellow/brown nil odour
BH14	13/02/2023	11:52	6.28	3.19	1190	6.40	14.5	8.5	0.12	moderate light brown turbidity nil odour

NOTES:

1 Groundwater samples taken using the low-flow method (as per EPA Publication 669) unless otherwise noted

2 All depths measured from the top of the PVC casing

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH3	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	YSI Pro+
Date	14/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:37	Total Depth (m)	3.89	Mid-screen accessible?	Clear	Depth pump set at (m)	2.50
Static Water Level (m)	0.87	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	2.50

Well Purging Details

Purge Method	LF	Pump Type	Micro purge
Time Pump in	11:40	Pump in' WL	0.84
Time Started	11:40	WL m (start)	0.86
Time Stopped	12:03	WL m (end)	0.88
Volume Removed (l)	3.6		
Discharge Rate (l/m)	0.16		

Sampling Details

Sampling Method	LF		
Time Started	12:06	WL m (start)	0.88
Time Stopped	12:15	WL m (end)	0.88
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	12:25	WL m(post-removal)	0.89	Bore Depth at end (m)	3.88

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: measured to top of casing not cover

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	18	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
11:42	0.1	0.88	Keep purging	1941	6.49	17.39	45.0	4.03	Yellow brown slightly turbid nil odour
11:45	0.6	0.88	Keep purging	2174	6.49	17.20	30.9	1.14	Yellow brown slightly turbid nil odour
11:48	1.1	0.88	Keep purging	2178	6.51	17.15	13.3	0.31	Yellow brown slightly turbid nil odour
11:51	1.6	0.88	Keep purging	2459	6.50	17.03	3.0	0.24	Yellow brown slightly turbid nil odour
11:54	2.1	0.88	Keep purging	2459	6.51	17.10	-4.1	0.18	Yellow brown slightly turbid nil odour
11:57	2.6	0.88	Keep purging	2459	6.53	17.30	-16.4	0.17	Yellow brown slightly turbid nil odour
12:00	3.1	0.88	Keep purging	2486	6.52	17.22	-16.6	0.17	Yellow brown slightly turbid nil odour
12:03	3.6	0.88	OK to sample	2481	6.52	17.20	-17.2	0.16	Yellow brown slightly turbid nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH14	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	YSI Pro+
Date	13/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	13:37	Total Depth (m)	7.92	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	4.88	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	LF	Pump Type	micro
Time Pump in	13:39	Pump in' WL	4.83
Time Started	13:40	WL m (start)	4.85
Time Stopped	13:59	WL m (end)	4.95
Volume Removed (l)	4.3		
Discharge Rate (l/m)	0.23		

Sampling Details

Sampling Method	LF		
Time Started	14:02	WL m (start)	4.94
Time Stopped	14:08	WL m (end)	4.95
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	14:15	WL m(post-removal)	4.93	Bore Depth at end (m)	7.92

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	18	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
13:41	0.1	4.89	Keep purging	1586	5.74	14.89	28.4	0.99	grey turbidity very slight odour
13:44	0.8	4.91	Keep purging	1799	5.71	14.45	15.1	0.86	grey turbidity very slight odour
13:47	1.5	4.93	Keep purging	1797	5.69	14.38	12.9	0.44	grey turbidity very slight odour
13:50	2.2	4.94	Keep purging	1860	5.84	14.30	11.2	0.40	grey turbidity very slight odour
13:53	2.9	4.94	Keep purging	1879	5.79	14.50	9.1	0.38	grey turbidity very slight odour
13:56	3.6	4.95	Keep purging	1845	5.77	14.40	7.3	0.38	grey turbidity very slight odour
13:59	4.3	4.95	OK to sample	1840	5.77	14.36	6.5	0.37	grey turbidity very slight odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH6	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	YSI Pro+
Date	14/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	8:34	Total Depth (m)	15.48	Mid-screen accessible?	Clear	Depth pump set at (m)	15.00
Static Water Level (m)	11.65	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	15.00

Well Purging Details

Purge Method	LF	Pump Type	micro
Time Pump in	8:51	Pump in' WL	11.65
Time Started	8:52	WL m (start)	11.65
Time Stopped	9:12	WL m (end)	11.65
Volume Removed (l)	3.7		
Discharge Rate (l/m)	0.19		

Sampling Details

Sampling Method	LF		
Time Started	9:15	WL m (start)	11.65
Time Stopped	9:24	WL m (end)	11.65
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	9:35	WL m(post-removal)	11.65	Bore Depth at end (m)	15.50

Pump Settings

Fill / Discharge used	22/8	CPM		Air/Gas Pressure (kPa)	40

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	23	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
8:54	0.1	11.65	Keep purging	613	5.19	14.68	177.5	3.13	slight white grey turbidity
8:57	0.7	11.65	Keep purging	625	5.12	14.85	192.4	1.07	slight white grey turbidity
9:00	1.3	11.65	Keep purging	630	5.11	14.89	202.9	0.51	slight white grey turbidity
9:03	1.9	11.65	Keep purging	635	5.11	14.83	205.7	0.38	slight white grey turbidity
9:06	2.5	11.65	Keep purging	634	5.10	14.82	212.1	0.30	slight white grey turbidity
9:09	3.1	11.65	Keep purging	631	5.06	14.91	218.0	0.29	slight white grey turbidity
9:12	3.7	11.65	OK to sample	632	5.05	14.92	220.1	0.28	slight white grey turbidity

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH7	Project Name	HEPBURN GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	YSI Pro+
Date	14/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	13:05	Total Depth (m)	7.18	Mid-screen accessible?	Clear	Depth pump set at (m)	6.50
Static Water Level (m)	2.69	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	6.50

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	13:24	Pump in' WL	2.69
Time Started	13:25	WL m (start)	2.69
Time Stopped		WL m (end)	2.69
Volume Removed (l)	4.3		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	LF		
Time Started	13:51	WL m (start)	2.69
Time Stopped	14:00	WL m (end)	2.69
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1Ltr green	1		
0ml filtered meta	1		
60ml COD	1		
50ml glass	1		

Pump Removal

Time of removal	14:10	WL m(post-removal)	2.69	Bore Depth at end (m)	7.18

Pump Settings

Fill / Discharge used	10/5	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	26	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
13:30	0.1	2.69		876	6.47	16.55	18.6	0.67	Light Yellow Brown turbidity. No odour.
13:33	0.8	2.69		949	6.40	15.68	16.1	0.23	Light Yellow Brown turbidity. No odour.
13:36	1.5	2.69		958	6.43	15.40	9.9	0.20	Light Yellow Brown turbidity. No odour.
13:39	2.2	2.69		960	6.48	15.37	6.1	0.19	Light Yellow Brown turbidity. No odour.
13:42	2.9	2.69		973	6.52	15.36	1.0	0.17	Light Yellow Brown turbidity. No odour.
13:45	3.6	2.69		973	6.52	15.33	-1.6	0.16	Light Yellow Brown turbidity. No odour.
13:48	4.3	2.69		975	6.54	15.34	-8.5	0.16	Light Yellow Brown turbidity. No odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH8	Project Name	HEPBURN SHIRE GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	YSI Pro+
Date	14/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	10:36	Total Depth (m)	7.57	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	3.02	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	10:40	Pump in' WL	2.91
Time Started	10:42	WL m (start)	2.95
Time Stopped	11:03	WL m (end)	3.05
Volume Removed (l)	4.3		
Discharge Rate (l/m)	0.20		

Sampling Details

Sampling Method	LF		
Time Started	11:06	WL m (start)	3.04
Time Stopped	11:15	WL m (end)	3.03
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1ltr	1		
)ml METALS filtere	1		
60ml COD	1		
50ml GLASS	1		

Pump Removal

Time of removal	11:25	WL m(post-removal)	3.05	Bore Depth at end (m)	7.57

Pump Settings

Fill / Discharge used	50/10	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

27 = vol required for 3V method (L)

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C (+/- 3%)	pH (+/- 0.05 pH)	Temp. (°C) (+/- 10%)	Redox ORP (mV) (+/- 10mV)	DO (mg/L) (+/- 10%)	Comments (colour, turbidity, odours, other)
10:45	0.1	3.04	Keep purging	956	6.55	17.20	-6.1	0.24	grey brown, thick turb, no odour.
10:48	0.8	3.04	Keep purging	969	6.60	17.00	-23.3	0.23	grey brown, thick turb, no odour.
10:51	1.5	3.05	Keep purging	970	6.65	16.88	-29.3	0.20	grey brown, thick turb, no odour.
10:54	2.2	3.06	Keep purging	954	6.64	16.74	-34.8	0.17	grey brown, thick turb, no odour.
10:57	2.9	3.06	Keep purging	947	6.67	16.84	-40.9	0.14	grey brown, thick turb, no odour.
11:00	3.6	3.05	Keep purging	932	6.67	16.80	-43.9	0.13	grey brown, thick turb, no odour.
11:03	4.3	3.05	OK to sample	928	6.68	16.67	-47.7	0.13	grey brown, thick turb, no odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH10	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	YSI Pro+
Date	14/02/2023	Project No		WQ. Meter Serial #	09L100298

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	9:50	Total Depth (m)	6.70	Mid-screen accessible?	Clear	Depth pump set at (m)	5.70
Static Water Level (m)	2.44	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.70

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	9:55	Pump in' WL	2.43
Time Started	9:56	WL m (start)	2.43
Time Stopped	10:21	WL m (end)	2.47
Volume Removed (l)	4.9		
Discharge Rate (l/m)	0.20		

Sampling Details

Sampling Method	LF		
Time Started	10:24	WL m (start)	2.49
Time Stopped	10:33	WL m (end)	2.50
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	10:40	WL m(post-removal)	2.53	Bore Depth at end (m)	6.73

Pump Settings

Fill / Discharge used	5/3	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	25	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
9:57	0.1	2.42	Keep purging	791	5.40	16.45	156.4	2.76	Highly turbid, yellow/brown nil odour
10:00	0.7	2.43	Keep purging	804	5.50	16.33	146.8	1.99	Highly turbid, yellow/brown nil odour
10:03	1.3	2.43	Keep purging	799	5.48	16.31	138.9	1.85	Highly turbid, yellow/brown nil odour
10:06	1.9	2.44	Keep purging	803	5.54	16.18	129.4	0.97	Highly turbid, yellow/brown nil odour
10:09	2.5	2.46	Keep purging	789	5.51	16.22	127.8	0.50	Highly turbid, yellow/brown nil odour
10:12	3.1	2.45	Keep purging	795	5.54	16.19	124.5	0.29	Highly turbid, yellow/brown nil odour
10:15	3.7	2.46	Keep purging	802	5.60	16.15	119.3	0.26	Highly turbid, yellow/brown nil odour
10:18	4.3	2.47	Keep purging	791	5.60	16.21	116.7	0.25	Highly turbid, yellow/brown nil odour
10:21	4.9	2.47	OK to sample	795	5.61	16.22	114.7	0.25	Highly turbid, yellow/brown nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH14	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	YSI Pro+
Date	13/02/2023	Project No		WQ. Meter Serial #	0/01/1900

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	y	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:20	Total Depth (m)	6.28	Mid-screen accessible?	Clear	Depth pump set at (m)	5.90
Static Water Level (m)	3.19	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.90

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	11:26	Pump in' WL	3.21
Time Started	11:27	WL m (start)	3.21
Time Stopped	11:49	WL m (end)	3.25
Volume Removed (l)	4.3		
Discharge Rate (l/m)	0.20		

Sampling Details

Sampling Method	LF		
Time Started	11:52	WL m (start)	3.25
Time Stopped	12:10	WL m (end)	3.27
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	12:15	WL m(post-removal)	3.24	Bore Depth at end (m)	6.29

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments
Dups taken
good recharge

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	18	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
11:28	0.1	3.24	Keep purging	1170	6.53	14.68	-15.7	1.86	moderate light brown turbidity nil odour
11:31	0.7	3.24	Keep purging	1225	6.53	14.46	-12.7	0.98	moderate light brown turbidity nil odour
11:34	1.3	3.24	Keep purging	1193	6.51	14.45	-8.7	0.31	moderate light brown turbidity nil odour
11:37	1.9	3.24	Keep purging	1191	6.47	14.52	-6.8	0.18	moderate light brown turbidity nil odour
11:40	2.5	3.24	Keep purging	1190	6.45	14.49	-5.4	0.15	moderate light brown turbidity nil odour
11:43	3.1	3.24	Keep purging	1189	6.41	14.48	6.4	0.13	moderate light brown turbidity nil odour
11:46	3.7	3.24	Keep purging	1191	6.40	14.50	7.1	0.12	moderate light brown turbidity nil odour
11:49	4.3	3.25	OK to sample	1190	6.40	14.53	8.5	0.12	moderate light brown turbidity nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH2	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua Troll
Date	17/02/2023	Project No		WQ. Meter Serial #	.844337.

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	7:30	Total Depth (m)	5.00	Mid-screen accessible?	Clear	Depth pump set at (m)	
Static Water Level (m)	2.98	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	

Well Purging Details

Purge Method		Pump Type	
Time Pump in		Pump in' WL	
Time Started		WL m (start)	
Time Stopped	8:00	WL m (end)	2.90
Volume Removed (l)	4		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	bailed		
Time Started		WL m (start)	
Time Stopped		WL m (end)	
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal		WL m(post-removal)		Bore Depth at end (m)	

Pump Settings

Fill / Discharge used		CPM		Air/Gas Pressure (kPa)	

Comments

Bore Bailed

Bore partially blocked

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	12	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
8:00	4	2.27	Keep purging	685	5.73	19.70	122.2	2.69	turbid red colour nil odour

ventia

INSTRUMENTATION - INTERMEDIATE VERIFICATION AND CALIBRATION

Serial no.: 07510	Centre: Burwood
Model no.: Aqua troll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results: Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV	Comments	Staff initials
13/2/23	4.01	4.06	Y				pH	AC
13/2/23	7.00	7.02	Y				pH	AC
13/2/23	10.01	9.87	Y				pH	AC
13/2/23	0	4	N				EC	AC
13/2/23	1413	1399	Y				EC	AC
13/2/23	100%	99.4	Y				DO	AC
13/2/23	249.9	251.6	Y				REDOX	AC
/ /								
14/2/23	4.01	4.03	Y				pH	AC
14/2/23	7.00	7.01	Y				pH	AC
14/2/23	10.01	9.98	Y				pH	AC
14/2/23	0	4	N				EC	AC
14/2/23	1413	1421	Y				EC	AC
14/2/23	100%	95.8	Y				DO	AC
14/2/23	250.2	250.3	Y				REDOX	AC
/ /								
15/2/23	4.01	4.08	Y				pH	AC
15/2/23	7.00	7.04	Y				pH	AC
15/2/23	10.01	10.01	Y				pH	AC
15/2/23	0	4	N				EC	AC
15/2/23	1413	1419	Y				EC	AC
15/2/23	100%	99.3	Y				DO	AC
15/2/23	250.2	250.4					REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH	Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1	Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 µS/cm < 1,000	4 3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 µS/cm > 1,000	7 6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l (0-20mg/l)	
	10 9.9 - 10.1	0 - 1000 = 10.00 NTU		

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

ventia

INSTRUMENTATION - INTERMEDIATE VERIFICATION AND CALIBRATION

Serial no.: 07510	Centre: Burwood
Model no.: Aqua troll 500	
Parameter:	
(EC, DO, TU, pH, Temperature, Redox)	

Date of verification /calibration	Results						Comments	Staff initials
	Expected	Observed	Adjusted	Batch no.	Slope mV	Asy mV		
16/2/23	4.01	3.99	Y				pH	AC
16/2/23	7.00	6.98	Y				pH	AC
16/2/23	10.01	10.0	Y				pH	AC
16/2/23	0	4	N				EC	AC
16/2/23	1413	1419	Y				EC	AC
16/2/23	100%	99.3	Y				DO	AC
16/2/23	250.4	250.8	Y				REDOX	AC
/ /								
17/2/23	4.01	4.00	Y				pH	AC
17/2/23	7.00	7.00	Y				pH	AC
17/2/23	10.01	9.93	Y				pH	AC
17/2/23	0	3	N				EC	AC
17/2/23	1413	1415	Y				EC	AC
17/2/23	100%	101.4	Y				DO	AC
17/2/23	250.8	251.4	Y				REDOX	AC
/ /								
/ /	4.01						pH	AC
/ /	7.00						pH	AC
/ /	10.01						pH	AC
/ /	0						EC	AC
/ /	1413						EC	AC
/ /	100%						DO	AC
/ /							REDOX	AC

***If standards are not used to calibrate instrument - explanation required under comments**

Water quality measurements where Q = 10 shall meet the following calibration limits

EC	pH	Turbidity	DO	Temperature
Standard +/- 5%	Standard +/- 0.1	Standard +/- 3%	<+/-2% FS (0-20mg/l)	+/-0.2°C (When a temperature stabilised environment can be created)
+/- 10 µS/cm < 1,000	4 3.9 - 4.1	0 - 10 = 0.10 NTU		
+/- 100 µS/cm > 1,000	7 6.9 - 7.1	0 - 100 = 1.00 NTU	<+/- 0.4 mg/l (0-20mg/l)	
	10 9.9 - 10.1	0 - 1000 = 10.00 NTU		

WQ Instruments that require continual calibration from initial values outside the above tolerance ranges using the specified solutions will need to be returned to the manufacturer for assessment or repair.

Ventia Landfill Subsurface Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Creswick Landfill
Sampling Staff	Andrew Callander
Instrument Type	GA 5000
Instrument Serial Number	G500274
Calibration Record Supplied (Y/N)	Y
Weather & Temperature	23 degrees / 8km wind
Site Ground Conditions	Moist
Barometric Pressure	967

General Comments
BH 12's J plug was not sealed properly which may have affected readings from this bore

LFG ID	Date	Time	Peak Flow (l/hr)	Stabilised Flow (l/hr)	SWL (mBTOC)	Depth (mBTOC)	Bore & Headworks Condition	Comments
BH11	13/02/2023	15:15	0	0	DRY	10.33	Good cond	
BH12	13/02/2023	15:00	0	0	DRY	6.57	J Plug does not seal properly	J plug needs replacing
BH10	13/02/2023	13:32	0	0	2.44	6.7	Good cond	
BH9	13/02/2023	12:50	0	0	DRY	6.84	Good cond	

Instrumentation Gas Readings recorded on instrument data export

Table 1: Subsurface Gas Bore Results (FEB 2023)

ID	DATE and TIME	CH4	CO2	O2	PEAKCH4	PEAKCO2	MIN O2	BARO	REL.PRESSURE	TERNAL FLO	CO	H2S
		%	%	%	%	%	%	mb	mb	l/h	ppm	ppm
BH12*	13/02/2023 15:00:00	44.9	17.1	0	45	17.1	0	967	0.23	0	2	1
BH9	13/02/2023 12:50:00	0	5.5	17.2	0	5.5	17.2	967	0.11	0.2	0	0
BH11	13/02/2023 15:15:00	0	2.2	18.6	0	2.2	18.6	967	0.12	0.3	0	0
BH10	13/02/2023 14:53:00	0	5.1	14.2	0	5.1	14.2	967	0.11	0.2	0	0

Notes: Exceedance of Adopted Assesment Criteria

Methane 1% v/v (EPA Victoria, Best Practice Environmental Management, Siting, design, operation and rehabilitation of landfills, 2015)

Carbon Dioxide 10% v/v (Mackenzie 2016)

* not applicable due to location within waste mass

Ventia Landfill Building Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y/N)	Y
Weather and Temperature	23 degrees / 8 km wind
Site Ground Conditions	Dry
Barometric Pressure	467
	970

General Comments
Locations as per Landserv Service location map

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
B1	13/02/2023	13:48	1.9	Good condition	Taken at foot of office building
B2	13/02/2023	13:49	1.8	Good condition	-
B3	13/02/2023	13:49	1.4	Good condition	-
B4	13/02/2023	13:49	1.4	Good condition	-
B5	13/02/2023	13:50	2.1	Good condition	Taken at foot of office building
B6	13/02/2023	13:50	2.2	Good condition	-
B7	13/02/2023	13:51	2	Good condition	-
B8	13/02/2023	13:51	2.4	Good condition	-
B9	13/02/2023	13:53	1.1	Good condition	taken on inside edge of open shed
B10	13/02/2023	13:53	0.7	Good condition	-
B11	13/02/2023	13:55	1	Good condition	taken on inside edge of open shed
B12	13/02/2023	13:56	1.1	Good condition	-
B13	13/02/2023	13:56	0.8	Good condition	-
B14	13/02/2023	14:22	0.6	Good condition	could not access shed - taken at base of slab
B15	13/02/2023	14:23	0.8	Good condition	-
B16	13/02/2023	14:24	0.8	Good condition	-
B17	13/02/2023	14:06	0.9	Good condition	Taken under outer edge of shed / slab
B18	13/02/2023	14:06	1.1	Good condition	-
B19	13/02/2023	14:07	0.8	Good condition	-
B20	13/02/2023	14:07	0.9	Good condition	-
TP1	13/02/2023	14:02	0.8	Good condition	drain / pit
TP2	13/02/2023	14:04	0.9	Good condition	-
TP3	13/02/2023	14:03	0.8	Good condition	-
TP4	13/02/2023	14:03	1.2	Good condition	-
TP5	13/02/2023	14:03	0.9	Good condition	-
TP6	13/02/2023	13:59	1.1	unknown	cannot locate taken in area
TP7	13/02/2023	13:59	2.4	Good condition	-
TP8	13/02/2023	13:59	2.2	Good condition	-
TP9	13/02/2023	13:59	2.7	Good condition	-
TP10	13/02/2023	13:59	2.6	Good condition	-
TP11 (new)	13/02/2023	14:28	2.8	Good condition	in front of green waste pile

EQUIPMENT QUALITY REPORT

Inspectra Laser

Equipment Code: MIL-1217 Serial Number: 4531217

☑ Equipment is clean ☑ Pump and battery voltage check ☑ Clear Data

Calibration Results				**Calibration Gas Expiry Date**
Parameter	**Standard**	**Result**	**Error Range**	
CH4	Methane by 500ppm	505ppm	± 25 ppm	66 – WO283592-2 Exp.12/01/2026

Date: 10/02/2023

Calibrated by: Frederick Campbell

*For quality control purposes HydroTerra can supply gas calibration data

Please check that the following items are received and all items are returned. Please clean equipment before retuning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of the form)	HT id No.	Sent?	Return?	Comments
1	Carry Case	N/A	✓		
2	Inspectra Laser	MIL-1217	✓		
3	Sampling Probe joint	N/A	✓		
4	Sampling Probe 600mm	N/A	✓		
5	Telescopic rod with Suction cup	N/A	✓		
6	Spare Battery & charger 240/110V to 12V 500mA	N/A	✓		
7	Spare filter	N/A	✓		
8	Tools – Screw driver	N/A	✓		
-	Test & Tag	N/A	✓		

☑ Equipment voltage ☑ Pre-delivery Calibration Test Complete

Date: 10/02/2023

Calibrated by: Frederick Campbell

HT JOB NO: 20523 CLIENTS REF: P/O No: TBC

RETURN DATE: / /	TIME:	CONDITION ON RETURN:

EQUIPMENT QUALITY REPORT

GA5000

Equipment Code: MLG-7420   Serial Number: G507420

The equipment has been issued as follows:

☑ Equipment is clean   ☑ Pump and battery voltage check   ☑ Clear Data

Calibration Results				Calibration Gas (Expiry Date)
Parameter	Standard	Result	Error Range	
CH4	Methane by Volume 60%	60.2%	± 2%	WO328585-4 Exp: 15/12/26
CO2	Carbon Dioxide by volume 40%	40%	± 2%	WO328585-4 Exp: 15/12/26
H2S	Hydrogen Sulphide 25 ppm	25 ppm	± 2 ppm	WO323447-25 Exp: 09/11/23
O2	Oxygen 18%	18%	± 0.2%	WO323447-25 Exp: 09/11/23
CO	Carbon Monoxide 50 ppm	50 ppm	± 2ppm	WO336583-4 Exp: 2/2/27

Date: 10/02/2023

Calibrated by: Frederick Campbell

Please check that the following items are received, and all items are returned. Please clean equipment before returning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of this form)	HT Id No.	Sent?	Returned?	Comments
1	Blue tubing with an inlet barb fitting	N/A	✓		
2	Clear tubing with an inlet Brass Ex-cap Female Fitting (filter attached)	N/A	✓		
3	Spare water trap filter(s) Qty 1	N/A	✓		
4	Yellow tubing with an inlet barb fitting	N/A	✓		
5	Clear tubing	N/A	✓		
6	Charger 240/110V to 12V 500mA	N/A	✓		
7	GA5000 with a carry bag	MLG-7420	✓		
8	Hard case	N/A	✓		
9	Instruction Manual	N/A	✓		
10	Well cap fitting	N/A	✓		
-	Test & Tag	N/A			

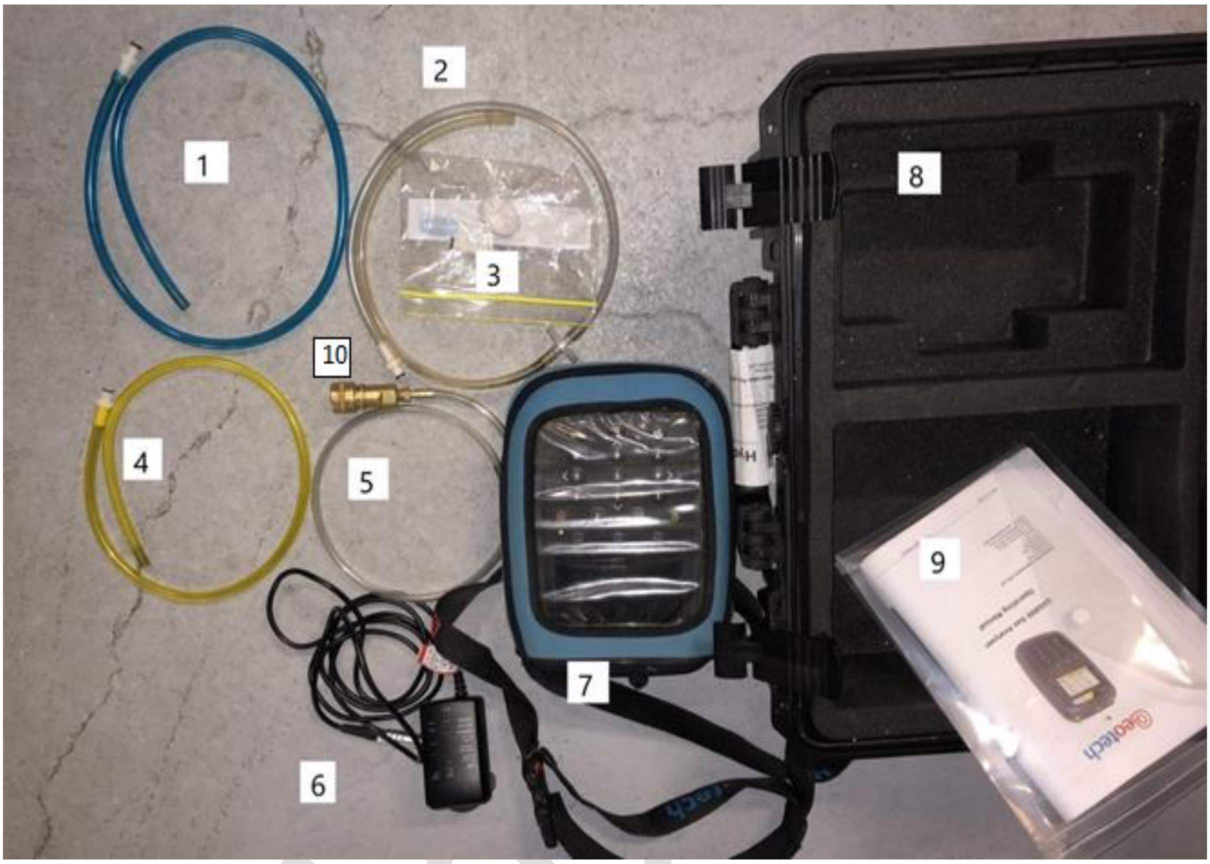
☑ Equipment voltage   ☑ Pre-delivery Calibration Test Complete

Date: 10/02/2023

Checked by: Frederick Campbell

HT JOB NO: 20523   CLIENTS REF: P/O No: TBC

RETURN DATE: / /   TIME: CONDITION ON RETURN:


1
2
3
4
5
6
7
8
9
10
Geotech

SAMPLING RESULTS SUBMISSION SHEET (SAMPLING UNDERTAKEN BY VENTIA)

Client: Hepburn Shire Council
Site: Creswick Landfill
Program: Groundwater/Surface Water Sampling

Samping Period: May 23
Sampler: A Callander
Phone: 427529051

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	pH	Electrical Conductivity (us/cm @ 25°C)	DO (mg/L)	Temp. (°C)	Redox (mV)	Comments
LB1	10/05/2023	-	-	13.33	-	-	-	-	-	No sample. Bore blocked
LB2	10/05/2023	-	-	14.17	-	-	-	-	-	No sample. Bore blocked
LB3	10/05/2023	-		10.70						SWL only.
Creek U/S BH3	11/05/2023	12:45			6.71	622	4.92	9.9	43.6	
Creek @ BH3	11/05/2023	12:30			6.71	911	4.47	9.4	18.2	
Creek D/S BH3	11/05/2023	10:30			6.91	648	5.71	9.6	94.4	
Leachate Pond	9/05/2023	16:01			6.84	900	3.57	12.3	46.3	
Wetland	6/05/2023	16:09			6.94	1170	0.32	13.3	-30.8	
Dredge hole	9/05/2023	16:24			6.63	818	4.03	11.9	3.8	
BH1	10/05/2023	-	-	-	-	-	-	-	-	Bore lost.
BH2	10/05/2023	14:26	4.98	2.90	5.59	673	4.53	16.1	117.7	Bailed sample due to resricting bend in bore casing.
BH3	10/05/2023	12:22	3.89	0.60	6.51	2541	0.18	13.3	-36.9	Yellow brown slightly turbid nil odour
BH4	10/05/2023	16:15	7.92	5.33	5.83	1907	0.5	13.4	29.9	Yellow silver turbidity very slight odour

Bore/Sample Point	Date	Time (EST)	Depth (mbmp)	SWL m (mbtoc)	pH	Electrical Conductivity (us/cm @ 25°C)	DO (mg/L)	Temp. (°C)	Redox (mV)	Comments
BH6	10/05/2023	10:11	15.50	11.96	4.97	563	0.56	14.9	229.4	Slight light coloured turbidity nil odour
BH7	10/05/2023	13:39	7.18	2.31	6.76	736	0.18	13.8	-28.4	Light Yellow Brown turbidity. No odour.
BH8	10/05/2023	11:38	7.57	3.00	6.62	728	0.22	15.4	-74.4	Dark grey brown, thick turb, no odour.
BH10	9/05/2023	15:31	6.74	2.44	5.57	645	0.26	15.2	90.5	Highly turbid, yellow/brown nil odour
BH14	11/05/2023	11:59	6.29	2.84	6.40	1141	0.25	14.9	9.2	Brown turbidity nil odour

NOTES:

1 Groundwater samples taken using the low-flow method (as per EPA Publication 669) unless otherwise noted

2 All depths measured from the top of the PVC casing

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH2	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua Troll
Date	10/05/2023	Project No		WQ. Meter Serial #	.844337.

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	14:26	Total Depth (m)	4.98	Mid-screen accessible?	Clear	Depth pump set at (m)	
Static Water Level (m)	2.90	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	

Well Purging Details

Purge Method		Pump Type	
Time Pump in		Pump in' WL	
Time Started		WL m (start)	
Time Stopped	15:00	WL m (end)	2.90
Volume Removed (l)	4		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	bailed		
Time Started		WL m (start)	
Time Stopped		WL m (end)	
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal		WL m(post-removal)		Bore Depth at end (m)	

Pump Settings

Fill / Discharge used		CPM		Air/Gas Pressure (kPa)	

Comments
Bore Bailed
Bore partially blocked

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

	12	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
15:00	4	2.90	Keep purging	673	5.59	16.10	117.7	4.53	turbid red colour nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH3	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	10/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:55	Total Depth (m)	3.89	Mid-screen accessible?	Clear	Depth pump set at (m)	2.50
Static Water Level (m)	0.60	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	2.50

Well Purging Details

Purge Method	LF	Pump Type	Micro purge
Time Pump in	11:58	Pump in' WL	0.58
Time Started	12:00	WL m (start)	0.58
Time Stopped	12:19	WL m (end)	0.61
Volume Removed (l)	3.1		
Discharge Rate (l/m)	0.16		

Sampling Details

Sampling Method	LF		
Time Started	12:22	WL m (start)	0.61
Time Stopped	12:30	WL m (end)	0.61
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	12:35	WL m(post-removal)	0.62	Bore Depth at end (m)	3.89

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: measured to top of casing not cover

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

19 = vol required for 3V method (L)

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
				+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
12:01	0.1	0.61	Keep purging	2541	6.55	12.27	-7.9	1.62	Yellow brown slightly turbid nil odour
12:04	0.6	0.61	Keep purging	2550	6.50	12.95	-11.6	0.26	Yellow brown slightly turbid nil odour
12:07	1.1	0.61	Keep purging	2547	6.50	13.10	-21.0	0.20	Yellow brown slightly turbid nil odour
12:10	1.6	0.61	Keep purging	2547	6.50	13.26	-26.9	0.23	Yellow brown slightly turbid nil odour
12:13	2.1	0.61	Keep purging	2539	6.50	13.31	-29.7	0.18	Yellow brown slightly turbid nil odour
12:16	2.6	0.61	Keep purging	2537	6.51	13.22	-33.8	0.17	Yellow brown slightly turbid nil odour
12:19	3.1	0.61	OK to sample	2541	6.51	13.29	-36.9	0.18	Yellow brown slightly turbid nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH4	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	10/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	15:38	Total Depth (m)	7.92	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	5.33	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	low flow	Pump Type	micro
Time Pump in	15:47	Pump in' WL	5.33
Time Started	15:48	WL m (start)	5.33
Time Stopped	16:12	WL m (end)	5.33
Volume Removed (l)	5.7		
Discharge Rate (l/m)	0.24		

Sampling Details

Sampling Method	low flow		
Time Started	13:21	WL m (start)	5.80
Time Stopped	13:27	WL m (end)	5.80
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	13:32	WL m(post-removal)	5.78	Bore Depth at end (m)	7.92

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	15	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
15:51	0.1	5.33	Keep purging	2060	6.26	11.74	-1.7	2.83	yellow silver turbidity very slight odour
15:54	0.9	5.33	Keep purging	1940	5.98	12.59	29.4	1.16	yellow silver turbidity very slight odour
15:57	1.7	5.33	Keep purging	1879	5.82	13.11	44.3	0.69	yellow silver turbidity very slight odour
16:00	2.5	5.33	Keep purging	1882	5.80	13.27	42.4	0.61	yellow silver turbidity very slight odour
16:03	3.3	5.33	Keep purging	1892	5.81	13.28	36.8	0.54	yellow silver turbidity very slight odour
16:06	4.1	5.33	Keep purging	1894	5.83	13.29	35.1	0.52	yellow silver turbidity very slight odour
16:09	4.9	5.33	Keep purging	1904	5.83	13.35	32.0	0.49	yellow silver turbidity very slight odour
16:12	5.7	5.33	OK to sample	1907	5.83	13.41	29.9	0.50	yellow silver turbidity very slight odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH6	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	10/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	8:55	Total Depth (m)	15.50	Mid-screen accessible?	Clear	Depth pump set at (m)	15.00
Static Water Level (m)	11.96	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	15.00

Well Purging Details

Purge Method	LF	Pump Type	Bladder
Time Pump in	9:50	Pump in' WL	11.96
Time Started	9:52	WL m (start)	11,96
Time Stopped	10:08	WL m (end)	11.97
Volume Removed (l)	2.3		
Discharge Rate (l/m)	0.14		

Sampling Details

Sampling Method	LF		
Time Started	10:11	WL m (start)	11.96
Time Stopped	10:25	WL m (end)	11.96
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	10:35	WL m(post-removal)	11.97	Bore Depth at end (m)	15.50

Pump Settings

Fill / Discharge used	22/8	CPM		Air/Gas Pressure (kPa)	40

Comments

bore has been tapered with, tubing had been cut and put down the casing. Tubing removerd

Dups and blank taken

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	21	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
9:56	0.1	11.97	Keep purging	509	4.96	12.55	212.0	1.21	slight light coloured turbidity nil odour
9:59	0.65	11.97	Keep purging	539	4.93	14.22	219.4	0.70	slight light coloured turbidity nil odour
10:02	1.2	11.97	Keep purging	551	4.95	14.30	222.5	0.58	slight light coloured turbidity nil odour
10:05	1.75	11.97	Keep purging	564	4.93	14.28	224.5	0.57	slight light coloured turbidity nil odour
10:08	2.3	11.97	OK to sample	563	4.97	14.90	229.4	0.56	slight light coloured turbidity nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH7	Project Name	HEPBURN GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	10/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	13:00	Total Depth (m)	7.18	Mid-screen accessible?	Clear	Depth pump set at (m)	6.50
Static Water Level (m)	2.31	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	6.50

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	13:09	Pump in' WL	2.31
Time Started	13:00	WL m (start)	2.31
Time Stopped		WL m (end)	2.31
Volume Removed (l)	4.1		
Discharge Rate (l/m)			

Sampling Details

Sampling Method	LF		
Time Started	11:09	WL m (start)	2.49
Time Stopped	11:14	WL m (end)	2.49
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1Ltr green	1		
)ml filtered meta	1		
60ml COD	1		
50ml glass	1		

Pump Removal

Time of removal	11:20	WL m(post-removal)	2.49	Bore Depth at end (m)	7.18

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

29 = vol required for 3V method (L)

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C (+/- 3%)	pH (+/- 0.05 pH)	Temp. (°C) (+/- 10%)	Redox ORP (mV) (+/- 10mV)	DO (mg/L) (+/- 10%)	Comments (colour, turbidity, odours, other)
13:12	0.1	2.31		127	7.18	11.55	35.3	9.19	Light Yellow Brown turbidity. No odour.
13:15	0.6	2.31		718	6.89	12.10	35.8	8.24	Light Yellow Brown turbidity. No odour.
13:18	1.1	2.31		712	6.78	12.64	32.4	3.41	Light Yellow Brown turbidity. No odour.
13:21	1.6	2.31		749	6.72	13.53	13.6	0.52	Light Yellow Brown turbidity. No odour.
13:24	2.1	2.31		746	6.74	13.59	-4.1	0.42	Light Yellow Brown turbidity. No odour.
13:27	2.6	2.31		740	6.75	13.50	-10.9	0.20	Light Yellow Brown turbidity. No odour.
13:30	3.1	2.31		734	6.75	13.74	-24.6	0.19	Light Yellow Brown turbidity. No odour.
13:33	3.6	2.31		735	6.73	13.79	-26.0	0.18	Light Yellow Brown turbidity. No odour.
13:36	4.1	2.31	OK to sample	736	6.76	13.83	-28.4	0.18	Light Yellow Brown turbidity. No odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH8	Project Name	HEPBURN SHIRE GW	Sampling Staff	AC
Project Area:		Client	HEPBURN SHIRE	WQ. Meter Model	Aqua troll 500
Date	10/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	10:51	Total Depth (m)	7.57	Mid-screen accessible?	Clear	Depth pump set at (m)	7.00
Static Water Level (m)	3.00	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	7.00

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	11:00	Pump in' WL	2.97
Time Started	11:01	WL m (start)	2.97
Time Stopped	11:35	WL m (end)	3.05
Volume Removed (l)	6.8		
Discharge Rate (l/m)	0.20		

Sampling Details

Sampling Method	LF		
Time Started	11:38	WL m (start)	3.04
Time Stopped	11:45	WL m (end)	3.04
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity
1ltr	1		
)ml METALS filtere	1		
60ml COD	1		
50ml GLASS	1		

Pump Removal

Time of removal	13:07	WL m(post-removal)	3.27	Bore Depth at end (m)	7.57

Pump Settings

Fill / Discharge used	50/10	CPM		Air/Gas Pressure (kPa)	30

Comments

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	27	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
11:02	0.1	3.04	Keep purging	859	6.48	14.72	67.6	0.39	Dark grey brown, thick turb, no odour.
11:05	0.7	3.04	Keep purging	851	6.57	15.57	-7.7	0.24	Dark grey brown, thick turb, no odour.
11:08	1.3	3.04	Keep purging	842	6.60	15.55	-23.4	0.22	Dark grey brown, thick turb, no odour.
11:11	2	3.04	Keep purging	821	6.60	15.58	-39.1	0.21	Dark grey brown, thick turb, no odour.
11:14	2.6	3.04	Keep purging	810	6.59	15.49	-49.1	0.20	Dark grey brown, thick turb, no odour.
11:17	3.2	3.04	Keep purging	802	6.60	15.46	-59.3	0.22	Dark grey brown, thick turb, no odour.
11:20	3.8	3.04	Keep purging	792	6.60	15.44	-61.7	0.22	Dark grey brown, thick turb, no odour.
11:23	4.4	3.05	Keep purging	771	6.60	15.34	-66.2	0.21	Dark grey brown, thick turb, no odour.
11:26	5	3.05	Keep purging	763	6.59	15.36	-67.8	0.22	Dark grey brown, thick turb, no odour.
11:29	5.6	3.05	Keep purging	744	6.62	15.39	-69.9	0.22	Dark grey brown, thick turb, no odour.
11:32	6.2	3.05	Keep purging	731	6.62	15.30	-72.7	0.22	Dark grey brown, thick turb, no odour.
11:35	6.8	3.05	OK to sample	728	6.62	15.36	-74.4	0.22	Dark grey brown, thick turb, no odour.

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

Bore ID No	BH10	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	9/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	14:24	Total Depth (m)	6.73	Mid-screen accessible?	Clear	Depth pump set at (m)	5.70
Static Water Level (m)	2.44	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.70

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	14:39	Pump in' WL	2.39
Time Started	14:41	WL m (start)	2.41
Time Stopped	15:28	WL m (end)	2.51
Volume Removed (l)	12		
Discharge Rate (l/m)	0.26		

Sampling Details

Sampling Method	LF		
Time Started	15:31	WL m (start)	2.51
Time Stopped	15:35	WL m (end)	2.51
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	15:45	WL m(post-removal)	2.52	Bore Depth at end (m)	6.74

Pump Settings

Fill / Discharge used	5/3	CPM		Air/Gas Pressure (kPa)	30

Comments: All times EST

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
	25	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
14:43	0.1	2.49	Keep purging	559	5.70	15.13	79.5	0.62	Highly turbid, yellow/brown nil odour
14:46	0.8	2.53	Keep purging	630	5.68	15.21	82.3	0.64	Highly turbid, yellow/brown nil odour
14:49	1.6	2.50	Keep purging	628	5.70	15.21	85.3	0.52	Highly turbid, yellow/brown nil odour
14:52	2.4	2.51	Keep purging	652	5.70	15.23	86.4	0.50	Highly turbid, yellow/brown nil odour
14:55	3.2	2.52	Keep purging	652	5.70	15.31	88.8	0.49	Highly turbid, yellow/brown nil odour
14:58	4	2.52	Keep purging	638	5.59	15.23	89.1	0.49	Highly turbid, yellow/brown nil odour
15:01	4.8	2.51	Keep purging	615	5.61	15.18	91.7	0.45	Highly turbid, yellow/brown nil odour
15:04	5.6	2.51	Keep purging	584	5.53	15.16	89.8	0.38	Highly turbid, yellow/brown nil odour
15:07	6.4	2.52	Keep purging	507	5.56	15.26	90.0	0.34	Highly turbid, yellow/brown nil odour
15:10	7.2	2.52	Keep purging	472	5.55	15.21	94.0	0.30	Highly turbid, yellow/brown nil odour
15:13	8	2.52	Keep purging	489	5.57	15.31	94.3	0.29	becoming clear
15:16	8.8	2.520	Keep purging	473	5.57	15.28	90.8	0.29	becoming clear
15:19	9.6	2.520	Keep purging	483	5.57	15.22	90.8	0.27	lightly turbid nil odour
15:22	10.4	2.51	Keep purging	632	5.57	15.26	90.5	0.26	lightly turbid nil odour
15:25	11.2	32.51	Keep purging	644	5.57	15.24	90.7	0.26	lightly turbid nil odour
15:28	12	2.51	OK to sample	645	5.57	15.24	90.5	0.26	lightly turbid nil odour

Notes: All bore measurements are referenced to the marked measurement point. All Coordinates in GDA94.

TS Groundwater sampling field sheet - Env Monitoring

ventia

Bore ID No	BH14	Project Name	Hepburn Land Fill	Sampling Staff	AC
Project Area:		Client		WQ. Meter Model	Aqua troll 500
Date	11/05/2023	Project No		WQ. Meter Serial #	,05710

Expected Bore Details

Internal Diameter (mm)		Easting		Total Depth (m)		Screen Depth From (m)	
Drop Tube already in bore? (Y/N)	N	Northing		Water Level (m)		Screen Depth To (m)	
Drop Tube Length (m)	0.00	Zone		Set Pump inlet at (m)		Set Pump at (m)	

Additional Information

Bore Field Measurements

Time of SWL	11:20	Total Depth (m)	6.30	Mid-screen accessible?	Clear	Depth pump set at (m)	5.90
Static Water Level (m)	2.85	Bore Diam (mm)	50	Open Screen Length(m)	0.00	Depth of pump inlet (m)	5.90

Well Purging Details

Purge Method	LF	Pump Type	MicroPurge
Time Pump in	11:29	Pump in' WL	2.85
Time Started	11:30	WL m (start)	2.85
Time Stopped	11:56	WL m (end)	2.88
Volume Removed (l)	5.7		
Discharge Rate (l/m)	0.22		

Sampling Details

Sampling Method	LF		
Time Started	11:59	WL m (start)	2.88
Time Stopped	12:07	WL m (end)	2.89
Duplicate sample ID?			
Triplicate sample ID?			
Rinsate sample ID?			

Sample Bottles Required

Bottle Type	Quantity	Bottle Type	Quantity

Pump Removal

Time of removal	12:15	WL m(post-removal)	2.84	Bore Depth at end (m)	6.29

Pump Settings

Fill / Discharge used	25/5	CPM		Air/Gas Pressure (kPa)	30

Comments

good recharge

Field Parameters are considered stable when within the EPA limits for 3 consecutive measurements

	20	= vol required for 3V method (L)		+/- 3%	+/- 0.05 pH	+/- 10%	+/- 10mV	+/- 10%	
Time	Cumulative Volume Removed (l)	Water Level (m below MP)	Stability of Field Params	Specific Conductance EC (uS/cm) @25°C	pH	Temp. (°C)	Redox ORP (mV)	DO (mg/L)	Comments (colour, turbidity, odours, other)
11:32	0.1	2.88	Keep purging	1020	6.52	14.31	67.8	0.74	Brown turbidity nil odour
11:35	0.8	2.87	Keep purging	1025	6.50	14.54	46.3	0.37	Brown turbidity nil odour
11:38	1.5	2.88	Keep purging	1053	6.47	14.66	32.0	0.42	Brown turbidity nil odour
11:41	2.2	2.89	Keep purging	1064	6.45	14.68	23.2	0.38	Brown turbidity nil odour
11:44	2.9	2.90	Keep purging	1071	6.42	15.01	16.6	0.37	Brown turbidity nil odour
11:47	3.6	2.88	Keep purging	1136	6.41	15.09	13.5	0.29	Brown turbidity nil odour
11:50	4.3	2.89	Keep purging	1139	6.40	15.01	11.0	0.26	Brown turbidity nil odour
11:53	5	2.88	Keep purging	1141	6.39	15.06	10.4	0.25	Brown turbidity nil odour
11:56	5.7	2.88	OK to sample	1141	6.40	14.94	9.2	0.25	Brown turbidity nil odour

Ventia Landfill Subsurface Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Creswick Landfill
Sampling Staff	Andrew Callander
Instrument Type	GA 5000
Instrument Serial Number	G507420
Calibration Record Supplied (Y/N)	Y
Weather & Temperature	14 degrees / 5-10 km wind
Site Ground Conditions	Moist
Barometric Pressure	975

General Comments
BH 12's J plug was not sealed properly which may have affected readings from this bore

LFG ID	Date	Time	Peak Flow (l/hr)	Stabilised Flow (l/hr)	SWL (mBTOC)	Depth (mBTOC)	Bore & Headworks Condition	Comments
BH11	18/05/2023	6:58	0	0	DRY	10.33	Good cond	
BH12	18/05/2023	6:39	0	0	DRY	6.57	J Plug does not seal properly	J plug needs replacing
BH10	18/05/2023	6:24	0	0	2.43	6.73	Good cond	
BH9	18/05/2023	6:08	0	0	DRY	6.84	Good cond	

Instrumentation Gas Readings recorded on instrument data export

Table 1: Subsurface Gas Bore Results (May 2023)

ID	DATE and TIME	CH4	CO2	O2	PEAKCH4	PEAKCO2	MIN O2	BARO	REL.PRESSURE	TERNAL FL(	CO	H2S
		%	%	%	%	%	%	mb	mb	l/h	ppm	ppm
BH12*	18/05/2023 6:39	43.9	17.4	0	45.8	17.7	0	974	-0.04	0.1	1	0
BH9	18/05/2023 6:08	0	6.3	13.7	0.1	6.3	13.7	975	-0.12	0.1	0	0
BH11	18/05/2023 6:58	0	15.6	15.6	1	3.5	15	974	-0.04	0.1	0	0
BH10	18/05/2023 6:24	0	9.8	9	0	9.9	9	975	-0.09	0.1	0	0

Notes: Exceedance of Adopted Assesment Criteria

Methane 1% v/v (EPA Victoria, Best Practice Environmental Management, Siting, design, operation and rehabilitation of landfills, 2015)

Carbon Dioxide 10% v/v (Mackenzie 2016)

* not applicable due to location within waste mass

Ventia Landfill Building Gas Monitoring - Field Sheet

Project	Creswick Landfill
Client	Hepburn Shire
Job Location	Landfill Cap Workover
Sampling Staff	Andrew Callander
Instrument Type	Inspectra laser
Instrument Serial Number	34090717
Calibration Record Supplied (Y/N)	Y
Weather and Temperature	14degrees / 5 km wind
Site Ground Conditions	Dry
Barometric Pressure	475

General Comments
Locations as per Landserv Service location map

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
B1	9/05/2023	13:15	0.9	Good condition	Taken at foot of office building
B2	9/05/2023	13:15	0.9	Good condition	-
B3	9/05/2023	13:16	1.2	Good condition	-
B4	9/05/2023	13:16	0.8	Good condition	-
B5	9/05/2023	13:19	0.8	Good condition	Taken at foot of office building
B6	9/05/2023	13:18	0.9	Good condition	-
B7	9/05/2023	13:18	1	Good condition	-
B8	9/05/2023	13:21	1.1	Good condition	-
B9	9/05/2023	13:22	1.1	Good condition	taken on inside edge of open shed
B10	9/05/2023	13:23	1.1	Good condition	-
B11	9/05/2023	13:25	0.9	Good condition	taken on inside edge of open shed
B12	9/05/2023	13:24	0.9	Good condition	-
B13	9/05/2023	13:25	1.1	Good condition	-
B14	9/05/2023	13:28	1.2	Good condition	could not access shed - taken at base of slab
B15	9/05/2023	13:29	1.4	Good condition	-
B16	9/05/2023	13:30	1.5	Good condition	-
B17	9/05/2023	13:41	1.8	Good condition	Taken under outer edge of shed / slab
B18	9/05/2023	13:41	1.2	Good condition	-
B19	9/05/2023	13:42	0.9	Good condition	-
B20	9/05/2023	13:43	1.1	Good condition	-

Location #	Date	Time	CH_4 Concentration (ppm)	Building and service condition	Sample Location Notes
TP1	9/05/2023	13:24	1.5	Good condition	drain / pit
TP2	9/05/2023	13:25	0.9	Good condition	-
TP3	9/05/2023	13:25	1.2	Good condition	-
TP4	9/05/2023	13:26	1.2	Good condition	-
TP5	9/05/2023	13:26	1.4	Good condition	-
TP6	9/05/2023	13:27	1.3	Good condition	-
TP7	9/05/2023	13:27	1.4	Good condition	-
TP8	9/05/2023	13:29	1.3	Good condition	-
TP9	9/05/2023	13:35	1.5	Good condition	-
TP10	9/05/2023	13:35	1.7	Good condition	-
TP11 (new)	9/05/2023	13:29	2	Good condition	in front of green waste pile

Document No: 2003
Reviewed by: IT
Approved by: R&WM
Issued date: 25/11/21

EQUIPMENT QUALITY REPORT

GA5000

Equipment Code: MLG-8510 Serial Number: G508510

The equipment has been issued as follows:

☑ Equipment is clean ☑ Pump and battery voltage check ☑ Clear Data

Calibration Results				Calibration Gas (Expiry Date)
Parameter	Standard	Result	Error Range	
CH_4	Methane by Volume 60%	60%	± 2%	WO328585-4 Exp: 15/12/26
CO_2	Carbon Dioxide by volume 40%	40%	± 2%	WO328585-4 Exp: 15/12/26
H_2S	Hydrogen Sulphide 25 ppm	25 ppm	± 2 ppm	WO361643-4-25 Exp: 22/07/24
O_2	Oxygen 18%	18%	± 0.2%	WO361643-4-25 Exp: 22/07/24
CO	Carbon Monoxide 50 ppm	50 ppm	± 2ppm	A01012 Exp: 12/09/27

Date: 08/05/2023

Calibrated by: Frederick Campbell

Please check that the following items are received, and all items are returned. Please clean equipment before returning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of this form)	HT Id No.	Sent?	Returned?	Comments
1	Blue tubing with an inlet barb fitting	N/A	✓		
2	Clear tubing with an inlet Brass Ex-cap Female Fitting (filter attached)	N/A	✓		
3	Spare water trap filter(s) Qty 1	N/A	✓		
4	Yellow tubing with an inlet barb fitting	N/A	✓		
5	Clear tubing	N/A	✓		
6	Charger 240/110V to 12V 500mA	N/A	✓		
7	GA5000 with a carry bag	MLG-8510	✓		
8	Hard case	N/A	✓		
9	Instruction Manual	N/A	✓		
10	Well cap fitting	N/A	✓		
-	Test & Tag	N/A			

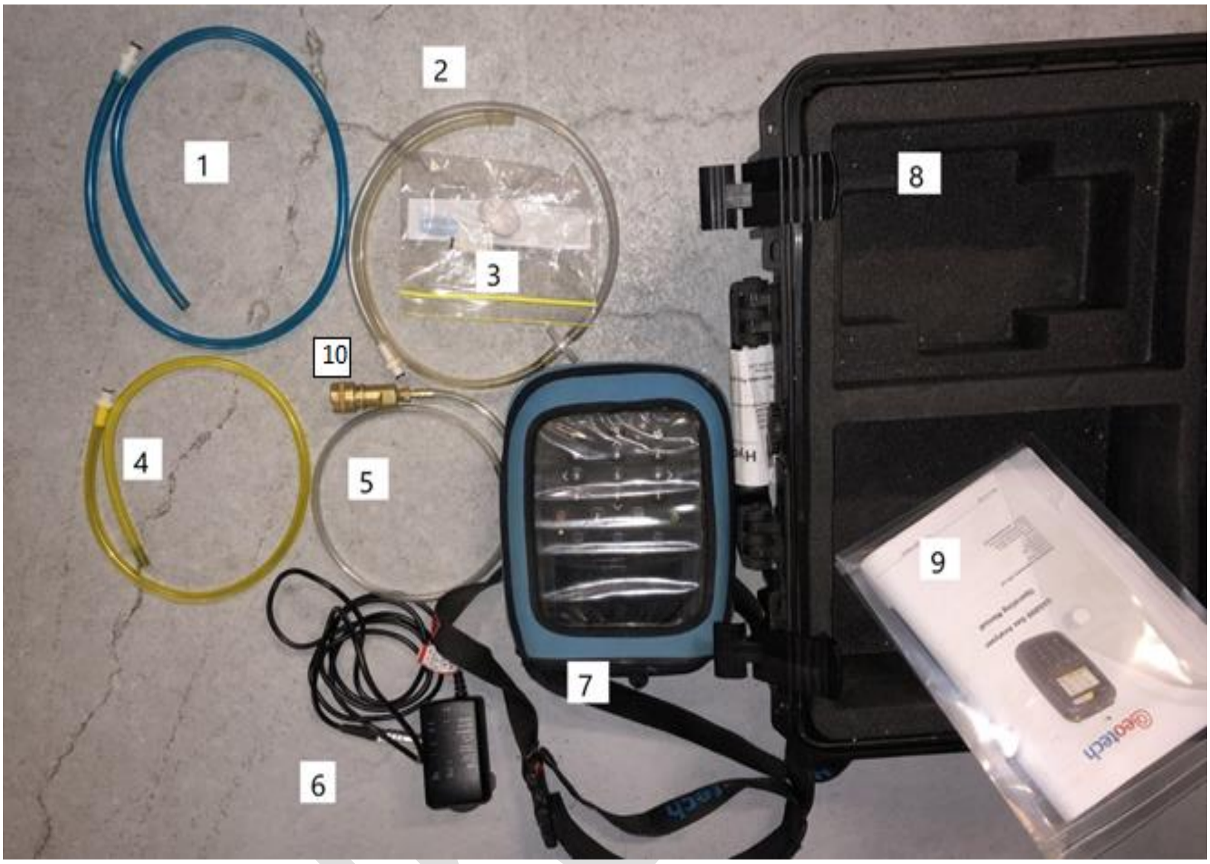
☑ Equipment voltage ☑ Pre-delivery Calibration Test Complete

Date: 08/05/2023

Checked by: Frederick Campbell

HT JOB NO: 20901 CLIENTS REF: P/O No: TBC

RETURN DATE: / /	TIME:	CONDITION ON RETURN:



EQUIPMENT QUALITY REPORT

Inspectra Laser

Equipment Code: MIL-4881   Serial Number: 4881217

☑ Equipment is clean   ☑ Pump and battery voltage check   ☑ Clear Data

Calibration Results				**Calibration Gas Expiry Date**
Parameter	**Standard**	**Result**	**Error Range**	
CH4	Methane by 500ppm	508ppm	± 25 ppm	66 – WO283592-2 Exp.12/01/2026

Date: 08/05/2023

Calibrated by: Frederick Campbell

*For quality control purposes HydroTerra can supply gas calibration data

Please check that the following items are received and all items are returned. Please clean equipment before retuning. **A minimum $20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Checklist Item (See photo at the back of the form)	HT id No.	Sent?	Return?	Comments
1	Carry Case	N/A	✓		
2	Inspectra Laser	MIL-4881	✓		
3	Sampling Probe joint	N/A	✓		
4	Sampling Probe 600mm	N/A	✓		
5	Telescopic rod with Suction cup	N/A	✓		
6	Spare Battery & charger 240/110V to 12V 500mA	N/A	✓		
7	Spare filter	N/A	✓		
8	Tools – Screw driver	N/A	✓		
-	Test & Tag	N/A	✓		

☑ Equipment voltage   ☑ Pre-delivery Calibration Test Complete

Date: 08/05/2023

Calibrated by: Frederick Campbell

HT JOB NO: 20901   CLIENTS REF: P/O No: TBC

RETURN DATE: / / TIME: CONDITION ON RETURN:

APPENDIX B – LABORATORY RESULTS

Field ID	Location Code	Date	Lab Report Number	Field						pH	EC	Solids	Alkalinity					
				Standing Water Level	Temperature	Dissolved Oxygen	Redox Potential	Electrical Conductivity (Non Compensated)	pH (Field)	pH (Lab)	Electrical conductivity *(lab)	TDS	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Calcium (filtered)	Chloride
				m	°C	ug/L	mV	µS/cm	-	-	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				0.01	0.1	10	0.1	1	0.01	0.01	1	10	1	1	1	1	0.5	1
Groundwater Quality Objective										6.5-8		2000					1000	25-700
ANZECC 2000 FW 95%																		
ANZECC 2000 Irrigation																		175
ANZECC 2000 Livestock												2,000					1,000	
BH2	BH2	31 Aug 2022	EM2216860	2.12	14.08	4,130	72.3	634.5	6.12	6.78	763	417	<1	56	<1	56	2	209
BH3	BH3	31 Aug 2022	EM2216860	0.45	10.91	230	-75.4	3364	6.67	6.93	3,240	1,830	<1	241	<1	241	39	932
BH7	BH7	31 Aug 2022	EM2216860	2.42	12.41	210	-42.1	1127	6.42	6.79	1,090	588	<1	146	<1	146	24	263
BH8	BH8	31 Aug 2022	EM2216860	2.25	12.24	330	-96.6	1122	6.71	7.05	1,020	521	<1	242	<1	242	17	139
BH10	BH10	01 Sep 2022	EM2217005	2.26	12.61	350	96.6	691	5.99	6.44	708	764	<1	95	<1	95	8	150
BH14	BH14	01 Sep 2022	EM2217005	2.23	10.68	630	-30.7	1608	6.42	6.68	1,780	1,240	<1	97	<1	97	33	517
BH4	BH4	01 Sep 2022	EM2217005	4.52	12.7	50	-82.3	2378	6.36	6.55	2,030	1,380	<1	213	<1	213	20	570
BH6	BH6	02 Sep 2022	EM2217005	11.72	13.82	340	242	713	5.03	5.79	746	439	<1	10	<1	10	4	215
BH14	BH14	16 Nov 2022	EM2222748	2.01	12.33	140	6.4	1541	6.15	6.88	1,520	820	<1	124	<1	124	22	409
BH4	BH4	16 Nov 2022	EM2222748	3.25	12.96	40	-74.9	2512	6.05	6.34	2,100	1,410	<1	167	<1	167	23	688
BH8	BH8	16 Nov 2022	EM2222748	1.87	14.1	30	-98.9	1000	6.54	7.06	875	455	<1	277	<1	277	15	100
BH2	BH2	17 Nov 2022	EM2222858	1.93	14.99	530	47.3	638.9	5.68	6.07	730	342	<1	32	<1	32	1	181
BH3	BH3	17 Nov 2022	EM2222858	0.59	14.1	120	-42.6	3353	6.39	6.58	2,950	1,820	<1	226	<1	226	44	991
BH6	BH6	17 Nov 2022	EM2222858	11.2	15.05	360	194.7	653.5	4.91	5.57	754	375	<1	12	<1	12	4	197
BH7	BH7	17 Nov 2022	EM2222858	2.42	14.45	90	-31.1	880	6.35	6.63	934	462	<1	181	<1	181	22	168
BH10	BH10	18 Nov 2022	EM2222858	2.06	14.53	210	68.3	777	5.72	6	845	566	<1	58	<1	58	8	206
BH14	BH14	13 Feb 2023	EM2302400	3.19	14.53	120	8.5	1,190	6.4	6.65	1,330	978	<1	138	<1	138	21	363
BH4	BH4	13 Feb 2023	EM2302400	4.88	14.36	370	6.5	1,840	5.77	5.96	1,770	1,060	<1	71	<1	71	12	550
BH10	BH10	14 Feb 2023	EM2302525	2.44	16.22	250	114.7	795	5.61	5.76	806	563	<1	46	<1	46	8	215
BH3	BH3	14 Feb 2023	EM2302525	0.87	17.2	160	-17.2	2,480	6.52	6.67	2,390	1,380	<1	227	<1	227	39	669
BH6	BH6	14 Feb 2023	EM2302525	11.65	14.9	280	220.1	632	5.05	5.66	661	395	<1	13	<1	13	5	182
BH7	BH7	14 Feb 2023	EM2302525	2.69	15.34	160	-8.5	975	6.54	6.53	924	573	<1	152	<1	152	18	205
BH8	BH8	14 Feb 2023	EM2302525	3.02	16.67	130	-47.7	928	6.68	6.85	823	656	<1	275	<1	275	13	96
BH2	BH2	17 Feb 2023	EM2302775	2.98	19.7	2,690	122.2	68	5.73	6.39	734	385	<1	32	<1	32	1	199
BH10	BH10	09 May 2023	EM2308222	2.44	15.2	260	90.5	645	5.57	6.32	761	459	<1	47	<1	47	6	200
BH2	BH2	10 May 2023	EM2308315	2.9	16.1	4,530	117.7	673	5.59	6.43	756	469	<1	34	<1	34	1	226
BH3	BH3	10 May 2023	EM2308315	0.6	13.29	180	-36.9	2541	6.51	8.15	3,350	2,030	<1	196	<1	196	51	917
BH4	BH4	10 May 2023	EM2308315	5.33	13.41	500	29.9	1907	5.83	7.71	2,300	1,510	<1	96	<1	96	20	720
BH6	BH6	10 May 2023	EM2308315	11.96	14.9	560	229.4	563	4.97	6.92	674	425	<1	10	<1	10	4	180
BH7	BH7	10 May 2023	EM2308315	2.31	13.83	180	-28.4	736	6.76	8.03	928	500	<1	146	<1	146	25	210
BH8	BH8	10 May 2023	EM2308315	3	15.36	220	-74.4	728	6.62	8.46	809	489	16	282	<1	298	13	94
BH14	BH14	11 May 2023	EM2308446	2.85	14.94	250	9.2	1,140	6.4	6.7	1,290	893	<1	103	<1	103	26	378

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted
'under review'. Calculations in NIWA (2002): Memorandum, Nitrate Guideline
Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.
Environmental Standards
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

Field ID	Location Code	Date	Lab Report Number	Major Ions						Sulfate as SO4	Nitrogen Forms					Inorganics	
				Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Cations Total	Anions Total	Ionic Balance	Sulfate as SO4 - Turbidimetric (filtered)	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrite + Nitrate as N	Kjeldahl Nitrogen Total	COD	TOC
				mg/L	mg/L	mg/L	meq/L	meq/L	%	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL				0.5	0.5	0.5	0.01	0.01	0.01	1,000	0.01	0.01	0.01	0.01	0.1	10	1
Groundwater Quality Objective				2000		115				250,000	0.9	0.16			25		
ANZECC 2000 FW 95%												7.2#1					
ANZECC 2000 Irrigation						115											
ANZECC 2000 Livestock																	
BH2	BH2	31 Aug 2022	EM2216860	18	<1	96	5.76	7.47	13	22,000	0.08	0.01	<0.01	0.01	0.3	<10	2
BH3	BH3	31 Aug 2022	EM2216860	83	12	423	27.5	31.4	6.65	14,000	0.68	<0.01	<0.01	<0.01	0.9	18	30
BH7	BH7	31 Aug 2022	EM2216860	26	16	119	8.92	10.6	8.52	12,000	0.8	0.02	<0.01	0.02	1.2	<10	9
BH8	BH8	31 Aug 2022	EM2216860	33	4	116	8.71	9.92	6.49	56,000	3.7	0.01	<0.01	0.01	5.4	<10	21
BH10	BH10	01 Sep 2022	EM2217005	17	19	85	5.98	6.75	6.06	30,000	1.06	0.57	<0.01	0.57	4.8	61	33
BH14	BH14	01 Sep 2022	EM2217005	52	3	187	14.1	16.9	8.83	17,000	0.24	0.04	<0.01	0.04	1.5	<10	10
BH4	BH4	01 Sep 2022	EM2217005	58	<1	253	16.8	20.5	10	9,000	0.62	<0.01	<0.01	<0.01	1.4	142	58
BH6	BH6	02 Sep 2022	EM2217005	17	1	94	5.71	6.68	7.81	20,000	<0.01	0.97	<0.01	0.97	0.4	<10	5
BH14	BH14	16 Nov 2022	EM2222748	45	3	168	12.2	14.8	9.64	37,000	0.32	0.03	<0.01	0.03	1.4	131	11
BH4	BH4	16 Nov 2022	EM2222748	64	<1	283	18.7	22.9	10	8,000	0.67	<0.02	<0.02	<0.01	2.3	210	28
BH8	BH8	16 Nov 2022	EM2222748	31	4	101	8.12	8.94	4.82	28,000	4.56	<0.01	<0.01	<0.01	4.9	105	19
BH2	BH2	17 Nov 2022	EM2222858	14	1	97	5.45	6.16	6.16	20,000	0.03	0.15	0.04	0.19	0.9	<10	<1
BH3	BH3	17 Nov 2022	EM2222858	95	14	431	29.1	32.8	6.01	18,000	0.42	0.03	<0.01	0.03	1	12	17
BH6	BH6	17 Nov 2022	EM2222858	18	1	91	5.66	6.21	4.62	20,000	<0.01	1.39	<0.01	1.39	0.3	12	<1
BH7	BH7	17 Nov 2022	EM2222858	24	15	100	7.81	8.54	4.5	9,000	0.43	0.01	<0.01	0.01	1	<10	13
BH10	BH10	18 Nov 2022	EM2222858	19	11	96	6.42	7.45	7.42	23,000	1.28	0.03	<0.01	0.03	3.2	17	11
BH14	BH14	13 Feb 2023	EM2302400	39	4	163	11.4	13.4	8.05	22,000	0.51	0.01	<0.01	0.01	0.9	90	16
BH4	BH4	13 Feb 2023	EM2302400	37	<1	239	14	17	9.71	6,000	<0.01	0.03	<0.01	0.03	0.7	145	39
BH10	BH10	14 Feb 2023	EM2302525	20	9	103	6.76	7.46	4.97	23,000	1.52	0.03	<0.01	0.03	1.8	83	11
BH3	BH3	14 Feb 2023	EM2302525	71	18	304	21.5	23.8	5.1	18,000	0.13	<0.01	<0.01	<0.01	0.9	13	30
BH6	BH6	14 Feb 2023	EM2302525	17	1	91	5.63	5.79	1.37	19,000	<0.01	1.91	<0.01	1.91	0.3	16	4
BH7	BH7	14 Feb 2023	EM2302525	24	15	111	8.08	9.03	5.51	10,000	0.79	<0.01	<0.01	<0.01	0.9	196	15
BH8	BH8	14 Feb 2023	EM2302525	26	4	114	7.85	8.35	3.08	7,000	1.43	<0.01	<0.01	<0.01	4	439	30
BH2	BH2	17 Feb 2023	EM2302775	14	1	103	5.71	6.67	7.77	20,000	0.32	0.89	<0.01	0.89	0.6	34	1
BH10	BH10	09 May 2023	EM2308222	19	9	95	6.31	7.08	5.73	24,000	1.23	0.25	<0.01	0.25	1.3	24	11
BH2	BH2	10 May 2023	EM2308315	17	1	117	6.56	7.43	6.18	18,000	0.08	3.14	0.01	3.15	0.7	58	6
BH3	BH3	10 May 2023	EM2308315	94	18	406	28.4	30.4	3.38	29,000	0.14	<0.02	<0.02	0.01	0.9	117	23
BH4	BH4	10 May 2023	EM2308315	58	<1	303	19	22.3	8.05	2,000	0.16	0.08	<0.01	0.08	0.7	149	35
BH6	BH6	10 May 2023	EM2308315	17	1	90	5.54	5.69	1.38	20,000	<0.01	2.01	<0.01	2.01	0.4	<10	<1
BH7	BH7	10 May 2023	EM2308315	25	18	106	8.38	8.88	2.93	2,000	1.51	0.02	<0.01	0.02	1.5	65	12
BH8	BH8	10 May 2023	EM2308315	30	4	112	8.09	8.67	3.44	3,000	3.6	0.02	<0.01	0.02	3.7	134	21
BH14	BH14	11 May 2023	EM2308446	42	4	158	11.7	12.9	4.79	9,000	0.74	0.03	<0.01	0.03	1.3	<10	7

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'. Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

Field ID	Location Code	Date	Lab Report Number	Metals: Chromium (III+VI)	Metals: Iron	Metals: Zinc	Volatile Fatty Acids (as Acetic Acid)
				mg/L	mg/L	mg/L	ug/L
EQL				0.001	0.05	0.005	5,000
Groundwater Quality Objective				0.001	0.3	0.008	
ANZECC 2000 FW 95%						0.008	
ANZECC 2000 Irrigation				0.1		2	
ANZECC 2000 Livestock				1		20	
BH2	BH2	31 Aug 2022	EM2216860	<0.001	23	0.04	16,000
BH3	BH3	31 Aug 2022	EM2216860	<0.001	58.4	0.061	14,000
BH7	BH7	31 Aug 2022	EM2216860	0.002	44.9	0.037	25,000
BH8	BH8	31 Aug 2022	EM2216860	0.013	70	0.072	17,000
BH10	BH10	01 Sep 2022	EM2217005	0.021	35.9	0.108	30,000
BH14	BH14	01 Sep 2022	EM2217005	0.014	48.2	0.046	14,000
BH4	BH4	01 Sep 2022	EM2217005	0.019	123	0.061	28,000
BH6	BH6	02 Sep 2022	EM2217005	0.001	0.3	0.059	11,000
BH14	BH14	16 Nov 2022	EM2222748	0.024	40.9	0.073	34,000
BH4	BH4	16 Nov 2022	EM2222748	0.03	116	0.077	56,000
BH8	BH8	16 Nov 2022	EM2222748	0.01	56.5	0.023	31,000
BH2	BH2	17 Nov 2022	EM2222858	<0.001	27.4	0.044	23,000
BH3	BH3	17 Nov 2022	EM2222858	0.002	68.4	0.159	26,000
BH6	BH6	17 Nov 2022	EM2222858	0.001	0.22	0.077	30,000
BH7	BH7	17 Nov 2022	EM2222858	0.004	39.2	0.018	31,000
BH10	BH10	18 Nov 2022	EM2222858	0.016	31	0.071	17,000
BH14	BH14	13 Feb 2023	EM2302400	0.048	47.5	0.059	19,000
BH4	BH4	13 Feb 2023	EM2302400	0.012	39.5	0.035	25,000
BH10	BH10	14 Feb 2023	EM2302525	0.005	22.8	0.062	9,000
BH3	BH3	14 Feb 2023	EM2302525	0.01	49.9	0.09	<5,000
BH6	BH6	14 Feb 2023	EM2302525	0.003	0.41	0.043	<5,000
BH7	BH7	14 Feb 2023	EM2302525	0.035	85.1	0.07	<5,000
BH8	BH8	14 Feb 2023	EM2302525	0.102	162	0.098	9,000
BH2	BH2	17 Feb 2023	EM2302775	<0.001	3.95	0.053	12,000
BH10	BH10	09 May 2023	EM2308222	0.003	7.1	0.028	18,000
BH2	BH2	10 May 2023	EM2308315	<0.001	8.46	0.057	11,000
BH3	BH3	10 May 2023	EM2308315	0.003	68.9	0.045	18,000
BH4	BH4	10 May 2023	EM2308315	0.012	82.9	0.017	60,000
BH6	BH6	10 May 2023	EM2308315	0.001	0.12	0.034	11,000
BH7	BH7	10 May 2023	EM2308315	0.003	16.1	0.013	29,000
BH8	BH8	10 May 2023	EM2308315	0.011	51.2	0.009	55,000
BH14	BH14	11 May 2023	EM2308446	0.004	36.6	0.016	21,000

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'. Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

Field ID	Location Code	Date	Lab Report Number						pH	EC	Solids	
				Temperature	Dissolved Oxygen	Redox Potential	Electrical Conductivity (Non Compensated)	pH (Field)	pH (Lab)	Electrical conductivity *(lab)	TDS	Alkalinity (Carbonate as CaCO3)
				°C	ug/L	mV	µS/cm	-	-	uS/cm	mg/L	mg/L
EQL				0.1	10	0.1	1	0.01	0.01	1	10	1
Surface Water Quality Objective								6.5-8	6.5-8		2000	
ANZECC 2000 FW 95%												
ANZECC 2000 Irrigation												
ANZECC 2000 Livestock											2,000	
D/S BH3	Creek D/S BH3	31 Aug 2022	EM2216860	8.76	10,260	93.8	214.2	7.24	6.9	229	162	<1
Leachate	Leachate Pond	31 Aug 2022	EM2216860	14.4	3,940	-61.2	708.1	7.15	7.55	745	466	<1
Wetland	Wetland	31 Aug 2022	EM2216860	11.5	10,910	-44.18	481.9	7.21	7.56	544	313	<1
Dredge	Dredge Hole	31 Aug 2022	EM2216860	9.86	9,540	82.32	745.9	6.68	7.19	799	400	<1
U/S BH3	Creek U/S BH3	01 Sep 2022	EM2217005	8.9	10,650	26.43	218.8	7.52	7.22	230	216	<1
@ BH3	Creek @ BH3	01 Sep 2022	EM2217005	8.7	10,420	-36	215.8	7.55	7.44	228	217	<1
@ BH3	Creek @ BH3	16 Nov 2022	EM2222748	13.02	9,540	151.2	178.8	7.01	7.04	204	158	<1
U/S BH3	Creek U/S BH3	16 Nov 2022	EM2222748	13.1	9,570	145.6	178.9	7.02	7.04	207	154	<1
D/S BH3	Creek D/S BH3	16 Nov 2022	EM2222748	12.56	9,550	157.6	179.4	7.04	7.05	207	160	<1
Leachate	Leachate Pond	17 Nov 2022	EM2222858	14.1	3,780	-79	740.6	6.94	7.25	834	480	<1
Wetland	Wetland	17 Nov 2022	EM2222858	14.5	8,200	-69.2	300.2	6.89	6.99	361	236	<1
Dredge	Dredge Hole	18 Nov 2022	EM2222858	13.8	5,920	3.67	875	6.44	6.85	940	503	<1
@ BH3	Creek @ BH3	13 Feb 2023	EM2302400	15.55	690	2.5	799	6.04	7.1	782	477	<1
D/S BH3	Creek D/S BH3	13 Feb 2023	EM2302400	16.81	1,120	-7.7	550	6.66	7.06	545	341	<1
U/S BH3	Creek U/S BH3	13 Feb 2023	EM2302400	19.4	4,960	20.4	668	6.83	7.5	687	429	<1
Wetland	Wetland	14 Feb 2023	EM2302525	21.72	8,720	14.9	1,610	7.44	7.7	1,660	892	<1
Leachate	Leachate Pond	14 Feb 2023	EM2302525	23.13	12,090	-28.9	1,160	7.32	7.54	1,180	638	<1
Dredge	Dredge Hole	16 Feb 2023	EM2302773	22	7,530	63.6	914	6.85	6.93	976	518	<1
Leachate	Leachate Pond	09 May 2023	EM2308222	12.3	3570	46.3	900	6.84	7.58	950	518	<1
Wetland	Wetland	09 May 2023	EM2308222	13.3	320	-30.8	1170	6.94	6.92	1,060	768	<1
Dredge	Dredge Hole	09 May 2023	EM2308222	11.9	4.03	3.8	818	6.63	6.91	878	533	<1
U/S BH3	Creek U/S BH3	11 May 2023	EM2308446	9.9	4,920	43.6	622	6.71	7.1	700	537	<1
@ BH3	Creek @ BH3	11 May 2023	EM2308446	9.42	4,470	18.18	911	7.08	7.67	996	561	<1
D/S BH3	Creek D/S BH3	11 May 2023	EM2308446	9.6	5,710	94.4	648	6.91	7.21	695	470	<1

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'. Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

	Alkalinity			Major Ions					
	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Calcium (filtered)	Chloride	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Cations Total
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L
EQL	1	1	1	0.5	1	0.5	0.5	0.5	0.01
Surface Water Quality Objective				1000		2000			
ANZECC 2000 FW 95%									
ANZECC 2000 Irrigation					175			115	
ANZECC 2000 Livestock				1,000					

Field ID	Location Code	Date	Lab Report Number	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Calcium (filtered)	Chloride	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Cations Total
D/S BH3	Creek D/S BH3	31 Aug 2022	EM2216860	28	<1	28	6	39	7	2	25	2.01
Leachate	Leachate Pond	31 Aug 2022	EM2216860	160	<1	160	23	132	17	28	72	6.39
Wetland	Wetland	31 Aug 2022	EM2216860	64	<1	64	9	123	12	6	67	4.5
Dredge	Dredge Hole	31 Aug 2022	EM2216860	30	<1	30	6	235	17	2	99	6.06
U/S BH3	Creek U/S BH3	01 Sep 2022	EM2217005	33	<1	33	6	34	7	2	24	1.97
@ BH3	Creek @ BH3	01 Sep 2022	EM2217005	35	<1	35	6	34	7	2	24	1.97
@ BH3	Creek @ BH3	16 Nov 2022	EM2222748	33	<1	33	6	31	7	2	19	1.75
U/S BH3	Creek U/S BH3	16 Nov 2022	EM2222748	32	<1	32	6	30	7	2	19	1.75
D/S BH3	Creek D/S BH3	16 Nov 2022	EM2222748	34	<1	34	6	31	7	2	19	1.75
Leachate	Leachate Pond	17 Nov 2022	EM2222858	171	<1	171	27	136	19	32	73	6.9
Wetland	Wetland	17 Nov 2022	EM2222858	66	<1	66	9	55	10	5	38	3.05
Dredge	Dredge Hole	18 Nov 2022	EM2222858	65	<1	65	12	248	24	3	118	7.78
@ BH3	Creek @ BH3	13 Feb 2023	EM2302400	90	<1	90	18	205	26	3	84	6.77
D/S BH3	Creek D/S BH3	13 Feb 2023	EM2302400	88	<1	88	17	122	18	3	55	4.8
U/S BH3	Creek U/S BH3	13 Feb 2023	EM2302400	82	<1	82	16	172	22	3	77	6.04
Wetland	Wetland	14 Feb 2023	EM2302525	244	<1	244	30	404	50	33	207	15.5
Leachate	Leachate Pond	14 Feb 2023	EM2302525	194	<1	194	40	264	30	24	130	10.7
Dredge	Dredge Hole	16 Feb 2023	EM2302773	58	<1	58	11	286	24	3	126	8.08
Leachate	Leachate Pond	09 May 2023	EM2308222	163	<1	163	29	210	23	22	100	8.55
Wetland	Wetland	09 May 2023	EM2308222	195	<1	195	33	236	26	25	108	9.12
Dredge	Dredge Hole	09 May 2023	EM2308222	49	<1	49	10	246	22	3	113	7.3
U/S BH3	Creek U/S BH3	11 May 2023	EM2308446	62	<1	62	16	189	23	3	84	6.42
@ BH3	Creek @ BH3	11 May 2023	EM2308446	187	<1	187	16	220	22	4	80	6.19
D/S BH3	Creek D/S BH3	11 May 2023	EM2308446	70	<1	70	28	186	31	19	108	9.13

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'.
Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

						Nitrogen Forms					Sulfate as SO4	Inorg
				Anions Total	Ionic Balance	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrite + Nitrate as N	Kjeldahl Nitrogen Total	Sulfate as SO4 - Turbidimetric (filtered)	COD
				meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L
EQL				0.01	0.01	0.01	0.01	0.01	0.01	0.1	1,000	10
Surface Water Quality Objective						0.9	0.7				1,000,000	
ANZECC 2000 FW 95%							7.2[#1]					
ANZECC 2000 Irrigation												
ANZECC 2000 Livestock												
Field ID	Location Code	Date	Lab Report Number									
D/S BH3	Creek D/S BH3	31 Aug 2022	EM2216860	1.85	4.33	<0.01	1.63	<0.01	1.63	1	9,000	35
Leachate	Leachate Pond	31 Aug 2022	EM2216860	7	4.54	3.78	0.05	0.01	0.06	6	4,000	147
Wetland	Wetland	31 Aug 2022	EM2216860	5.02	5.4	0.01	0.08	<0.01	0.08	0.8	13,000	37
Dredge	Dredge Hole	31 Aug 2022	EM2216860	7.52	10.8	<0.01	0.22	<0.01	0.22	0.7	14,000	15
U/S BH3	Creek U/S BH3	01 Sep 2022	EM2217005	1.78	4.94	<0.01	1.65	<0.01	1.65	1	8,000	31
@ BH3	Creek @ BH3	01 Sep 2022	EM2217005	1.8	4.41	<0.01	1.68	<0.01	1.68	0.8	7,000	29
@ BH3	Creek @ BH3	16 Nov 2022	EM2222748	1.6	-	0.01	0.73	<0.01	0.73	1.3	3,000	69
U/S BH3	Creek U/S BH3	16 Nov 2022	EM2222748	1.55	-	0.03	0.73	<0.01	0.73	1.2	3,000	69
D/S BH3	Creek D/S BH3	16 Nov 2022	EM2222748	1.62	-	0.03	0.72	<0.01	0.72	1.2	3,000	72
Leachate	Leachate Pond	17 Nov 2022	EM2222858	7.36	3.17	5.35	<0.01	0.02	0.02	5.5	5,000	108
Wetland	Wetland	17 Nov 2022	EM2222858	2.93	2.01	0.04	0.01	<0.01	0.01	0.9	3,000	45
Dredge	Dredge Hole	18 Nov 2022	EM2222858	8.61	5.02	0.01	0.11	<0.01	0.11	1.1	15,000	28
@ BH3	Creek @ BH3	13 Feb 2023	EM2302400	7.58	5.66	0.15	<0.01	<0.01	<0.01	0.8	<1,000	11
D/S BH3	Creek D/S BH3	13 Feb 2023	EM2302400	5.2	4.01	0.21	<0.01	<0.01	<0.01	1	<1,000	14
U/S BH3	Creek U/S BH3	13 Feb 2023	EM2302400	6.62	4.58	<0.01	0.14	<0.01	0.14	0.8	6,000	15
Wetland	Wetland	14 Feb 2023	EM2302525	16.3	2.56	0.01	<0.01	<0.01	<0.01	10.4	<1,000	374
Leachate	Leachate Pond	14 Feb 2023	EM2302525	11.4	2.95	6.26	0.06	0.04	0.1	6.6	3,000	53
Dredge	Dredge Hole	16 Feb 2023	EM2302773	9.56	8.38	<0.01	0.01	<0.01	0.01	0.7	16,000	47
Leachate	Leachate Pond	09 May 2023	EM2308222	9.26	4.05	4.11	0.01	0.01	0.02	3.8	4,000	34
Wetland	Wetland	09 May 2023	EM2308222	10.6	7.36	3.32	<0.01	<0.01	<0.01	3.8	1,000	<10
Dredge	Dredge Hole	09 May 2023	EM2308222	8.17	5.6	0.43	0.09	<0.01	0.09	1.1	12,000	21
U/S BH3	Creek U/S BH3	11 May 2023	EM2308446	6.72	2.24	0.1	0.09	<0.01	0.09	0.7	7,000	<10
@ BH3	Creek @ BH3	11 May 2023	EM2308446	9.96	23.3	0.11	0.05	0.01	0.06	0.7	1,000	15
D/S BH3	Creek D/S BH3	11 May 2023	EM2308446	6.77	14.8	1.17	0.02	<0.01	0.02	1.8	6,000	31

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'.
Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation
Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

				anics	Metals			
				TOC	Chromium (III+VI)	Iron	Zinc	Volatile Fatty Acids (as Acetic Acid)
				mg/L	mg/L	mg/L	mg/L	ug/L
EQL				1	0.001	0.05	0.005	5,000
Surface Water Quality Objective					0.001		0.008	
ANZECC 2000 FW 95%							0.008	
ANZECC 2000 Irrigation					0.1		2	
ANZECC 2000 Livestock					1		20	
Field ID	Location Code	Date	Lab Report Number					
D/S BH3	Creek D/S BH3	31 Aug 2022	EM2216860	11	0.002	1.41	<0.005	10,000
Leachate	Leachate Pond	31 Aug 2022	EM2216860	38	0.005	18.3	0.033	14,000
Wetland	Wetland	31 Aug 2022	EM2216860	13	0.002	2.43	<0.005	10,000
Dredge	Dredge Hole	31 Aug 2022	EM2216860	5	<0.001	2.16	0.007	11,000
U/S BH3	Creek U/S BH3	01 Sep 2022	EM2217005	10	0.002	1.28	<0.005	10,000
@ BH3	Creek @ BH3	01 Sep 2022	EM2217005	10	0.002	1.2	<0.005	10,000
@ BH3	Creek @ BH3	16 Nov 2022	EM2222748	20	0.005	2.82	0.012	16,000
U/S BH3	Creek U/S BH3	16 Nov 2022	EM2222748	19	0.003	2.54	0.012	22,000
D/S BH3	Creek D/S BH3	16 Nov 2022	EM2222748	20	0.004	2.56	0.013	23,000
Leachate	Leachate Pond	17 Nov 2022	EM2222858	29	0.006	23.5	0.036	28,000
Wetland	Wetland	17 Nov 2022	EM2222858	18	0.004	9.71	0.006	17,000
Dredge	Dredge Hole	18 Nov 2022	EM2222858	9	<0.001	2.45	0.005	25,000
@ BH3	Creek @ BH3	13 Feb 2023	EM2302400	11	<0.001	14.7	<0.005	8,000
D/S BH3	Creek D/S BH3	13 Feb 2023	EM2302400	13	<0.001	13.8	<0.005	14,000
U/S BH3	Creek U/S BH3	13 Feb 2023	EM2302400	10	<0.001	4.82	<0.005	11,000
Wetland	Wetland	14 Feb 2023	EM2302525	44	<0.001	7.65	0.01	17,000
Leachate	Leachate Pond	14 Feb 2023	EM2302525	13	<0.001	5.48	<0.005	<5,000
Dredge	Dredge Hole	16 Feb 2023	EM2302773	6	<0.001	1.42	<0.005	8,000
Leachate	Leachate Pond	09 May 2023	EM2308222	10	<0.001	1.42	<0.005	26,000
Wetland	Wetland	09 May 2023	EM2308222	13	<0.001	69.4	<0.005	38,000
Dredge	Dredge Hole	09 May 2023	EM2308222	7	<0.001	3.93	<0.005	13,000
U/S BH3	Creek U/S BH3	11 May 2023	EM2308446	7	<0.001	9.1	0.011	10,000
@ BH3	Creek @ BH3	11 May 2023	EM2308446	11	<0.001	2.68	0.01	16,000
D/S BH3	Creek D/S BH3	11 May 2023	EM2308446	7	<0.001	6.54	0.01	13,000

#1 Errata slip for ANZECC (2000), June 2005, nitrate trigger levels should be deleted and noted 'under review'.
Calculations in NIWA (2002): Memorandum, Nitrate Guideline Values in ANZECC (2000) suggest that nitrate criteria are significantly underestimated.

Environmental Standards

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 FW 95%

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Irrigation

Australian and New Zealand Environment and Conservation Council, October 2000, ANZECC 2000 Livestock

APPENDIX C – QA QC RESULTS

	Unit	EQL	BH8	BLIND	RPD	BH8	CRESWICK SPLIT	RPD
Matrix Type			Water	Water		Water	Water	
Date			31 Aug 2022	31 Aug 2022		31 Aug 2022	31 Aug 2022	
Lab Report Number			EM2216860	EM2216860		EM2216860	920032	
Electrical conductivity *(lab)	uS/cm	1	1,020	986	3	1,020	890	14
pH (Lab)	-	0.01	7.05	7.14	1	7.05	7.1	1
Solids								
TDS	mg/L	10	521	518	1	521	480	8
Alkalinity								
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	0	<1	<10	0
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	242	242	0	242	240	1
Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	0	<1	<20	0
Alkalinity (total) as CaCO3	mg/L	1	242	242	0	242	240	1
Major Ions								
Calcium (filtered)	mg/L	0.5	17	17	0	17	19	11
Chloride	mg/L	1	139	139	0	139	130	7
Magnesium (filtered)	mg/L	0.5	33	33	0	33	32	3
Potassium (filtered)	mg/L	0.5	4	4	0	4	3.7	8
Sodium (filtered)	mg/L	0.5	116	116	0	116	120	3
Nitrogen Forms								
Ammonia as N	mg/L	0.01	3.70	3.78	2	3.70	4.2	13
Nitrate (as N)	mg/L	0.01	0.01	<0.01	0	0.01	<0.02	0
Kjeldahl Nitrogen Total	mg/L	0.1	5.4	5.4	0	5.4	4.6	16
Inorganics								
COD	mg/L	10	<10	<10	0	<10	69	149
Sulfate as SO4 - Turbidimetric (filtered)	ug/L	1,000	56,000	55,000	2	56,000	47,000	17
TOC	mg/L	1	21	28	29	21	25	17
Metals								
Chromium (III+VI)	mg/L	0.001	0.013	0.005	89	0.013	0.006	74
Chromium (III+VI) (filtered)	mg/L	0.001						
Iron	mg/L	0.05	70.0	68.0	3	70.0		
Iron (filtered)	mg/L	0.05						
Zinc	mg/L	0.005	0.072	0.070	3	0.072	0.061	17
Zinc (filtered)	mg/L	0.005						
Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	17,000	19,000	11	17,000	<5,000	109

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

		Field ID	BH8	BLIND		BH8	CRESWICK SPLIT	
		Matrix Type	Water	Water		Water	Water	
		Date	16 Nov 2022	16 Nov 2022		16 Nov 2022	16 Nov 2022	
		Lab Report Number	EM2222748	EM2222748	RPD	EM2222748	942675	RPD
	Unit	EQL						
Electrical conductivity *(lab)	uS/cm	1	875	901	3	875	870	1
pH (Lab)	-	0.01	7.06	7.15	1	7.06	8.6	20
Solids								
TDS	mg/L	10	455	468	3	455	450	1
Alkalinity								
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	0	<1	25	185
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	277	280	1	277	300	8
Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	0	<1	<20	0
Alkalinity (total) as CaCO3	mg/L	1	277	280	1	277	330	17
Major Ions								
Calcium (filtered)	mg/L	0.5	15	15	0	15	14	7
Chloride	mg/L	1	100	100	0	100	110	10
Magnesium (filtered)	mg/L	0.5	31	31	0	31	28	10
Potassium (filtered)	mg/L	0.5	4	4	0	4	3	28
Sodium (filtered)	mg/L	0.5	101	102	1	101	110	9
Nitrogen Forms								
Ammonia as N	mg/L	0.01	4.56	4.63	2	4.56	3.6	24
Nitrate (as N)	mg/L	0.01	<0.01	<0.01	0	<0.01	<0.02	0
Kjeldahl Nitrogen Total	mg/L	0.1	4.9	4.5	9	4.9	4.9	0
Inorganics								
COD	mg/L	10	105	97	8	105	71	39
Sulfate as SO4 - Turbidimetric (filtered)	ug/L	1,000	28,000	30,000	7	28,000	21,000	28
TOC	mg/L	1	19	21	10	19	35	59
Metals								
Chromium (III+VI)	mg/L	0.001	0.010	0.014	33	0.010		
Chromium (III+VI) (filtered)	mg/L	0.001					<0.001	
Iron	mg/L	0.05	56.5	56.6	0	56.5		
Iron (filtered)	mg/L	0.05					<0.05	
Zinc	mg/L	0.005	0.023	0.027	16	0.023		
Zinc (filtered)	mg/L	0.005					<0.005	
Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	31,000	30,000	3	31,000	<5,000	144

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multipli
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories

		Field ID	BH14	BLIND		BH14	CRESWICK SPLIT	
		Matrix Type	Water	Water		Water	Water	
		Date	13 Feb 2023	13 Feb 2023		13 Feb 2023	13 Feb 2023	
		Lab Report Number	EM2302400	EM2302400	RPD	EM2302400	963891	RPD
	Unit	EQL						
Electrical conductivity *(lab)	uS/cm	1	1,330	1,320	1	1,330	1,300	2
pH (Lab)	-	0.01	6.65	6.64	0	6.65	6.9	4
Solids								
TDS	mg/L	10	978	925	6	978	790	21
Alkalinity								
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	0	<1	<10	0
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	138	141	2	138	<20	149
Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	0	<1	<20	0
Alkalinity (total) as CaCO3	mg/L	1	138	141	2	138	<20	149
Major Ions								
Calcium (filtered)	mg/L	0.5	21	22	5	21	22	5
Chloride	mg/L	1	363	354	3	363	200	58
Magnesium (filtered)	mg/L	0.5	39	39	0	39	38	3
Potassium (filtered)	mg/L	0.5	4	4	0	4	3.2	22
Sodium (filtered)	mg/L	0.5	163	158	3	163	160	2
Nitrogen Forms								
Ammonia as N	mg/L	0.01	0.51	0.21	83	0.51	0.24	72
Nitrate (as N)	mg/L	0.01	0.01	0.01	0	0.01	<0.02	0
Kjeldahl Nitrogen Total	mg/L	0.1	0.9	0.5	57	0.9	1.2	29
Inorganics								
COD	mg/L	10	90	100	11	90	42	73
Sulfate as SO4 - Turbidimetric (filtered)	ug/L	1,000	22,000	22,000	0	22,000	22,000	0
TOC	mg/L	1	16	15	6	16	19	17
Metals								
Chromium (III+VI)	mg/L	0.001	0.048	0.062	25	0.048	0.004	169
Chromium (III+VI) (filtered)	mg/L	0.001						
Iron	mg/L	0.05	47.5	54.3	13	47.5		
Iron (filtered)	mg/L	0.05						
Zinc	mg/L	0.005	0.059	0.065	10	0.059	0.020	99
Zinc (filtered)	mg/L	0.005						
Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	19,000	13,000	38	19,000	<5,000	117

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multipli
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories

		Field ID	BH6	BLIND		BH6	CRESWICK SPLIT	
		Matrix Type	Water	Water		Water	Water	
		Date	10 May 2023	10 May 2023		10 May 2023	10 May 2023	
		Lab Report Number	EM2308315	EM2308315	RPD	EM2308315	989018	RPD
	Unit	EQL						
Electrical conductivity *(lab)	uS/cm	1	674	680	1	674		
pH (Lab)	-	0.01	6.92	6.94	0	6.92		
Solids								
TDS	mg/L	10	425	355	18	425	280	41
Alkalinity								
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	0	<1	<10	0
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	10	11	10	10	<20	0
Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	0	<1	<20	0
Alkalinity (total) as CaCO3	mg/L	1	10	11	10	10	<20	0
Major Ions								
Calcium (filtered)	mg/L	0.5	4	4	0	4	3.5	11
Chloride	mg/L	1	180	194	7	180	190	5
Magnesium (filtered)	mg/L	0.5	17	17	0	17	15	13
Potassium (filtered)	mg/L	0.5	1	1	0	1	1.3	26
Sodium (filtered)	mg/L	0.5	90	90	0	90	86	5
Nitrogen Forms								
Ammonia as N	mg/L	0.01	<0.01	<0.01	0	<0.01	0.03	100
Nitrate (as N)	mg/L	0.01	2.01	2.12	5	2.01	2.4	18
Kjeldahl Nitrogen Total	mg/L	0.1	0.4	0.4	0	0.4	0.3	29
Inorganics								
COD	mg/L	10	<10	<10	0	<10	<25	0
Sulfate as SO4 - Turbidimetric (filtered)	ug/L	1,000	20,000	19,000	5	20,000	19,000	5
TOC	mg/L	1	<1	<1	0	<1	<5	0
Metals								
Chromium (III+VI)	mg/L	0.001	0.001	<0.001	0	0.001	<0.001	0
Chromium (III+VI) (filtered)	mg/L	0.001						
Iron	mg/L	0.05	0.12	0.11	9	0.12		
Iron (filtered)	mg/L	0.05						
Zinc	mg/L	0.005	0.034	0.032	6	0.034	0.031	9
Zinc (filtered)	mg/L	0.005						
Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	11,000	8,000	32	11,000	<5,000	75

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multipli
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories

	Unit	EQL				
Field ID			RINSATE	RINSATE	RINSATE	RINSATE
Matrix Type			Water	Water	Water	Water
Date			31 Aug 2022	16 Nov 2022	14 Feb 2023	10 May 2023
Lab Report Number			EM2216860	EM2222748	EM2302525	EM2308315
EC						
Electrical conductivity *(lab)	uS/cm	1	9	<1	<1	2
NA						
Volatile Fatty Acids (as Acetic Acid)	ug/L	5,000	<5,000	<5,000	7,000	<10,000
Sulfate as SO4						
Sulfate as SO4 - Turbidimetric (filtered)	ug/L	1,000	<1,000	<1,000	<1,000	<1,000
pH						
pH (Lab)	-	0.01	5.28	5.40	5.49	6.32
Solids						
TDS	mg/L	10	<10	<10	<10	<10
Alkalinity						
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	<1	<1
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	1	<1	1	1
Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	<1
Alkalinity (total) as CaCO3	mg/L	1	1	<1	1	1
Major Ions						
Calcium (filtered)	mg/L	1	<1	<1	<1	<1
Chloride	mg/L	1	<1	<1	<1	<1
Magnesium (filtered)	mg/L	1	<1	<1	<1	<1
Potassium (filtered)	mg/L	1	<1	<1	<1	<1
Sodium (filtered)	mg/L	1	<1	<1	<1	<1
Cations Total	meq/L	0.01	<0.01	<0.01	<0.01	<0.01
Anions Total	meq/L	0.01	0.02	<0.01	0.02	0.02
Ionic Balance	%	0.01		<0.01		
Nitrogen Forms						
Ammonia as N	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Nitrate (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Nitrite (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Nitrite + Nitrate as N	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Kjeldahl Nitrogen Total	mg/L	0.1	<0.1	<0.1	<0.1	<0.1
Inorganics						
COD	mg/L	10	<10	<10	<10	<10
TOC	mg/L	1	3	<1	<1	<1
Metals						
Chromium (III+VI)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Iron	mg/L	0.05	<0.05	<0.05	<0.05	<0.05
Zinc	mg/L	0.005	0.011	<0.005	<0.005	<0.005

APPENDIX D – LABORATORY REPORTS

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171 6

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		Please forward to EUROFINS for analysis
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:** 190924VENV		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	4	31/8/22	1028	W	6.71	1122	0.33	12.24	-96.6	2.25				

Special Instructions:	Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	Manu	ALS	1/9	10:10
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
RIC	ALS	1/9					

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY **Sample conditions:**
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
*Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

920032

2/9/22 NC

DATE: 02.09.22
TIME: 8:30
COURIER: YES
TEMPERATURE 0.5 - 0.1 0.4
ATTEMPT TO CHILL: YES NO

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	4/52 Industrial Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield East NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	PO Box 60 Wickham 2293
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	Tel: +61 2 4968 8448
NATA# 1261 Site# 1254	NATA# 1261 Site# 1254	NATA# 1261 Site# 18217		NATA# 1261 Site# 20794	NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road	43 Detroit Drive
Penrose,	Rolleston,
Auckland 1061	Christchurch 7675
Tel: +64 9 526 45 51	Tel: 0800 856 450
IANZ# 1327	IANZ# 1290

Sample Receipt Advice

Company name:	Ventia Utility Services P/L (Burwood)
Contact name:	Robert Callander
Project name:	CRESWICK LANDFILL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Sep 2, 2022 3:27 PM
Eurofins reference	920032

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Robert Callander - Robert.callander@ventia.com.au.

Note: A copy of these results will also be delivered to the general Ventia Utility Services P/L (Burwood) email address.

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name:	Ventia Utility Services P/L (Burwood)	**Order No.:**		**Received:**	Sep 2, 2022 3:27 PM
Address:	Unit 11, 25-37 Huntingdale Rd Burwood VIC 3125	**Report #:**	920032	**Due:**	Sep 9, 2022
		Phone:	03 9861 8169	**Priority:**	5 Day
		Fax:	03 9861 8101	**Contact Name:**	Robert Callander
Project Name:	CRESWICK LANDFILL				

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Conductivity (at 25 °C)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	CRESWICK SPLIT	Aug 31, 2022		Water	M22-Se0003910	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1

Certificate of Analysis

Environment Testing

Ventia Utility Services P/L (Burwood)
Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Callander**

Report **920032-W**
Project name CRESWICK LANDFILL
Received Date Sep 02, 2022

Client Sample ID			**CRESWICK SPLIT**
Sample Matrix			**Water**
Eurofins Sample No.			**M22-Se0003910**
Date Sampled			**Aug 31, 2022**
Test/Reference	LOR	Unit	
Volatile Fatty Acids (VFA) by GC-MS			
Acetic Acid	5	mg/L	< 5
Propionic acid	5	mg/L	< 5
Isobutyric acid	5	mg/L	< 5
Butyric acid	5	mg/L	< 5
Isovaleric acid	5	mg/L	< 5
Valeric acid	5	mg/L	< 5
4-Methylvaleric acid	5	mg/L	< 5
Hexanoic acid	5	mg/L	< 5
Heptanoic acid	5	mg/L	< 5
Total VFA as Acetic Acid Equivalents	5	mg/L	< 5
Ammonia (as N)	0.01	mg/L	4.2
Chemical Oxygen Demand (COD)	25	mg/L	69
Chloride	1	mg/L	130
Conductivity (at 25 °C)	10	uS/cm	890
Nitrate (as N)	0.02	mg/L	< 0.02
Organic Nitrogen (as N)*	0.2	mg/L	0.4
pH (at 25 °C)	0.1	pH Units	7.1
Sulphate (as SO4)	5	mg/L	47
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	480
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	4.6
Total Organic Carbon	5	mg/L	25
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	240
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	240
Heavy Metals			
Arsenic	0.001	mg/L	0.019
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.006
Copper	0.001	mg/L	0.003
Lead	0.001	mg/L	0.004
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.007
Zinc	0.005	mg/L	0.061

Client Sample ID			CRESWICK SPLIT
Sample Matrix			Water
Eurofins Sample No.			M22-Se0003910
Date Sampled			Aug 31, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	19
Magnesium	0.5	mg/L	34
Potassium	0.5	mg/L	4.0
Sodium	0.5	mg/L	120

eurofins

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Volatile Fatty Acids (VFA) by GC-MS	Melbourne	Sep 07, 2022	28 Day
- Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS			
Chemical Oxygen Demand (COD)	Melbourne	Sep 06, 2022	28 Days
- Method: LTM-INO-4220 Determination of COD in Water			
Conductivity (at 25 °C)	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Nitrate (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
pH (at 25 °C)	Melbourne	Sep 02, 2022	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Total Organic Carbon	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Metals M8	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Sep 08, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Ammonia (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Organic Nitrogen (as N)*	Melbourne	Sep 02, 2022	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Sep 08, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Sep 08, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

Repeat Samples

Description	Testing Site	Extracted	Holding Time
Volatile Fatty Acids (VFA) by GC-MS	Melbourne	Sep 07, 2022	28 Day
- Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS			
Chemical Oxygen Demand (COD)	Melbourne	Sep 06, 2022	28 Days
- Method: LTM-INO-4220 Determination of COD in Water			
Conductivity (at 25 °C)	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Nitrate (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
pH (at 25 °C)	Melbourne	Sep 02, 2022	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Total Organic Carbon	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Metals M8	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Sep 08, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			

eurofins | Environment Testing

Description	Testing Site	Extracted	Holding Time
Ammonia (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Organic Nitrogen (as N)*	Melbourne	Sep 02, 2022	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Sep 02, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Sep 08, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Sep 08, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Sep 02, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Ventia Utility Services P/L (Burwood)
Address: Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Project Name: CRESWICK LANDFILL

Order No.:
Report #: 920032
Phone: 03 9861 8169
Fax: 03 9861 8101

Received: Sep 2, 2022 3:27 PM
Due: Sep 9, 2022
Priority: 5 Day
Contact Name: Robert Callander

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Conductivity (at 25 °C)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	CRESWICK SPLIT	Aug 31, 2022		Water	M22-Se0003910	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

eurofins | Environment Testing

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	mg/L	< 5			5	Pass	
Propionic acid	mg/L	< 5			5	Pass	
Isobutyric acid	mg/L	< 5			5	Pass	
Butyric acid	mg/L	< 5			5	Pass	
Isovaleric acid	mg/L	< 5			5	Pass	
Valeric acid	mg/L	< 5			5	Pass	
4-Methylvaleric acid	mg/L	< 5			5	Pass	
Hexanoic acid	mg/L	< 5			5	Pass	
Heptanoic acid	mg/L	< 5			5	Pass	
Total VFA as Acetic Acid Equivalents	mg/L	< 5			5	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chemical Oxygen Demand (COD)	mg/L	< 25			25	Pass	
Chloride	mg/L	< 1			1	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Organic Carbon	mg/L	< 5			5	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Ammonia (as N)	%	103			70-130	Pass	
Chemical Oxygen Demand (COD)	%	86			70-130	Pass	
Chloride	%	109			70-130	Pass	
Conductivity (at 25 °C)	%	93			70-130	Pass	
Nitrate (as N)	%	91			70-130	Pass	
Sulphate (as SO4)	%	111			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	100			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Kjeldahl Nitrogen (as N)			%	111			70-130	Pass	
Total Organic Carbon			%	83			70-130	Pass	
LCS - % Recovery									
Alkalinity (speciated)									
Carbonate Alkalinity (as CaCO3)			%	96			70-130	Pass	
Total Alkalinity (as CaCO3)			%	97			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	97			80-120	Pass	
Cadmium			%	100			80-120	Pass	
Chromium			%	97			80-120	Pass	
Copper			%	98			80-120	Pass	
Lead			%	98			80-120	Pass	
Mercury			%	99			80-120	Pass	
Nickel			%	99			80-120	Pass	
Zinc			%	97			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	108			80-120	Pass	
Magnesium			%	97			80-120	Pass	
Potassium			%	94			80-120	Pass	
Sodium			%	101			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Volatile Fatty Acids (VFA) by GC-MS				Result 1					
Isobutyric acid	M22-Se0009673	NCP	%	112			70-130	Pass	
Isovaleric acid	M22-Se0009673	NCP	%	114			70-130	Pass	
Valeric acid	M22-Se0009673	NCP	%	114			70-130	Pass	
4-Methylvaleric acid	M22-Se0009673	NCP	%	108			70-130	Pass	
Hexanoic acid	M22-Se0009673	NCP	%	99			70-130	Pass	
Heptanoic acid	M22-Se0009673	NCP	%	97			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	M22-Se0001775	NCP	%	72			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M22-Se0002879	NCP	%	102			75-125	Pass	
Cadmium	M22-Se0002879	NCP	%	95			75-125	Pass	
Chromium	M22-Se0002879	NCP	%	97			75-125	Pass	
Copper	M22-Se0002879	NCP	%	92			75-125	Pass	
Lead	M22-Se0002879	NCP	%	90			75-125	Pass	
Mercury	M22-Se0002879	NCP	%	100			75-125	Pass	
Nickel	M22-Se0002879	NCP	%	94			75-125	Pass	
Zinc	M22-Se0002879	NCP	%	99			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M22-Se0002056	NCP	%	119			75-125	Pass	
Magnesium	M22-Se0002056	NCP	%	111			75-125	Pass	
Potassium	M22-Se0002056	NCP	%	105			75-125	Pass	
Sodium	M22-Se0002056	NCP	%	118			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Volatile Fatty Acids (VFA) by GC-MS				Result 1	Result 2	RPD			
Acetic Acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Propionic acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isobutyric acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Butyric acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isovaleric acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Valeric acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
4-Methylvaleric acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Hexanoic acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Heptanoic acid	M22-Se0009666	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Total VFA as Acetic Acid Equivalents	M22-Se0002897	NCP	mg/L	< 500	< 500	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-Se0003908	NCP	mg/L	5.8	5.8	<1	30%	Pass	
Chemical Oxygen Demand (COD)	M22-Au0070768	NCP	mg/L	< 25	< 25	<1	30%	Pass	
Chloride	M22-Se0000710	NCP	mg/L	66	66	23	30%	Pass	
Conductivity (at 25 °C)	M22-Se0000645	NCP	uS/cm	780	790	<1	30%	Pass	
Nitrate (as N)	M22-Se0003908	NCP	mg/L	25	25	<1	30%	Pass	
pH (at 25 °C)	M22-Se0000645	NCP	pH Units	8.2	8.2	pass	30%	Pass	
Sulphate (as SO4)	M22-Se0000710	NCP	mg/L	18	19	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	M22-Se0004488	NCP	mg/L	740	750	1.6	30%	Pass	
Total Kjeldahl Nitrogen (as N)	R22-Se0000145	NCP	mg/L	3.7	3.0	21	30%	Pass	
Total Organic Carbon	M22-Se0001049	NCP	mg/L	33	24	29	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M22-Se0000645	NCP	mg/L	410	360	12	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M22-Se0000645	NCP	mg/L	17	11	40	30%	Fail	Q15
Hydroxide Alkalinity (as CaCO3)	M22-Se0000645	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	M22-Se0000645	NCP	mg/L	420	370	13	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M22-Se0002879	NCP	mg/L	0.001	< 0.001	14	30%	Pass	
Cadmium	M22-Se0002879	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M22-Se0002879	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	M22-Se0002879	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	M22-Se0002879	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	M22-Se0002879	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M22-Se0002879	NCP	mg/L	0.001	0.001	2.8	30%	Pass	
Zinc	M22-Se0002879	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M22-Se0008426	NCP	mg/L	6.1	5.9	2.3	30%	Pass	
Magnesium	M22-Se0008426	NCP	mg/L	3.2	3.1	1.2	30%	Pass	
Potassium	M22-Se0008426	NCP	mg/L	2.0	2.1	4.3	30%	Pass	
Sodium	M22-Se0008426	NCP	mg/L	27	26	2.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2216860**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Shirley LeCornu
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 01-Sep-2022 10:10
Order number	: CRESWICK LANDFILL 1 OF 3	Date Analysis Commenced	: 01-Sep-2022
C-O-C number	: ----	Issue Date	: 08-Sep-2022 17:26
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 10		
No. of samples analysed	: 10		

ilac-MRA NATA
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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

- EG020T: EM2216860 #6, the result for Total Zinc has been confirmed by re-preparation and re-analysis.
- Ionic Balance out of acceptable limits for samples #1, #4-5, #7 and #9-10 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2	BH3	BH7	BH8	BLIND
			Sampling date / time	31-Aug-2022 09:35	31-Aug-2022 13:00	31-Aug-2022 15:13	31-Aug-2022 10:28	31-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	EM2216860-001	EM2216860-002	EM2216860-003	EM2216860-004	EM2216860-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.78	6.93	6.79	7.05	7.14
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	763	3240	1090	1020	986
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	417	1830	588	521	518
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	56	241	146	242	242
Total Alkalinity as CaCO3	----	1	mg/L	56	241	146	242	242
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	22	14	12	56	55
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	209	932	263	139	139
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	39	24	17	17
Magnesium	7439-95-4	1	mg/L	18	83	26	33	33
Sodium	7440-23-5	1	mg/L	96	423	119	116	116
Potassium	7440-09-7	1	mg/L	<1	12	16	4	4
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.002	0.013	0.005
Zinc	7440-66-6	0.005	mg/L	0.040	0.061	0.037	0.072	0.070
Iron	7439-89-6	0.05	mg/L	23.0	58.4	44.9	70.0	68.0
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.68	0.80	3.70	3.78
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	0.3	0.9	1.2	5.4	5.4

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2	BH3	BH7	BH8	BLIND
			Sampling date / time	31-Aug-2022 09:35	31-Aug-2022 13:00	31-Aug-2022 15:13	31-Aug-2022 10:28	31-Aug-2022 00:00
Compound	CAS Number	LOR	Unit	EM2216860-001	EM2216860-002	EM2216860-003	EM2216860-004	EM2216860-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**7.47**	**31.4**	**10.6**	**9.92**	**9.90**
ø Total Cations	----	0.01	meq/L	**5.76**	**27.5**	**8.92**	**8.71**	**8.71**
ø Ionic Balance	----	0.01	%	**13.0**	**6.65**	**8.52**	**6.49**	**6.39**
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	**4.13**	**0.23**	**0.21**	**0.33**	----
ø pH	----	0.01	pH Unit	**6.12**	**6.67**	**6.42**	**6.71**	----
ø Redox Potential	----	0.1	mV	**72.3**	**-75.4**	**-42.1**	**-96.6**	----
ø Temperature	----	0.1	°C	**14.08**	**10.91**	**12.41**	**12.24**	----
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	**634.5**	**3364**	**1127**	**1122**	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**2.12**	**0.45**	**2.42**	**2.25**	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**2**	**30**	**9**	**21**	**28**
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	**18**	<10	<10	<10
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**16**	**14**	**25**	**17**	**19**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RINSATE	D/S BH3	Leachate	Wetland	Dredge
			Sampling date / time	31-Aug-2022 07:45	31-Aug-2022 08:07	31-Aug-2022 16:05	31-Aug-2022 13:30	31-Aug-2022 09:03
Compound	CAS Number	LOR	Unit	EM2216860-006	EM2216860-007	EM2216860-008	EM2216860-009	EM2216860-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.28	6.90	7.55	7.56	7.19
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	9	229	745	544	799
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	<10	162	466	313	400
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	1	28	160	64	30
Total Alkalinity as CaCO3	----	1	mg/L	1	28	160	64	30
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	9	4	13	14
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	<1	39	132	123	235
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	6	23	9	6
Magnesium	7439-95-4	1	mg/L	<1	7	17	12	17
Sodium	7440-23-5	1	mg/L	<1	25	72	67	99
Potassium	7440-09-7	1	mg/L	<1	2	28	6	2
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	0.005	0.002	<0.001
Zinc	7440-66-6	0.005	mg/L	0.011	<0.005	0.033	<0.005	0.007
Iron	7439-89-6	0.05	mg/L	<0.05	1.41	18.3	2.43	2.16
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	3.78	0.01	<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	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	1.63	0.05	0.08	0.22
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	1.63	0.06	0.08	0.22
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	1.0	6.0	0.8	0.7

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RINSATE	D/S BH3	Leachate	Wetland	Dredge
			Sampling date / time	31-Aug-2022 07:45	31-Aug-2022 08:07	31-Aug-2022 16:05	31-Aug-2022 13:30	31-Aug-2022 09:03
Compound	CAS Number	LOR	Unit	EM2216860-006	EM2216860-007	EM2216860-008	EM2216860-009	EM2216860-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**0.02**	**1.85**	**7.00**	**5.02**	**7.52**
ø Total Cations	----	0.01	meq/L	<0.01	**2.01**	**6.39**	**4.50**	**6.06**
ø Ionic Balance	----	0.01	%	----	**4.33**	**4.54**	**5.40**	**10.8**
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	----	**10.26**	**3.94**	**10.91**	**9.54**
ø pH	----	0.01	pH Unit	----	**7.24**	**7.15**	**7.21**	**6.68**
ø Redox Potential	----	0.1	mV	----	**93.8**	**-61.2**	**-44.18**	**82.32**
ø Temperature	----	0.1	°C	----	**8.76**	**14.4**	**11.5**	**9.86**
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	----	**214.2**	**708.1**	**481.9**	**745.9**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**3**	**11**	**38**	**13**	**5**
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	**35**	**147**	**37**	**15**
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	<5	**10**	**14**	**10**	**11**

QUALITY CONTROL REPORT

Work Order	: **EM2216860**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Shirley LeCornu
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 01-Sep-2022
Order number	: CRESWICK LANDFILL 1 OF 3	Date Analysis Commenced	: 01-Sep-2022
C-O-C number	: ----	Issue Date	: 08-Sep-2022
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 10		
No. of samples analysed	: 10		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4556011)									
EM2216860-002	BH3	EA005-P: pH Value	----	0.01	pH Unit	6.93	6.94	0.1	0% - 20%
EM2216866-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.84	7.88	0.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4556010)									
EM2216860-002	BH3	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3240	3130	3.5	0% - 20%
EM2216866-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	5090	5090	0.0	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4559123)									
EM2216831-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	746	692	7.6	0% - 20%
EM2216853-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2540	2490	2.0	0% - 20%
EM2216860-010	Dredge	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	400	403	0.6	0% - 20%
EM2216866-010	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3750	3740	0.3	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4556008)									
EM2216860-002	BH3	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	241	241	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	241	241	0.0	0% - 20%
EM2216850-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	28	27	4.5	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	28	27	4.5	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4556012)									
EM2216866-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	418	408	2.5	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	***Sample ID***	***Method: Compound***	***CAS Number***	***LOR***	***Unit***	***Original Result***	***Duplicate Result***	***RPD (%)***	***Acceptable RPD (%)***
ED037P: Alkalinity by PC Titrator (QC Lot: 4556012) - continued									
EM2216866-001	Anonymous	ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	418	408	2.5	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4556434)									
EM2216860-010	Dredge	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	14	0.0	0% - 50%
EM2216860-001	BH2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	22	22	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4556433)									
EM2216860-001	BH2	ED045G: Chloride	16887-00-6	1	mg/L	209	208	0.0	0% - 20%
EM2216764-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4110	4150	0.9	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4556503)									
EM2216777-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	23	23	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EM2216853-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	53	53	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	101	100	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	937	936	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	269	268	0.4	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4556445)									
EM2216792-002	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.286	0.286	0.0	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.23	0.23	0.0	No Limit
EM2216860-004	BH8	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.013	0.013	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.072	0.070	3.5	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	70.0	70.4	0.6	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4554235)									
EM2216853-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	<0.01	0.0	No Limit
EM2216860-009	Wetland	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4556432)									
EM2216911-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.31	0.31	0.0	0% - 20%
EM2216764-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4554234)									
EM2216853-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EM2216860-008	Leachate	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.06	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4556123)									
EM2216834-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.0	No Limit
EM2216853-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4557363)									
EM2216779-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	2	77.5	No Limit
EM2216820-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	56	63	12.5	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP005: Total Organic Carbon (TOC) (QC Lot: 4557364)									
EM2216860-009	Wetland	EP005: Total Organic Carbon	----	1	mg/L	13	13	0.0	0% - 50%
EM2217005-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	33	31	7.1	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4554462)									
EM2216779-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	<10	0.0	No Limit
EM2216853-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	1030	1030	0.5	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4554463)									
EM2216860-010	Dredge	EP026SP: Chemical Oxygen Demand	----	10	mg/L	15	13	11.4	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 4557322)									
EM2216691-001	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	17	19	8.8	No Limit
EM2216691-011	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	0.0	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 4557323)									
EM2216860-002	BH3	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	14	16	10.7	No Limit
EM2217005-002	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	14	16	10.7	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4556011)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4556010)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	107	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4559123)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.3	91.0	110
				<10	2440 mg/L	106	81.6	118
				<10	293 mg/L	104	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4556008)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	92.6	85.0	116
ED037P: Alkalinity by PC Titrator (QCLot: 4556012)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	94.0	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4556434)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	106	85.8	117
				<1	500 mg/L	109	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4556433)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	101	85.0	115
				<1	1000 mg/L	107	85.0	122
ED093F: Dissolved Major Cations (QCLot: 4556503)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	105	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4556445)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.8	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4554235)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	95.4	84.1	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4556432)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4554234)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	117

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4556123)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	101	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4557363)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	94.0	81.2	110
EP005: Total Organic Carbon (TOC) (QCLot: 4557364)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	93.6	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4554462)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	99.8	89.7	111
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4554463)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	99.8	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4557322)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	175 mg/L	103	85.5	116
EP045: Volatile Acids as CH3COOH (QCLot: 4557323)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	175 mg/L	99.5	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4556434)							
EM2216860-002	BH3	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	98.5	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4556433)							
EM2216764-012	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4556445)							
EM2216792-002	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	111	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	103	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4554235)							
EM2216860-001	BH2	EK055G: Ammonia as N	7664-41-7	1 mg/L	96.8	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4556432)							
EM2216911-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	# Not Determined	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4554234)							
EM2216853-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	91.9	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4556123)							
EM2216834-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.6	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4557363)							
EM2216779-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	101	76.6	125
EP005: Total Organic Carbon (TOC) (QCLot: 4557364)							
EM2216860-010	Dredge	EP005: Total Organic Carbon	----	100 mg/L	109	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4554462)							
EM2216779-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	500 mg/L	120	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2216860**	Page	: 1 of 9
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9630
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 01-Sep-2022
Site	: ----	Issue Date	: 08-Sep-2022
Sampler	: ----	No. of samples received	: 10
Order number	: CRESWICK LANDFILL 1 OF 3	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	EM2216764--012	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK057G: Nitrite as N by Discrete Analyser	EM2216911--002	Anonymous	**Nitrite as N**	14797-65-0	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH2,	BH3,	----	----	----	02-Sep-2022	31-Aug-2022	**2**
BH7,	BH8,						
BLIND,	RINSATE,						
D/S BH3,	Leachate,						
Wetland,	Dredge						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Total Kjeldahl Nitrogen as N By Discrete Analyser	2	21	9.52	10.00	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)					
Total Kjeldahl Nitrogen as N By Discrete Analyser	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)					
Total Kjeldahl Nitrogen as N By Discrete Analyser	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Chemical Oxygen Demand (COD) (Spectrophotometric)	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation* Date extracted	*Due for extraction*	*Evaluation*	*Analysis* Date analysed	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	31-Aug-2022	✗
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**05-Sep-2022**	07-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	14-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**03-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**03-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**03-Sep-2022**	07-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH2,	BH3,	**31-Aug-2022**	**02-Sep-2022**	27-Feb-2023	✓	**02-Sep-2022**	27-Feb-2023	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	02-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**01-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH2,	BH3,	**31-Aug-2022**	**05-Sep-2022**	28-Sep-2022	✓	**05-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**01-Sep-2022**	28-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH2,	BH3,	**31-Aug-2022**	**----**	----	----	**02-Sep-2022**	14-Sep-2022	✓
BH7,	BH8,							
BLIND,	RINSATE,							
D/S BH3,	Leachate,							
Wetland,	Dredge							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✘ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	3	23	**13.04**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	3	21	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	21	**9.52**	**10.00**	✘	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	23	**8.70**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	21	**9.52**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	21	**4.76**	**5.00**	✘	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	21	**9.52**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type *Analytical Methods*	*Method*	*Count* QC	Regular	*Rate (%)* **Actual**	**Expected**	*Evaluation*	*Quality Control Specification*
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	21	**4.76**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	21	**4.76**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	21	**4.76**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill 1 of 3
Contact:	Robert Callander		TESTS REQUIRED AS PER QUOTE ME/412/16
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:		Quote No.:	ME/412/16
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
	BH1	Groundwater Bore	0	31/8/22	—		No sample possible. bore location lost to road resurfacing									
1	BH2	Groundwater Bore	4	31/8/22	0935	W	6.12	634.5	~~4.13~~ 4.13	14.08	72.3	2.12				
2	BH3	Groundwater Bore	4	31/8/22	1308	W	6.67	3364	0.23	10.91	-75.4	0.45				
	BH4	Groundwater Bore														
	BH6	Groundwater Bore														
3	BH7	Groundwater Bore	4	31/8/22	1513	W	6.42	1127	0.21	12.41	-42.1	2.42				
4	BH8	Groundwater Bore	4	31/8/22	1028	W	6.71	1122	0.33	12.24	-96.6	2.25				
	BH9	Groundwater Bore														

Environmental Division
Melbourne
Work Order Reference
EM2216860

Telephone : + 61-3-8549 9600

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
[signature]	Ventia	31/8/22	1700	[signature]	[signature]	1/9	10:20

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia			Job Ref:	Creswick Landfill 2 of 3
Contact:	Robert Callander			TESTS REQUIRED AS PER QUOTE ME/412/16	
Address:	25-37 Huntingdale Road, Burwood, 3125				
Phone:	0427529051	Fax:			
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au				
P/O No.:		Quote No.:			
T/A Time:					

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	Groundwater bore														
BH13	Groundwater bore														
LB1	Leachate bore														
LB2	Leachate bore														
LB3	Leachate bore					NO SAMPLE – SWL ONLY									
5 BLIND	Blind dup (analysed by ALS)	4	31/8/22												
6 RINSATE	Rinsate blank	4	31/8/22	745											

Special Instructions: Please email a signed copy of this sheet to Burwood upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	[signature]	[signature]		

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
	U/S BH3	**Creek Sample**														
	@ BH3	**Creek Sample**														
7	**D/S BH3**	**Creek Sample**	4	31/8/22	0807	w	7.24	214.2	10.26	8.76	93.8	–				
8	**Leachate**	**Surface water sample**	4	31/8/22	1605	w	7.15	708.1	3.94	14.4	-61.2	–				
9	**Wetland**	**Surface water sample**	4	31/8/22	1330	w	7.21	481.9	10.91	11.5	-44.18	–				
10	**Dredge**	**Surface water sample**	4	31/8/22	0903	w	6.68	745.9	9.54	9.86	82.32	–				

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	[illegible signature]	[illegible signature]		

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill
Contact:	Robert Callander		Please forward to EUROFINS for analysis
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:		Quote No.:	190924VENV
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	4	31/8/22	1028	W	6.71	1122	0.33	12.24	-96.6	2.25				

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	Manta	Ami	1/9	10:10
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group
2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia		Job Ref:	Creswick Landfill 1 of 3
Contact:	Robert Callander			TESTS REQUIRED AS PER QUOTE ME/412/16
Address:	25-37 Huntingdale Road, Burwood, 3125			
Phone:	0427529051	Fax:		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au			
P/O No.:		Quote No.:	ME/412/16	
T/A Time:				

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
	BH1	Groundwater Bore	0	31/8/22	—	—	No sample possible. bore location lost to road resurfacing									
1	BH2	Groundwater Bore	4	31/8/22	0935	W	6.12	634.5	4.13	14.08	72.3	2.12				
2	BH3	Groundwater Bore	4	31/8/22	1306	W	6.67	3364	0.23	10.91	-75.4	0.45				
	BH4	Groundwater Bore														
	BH6	Groundwater Bore														
3	BH7	Groundwater Bore	4	31/8/22	1513	W	6.42	1127	0.21	12.41	-42.1	2.42				
4	BH8	Groundwater Bore	4	31/8/22	1028	W	6.71	1122	0.33	12.24	-96.6	2.25				
	BH9	Groundwater Bore														

Environmental Division
Melbourne
Work Order Reference
EM2216860

Telephone : + 61-3-8549 9600

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
[signature]	Ventia	31/8/22	1700	[signature]	[signature]	1/9	10:20

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
	BH10	Groundwater bore														
	BH13	Groundwater bore														
	LB1	Leachate bore														
	LB2	Leachate bore														
	LB3	Leachate bore					NO SAMPLE – SWL ONLY									
5	BLIND	Blind dup (analysed by ALS)	4	31/8/22												
6	RINSATE	Rinsate blank	4	31/8/22	745											

Special Instructions: Please email a signed copy of this sheet to Burwood upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	[signature]	[signature]		

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:		**Quote No.:**	
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
U/S BH3	**Creek Sample**														
@ BH3	**Creek Sample**														
7 **D/S BH3**	**Creek Sample**	4	31/8/22	0807	w	7.24	214.2	10.26	8.76	93.8	–				
8 **Leachate**	**Surface water sample**	4	31/8/22	1605	w	7.15	708.1	3.94	14.4	-61.2	–				
9 **Wetland**	**Surface water sample**	4	31/8/22	1330	w	7.21	481.9	10.91	11.5	-44.18	–				
10 **Dredge**	**Surface water sample**	4	31/8/22	0903	w	6.68	745.9	9.54	9.86	82.32	–				

Special Instructions:	Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	[signature]	[signature]		

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		Please forward to EUROFINS for analysis
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:		**Quote No.:**	190924VENV
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	4	31/8/22	1028	W	6.71	1122	0.33	12.24	-96.6	2.25				

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	31/8/22	1700	[illegible]	[illegible]	1/9	10:20
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions. As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.	*LAB USE ONLY* Sample conditions: Samples received undamaged [Yes/No] Samples adequately preserved [Yes/No] Samples within recommended holding times: [Yes/No] Samples transported at appropriate temperature [Yes/No]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2217005**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 02-Sep-2022 10:45
Order number	: CRESWICK LANDFILL 2-3	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: ----	Issue Date	: 08-Sep-2022 16:07
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 6		
No. of samples analysed	: 6		

NATA

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*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

- EA015H: EM2217005 #1, #5-6: 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.
- Ionic Balance out of acceptable limits for samples #1 and #4-6 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- EK061G : EM2216879 #4 Poor duplicate precision for total kjeldahl nitrogen due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH10	BH14	BH4	BH6	U/S BH3
			Sampling date / time	01-Sep-2022 16:15	01-Sep-2022 09:46	01-Sep-2022 13:12	02-Sep-2022 07:29	01-Sep-2022 10:15
Compound	CAS Number	LOR	Unit	EM2217005-001	EM2217005-002	EM2217005-003	EM2217005-004	EM2217005-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.44	6.68	6.55	5.79	7.22
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	708	1780	2030	746	230
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	764	1240	1380	439	216
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	95	97	213	10	33
Total Alkalinity as CaCO3	----	1	mg/L	95	97	213	10	33
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	30	17	9	20	8
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	150	517	570	215	34
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	8	33	20	4	6
Magnesium	7439-95-4	1	mg/L	17	52	58	17	7
Sodium	7440-23-5	1	mg/L	85	187	253	94	24
Potassium	7440-09-7	1	mg/L	19	3	<1	1	2
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	0.021	0.014	0.019	0.001	0.002
Zinc	7440-66-6	0.005	mg/L	0.108	0.046	0.061	0.059	<0.005
Iron	7439-89-6	0.05	mg/L	35.9	48.2	123	0.30	1.28
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	1.06	0.24	0.62	<0.01	<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	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.57	0.04	<0.01	0.97	1.65
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.57	0.04	<0.01	0.97	1.65
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.8	1.5	1.4	0.4	1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH10	BH14	BH4	BH6	U/S BH3
			Sampling date / time	01-Sep-2022 16:15	01-Sep-2022 09:46	01-Sep-2022 13:12	02-Sep-2022 07:29	01-Sep-2022 10:15
Compound	CAS Number	LOR	Unit	EM2217005-001	EM2217005-002	EM2217005-003	EM2217005-004	EM2217005-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**6.75**	**16.9**	**20.5**	**6.68**	**1.78**
ø Total Cations	----	0.01	meq/L	**5.98**	**14.1**	**16.8**	**5.71**	**1.97**
ø Ionic Balance	----	0.01	%	**6.06**	**8.83**	**10.0**	**7.81**	**4.94**
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	**0.35**	**0.63**	**0.05**	**0.34**	**10.65**
ø pH	----	0.01	pH Unit	**5.99**	**6.42**	**6.36**	**5.03**	**7.52**
ø Redox Potential	----	0.1	mV	**96.6**	**-30.7**	**-82.3**	**242.0**	**26.43**
ø Temperature	----	0.1	°C	**12.61**	**10.68**	**12.70**	**13.82**	**8.90**
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	**691**	**1608**	**2378**	**713**	**218.8**
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**2.26**	**2.23**	**4.52**	**11.72**	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**33**	**10**	**58**	**5**	**10**
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**61**	<10	**142**	<10	**31**
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**30**	**14**	**28**	**11**	**10**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	@ BH3	----	----	----	----
			Sampling date / time	01-Sep-2022 07:55	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2217005-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.44	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	228	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	217	----	----	----	----
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	35	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	35	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	7	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	34	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	6	----	----	----	----
Magnesium	7439-95-4	1	mg/L	7	----	----	----	----
Sodium	7440-23-5	1	mg/L	24	----	----	----	----
Potassium	7440-09-7	1	mg/L	2	----	----	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	0.002	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.20	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	----	----
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	1.68	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	1.68	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	----	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**@ BH3**	----	----	----	----
			Sampling date / time	01-Sep-2022 07:55	----	----	----	----
Compound	CAS Number	LOR	Unit	**EM2217005-006**	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance								
ø **Total Anions**	----	0.01	meq/L	**1.80**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L	**1.97**	----	----	----	----
ø **Ionic Balance**	----	0.01	%	**4.41**	----	----	----	----
EN67: Field Tests								
ø **Dissolved Oxygen**	----	0.1	mg/L	**10.42**	----	----	----	----
ø **pH**	----	0.01	pH Unit	**7.55**	----	----	----	----
ø **Redox Potential**	----	0.1	mV	**-36.0**	----	----	----	----
ø **Temperature**	----	0.1	°C	**8.70**	----	----	----	----
ø **Electrical Conductivity (Temperature Compensated)**	COND_TEMP	1	µS/cm	**215.8**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**10**	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**29**	----	----	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**10**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2217005**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 02-Sep-2022
Order number	: CRESWICK LANDFILL 2-3	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: ----	Issue Date	: 08-Sep-2022
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 6		
No. of samples analysed	: 6		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4565016)									
EM2217005-005	U/S BH3	EA005-P: pH Value	----	0.01	pH Unit	7.22	7.32	1.4	0% - 20%
EM2217005-001	BH10	EA005-P: pH Value	----	0.01	pH Unit	6.44	6.62	2.8	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4565017)									
EM2217005-005	U/S BH3	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	230	227	1.4	0% - 20%
EM2217005-001	BH10	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	708	722	1.9	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4564625)									
EM2216916-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	959	895	6.9	0% - 20%
EM2216999-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1370	1380	0.9	0% - 20%
EM2217005-006	@ BH3	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	217	198	8.9	0% - 20%
EM2217083-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2350	2390	1.7	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4565015)									
EM2216764-011	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	403	403	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	403	403	0.0	0% - 20%
EM2217005-001	BH10	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	95	89	6.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	95	89	6.2	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4558578)									
EM2217037-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	94	94	0.0	0% - 20%
EM2216953-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	28	27	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4558579)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 4558579) - continued									
EM2217028-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	63	64	1.8	0% - 20%
EM2216953-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	306	314	2.6	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4557489)									
EM2216954-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	26	26	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	28	28	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	54	55	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EM2217005-005	U/S BH3	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	7	7	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	24	24	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4562157)									
EM2216805-062	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EM2217042-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.41	0.41	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4559907)									
EM2216916-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2216871-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	<0.01	87.4	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4559910)									
EM2217005-003	BH4	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.62	0.58	7.3	0% - 20%
EM2217060-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	4.77	5.68	17.5	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4558577)									
EM2216916-016	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.06	0.06	0.0	No Limit
EM2217005-005	U/S BH3	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4559909)									
EM2217001-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.62	0.63	0.0	0% - 20%
EM2217028-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	7.04	7.09	0.7	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4558560)									
EM2216690-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.2	2.2	0.0	0% - 20%
EM2216879-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.4	# 3.2	31.7	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4558561)									
EM2217005-003	BH4	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.3	7.9	0% - 50%
EM2217058-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.3	52.8	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4557364)									
EM2216860-009	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	13	13	0.0	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP005: Total Organic Carbon (TOC) (QC Lot: 4557364) - continued									
EM2217005-001	BH10	EP005: Total Organic Carbon	----	1	mg/L	33	31	7.1	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4557356)									
EM2216954-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	<10	0.0	No Limit
EM2217005-003	BH4	EP026SP: Chemical Oxygen Demand	----	10	mg/L	142	144	1.4	0% - 50%
EP045: Volatile Acids as CH3COOH (QC Lot: 4557323)									
EM2216860-002	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	14	16	10.7	No Limit
EM2217005-002	BH14	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	14	16	10.7	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4565016)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4565017)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	103	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4564625)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	103	91.0	110
				<10	2440 mg/L	108	81.6	118
				<10	293 mg/L	104	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4565015)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.8	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4558578)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	107	85.8	117
				<1	500 mg/L	104	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4558579)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	105	85.0	115
				<1	1000 mg/L	101	85.0	122
ED093F: Dissolved Major Cations (QCLot: 4557489)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.0	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.9	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4562157)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.8	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4559907)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	84.1	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4559910)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	106	84.1	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4558577)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4559909)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	90.0	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4558560)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	114	70.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4558561)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	106	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4557364)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	93.6	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4557356)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	98.4	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4557323)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	175 mg/L	99.5	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4558578)							
EM2217005-001	BH10	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	98.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4558579)							
EM2217005-001	BH10	ED045G: Chloride	16887-00-6	400 mg/L	103	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4562157)							
EM2216805-062	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	100	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	100.0	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4559907)							
EM2216871-002	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	107	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4559910)							
EM2217005-004	BH6	EK055G: Ammonia as N	7664-41-7	1 mg/L	126	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4558577)							
EM2216916-017	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	81.0	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4559909)							
EM2217001-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	94.2	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4558560)							
EM2216871-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	116	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4558561)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4558561) - continued							
EM2217058-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	97.8	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4557364)							
EM2216860-010	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	109	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4557356)							
EM2216954-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	2500 mg/L	100	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2217005**	Page	: 1 of 9
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 02-Sep-2022
Site	: ----	Issue Date	: 08-Sep-2022
Sampler	: ----	No. of samples received	: 6
Order number	: CRESWICK LANDFILL 2-3	No. of samples analysed	: 6

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	**Analyte**	CAS Number	Data	Limits	**Comment**
Duplicate (DUP) RPDs							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	EM2216879--004	Anonymous	**Total Kjeldahl Nitrogen as N**	----	31.7 %	0% - 20%	**RPD exceeds LOR based limits**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH10,	BH14,	----	----	----	07-Sep-2022	01-Sep-2022	**6**
BH4,	U/S BH3,						
@ BH3							
Clear Plastic Bottle - Natural							
BH6		----	----	----	07-Sep-2022	02-Sep-2022	**5**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method		***Sample Date***	Extraction / Preparation			Analysis		
***Container** / Client Sample ID(s)*			***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
BH10,	BH14,	**01-Sep-2022**	**----**	----	----	**07-Sep-2022**	01-Sep-2022	✘
BH4,	U/S BH3,							
@ BH3								
Clear Plastic Bottle - Natural (EA005-P)								
BH6		**02-Sep-2022**	**----**	----	----	**07-Sep-2022**	02-Sep-2022	✘

Work Order : EM2217005
Client : VENTIA UTILITY SERVICES PTY LTD
Project : Creswick Landfill 2 of 3

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**07-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Natural (EA010-P) BH6	**02-Sep-2022**	**----**	----	----	**07-Sep-2022**	30-Sep-2022	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**07-Sep-2022**	08-Sep-2022	✓
Clear Plastic Bottle - Natural (EA015H) BH6	**02-Sep-2022**	**----**	----	----	**07-Sep-2022**	09-Sep-2022	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**07-Sep-2022**	15-Sep-2022	✓
Clear Plastic Bottle - Natural (ED037-P) BH6	**02-Sep-2022**	**----**	----	----	**07-Sep-2022**	16-Sep-2022	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**05-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Natural (ED041G) BH6	**02-Sep-2022**	**----**	----	----	**05-Sep-2022**	30-Sep-2022	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**05-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Natural (ED045G) BH6	**02-Sep-2022**	**----**	----	----	**05-Sep-2022**	30-Sep-2022	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**----**	----	----	**06-Sep-2022**	08-Sep-2022	✓
Clear Plastic Bottle - Natural (ED093F) BH6	**02-Sep-2022**	**----**	----	----	**06-Sep-2022**	09-Sep-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**06-Sep-2022**	28-Feb-2023	✓	**06-Sep-2022**	28-Feb-2023	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) BH6	**02-Sep-2022**	**06-Sep-2022**	01-Mar-2023	✓	**06-Sep-2022**	01-Mar-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	----	----	----	**06-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH6	**02-Sep-2022**	----	----	----	**06-Sep-2022**	30-Sep-2022	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	----	----	----	**03-Sep-2022**	03-Sep-2022	✓
Clear Plastic Bottle - Natural (EK057G) BH6	**02-Sep-2022**	----	----	----	**03-Sep-2022**	04-Sep-2022	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	----	----	----	**06-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH6	**02-Sep-2022**	----	----	----	**06-Sep-2022**	30-Sep-2022	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	**07-Sep-2022**	29-Sep-2022	✓	**07-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH6	**02-Sep-2022**	**07-Sep-2022**	30-Sep-2022	✓	**07-Sep-2022**	30-Sep-2022	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) BH10, BH14, BH4, U/S BH3, @ BH3	**01-Sep-2022**	----	----	----	**02-Sep-2022**	29-Sep-2022	✓
Amber TOC Vial - Sulfuric Acid (EP005) BH6	**02-Sep-2022**	----	----	----	**02-Sep-2022**	30-Sep-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH10, BH4, @ BH3	BH14, U/S BH3,	**01-Sep-2022**	----	----	----	**02-Sep-2022**	29-Sep-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH6		**02-Sep-2022**	----	----	----	**02-Sep-2022**	30-Sep-2022	✓
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH10, BH4, @ BH3	BH14, U/S BH3,	**01-Sep-2022**	----	----	----	**02-Sep-2022**	15-Sep-2022	✓
Clear Plastic Bottle - Natural (EP045)								
BH6		**02-Sep-2022**	----	----	----	**02-Sep-2022**	16-Sep-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		*Count*		*Rate (%)*			*Quality Control Specification*
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2217005**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 2 of 3	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 02-Sep-2022 10:45	Issue Date	: 02-Sep-2022
Client Requested Due Date	: 09-Sep-2022	Scheduled Reporting Date	: **09-Sep-2022**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 1.4°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2217005-001	01-Sep-2022 16:15	BH10	✓	✓	✓	✓	✓	✓	✓
EM2217005-002	01-Sep-2022 09:46	BH14	✓	✓	✓	✓	✓	✓	✓
EM2217005-003	02-Sep-2022 13:12	BH4	✓	✓	✓	✓	✓	✓	✓
EM2217005-004	01-Sep-2022 07:29	BH6	✓	✓	✓	✓	✓	✓	✓
EM2217005-005	01-Sep-2022 10:55	U/S BH3	✓	✓	✓	✓	✓	✓	✓
EM2217005-006	01-Sep-2022 07:55	@ BH3	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2217005-001	01-Sep-2022 16:15	BH10	✓	✓	✓	✓	✓
EM2217005-002	01-Sep-2022 09:46	BH14	✓	✓	✓	✓	✓
EM2217005-003	02-Sep-2022 13:12	BH4	✓	✓	✓	✓	✓
EM2217005-004	01-Sep-2022 07:29	BH6	✓	✓	✓	✓	✓
EM2217005-005	01-Sep-2022 10:55	U/S BH3	✓	✓	✓	✓	✓
EM2217005-006	01-Sep-2022 07:55	@ BH3	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
@ BH3	Clear Plastic Bottle - Natural	----	01-Sep-2022	02-Sep-2022	×	----	----
BH10	Clear Plastic Bottle - Natural	----	01-Sep-2022	02-Sep-2022	×	----	----
BH14	Clear Plastic Bottle - Natural	----	01-Sep-2022	02-Sep-2022	×	----	----
BH6	Clear Plastic Bottle - Natural	----	01-Sep-2022	02-Sep-2022	×	----	----
U/S BH3	Clear Plastic Bottle - Natural	----	01-Sep-2022	02-Sep-2022	×	----	----

Requested Deliverables

ACCOUNTS PAYABLE - VIC ONLY

- A4 - AU Tax Invoice (INV)	Email	Nicole.Robins@ventia.com

ISAAC SAUNDERS

- *AU Certificate of Analysis - NATA (COA)	Email	Isaac.Saunders@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Isaac.Saunders@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Isaac.Saunders@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Isaac.Saunders@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	Isaac.Saunders@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	Isaac.Saunders@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	Isaac.Saunders@ventia.com.au

ROBERT CALLANDER

- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com.au
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com.au
- Purchase Order Request Letter (PO_Request)	Email	robert.callander@ventia.com.au

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	**Job Ref:**	Creswick Landfill 2 of 3
Contact:	Robert Callander		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

Environmental Division
Melbourne
Work Order Reference
EM2217005
Telephone : + 61-3-8549 9600

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
1	BH10	Groundwater bore	4	1/9/22	1615	W	5.99	691	0.35	12.61	96.6	2.26				
2	BH14	Groundwater bore	4	1/9/22	946	W	6.42	1608	0.63	10.68	-30.7	2.23				
3	BH4	" "	4	1/9/22	1312	W	6.36	2378	0.05	12.70	-82.3	4.52				
	LB1	Leachate bore														
	LB2	Leachate bore														
	LB3	Leachate bore					NO SAMPLE – SWL ONLY									
4	BH 6	Ground water bore	4	2/9/22	0729	W	5.03	713	0.34	13.82	242.0	11.72				
	BLIND	Blind dup (analysed by ALS)														
	RINSATE	Rinsate blank														

Special Instructions: Please email a signed copy of this sheet to Burwood upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	2/9/22	1040	KSF	ALS	2/9/22	10:45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
5 **U/S BH3**	**Creek Sample**	4	1/9/22	1055	W	7.52	218.8	10.65	8.90	26.43	–				
6 @ BH3	**Creek Sample**	4	1/9/22	1015	W	7.55	215.8	10.42	8.70	-36.0	–				
D/S BH3	**Creek Sample**														
Leachate	**Surface water sample**														
Wetland	**Surface water sample**														
Dredge	**Surface water sample**														

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	1/9/22	1040	[illegible]	ALS	2/9/22	10.45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF COUNTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

Environmental Division
Melbourne
Work Order Reference
EM2217005

Telephone : + 61-3-8549 9600

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
1	BH10	Groundwater bore	4	1/9/22	1615	W	5.99	691	0.35	12.61	96.6	2.26				
2	BH14	Groundwater bore	4	1/9/22	946	W	6.42	1608	0.63	10.68	-30.7	2.23				
3	BH4	" "	4	1/9/22	1312	W	6.36	2378	0.05	12.70	-82.3	4.52				
	LB1	Leachate bore														
	LB2	Leachate bore														
	LB3	Leachate bore					NO SAMPLE – SWL ONLY									
4	BH 6	Ground water bore	4	2/9/22	0729	W	5.03	713	0.34	13.82	242.0	11.72				
	BLIND	Blind dup (analysed by ALS)														
	RINSATE	Rinsate blank														

Special Instructions: Please email a signed copy of this sheet to Burwood upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	2/9/22	1040	KSF	ALS	2/9/22	10:45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	isaac.saunders@ventia.com.au robert.callander@ventia.com.au		
P/O No.:	**Quote No.:**		
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
5	U/S BH3	Creek Sample	4	1/9/22	1055	W	7.52	218.8	10.65	8.90	26.43	—				
6	@ BH3	Creek Sample	4	1/9/22	1015	W	7.55	215.8	10.42	8.70	-36.0	—				
	D/S BH3	Creek Sample														
	Leachate	Surface water sample														
	Wetland	Surface water sample														
	Dredge	Surface water sample														

Special Instructions: Please email a signed copy of this sheet to Burwood office upon receipt.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	2/9/22	1000	K	ALS	2/9/22	10:45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

(224)

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		Please forward to EUROFINS for analysis
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:** 190924VENV		
T/A Time:			

#942675
18/11/22

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	**Groundwater**	4	16/11/22	1446	W	6.54	1000	0.03	14.1	-98.9	1.87				

DATE: 18/11/22
TIME: 5.15pm
COURIER: ✓
TEMPERATURE 10.6
TEMP TO CHILL: YES NO
Maygum

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
VL	ALS	18/11/22	4:22				

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

9.3
+1.3 / 10.6.

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	4/52 Industrial Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield East NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	PO Box 60 Wickham 2293
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	Tel: +61 2 4968 8448
NATA# 1261 Site# 1254	NATA# 1261 Site# 1254	NATA# 1261 Site# 18217		NATA# 1261 Site# 20794	NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road	43 Detroit Drive
Penrose,	Rolleston,
Auckland 1061	Christchurch 7675
Tel: +64 9 526 45 51	Tel: 0800 856 450
IANZ# 1327	IANZ# 1290

Sample Receipt Advice

Company name:	Ventia Utility Services P/L (Burwood)
Contact name:	Robert Callander
Project name:	CRESWICK LANDFILL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Nov 18, 2022 5:15 PM
Eurofins reference	942675

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Robert Callander - Robert.callander@ventia.com.au.

Note: A copy of these results will also be delivered to the general Ventia Utility Services P/L (Burwood) email address.

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name:	Ventia Utility Services P/L (Burwood)	**Order No.:**		**Received:**	Nov 18, 2022 5:15 PM
Address:	Unit 11, 25-37 Huntingdale Rd	**Report #:**	942675	**Due:**	Nov 25, 2022
	Burwood	**Phone:**	03 9861 8169	**Priority:**	5 Day
	VIC 3125	**Fax:**	03 9861 8101	**Contact Name:**	Robert Callander
Project Name:	CRESWICK LANDFILL				

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Chromium (filtered)	Conductivity (at 25 °C)	Dissolved Oxygen	Iron (filtered)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Zinc (filtered)	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	CRESWICK SPLIT	Nov 16, 2022	2:46PM	Water	M22-No0046553	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1

Certificate of Analysis

Environment Testing

Ventia Utility Services P/L (Burwood)
Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Robert Callander**

Report **942675-W**
Project name CRESWICK LANDFILL
Received Date Nov 18, 2022

Client Sample ID			**CRESWICK SPLIT**
Sample Matrix			**Water**
Eurofins Sample No.			**M22-No0046553**
Date Sampled			**Nov 16, 2022**
Test/Reference	LOR	Unit	
Volatile Fatty Acids (VFA) by GC-MS			
Acetic Acid	5	mg/L	< 5
Propionic acid	5	mg/L	< 5
Isobutyric acid	5	mg/L	< 5
Butyric acid	5	mg/L	< 5
Isovaleric acid	5	mg/L	< 5
Valeric acid	5	mg/L	< 5
4-Methylvaleric acid	5	mg/L	< 5
Hexanoic acid	5	mg/L	< 5
Heptanoic acid	5	mg/L	< 5
Total VFA as Acetic Acid Equivalents	5	mg/L	< 5
Ammonia (as N)	0.01	mg/L	3.6
Chemical Oxygen Demand (COD)	25	mg/L	71
Chloride	1	mg/L	110
Conductivity (at 25 °C)	10	uS/cm	870
Dissolved Oxygen	0.01	mg/L	7.7
Nitrate (as N)	0.02	mg/L	< 0.02
Organic Nitrogen (as N)*	0.2	mg/L	1.3
pH (at 25 °C)	0.1	pH Units	8.6
Sulphate (as SO4)	5	mg/L	21
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	450
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	4.9
Total Organic Carbon	5	mg/L	35
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	300
Carbonate Alkalinity (as CaCO3)	10	mg/L	25
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	330
Heavy Metals			
Chromium (filtered)	0.001	mg/L	< 0.001
Iron (filtered)	0.05	mg/L	< 0.05
Zinc (filtered)	0.005	mg/L	< 0.005

Environment Testing

Client Sample ID			CRESWICK SPLIT
Sample Matrix			Water
Eurofins Sample No.			M22-No0046553
Date Sampled			Nov 16, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	14
Magnesium	0.5	mg/L	28
Potassium	0.5	mg/L	3.0
Sodium	0.5	mg/L	110

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Volatile Fatty Acids (VFA) by GC-MS	Melbourne	Nov 21, 2022	28 Day
- Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS			
Chemical Oxygen Demand (COD)	Melbourne	Nov 21, 2022	28 Days
- Method: LTM-INO-4220 Determination of COD in Water			
Conductivity (at 25 °C)	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Melbourne	Nov 21, 2022	28 Days
- Method: APHA 4500-O B, C, G using Dissolved Oxygen analyser			
Nitrate (as N)	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
pH (at 25 °C)	Melbourne	Nov 19, 2022	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Total Organic Carbon	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Heavy Metals (filtered)	Melbourne	Nov 19, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Nov 19, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Ammonia (as N)	Melbourne	Nov 19, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Organic Nitrogen (as N)*	Melbourne	Nov 18, 2022	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Nov 19, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Nov 19, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Nov 19, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

Company Name: Ventia Utility Services P/L (Burwood)
Address: Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Project Name: CRESWICK LANDFILL

Order No.:
Report #: 942675
Phone: 03 9861 8169
Fax: 03 9861 8101

Received: Nov 18, 2022 5:15 PM
Due: Nov 25, 2022
Priority: 5 Day
Contact Name: Robert Callander

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Chromium (filtered)	Conductivity (at 25 °C)	Dissolved Oxygen	Iron (filtered)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Zinc (filtered)	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																			
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**														
1	CRESWICK SPLIT	Nov 16, 2022	2:46PM	Water	M22-No0046553	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1

Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	mg/L	< 5			5	Pass	
Propionic acid	mg/L	< 5			5	Pass	
Isobutyric acid	mg/L	< 5			5	Pass	
Butyric acid	mg/L	< 5			5	Pass	
Isovaleric acid	mg/L	< 5			5	Pass	
Valeric acid	mg/L	< 5			5	Pass	
4-Methylvaleric acid	mg/L	< 5			5	Pass	
Hexanoic acid	mg/L	< 5			5	Pass	
Heptanoic acid	mg/L	< 5			5	Pass	
Total VFA as Acetic Acid Equivalents	mg/L	< 5			5	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chemical Oxygen Demand (COD)	mg/L	< 25			25	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Organic Carbon	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	%	99			70-130	Pass	
Propionic acid	%	89			70-130	Pass	
Isobutyric acid	%	92			70-130	Pass	
Butyric acid	%	91			70-130	Pass	
Isovaleric acid	%	101			70-130	Pass	
Valeric acid	%	97			70-130	Pass	
4-Methylvaleric acid	%	95			70-130	Pass	
Hexanoic acid	%	93			70-130	Pass	
Heptanoic acid	%	89			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	95			70-130	Pass	
Chemical Oxygen Demand (COD)	%	110			70-130	Pass	
Chloride	%	110			70-130	Pass	
Conductivity (at 25 °C)	%	117			70-130	Pass	
Nitrate (as N)	%	101			70-130	Pass	
Sulphate (as SO4)	%	78			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	112			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	91			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Organic Carbon			%	82			70-130	Pass	
LCS - % Recovery									
Alkalinity (speciated)									
Total Alkalinity (as CaCO3)			%	90			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Chromium (filtered)			%	108			80-120	Pass	
Iron (filtered)			%	109			80-120	Pass	
Zinc (filtered)			%	107			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	84			80-120	Pass	
Magnesium			%	90			80-120	Pass	
Potassium			%	88			80-120	Pass	
Sodium			%	90			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Volatile Fatty Acids (VFA) by GC-MS				Result 1					
Isobutyric acid	M22-No0046553	CP	%	90			70-130	Pass	
Isovaleric acid	M22-No0046553	CP	%	104			70-130	Pass	
Valeric acid	M22-No0046553	CP	%	101			70-130	Pass	
4-Methylvaleric acid	M22-No0046553	CP	%	99			70-130	Pass	
Hexanoic acid	M22-No0046553	CP	%	95			70-130	Pass	
Heptanoic acid	M22-No0046553	CP	%	91			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chemical Oxygen Demand (COD)	M22-No0044603	NCP	%	105			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M22-No0046482	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Chromium (filtered)	M22-No0038504	NCP	%	90			75-125	Pass	
Iron (filtered)	M22-No0038487	NCP	%	94			75-125	Pass	
Zinc (filtered)	M22-No0038487	NCP	%	107			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	B22-No0040291	NCP	%	84			75-125	Pass	
Magnesium	B22-No0040291	NCP	%	91			75-125	Pass	
Potassium	B22-No0040291	NCP	%	87			75-125	Pass	
Sodium	B22-No0040291	NCP	%	89			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Volatile Fatty Acids (VFA) by GC-MS				Result 1	Result 2	RPD			
Acetic Acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Propionic acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isobutyric acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Butyric acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isovaleric acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Valeric acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
4-Methylvaleric acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Hexanoic acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Heptanoic acid	M22-No0046728	NCP	mg/L	< 5	< 5	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	B22-No0040252	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chemical Oxygen Demand (COD)	M22-No0044602	NCP	mg/L	40	37	6.3	30%	Pass	
Chloride	M22-No0044602	NCP	mg/L	1500	1500	<1	30%	Pass	
Conductivity (at 25 °C)	M22-No0038523	NCP	uS/cm	460	480	4.3	30%	Pass	
Dissolved Oxygen	R22-No0039935	NCP	mg/L	9.0	9.0	<1	30%	Pass	
Nitrate (as N)	B22-No0040252	NCP	mg/L	1.0	1.0	<1	30%	Pass	
pH (at 25 °C)	M22-No0038523	NCP	pH Units	7.2	7.2	pass	30%	Pass	
Sulphate (as SO4)	M22-No0044602	NCP	mg/L	330	330	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	M22-No0046553	CP	mg/L	450	450	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-No0046499	NCP	mg/L	2.9	2.8	3.2	30%	Pass	
Total Organic Carbon	M22-No0044602	NCP	mg/L	20	20	1.1	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M22-No0038523	NCP	mg/L	27	31	14	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M22-No0038523	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	M22-No0038523	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	M22-No0038523	NCP	mg/L	27	31	14	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Chromium (filtered)	M22-No0038504	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron (filtered)	M22-No0038504	NCP	mg/L	6.9	6.8	1.5	30%	Pass	
Zinc (filtered)	M22-No0038504	NCP	mg/L	0.59	0.58	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M22-No0045085	NCP	mg/L	39	38	1.8	30%	Pass	
Magnesium	M22-No0045085	NCP	mg/L	23	23	<1	30%	Pass	
Potassium	M22-No0045085	NCP	mg/L	5.3	5.3	1.2	30%	Pass	
Sodium	M22-No0045085	NCP	mg/L	240	240	1.4	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Savini Suduweli	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222748**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 17-Nov-2022 11:05
Order number	: Creswick Landfill	Date Analysis Commenced	: 17-Nov-2022
C-O-C number	: ----	Issue Date	: 24-Nov-2022 18:10
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

- EK057G: EM2222748 #1 Sample required dilution prior Nitrite analysis due to matrix interferences. LOR values have been adjusted accordingly.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- It is recognised that TKN is less than ammonia for sample #4. However, the difference is within experimental variation of the methods.
- Ionic Balance out of acceptable limits for sample #1-2 and #4 due to analytes not quantified in this report.
- Ionic Balance out of acceptable limits for sample #1 and 4 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- Ionic balances were calculated using: major anions - chloride, alkalinity, sulfate; and major cations - calcium, magnesium, potassium, sodium and ammonia for #2.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH4	BH8	BH14	BLIND	RINSATE
			Sampling date / time	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222748-001	EM2222748-002	EM2222748-003	EM2222748-004	EM2222748-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.34**	**7.06**	**6.88**	**7.15**	**5.40**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**2100**	**875**	**1520**	**901**	<1
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**1410**	**455**	**820**	**468**	<10
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	**167**	**277**	**124**	**280**	<1
Total Alkalinity as CaCO3	----	1	mg/L	**167**	**277**	**124**	**280**	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**8**	**28**	**37**	**30**	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**688**	**100**	**409**	**100**	<1
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**23**	**15**	**22**	**15**	<1
Magnesium	7439-95-4	1	mg/L	**64**	**31**	**45**	**31**	<1
Sodium	7440-23-5	1	mg/L	**283**	**101**	**168**	**102**	<1
Potassium	7440-09-7	1	mg/L	<1	**4**	**3**	**4**	<1
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	**0.030**	**0.010**	**0.024**	**0.014**	<0.001
Zinc	7440-66-6	0.005	mg/L	**0.077**	**0.023**	**0.073**	**0.027**	<0.005
Iron	7439-89-6	0.05	mg/L	**116**	**56.5**	**40.9**	**56.6**	<0.05
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.67**	**4.56**	**0.32**	**4.63**	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.02	<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	<0.02	<0.01	**0.03**	<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	**0.03**	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**2.3**	**4.9**	**1.4**	**4.5**	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH4	BH8	BH14	BLIND	RINSATE
			Sampling date / time	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222748-001	EM2222748-002	EM2222748-003	EM2222748-004	EM2222748-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	22.9	8.94	14.8	9.04	<0.01
ø Total Cations	----	0.01	meq/L	----	8.12	----	----	----
ø Total Cations	----	0.01	meq/L	18.7	----	12.2	7.84	<0.01
ø Ionic Balance	----	0.01	%	----	4.82	----	----	<0.01
ø Ionic Balance	----	0.01	%	10.0	----	9.64	7.12	----
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	0.04	0.03	0.14	----	----
ø pH	----	0.01	pH Unit	6.05	6.54	6.15	----	----
ø Redox Potential	----	0.1	mV	-74.9	-98.9	6.4	----	----
ø Temperature	----	0.1	°C	12.96	14.1	12.33	----	----
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	2512	1000	1541	----	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	3.25	1.87	2.01	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	28	19	11	21	<1
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	210	105	131	97	<10
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	56	31	34	30	<5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	U/S BH3	@ BH3	D/S BH3	----	----
			Sampling date / time	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222748-006	EM2222748-007	EM2222748-008	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.04	7.04	7.05	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	207	204	207	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	154	158	160	----	----
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	32	33	34	----	----
Total Alkalinity as CaCO3	----	1	mg/L	32	33	34	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3	3	3	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	30	31	31	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	6	6	6	----	----
Magnesium	7439-95-4	1	mg/L	7	7	7	----	----
Sodium	7440-23-5	1	mg/L	19	19	19	----	----
Potassium	7440-09-7	1	mg/L	2	2	2	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	0.003	0.005	0.004	----	----
Zinc	7440-66-6	0.005	mg/L	0.012	0.012	0.013	----	----
Iron	7439-89-6	0.05	mg/L	2.54	2.82	2.56	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.01	0.03	----	----
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	0.73	0.73	0.72	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.73	0.73	0.72	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.3	1.2	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	U/S BH3	@ BH3	D/S BH3	----	----
			Sampling date / time	16-Nov-2022 00:00	16-Nov-2022 00:00	16-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222748-006	EM2222748-007	EM2222748-008	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	1.55	1.60	1.62	----	----
ø Total Cations	----	0.01	meq/L	1.75	1.75	1.75	----	----
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	9.57	9.54	9.55	----	----
ø pH	----	0.01	pH Unit	7.02	7.01	7.04	----	----
ø Redox Potential	----	0.1	mV	145.6	151.2	157.6	----	----
ø Temperature	----	0.1	°C	13.10	13.02	12.56	----	----
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	178.9	178.8	179.4	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	19	20	20	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	69	69	72	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	22	16	23	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2222748**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 17-Nov-2022
Order number	: Creswick Landfill	Date Analysis Commenced	: 17-Nov-2022
C-O-C number	: ----	Issue Date	: 24-Nov-2022
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 4711734)									
EM2222745-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	4.73	4.79	1.3	0% - 20%
EM2222745-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	2.89	2.87	0.7	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 4712860)									
EM2222721-019	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.25	7.31	0.8	0% - 20%
EM2222748-007	@ BH3	EA005-P: pH Value	----	0.01	pH Unit	7.04	7.06	0.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4711733)									
EM2222644-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	76	80	4.1	0% - 20%
EM2222745-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1450	1440	0.7	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4712862)									
EM2222743-011	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	<1	0.0	No Limit
EM2222748-007	@ BH3	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	204	208	1.7	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4714209)									
EM2222642-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7720	7940	2.8	0% - 20%
EM2222680-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3140	2860	9.0	0% - 20%
EM2222702-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	9650	10000	3.6	0% - 20%
EM2222748-005	RINSATE	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	<10	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 4711735)									
EM2222745-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1	<1	0.0	No Limit
EM2222745-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
ED037P: Alkalinity by PC Titrator (QC Lot: 4711735) - continued									
EM2222745-003	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 4712861)									
EM2222734-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	768	752	2.2	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	128	125	2.9	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	897	877	2.3	0% - 20%
EM2222743-011	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	2	<1	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 4712863)									
EM2222851-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	97	96	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	97	96	0.0	0% - 20%
EM2222748-007	@ BH3	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	33	33	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	33	33	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4710717)									
EM2222719-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	848	860	1.5	0% - 20%
EM2222748-002	BH8	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	28	28	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4710715)									
EM2222702-004	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	5200	5210	0.2	0% - 20%
EM2222212-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	115	117	1.9	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4710824)									
EM2222576-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EM2222701-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	580	507	13.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	956	841	12.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1150	1020	12.1	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	300	265	12.4	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4710825)									
EM2222748-003	BH14	ED093F: Calcium	7440-70-2	1	mg/L	22	22	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	45	46	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	168	170	1.4	0% - 20%

Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 4710825) - continued									
EM2222748-003	BH14	ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4710777)									
EM2222743-012	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EM2222720-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.013	0.011	16.2	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.283	0.265	6.6	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	4.27	4.24	0.8	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4710779)									
EM2222748-004	BLIND	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.014	0.014	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.027	0.026	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	56.6	56.9	0.7	0% - 20%
EM2222752-005	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.015	0.014	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.078	0.079	0.0	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	2.56	2.70	5.2	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4711226)									
EM2222748-002	BH8	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	4.56	4.66	2.3	0% - 20%
EM2222717-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	6.68	6.80	1.8	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4710716)									
EM2222717-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.0	No Limit
EM2222748-007	@ BH3	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4711227)									
EM2222748-004	BLIND	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2222717-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.11	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4713437)									
EM2222723-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.7	26.4	No Limit
EM2222756-008	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.1	18.2	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 4717951)									
EM2222743-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	8	6	32.4	No Limit
EM2222743-010	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4710121)									
EM2222649-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	11500	11600	1.3	0% - 20%
EP045: Volatile Acids as CH3COOH (QC Lot: 4720066)									
EM2222743-012	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	0.0	No Limit
EM2222764-002	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	81	78	4.0	0% - 50%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4711734)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.8	101
				----	9 pH Unit	99.9	99.3	101
EA005P: pH by PC Titrator (QCLot: 4712860)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4711733)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.0	85.0	119
EA010P: Conductivity by PC Titrator (QCLot: 4712862)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.6	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4714209)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.0	91.0	110
				<10	2440 mg/L	104	81.6	118
				<10	293 mg/L	108	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4711735)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	93.1	85.0	116
ED037P: Alkalinity by PC Titrator (QCLot: 4712861)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.9	85.0	116
ED037P: Alkalinity by PC Titrator (QCLot: 4712863)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.0	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4710717)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	85.8	117
				<1	500 mg/L	103	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4710715)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	85.0	115
				<1	1000 mg/L	105	85.0	122
ED093F: Dissolved Major Cations (QCLot: 4710824)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	87.4	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	90.9	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	90.0	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	89.9	80.0	120
ED093F: Dissolved Major Cations (QCLot: 4710825)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	87.5	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	91.0	80.0	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
ED093F: Dissolved Major Cations (QCLot: 4710825) - continued								
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	89.8	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	89.9	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4710777)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	117	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	92.8	118
EG020T: Total Metals by ICP-MS (QCLot: 4710779)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	112	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4711226)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	94.0	84.1	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4710716)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4711227)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.9	90.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4713437)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	97.2	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4717951)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	97.8	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4710121)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	101	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4720066)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	192 mg/L	97.4	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4710717)							
EM2222719-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4710715)							
EM2222698-001	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	108	70.0	142

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4710777)							
EM2222720-001	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	97.1	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	93.3	74.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4710779)							
EM2222748-004	BLIND	EG020A-T: Chromium	7440-47-3	1 mg/L	93.0	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4711226)							
EM2222720-004	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4710716)							
EM2222717-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	100	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4711227)							
EM2222720-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.0	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4713437)							
EM2222723-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	103	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4717951)							
EM2222743-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	106	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4710121)							
EM2222717-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	2500 mg/L	99.4	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222748**	Page	: 1 of 9
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 17-Nov-2022
Site	: ----	Issue Date	: 24-Nov-2022
Sampler	: AC	No. of samples received	: 8
Order number	: Creswick Landfill	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2222719--005	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK055G: Ammonia as N by Discrete Analyser	EM2222720--004	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	----	----	----	18-Nov-2022	17-Nov-2022	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chemical Oxygen Demand (COD) (Spectrophotometric)	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	17-Nov-2022	×
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	14-Dec-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**21-Nov-2022**	23-Nov-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	30-Nov-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**21-Nov-2022**	14-Dec-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**21-Nov-2022**	14-Dec-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	23-Nov-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**18-Nov-2022**	15-May-2023	✓	**18-Nov-2022**	15-May-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	14-Dec-2022	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	18-Nov-2022	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**----**	----	----	**18-Nov-2022**	14-Dec-2022	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**22-Nov-2022**	14-Dec-2022	✓	**22-Nov-2022**	14-Dec-2022	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**----**	----	----	**22-Nov-2022**	14-Dec-2022	✓
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP) BH4, BH8, BH14, BLIND, RINSATE, U/S BH3, @ BH3, D/S BH3	**16-Nov-2022**	**----**	----	----	**17-Nov-2022**	14-Dec-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH4,	BH8,	**16-Nov-2022**	**----**	----	----	**23-Nov-2022**	30-Nov-2022	✓
BH14,	BLIND,							
RINSATE,	U/S BH3,							
@ BH3,	D/S BH3							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	6	59	**10.17**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	3	59	**5.08**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / *Analytical Methods*	*Method*	*Count* QC	*Count* Regular	*Rate (%)* Actual	*Rate (%)* Expected	Evaluation	*Quality Control Specification*
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2222748**

Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: AC		

Dates

Date Samples Received	: 17-Nov-2022 11:05	Issue Date	: 17-Nov-2022
Client Requested Due Date	: 24-Nov-2022	Scheduled Reporting Date	: **24-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3.1°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2222748-001	16-Nov-2022 00:00	BH4	✓	✓	✓	✓	✓	✓	✓
EM2222748-002	16-Nov-2022 00:00	BH8	✓	✓	✓	✓	✓	✓	✓
EM2222748-003	16-Nov-2022 00:00	BH14	✓	✓	✓	✓	✓	✓	✓
EM2222748-004	16-Nov-2022 00:00	BLIND	✓	✓	✓	✓	✓	✓	✓
EM2222748-005	16-Nov-2022 00:00	RINSATE	✓	✓	✓	✓	✓	✓	✓
EM2222748-006	16-Nov-2022 00:00	U/S BH3	✓	✓	✓	✓	✓	✓	✓
EM2222748-007	16-Nov-2022 00:00	@ BH3	✓	✓	✓	✓	✓	✓	✓
EM2222748-008	16-Nov-2022 00:00	D/S BH3	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2222748-001	16-Nov-2022 00:00	BH4	✓	✓	✓	✓	✓
EM2222748-002	16-Nov-2022 00:00	BH8	✓	✓	✓	✓	✓
EM2222748-003	16-Nov-2022 00:00	BH14	✓	✓	✓	✓	✓
EM2222748-004	16-Nov-2022 00:00	BLIND	✓	✓		✓	✓
EM2222748-005	16-Nov-2022 00:00	RINSATE	✓	✓		✓	✓
EM2222748-006	16-Nov-2022 00:00	U/S BH3	✓	✓	✓	✓	✓
EM2222748-007	16-Nov-2022 00:00	@ BH3	✓	✓	✓	✓	✓
EM2222748-008	16-Nov-2022 00:00	D/S BH3	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE - VIC ONLY		
- A4 - AU Tax Invoice (INV)	Email	Nicole.Robins@ventia.com
LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	Lucy.Edwards@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lucy.Edwards@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lucy.Edwards@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lucy.Edwards@ventia.com
- Chain of Custody (CoC) (COC)	Email	Lucy.Edwards@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	Lucy.Edwards@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	Lucy.Edwards@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com.au
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com.au
- Purchase Order Request Letter (PO_Request)	Email	robert.callander@ventia.com.au

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 1 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:** ME/412/16		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL
BH1	Groundwater Bore										
BH2	Groundwater Bore										
BH3	Groundwater Bore										
BH4	Groundwater Bore 1	4	16/11/22	1223	W	6.05	2512	0.04	12.96	-74.9	3.25
BH6	Groundwater Bore										
BH7	Groundwater Bore										
BH8	Groundwater Bore 2	4	16/11/22	1446	W	6.54	1000	0.03	14.1	-98.9	1.87
BH9	Groundwater Bore										

Environmental Division
Melbourne
Work Order Reference
EM2222748

Telephone : + 61-3-8549 9600

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill 2 of 3
Contact:	Robert Callander		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		Quote No.:	
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	Groundwater bore														
BH1~~2~~4	Groundwater bore 3	4	16/11/22	1316	W	6.15	1541	0.14	12.33	6.4	2.01				
LB1	Leachate bore														
LB2	Leachate bore														
LB3	Leachate bore					NO SAMPLE – SWL ONLY									
BLIND	Blind dup (analysed by ALS) 4	4	16/11/22	–	W										
RINSATE	Rinsate blank 5	4	16/11/22	1140											

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:**		
T/A Time:			

Sample ID	Sample Description		No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
U/S BH3	Creek Sample	6	4	16/11/22	1130	W	7.02	178.9	9.57	13.10	145.6	–				
@ BH3	Creek Sample	7	4	16/11/22	1107	W	7.01	178.8	9.54	13.02	151.2	–				
D/S BH3	Creek Sample	8	4	16/11/22	1035	W	7.04	179.4	9.55	12.56	157.6	–				
Leachate	Surface water sample															
Wetland	Surface water sample															
Dredge	Surface water sample															

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	**Job Ref:**	Creswick Landfill
Contact:	Robert Callander		Please forward to EUROFINS for analysis
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:** 190924VENV		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	4	16/11/22	1446	W	6.54	1000	0.03	14.1	-98.9	1.87				

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill 1 of 3
Contact:	Robert Callander		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		Quote No.:	ME/412/16
T/A Time:			

Environmental Division
Melbourne
Work Order Reference
EM2222748

Telephone : + 61-3-8549 9600

Sample ID	Sample Description		No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
BH1	Groundwater Bore															
BH2	Groundwater Bore															
BH3	Groundwater Bore															
BH4	Groundwater Bore	1	4	16/11/22	1223	W	6.05	2512	0.04	12.96	-74.9	3.25				
BH6	Groundwater Bore															
BH7	Groundwater Bore															
BH8	Groundwater Bore	2	4	16/11/22	1446	W	6.54	1000	0.03	14.1	-98.9	1.87				
BH9	Groundwater Bore															

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.	*LAB USE ONLY*	Sample conditions: Samples received undamaged [Yes/No] Samples adequately preserved [Yes/No] Samples within recommended holding times: [Yes/No] Samples transported at appropriate temperature [Yes/No]
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.		

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:**		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	**Groundwater bore**														
BH14	**Groundwater bore** 3	4	16/11/22	1316	W	6.15	1541	0.14	12.33	6.4	2.01				
LB1	**Leachate bore**														
LB2	**Leachate bore**														
LB3	**Leachate bore**					NO SAMPLE – SWL ONLY									
BLIND	**Blind dup (analysed by ALS)** 4	4	16/11/22	–	W										
RINSATE	**Rinsate blank** 5	4	16/11/22	1140											

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

Sample ID	Sample Description		No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
U/S BH3	Creek Sample	6	4	16/11/22	1130	W	7.02	178.9	9.57	13.10	145.6	–				
@ BH3	Creek Sample	7	4	16/11/22	1107	W	7.01	178.8	9.54	13.02	151.2	–				
D/S BH3	Creek Sample	8	4	16/11/22	1035	W	7.04	179.4	9.55	12.56	157.6	–				
Leachate	Surface water sample															
Wetland	Surface water sample															
Dredge	Surface water sample															

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:

Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CHUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	**Job Ref:**	**Creswick Landfill**
Contact:	Robert Callander		Please forward to EUROFINS for analysis
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	190924VENV
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	4	16/11/22	1446	W	6.54	1000	0.03	14.1	-98.9	1.87				

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	16/11/22	1700	Scott	ALS	17/11/22	1105
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222858**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 18-Nov-2022 13:30
Order number	: -	Date Analysis Commenced	: 18-Nov-2022
C-O-C number	: ----	Issue Date	: 23-Nov-2022 22:29
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2 Groundwater Bore	BH3 Groundwater Bore	BH6 Groundwater Bore	BH7 Groundwater Bore	BH10 Groundwater Bore
			Sampling date / time	17-Nov-2022 12:05	17-Nov-2022 09:10	17-Nov-2022 16:48	17-Nov-2022 10:22	18-Nov-2022 14:02
Compound	CAS Number	LOR	Unit	EM2222858-001	EM2222858-002	EM2222858-003	EM2222858-004	EM2222858-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.07	6.58	5.57	6.63	6.00
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	730	2950	754	934	845
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	342	1820	375	462	566
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	32	226	12	181	58
Total Alkalinity as CaCO3	----	1	mg/L	32	226	12	181	58
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	20	18	20	9	23
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	181	991	197	168	206
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1	44	4	22	8
Magnesium	7439-95-4	1	mg/L	14	95	18	24	19
Sodium	7440-23-5	1	mg/L	97	431	91	100	96
Potassium	7440-09-7	1	mg/L	1	14	1	15	11
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	0.001	0.004	0.016
Zinc	7440-66-6	0.005	mg/L	0.044	0.159	0.077	0.018	0.071
Iron	7439-89-6	0.05	mg/L	27.4	68.4	0.22	39.2	31.0
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.42	<0.01	0.43	1.28
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.04	<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	0.15	0.03	1.39	0.01	0.03
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.19	0.03	1.39	0.01	0.03
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.0	0.3	1.0	3.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2 Groundwater Bore	BH3 Groundwater Bore	BH6 Groundwater Bore	BH7 Groundwater Bore	BH10 Groundwater Bore
			Sampling date / time	17-Nov-2022 12:05	17-Nov-2022 09:10	17-Nov-2022 16:48	17-Nov-2022 10:22	18-Nov-2022 14:02
Compound	CAS Number	LOR	Unit	EM2222858-001	EM2222858-002	EM2222858-003	EM2222858-004	EM2222858-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**6.16**	**32.8**	**6.21**	**8.54**	**7.45**
ø Total Cations	----	0.01	meq/L	**5.45**	**29.1**	**5.66**	**7.81**	**6.42**
ø Ionic Balance	----	0.01	%	**6.16**	**6.01**	**4.62**	**4.50**	**7.42**
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	**0.53**	**0.12**	**0.36**	**0.09**	**0.21**
ø pH	----	0.01	pH Unit	**5.68**	**6.39**	**4.91**	**6.35**	**5.72**
ø Redox Potential	----	0.1	mV	**47.3**	**-42.6**	**194.7**	**-31.1**	**68.3**
ø Temperature	----	0.1	°C	**14.99**	**14.10**	**15.05**	**14.45**	**14.53**
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	**638.9**	**3353**	**653.5**	**880**	**777**
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**1.93**	**0.59**	**11.20**	**2.42**	**2.06**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	**17**	<1	**13**	**11**
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	**12**	**12**	<10	**17**
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**23**	**26**	**30**	**31**	**17**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Leachate Surface water sample	Wetland Surface water sample	Dredge Surface water sample	----	----
			Sampling date / time	17-Nov-2022 10:40	17-Nov-2022 09:35	18-Nov-2022 07:30	----	----
Compound	CAS Number	LOR	Unit	EM2222858-006	EM2222858-007	EM2222858-008	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.25**	**6.99**	**6.85**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**834**	**361**	**940**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**480**	**236**	**503**	----	----
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	**171**	**66**	**65**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**171**	**66**	**65**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**5**	**3**	**15**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**136**	**55**	**248**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**27**	**9**	**12**	----	----
Magnesium	7439-95-4	1	mg/L	**19**	**10**	**24**	----	----
Sodium	7440-23-5	1	mg/L	**73**	**38**	**118**	----	----
Potassium	7440-09-7	1	mg/L	**32**	**5**	**3**	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	**0.006**	**0.004**	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	**0.036**	**0.006**	**0.005**	----	----
Iron	7439-89-6	0.05	mg/L	**23.5**	**9.71**	**2.45**	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**5.35**	**0.04**	**0.01**	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.02**	<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**	**0.11**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.02**	**0.01**	**0.11**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**5.5**	**0.9**	**1.1**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Leachate Surface water sample	Wetland Surface water sample	Dredge Surface water sample	----	----
			Sampling date / time	17-Nov-2022 10:40	17-Nov-2022 09:35	18-Nov-2022 07:30	----	----
Compound	CAS Number	LOR	Unit	EM2222858-006	EM2222858-007	EM2222858-008	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	7.36	2.93	8.61	----	----
ø Total Cations	----	0.01	meq/L	6.90	3.05	7.78	----	----
ø Ionic Balance	----	0.01	%	3.17	2.01	5.02	----	----
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	3.78	8.20	5.92	----	----
ø pH	----	0.01	pH Unit	6.94	6.89	6.44	----	----
ø Redox Potential	----	0.1	mV	-79.0	-69.2	3.67	----	----
ø Temperature	----	0.1	°C	14.1	14.5	13.8	----	----
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	740.6	300.2	875	----	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	NR	NR	NR	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	29	18	9	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	108	45	28	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	28	17	25	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2222858**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 18-Nov-2022
Order number	: -	Date Analysis Commenced	: 18-Nov-2022
C-O-C number	: ----	Issue Date	: 23-Nov-2022
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
\# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4712860)									
EM2222721-019	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.25	7.31	0.8	0% - 20%
EM2222748-007	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.04	7.06	0.3	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 4712865)									
EM2222858-008	Dredge Surface water sample	EA005-P: pH Value	----	0.01	pH Unit	6.85	6.94	1.3	0% - 20%
EM2222870-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.19	7.37	2.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4712862)									
EM2222743-011	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	<1	0.0	No Limit
EM2222748-007	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	204	208	1.7	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4712866)									
EM2222858-008	Dredge Surface water sample	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	940	956	1.7	0% - 20%
EM2222870-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	592	547	7.9	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4714211)									
EM2222791-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2370	2390	0.9	0% - 20%
EM2222802-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	874	866	0.9	0% - 20%
EM2222858-008	Dredge Surface water sample	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	503	521	3.5	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4712864)									
EM2222861-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	349	344	1.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	349	344	1.2	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
ED037P: Alkalinity by PC Titrator (QC Lot: 4712864) - continued									
EM2222858-008	Dredge Surface water sample	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	65	66	1.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	65	66	1.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4712628)									
EM2222855-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	12	11	0.0	0% - 50%
EM2222861-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	543	548	1.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4712629)									
EM2222855-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	60	59	0.0	0% - 20%
EM2222861-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4810	4800	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4713369)									
EM2222851-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	38	38	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	33	33	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	92	91	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	7	7	0.0	No Limit
EM2222856-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	44	44	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	41	41	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	86	86	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 4713370)									
EM2222861-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4713347)									
EM2222788-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.074	0.073	0.0	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.404	0.408	0.9	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	8.32	8.40	1.0	0% - 20%
EM2222802-008	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.039	0.037	3.8	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	24.7	24.8	0.2	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4713348)									
EM2222858-002	BH3 Groundwater Bore	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.159	0.168	5.7	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	68.4	66.6	2.6	0% - 20%
EM2222862-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4715696)									
EM2222861-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4712630)									
EM2222855-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2222861-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4715697)									
EM2222843-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	36.6	36.8	0.4	0% - 20%
EM2222861-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.29	2.32	1.3	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4713441)									
EM2222870-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	6.6	6.5	0.0	0% - 20%
EM2222815-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	1.1	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 4717217)									
EM2222856-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0	No Limit
EM2222858-005	BH10 Groundwater Bore	EP005: Total Organic Carbon	----	1	mg/L	11	11	0.0	0% - 50%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4713337)									
EM2222856-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	<10	0.0	No Limit
EM2222858-005	BH10 Groundwater Bore	EP026SP: Chemical Oxygen Demand	----	10	mg/L	17	17	0.0	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 4720066)									
EM2222743-012	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	0.0	No Limit
EM2222764-002	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	81	78	4.0	0% - 50%
EP045: Volatile Acids as CH3COOH (QC Lot: 4720067)									
EM2222858-005	BH10 Groundwater Bore	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	17	19	8.9	No Limit
EM2222861-008	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4712860)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	100	99.3	101
EA005P: pH by PC Titrator (QCLot: 4712865)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.8	101
				----	7 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4712862)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.6	85.0	119
EA010P: Conductivity by PC Titrator (QCLot: 4712866)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	108	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4714211)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.5	91.0	110
				<10	2440 mg/L	103	81.6	118
				<10	293 mg/L	108	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4712864)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	100	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4712628)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	85.8	117
				<1	500 mg/L	105	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4712629)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	103	85.0	115
				<1	1000 mg/L	103	85.0	122
ED093F: Dissolved Major Cations (QCLot: 4713369)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	109	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	109	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	80.0	120
ED093F: Dissolved Major Cations (QCLot: 4713370)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	109	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	109	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	106	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4713347)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.9	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 4713347) - continued								
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	92.8	118
EG020T: Total Metals by ICP-MS (QCLot: 4713348)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4715696)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.1	84.1	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4712630)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4715697)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	90.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4713441)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	95.3	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4717217)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	98.7	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4713337)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	102	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4720066)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	192 mg/L	97.4	85.5	116
EP045: Volatile Acids as CH3COOH (QCLot: 4720067)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	192 mg/L	101	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4712628)							
EM2222858-001	BH2 Groundwater Bore	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	99.8	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4712629)							
EM2222858-001	BH2 Groundwater Bore	ED045G: Chloride	16887-00-6	400 mg/L	109	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4713347)							
EM2222788-001	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	93.4	78.9	119

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4713347) - continued							
EM2222788-001	Anonymous	EG020A-T: Zinc	7440-66-6	1 mg/L	94.4	74.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4713348)							
EM2222858-002	BH3 Groundwater Bore	EG020A-T: Chromium	7440-47-3	1 mg/L	93.8	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	98.1	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4715696)							
EM2222858-001	BH2 Groundwater Bore	EK055G: Ammonia as N	7664-41-7	1 mg/L	119	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4712630)							
EM2222858-001	BH2 Groundwater Bore	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	100	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4715697)							
EM2222858-001	BH2 Groundwater Bore	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	73.6	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4713441)							
EM2222815-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.1	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4717217)							
EM2222856-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	104	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4713337)							
EM2222856-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	2500 mg/L	99.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222858**	Page	: 1 of 9
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 18-Nov-2022
Site	: ----	Issue Date	: 23-Nov-2022
Sampler	: AC	No. of samples received	: 8
Order number	: -	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH2 - Groundwater Bore,	BH3 - Groundwater Bore,	----	----	----	18-Nov-2022	17-Nov-2022	**1**
BH6 - Groundwater Bore,	BH7 - Groundwater Bore,						
Leachate - Surface water sample,	Wetland - Surface water sample						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Ammonia as N by Discrete analyser	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
BH2 - Groundwater Bore,	BH3 - Groundwater Bore,	**17-Nov-2022**	**----**	----	----	**18-Nov-2022**	17-Nov-2022	×
BH6 - Groundwater Bore,	BH7 - Groundwater Bore,							
Leachate - Surface water sample,	Wetland - Surface water sample							
Clear Plastic Bottle - Natural (EA005-P)								
BH10 - Groundwater Bore,	Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**18-Nov-2022**	18-Nov-2022	✓
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
BH2 - Groundwater Bore,	BH3 - Groundwater Bore,	**17-Nov-2022**	**----**	----	----	**18-Nov-2022**	15-Dec-2022	✓
BH6 - Groundwater Bore,	BH7 - Groundwater Bore,							
Leachate - Surface water sample,	Wetland - Surface water sample							
Clear Plastic Bottle - Natural (EA010-P)								
BH10 - Groundwater Bore,	Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**18-Nov-2022**	16-Dec-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	----	----	----	21-Nov-2022	24-Nov-2022	✓
Clear Plastic Bottle - Natural (EA015H) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	----	----	----	21-Nov-2022	25-Nov-2022	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	----	----	----	18-Nov-2022	01-Dec-2022	✓
Clear Plastic Bottle - Natural (ED037-P) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	----	----	----	18-Nov-2022	02-Dec-2022	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	----	----	----	22-Nov-2022	15-Dec-2022	✓
Clear Plastic Bottle - Natural (ED041G) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	----	----	----	22-Nov-2022	16-Dec-2022	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	----	----	----	22-Nov-2022	15-Dec-2022	✓
Clear Plastic Bottle - Natural (ED045G) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	----	----	----	22-Nov-2022	16-Dec-2022	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	----	----	----	22-Nov-2022	24-Nov-2022	✓
Clear Plastic Bottle - Natural (ED093F) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	----	----	----	22-Nov-2022	25-Nov-2022	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	17-Nov-2022	19-Nov-2022	16-May-2023	✓	19-Nov-2022	16-May-2023	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) BH10 - Groundwater Bore, Dredge - Surface water sample	18-Nov-2022	19-Nov-2022	17-May-2023	✓	19-Nov-2022	17-May-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**22-Nov-2022**	15-Dec-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**22-Nov-2022**	16-Dec-2022	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**18-Nov-2022**	19-Nov-2022	✓
Clear Plastic Bottle - Natural (EK057G) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**18-Nov-2022**	20-Nov-2022	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**22-Nov-2022**	15-Dec-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**22-Nov-2022**	16-Dec-2022	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**22-Nov-2022**	15-Dec-2022	✓	**22-Nov-2022**	15-Dec-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**22-Nov-2022**	16-Dec-2022	✓	**22-Nov-2022**	16-Dec-2022	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**22-Nov-2022**	15-Dec-2022	✓
Amber TOC Vial - Sulfuric Acid (EP005) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**22-Nov-2022**	16-Dec-2022	✓
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**19-Nov-2022**	15-Dec-2022	✓
Clear Plastic Bottle - Sulfuric Acid (EP026SP) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**19-Nov-2022**	16-Dec-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP045: Volatile Acids as CH3COOH							
Clear Plastic Bottle - Natural (EP045) BH2 - Groundwater Bore, BH3 - Groundwater Bore, BH6 - Groundwater Bore, BH7 - Groundwater Bore, Leachate - Surface water sample, Wetland - Surface water sample	**17-Nov-2022**	**----**	----	----	**23-Nov-2022**	01-Dec-2022	✓
Clear Plastic Bottle - Natural (EP045) BH10 - Groundwater Bore, Dredge - Surface water sample	**18-Nov-2022**	**----**	----	----	**23-Nov-2022**	02-Dec-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	25	**12.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	21	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	27	**14.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	21	**14.29**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	2	25	**8.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	21	**9.52**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2222858**

Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: Lucy.Edwards@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill	Page	: 1 of 3
Order number	: -	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: AC		

Dates

Date Samples Received	: 18-Nov-2022 13:30	Issue Date	: 18-Nov-2022
Client Requested Due Date	: 25-Nov-2022	Scheduled Reporting Date	: **25-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 5.0°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EM2222858-001	: 17-Nov-2022 12:05	: BH2 - Groundwater Bore
EM2222858-002	: 17-Nov-2022 09:10	: BH3 - Groundwater Bore
EM2222858-003	: 17-Nov-2022 16:48	: BH6 - Groundwater Bore
EM2222858-004	: 17-Nov-2022 10:22	: BH7 - Groundwater Bore
EM2222858-005	: 18-Nov-2022 14:02	: BH10 - Groundwater Bore
EM2222858-006	: 17-Nov-2022 10:40	: Leachate - Surface water sample
EM2222858-007	: 17-Nov-2022 09:35	: Wetland - Surface water sample
EM2222858-008	: 18-Nov-2022 07:30	: Dredge - Surface water sample

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2222858-001	17-Nov-2022 12:05	BH2 Groundwater Bore	✓	✓	✓	✓	✓	✓	✓
EM2222858-002	17-Nov-2022 09:10	BH3 Groundwater Bore	✓	✓	✓	✓	✓	✓	✓
EM2222858-003	17-Nov-2022 16:48	BH6 Groundwater Bore	✓	✓	✓	✓	✓	✓	✓
EM2222858-004	17-Nov-2022 10:22	BH7 Groundwater Bore	✓	✓	✓	✓	✓	✓	✓
EM2222858-005	18-Nov-2022 14:02	BH10 Groundwater Bo...	✓	✓	✓	✓	✓	✓	✓
EM2222858-006	17-Nov-2022 10:40	Leachate Surface wa...	✓	✓	✓	✓	✓	✓	✓
EM2222858-007	17-Nov-2022 09:35	Wetland Surface wat...	✓	✓	✓	✓	✓	✓	✓
EM2222858-008	18-Nov-2022 07:30	Dredge Surface wate...	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2222858-001	17-Nov-2022 12:05	BH2 Groundwater Bore	✓	✓	✓	✓	✓
EM2222858-002	17-Nov-2022 09:10	BH3 Groundwater Bore	✓	✓	✓	✓	✓
EM2222858-003	17-Nov-2022 16:48	BH6 Groundwater Bore	✓	✓	✓	✓	✓
EM2222858-004	17-Nov-2022 10:22	BH7 Groundwater Bore	✓	✓	✓	✓	✓
EM2222858-005	18-Nov-2022 14:02	BH10 Groundwater Bo...	✓	✓	✓	✓	✓
EM2222858-006	17-Nov-2022 10:40	Leachate Surface wa...	✓	✓	✓	✓	✓
EM2222858-007	17-Nov-2022 09:35	Wetland Surface wat...	✓	✓	✓	✓	✓
EM2222858-008	18-Nov-2022 07:30	Dredge Surface wate...	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EA005-P: pH by Auto Titrator							
BH2	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----
BH3	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----
BH6	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----
BH7	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----
Leachate	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----
Wetland	Clear Plastic Bottle - Natural	----	17-Nov-2022	18-Nov-2022	×	----	----

Requested Deliverables

LUCY EDWARDS

- *AU Certificate of Analysis - NATA (COA)	Email	Lucy.Edwards@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lucy.Edwards@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lucy.Edwards@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lucy.Edwards@ventia.com
- A4 - AU Tax Invoice (INV)	Email	Lucy.Edwards@ventia.com
- Chain of Custody (CoC) (COC)	Email	Lucy.Edwards@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	Lucy.Edwards@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	Lucy.Edwards@ventia.com

NICOLE ROBINS

- A4 - AU Tax Invoice (INV)	Email	nicole.robins@ventia.com

Ping Yao

- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com

ROBERT CALLANDER

- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com.au

2-4 Westall Rd,
Springvale VIC 3171

ALS Group

CHAIN OF CUSTODY

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 1 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	ME/412/16
T/A Time:			

Environmental Division
Melbourne
Work Order Reference
EM2222858

Telephone : + 61-3-8549 9600

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL
	BH1	Groundwater Bore										
1	BH2	Groundwater Bore	4	17/11/22	1205	W	5.68	638.9	0.53	14.99	47.3	1.93
2	BH3	Groundwater Bore	4	17/11/22	9:10	W	6.39	3353	0.12	14.10	-42.6	0.59
	BH4	Groundwater Bore										
3	BH6	Groundwater Bore	4	17/11/22	1648	W	4.91	6535	0.36	15.05	194.7	11.20
4	BH7	Groundwater Bore	4	17/11/22	1022	W	6.35	880	0.09	14.45	-31.1	2.42
	BH8	Groundwater Bore										
	BH9	Groundwater Bore										

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	18/11/22	1330	[illegible]	[illegible]	18/11	13:30

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:**		
T/A Time:			

	Sample ID	**Sample Description**	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
5	**BH10**	**Groundwater bore**	4	17/11/22	1402		5.72	777	0.21	14.53	68.3	2.06				
	BH13	**Groundwater bore**														
	LB1	**Leachate bore**	0	18/11/22	0805		Blocked NO sample					~~14.37~~	12.99			
	LB2	**Leachate bore**	0	18/11/22	0825							14.37				
	LB3	**Leachate bore**	0	18/11/22	0901		NO SAMPLE – SWL ONLY					10.39				
	BLIND	**Blind dup (analysed by ALS)**														
	RINSATE	**Rinsate blank**														

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
A Callender	Ventia	18/11/22	1330	[illegible]	[illegible]	18/11	13:30

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

CHAIN OF CUSTODY

(ALS) Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
	U/S BH3	Creek Sample														
	@ BH3	Creek Sample														
	D/S BH3	Creek Sample														
								~~[illegible]~~								
6	Leachate	Surface water sample	4	17/11/22	1040	W	6.94	740.6	3.78	14.1	-79.0	—				
7	Wetland	Surface water sample	4	17/11/22	0935	W	6.89	300.2	8.20	14.5	-69.2	—				
8	Dredge	Surface water sample	4	18/11/22	0730	W	6.44	875	5.92	13.8	3.67	—				

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
R Callander	Ventia	18/11/22	1330	[illegible]	[illegible]	18/11	13:30

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

(180)

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**	Please forward to EUROFINS for analysis	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:** 190924VENV		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	**Groundwater**	4	13/2/23	1152	W	6.40	1190	0.12	14.53	8.5	3.19				

DATE: 15/2 9am
TIME:
COURIER:
TEMPERATURE 4.5
ATTEMP TO CHILL: YES NO
TW

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com						
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
A Callander	Ventia	13/2/23	1700	[signature]	[signature]	14/2	10:05
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

RELINQUISHED BY
ELP 14.2.23
1815

#963891
15/2/23

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne 6 Monterey Road, Dandenong South VIC 3175, Tel: +61 3 8564 5000, NATA# 1261 Site# 1254
Geelong 19/8 Lewalan Street, Grovedale VIC 3216, Tel: +61 3 8564 5000, NATA# 1261 Site# 25403
Sydney 179 Magowar Road, Girraween NSW 2145, Tel: +61 2 9900 8400, NATA# 1261 Site# 18217
Canberra Unit 1,2 Dacre Street, Mitchell ACT 2911, Tel: +61 2 6113 8091, NATA# 1261 Site# 25466
Brisbane 1/21 Smallwood Place, Murarrie QLD 4172, Tel: +61 7 3902 4600, NATA# 1261 Site# 20794
Newcastle 1/2 Frost Drive, Mayfield West NSW 2304, Tel: +61 2 4968 8448, NATA# 1261, Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth 46-48 Banksia Road, Welshpool WA 6106, Tel: +61 8 6253 4444, NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland 35 O'Rorke Road, Penrose, Auckland 1061, Tel: +64 9 526 45 51, IANZ# 1327
Christchurch 43 Detroit Drive, Rolleston, Christchurch 7675, Tel: 0800 856 450, IANZ# 1290

Sample Receipt Advice

Company name:	Ventia Utility Services P/L (Burwood)
Contact name:	Robert Callander
Project name:	CRESWICK LANDFILL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Feb 15, 2023 9:00 AM
Eurofins reference	963891

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Robert Callander - Robert.callander@ventia.com.au.

Note: A copy of these results will also be delivered to the general Ventia Utility Services P/L (Burwood) email address.

Company Name:	Ventia Utility Services P/L (Burwood)	**Order No.:**		**Received:**	Feb 15, 2023 9:00 AM
Address:	Unit 11, 25-37 Huntingdale Rd Burwood VIC 3125	**Report #:**	963891	**Due:**	Feb 22, 2023
		Phone:	03 9861 8169	**Priority:**	5 Day
		Fax:	03 9861 8101	**Contact Name:**	Robert Callander
Project Name:	CRESWICK LANDFILL				

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Conductivity (at 25 °C)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	CRESWICK SPLIT	Feb 13, 2023		Water	M23-Fe0033757	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1

eurofins | Environment Testing

Certificate of Analysis

Ventia Utility Services P/L (Burwood)
Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Attention: **Robert Callander**

Report **963891-W**
Project name CRESWICK LANDFILL
Received Date Feb 15, 2023

Client Sample ID			**CRESWICK SPLIT**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0033757**
Date Sampled			**Feb 13, 2023**
Test/Reference	LOR	Unit	
Volatile Fatty Acids (VFA) by GC-MS			
Acetic Acid	5	mg/L	< 5
Propionic acid	5	mg/L	< 5
Isobutyric acid	5	mg/L	< 5
Butyric acid	5	mg/L	< 5
Isovaleric acid	5	mg/L	< 5
Valeric acid	5	mg/L	< 5
4-Methylvaleric acid	5	mg/L	< 5
Hexanoic acid	5	mg/L	< 5
Heptanoic acid	5	mg/L	< 5
Total VFA as Acetic Acid Equivalents	5	mg/L	< 5
Ammonia (as N)	0.01	mg/L	0.24
Chemical Oxygen Demand (COD)	25	mg/L	42
Chloride	1	mg/L	200
Conductivity (at 25 °C)	10	uS/cm	1300
Nitrate (as N)	0.02	mg/L	< 0.02
Organic Nitrogen (as N)*	0.2	mg/L	0.96
pH (at 25 °C)	0.1	pH Units	6.9
Sulphate (as SO4)	5	mg/L	22
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	790
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.2
Total Organic Carbon	5	mg/L	19
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20
Heavy Metals			
Arsenic	0.001	mg/L	0.010
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.004
Copper	0.001	mg/L	0.029
Lead	0.001	mg/L	0.028
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.013
Zinc	0.005	mg/L	0.020

Client Sample ID			CRESWICK SPLIT
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0033757**
Date Sampled			**Feb 13, 2023**
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	22
Magnesium	0.5	mg/L	38
Potassium	0.5	mg/L	3.2
Sodium	0.5	mg/L	160

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Volatile Fatty Acids (VFA) by GC-MS	Melbourne	Feb 16, 2023	28 Day
- Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS			
Chemical Oxygen Demand (COD)	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4220 Determination of COD in Water			
Conductivity (at 25 °C)	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4030 Conductivity			
Nitrate (as N)	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
pH (at 25 °C)	Melbourne	Feb 16, 2023	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Total Organic Carbon	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Metals M8	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Feb 16, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Ammonia (as N)	Melbourne	Feb 16, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Organic Nitrogen (as N)*	Melbourne	Feb 15, 2023	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 16, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Feb 16, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Feb 16, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

Company Name: Ventia Utility Services P/L (Burwood)
Address: Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Project Name: CRESWICK LANDFILL

Order No.:
Report #: 963891
Phone: 03 9861 8169
Fax: 03 9861 8101

Received: Feb 15, 2023 9:00 AM
Due: Feb 22, 2023
Priority: 5 Day
Contact Name: Robert Callander

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Conductivity (at 25 °C)	Nitrate (as N)	pH (at 25 °C)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X
External Laboratory																
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**											
1	CRESWICK SPLIT	Feb 13, 2023		Water	M23-Fe0033757	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	mg/L	< 5			5	Pass	
Propionic acid	mg/L	< 5			5	Pass	
Isobutyric acid	mg/L	< 5			5	Pass	
Butyric acid	mg/L	< 5			5	Pass	
Isovaleric acid	mg/L	< 5			5	Pass	
Valeric acid	mg/L	< 5			5	Pass	
4-Methylvaleric acid	mg/L	< 5			5	Pass	
Hexanoic acid	mg/L	< 5			5	Pass	
Heptanoic acid	mg/L	< 5			5	Pass	
Total VFA as Acetic Acid Equivalents	mg/L	< 5			5	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Organic Carbon	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	%	100			70-130	Pass	
Propionic acid	%	73			70-130	Pass	
Isobutyric acid	%	96			70-130	Pass	
Butyric acid	%	97			70-130	Pass	
Isovaleric acid	%	113			70-130	Pass	
Valeric acid	%	96			70-130	Pass	
4-Methylvaleric acid	%	104			70-130	Pass	
Hexanoic acid	%	100			70-130	Pass	
Heptanoic acid	%	102			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	115			70-130	Pass	
Chemical Oxygen Demand (COD)	%	98			70-130	Pass	
Chloride	%	97			70-130	Pass	
Nitrate (as N)	%	90			70-130	Pass	

eurofins

Environment Testing

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Sulphate (as SO4)			%	118			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C			%	96			70-130	Pass	
Total Kjeldahl Nitrogen (as N)			%	114			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	94			80-120	Pass	
Cadmium			%	101			80-120	Pass	
Chromium			%	93			80-120	Pass	
Copper			%	94			80-120	Pass	
Lead			%	94			80-120	Pass	
Mercury			%	80			80-120	Pass	
Nickel			%	95			80-120	Pass	
Zinc			%	95			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	94			80-120	Pass	
Magnesium			%	93			80-120	Pass	
Potassium			%	92			80-120	Pass	
Sodium			%	95			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Volatile Fatty Acids (VFA) by GC-MS				Result 1					
Isobutyric acid	M23-Fe0033716	NCP	%	72			70-130	Pass	
Isovaleric acid	M23-Fe0033716	NCP	%	122			70-130	Pass	
Valeric acid	M23-Fe0044041	NCP	%	92			70-130	Pass	
4-Methylvaleric acid	M23-Fe0033716	NCP	%	87			70-130	Pass	
Hexanoic acid	M23-Fe0033716	NCP	%	125			70-130	Pass	
Heptanoic acid	M23-Fe0033716	NCP	%	83			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M23-Fe0032861	NCP	%	91			70-130	Pass	
Chemical Oxygen Demand (COD)	M23-Fe0035004	NCP	%	85			70-130	Pass	
Chloride	B23-Fe0032328	NCP	%	85			70-130	Pass	
Nitrate (as N)	M23-Fe0032861	NCP	%	70			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	S23-Fe0032357	NCP	%	84			70-130	Pass	
Total Organic Carbon	M23-Fe0040367	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	W23-Fe0028496	NCP	%	92			75-125	Pass	
Cadmium	W23-Fe0028496	NCP	%	102			75-125	Pass	
Chromium	W23-Fe0028496	NCP	%	91			75-125	Pass	
Copper	W23-Fe0028496	NCP	%	86			75-125	Pass	
Lead	W23-Fe0028496	NCP	%	86			75-125	Pass	
Mercury	W23-Fe0028496	NCP	%	91			75-125	Pass	
Nickel	W23-Fe0028496	NCP	%	84			75-125	Pass	
Zinc	W23-Fe0028496	NCP	%	85			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M23-Fe0034744	NCP	%	115			75-125	Pass	
Magnesium	M23-Fe0032955	NCP	%	95			75-125	Pass	
Potassium	M23-Fe0034744	NCP	%	110			75-125	Pass	
Sodium	M23-Fe0032955	NCP	%	91			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Volatile Fatty Acids (VFA) by GC-MS				Result 1	Result 2	RPD			
Acetic Acid	K23-Fe0019144	NCP	mg/L	21	22	1.7	30%	Pass	
Propionic acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isobutyric acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Butyric acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isovaleric acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Valeric acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
4-Methylvaleric acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Hexanoic acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Heptanoic acid	K23-Fe0019144	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Total VFA as Acetic Acid Equivalents	M23-Fe0013656	NCP	mg/L	1400	1400	2.8	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M23-Fe0032892	NCP	mg/L	< 0.01	0.01	n/a	30%	Pass	
Chemical Oxygen Demand (COD)	M23-Fe0035007	NCP	mg/L	440	420	3.4	30%	Pass	
Chloride	M23-Fe0033757	CP	mg/L	200	240	18	30%	Pass	
Nitrate (as N)	M23-Fe0032892	NCP	mg/L	0.51	0.52	1.4	30%	Pass	
Sulphate (as SO4)	M23-Fe0033757	CP	mg/L	22	23	4.5	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	M23-Fe0034745	NCP	mg/L	6000	5800	4.1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	B23-Fe0035457	NCP	mg/L	3.1	2.7	13	30%	Pass	
Total Organic Carbon	M23-Fe0040364	NCP	mg/L	6.5	7.4	14	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	W23-Fe0028496	NCP	mg/L	0.002	0.002	21	30%	Pass	
Cadmium	W23-Fe0028496	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	W23-Fe0028496	NCP	mg/L	0.002	0.002	19	30%	Pass	
Copper	W23-Fe0028496	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	W23-Fe0028496	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	W23-Fe0028496	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	W23-Fe0028496	NCP	mg/L	0.035	0.033	4.9	30%	Pass	
Zinc	W23-Fe0028496	NCP	mg/L	0.017	0.016	1.6	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M23-Fe0034744	NCP	mg/L	71	71	<1	30%	Pass	
Magnesium	M23-Fe0034744	NCP	mg/L	330	330	<1	30%	Pass	
Potassium	M23-Fe0034744	NCP	mg/L	22	22	2.3	30%	Pass	
Sodium	M23-Fe0034744	NCP	mg/L	1800	1700	1.5	30%	Pass	

Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Savini Suduweli	Analytical Services Manager
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2302400**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 14-Feb-2023 10:05
Order number	: Creswick Landfill	Date Analysis Commenced	: 15-Feb-2023
C-O-C number	: ----	Issue Date	: 20-Feb-2023 16:47
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 6		
No. of samples analysed	: 6		

NATA

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	BH4	BH14	BLIND	U/S BH3	@ BH3
			Sampling date / time	13-Feb-2023 14:02	13-Feb-2023 11:52	13-Feb-2023 00:00	13-Feb-2023 13:15	13-Feb-2023 12:55
Compound	CAS Number	LOR	Unit	EM2302400-001	EM2302400-002	EM2302400-003	EM2302400-005	EM2302400-006
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.96	6.65	6.64	7.50	7.10
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1770	1330	1320	687	782
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1060	978	925	429	477
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	71	138	141	82	90
Total Alkalinity as CaCO3	----	1	mg/L	71	138	141	82	90
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	22	22	6	<1
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	550	363	354	172	205
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	12	21	22	16	18
Magnesium	7439-95-4	1	mg/L	37	39	39	22	26
Sodium	7440-23-5	1	mg/L	239	163	158	77	84
Potassium	7440-09-7	1	mg/L	<1	4	4	3	3
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	0.012	0.048	0.062	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	0.035	0.059	0.065	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L	39.5	47.5	54.3	4.82	14.7
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.51	0.21	<0.01	0.15
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	0.03	0.01	0.01	0.14	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.01	0.01	0.14	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.9	0.5	0.8	0.8

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	BH4	BH14	BLIND	U/S BH3	@ BH3
			Sampling date / time	13-Feb-2023 14:02	13-Feb-2023 11:52	13-Feb-2023 00:00	13-Feb-2023 13:15	13-Feb-2023 12:55
Compound	CAS Number	LOR	Unit	EM2302400-001	EM2302400-002	EM2302400-003	EM2302400-005	EM2302400-006
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	17.0	13.4	13.3	6.62	7.58
ø Total Cations	----	0.01	meq/L	14.0	11.4	11.3	6.04	6.77
ø Ionic Balance	----	0.01	%	9.71	8.05	8.06	4.58	5.66
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	1840	1190	----	668	799
ø Dissolved Oxygen	----	0.1	mg/L	0.37	0.12	----	4.96	0.69
ø pH	----	0.01	pH Unit	5.77	6.40	----	6.83	6.04
ø Redox Potential	----	0.1	mV	6.5	8.5	----	20.4	2.5
ø Temperature	----	0.1	°C	14.36	14.53	----	19.4	15.55
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	4.88	3.19	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	39	16	15	10	11
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	145	90	100	15	11
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	25	19	13	11	8

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	D/S BH3	----	----	----	----
			Sampling date / time	13-Feb-2023 10:50	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302400-007	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.06**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**545**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**341**	----	----	----	----
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	**88**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**88**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**122**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**17**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**18**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**55**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**3**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**13.8**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.21**	----	----	----	----
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	**1.0**	----	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	D/S BH3	----	----	----	----
			Sampling date / time	13-Feb-2023 10:50	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302400-007	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**5.20**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**4.80**	----	----	----	----
ø Ionic Balance	----	0.01	%	**4.01**	----	----	----	----
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	**550**	----	----	----	----
ø Dissolved Oxygen	----	0.1	mg/L	**1.12**	----	----	----	----
ø pH	----	0.01	pH Unit	**6.66**	----	----	----	----
ø Redox Potential	----	0.1	mV	**-7.7**	----	----	----	----
ø Temperature	----	0.1	°C	**16.81**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**13**	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**14**	----	----	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**14**	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2302400**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 14-Feb-2023
Order number	: Creswick Landfill	Date Analysis Commenced	: 15-Feb-2023
C-O-C number	: ----	Issue Date	: 20-Feb-2023
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 6		
No. of samples analysed	: 6		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4873035)									
EM2302394-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.46	7.41	0.7	0% - 20%
EM2302401-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	2.48	2.47	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4873034)									
EM2302393-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	7830	7920	1.2	0% - 20%
EM2302393-006	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	6620	6590	0.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4873037)									
EM2302412-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	228	221	3.1	0% - 20%
EM2302401-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	11300	11200	0.2	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4878500)									
EM2302364-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	626	594	5.2	0% - 20%
EM2302393-007	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7260	7170	1.2	0% - 20%
EM2302400-001	BH4	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1060	1060	0.6	0% - 20%
EM2302426-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2010	2020	0.1	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4873036)									
EM2302394-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	809	778	3.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	809	778	3.8	0% - 20%
EM2302401-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4873416)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4873416) - continued									
EM2302400-001	BH4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6	8	14.4	No Limit
EM2302452-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1840	1930	4.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4873417)									
EM2302400-001	BH4	ED045G: Chloride	16887-00-6	1	mg/L	550	550	0.0	0% - 20%
EM2302452-004	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3900	3910	0.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4876344)									
EM2302271-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	94	94	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	127	127	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1550	1550	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	30	30	0.0	0% - 20%
EM2302400-003	BLIND	ED093F: Calcium	7440-70-2	1	mg/L	22	22	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	39	39	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	158	160	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4875506)									
EM2302400-001	BH4	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.012	0.012	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.035	0.036	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	39.5	39.5	0.0	0% - 20%
EM2302482-002	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	3.46	3.58	3.5	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.90	0.72	21.6	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4875779)									
EM2302278-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	2.49	2.49	0.0	0% - 20%
EM2302364-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.36	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4873415)									
EM2302400-001	BH4	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2302452-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.02	<0.02	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4875780)									
EM2302278-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EM2302364-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4873873)									
EM2302335-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	0.3	97.2	No Limit
EM2302084-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	<1.0	45.7	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4876174)									
EM2302400-001	BH4	EP005: Total Organic Carbon	----	1	mg/L	39	33	16.7	0% - 20%
EM2302452-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	30	30	0.0	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4873903)									
--------		EP026SP: Chemical Oxygen Demand	----	10	mg/L	----	585	1.7	0% - 50%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4873903) - continued									
EM2302393-007	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<20	<20	0.0	No Limit
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4873904)									
EM2302400-003	BLIND	EP026SP: Chemical Oxygen Demand	----	10	mg/L	100	98	2.0	0% - 50%
EP045: Volatile Acids as CH3COOH (QC Lot: 4873436)									
EM2302160-002	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	48	51	6.3	0% - 50%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EA005P: pH by PC Titrator (QCLot: 4873035)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.5	98.8	101
				----	7 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4873034)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	107	85.0	119
EA010P: Conductivity by PC Titrator (QCLot: 4873037)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	106	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4878500)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	99.6	91.0	110
				<10	2440 mg/L	99.7	81.6	118
				<10	293 mg/L	106	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4873036)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	99.4	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4873416)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	90.0	110
				<1	500 mg/L	102	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 4873417)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	109	90.0	110
				<1	1000 mg/L	104	90.0	110
ED093F: Dissolved Major Cations (QCLot: 4876344)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	111	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	110	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	109	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	108	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4875506)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	115	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	108	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4875779)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.0	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4873415)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.3	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4875780)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	110

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4873873)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	89.9	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4876174)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	101	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4873903)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	25 mg/L	104	89.7	111
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4873904)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	105	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4873436)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	185 mg/L	97.4	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4873416)							
EM2302400-002	BH14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	98.2	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4873417)							
EM2302400-002	BH14	ED045G: Chloride	16887-00-6	400 mg/L	91.3	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4875506)							
EM2302400-001	BH4	EG020A-T: Chromium	7440-47-3	1 mg/L	101	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	104	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4875779)							
EM2302278-002	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4873415)							
EM2302400-002	BH14	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	105	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4875780)							
EM2302278-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	89.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4873873)							
EM2302271-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	100	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4876174)							
EM2302400-002	BH14	EP005: Total Organic Carbon	----	100 mg/L	115	76.6	125

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	High
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4873903)							
EM2302318-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	500 mg/L	125	70.0	130
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4873904)							
EM2302400-005	U/S BH3	EP026SP: Chemical Oxygen Demand	----	500 mg/L	113	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2302400**	Page	: 1 of 8
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 14-Feb-2023
Site	: ----	Issue Date	: 20-Feb-2023
Sampler	: ----	No. of samples received	: 6
Order number	: Creswick Landfill	No. of samples analysed	: 6

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	EM2302278--002	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural BH4, BH14, BLIND, U/S BH3, @ BH3, D/S BH3	----	----	----	16-Feb-2023	13-Feb-2023	**3**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural BH4, BH14, BLIND, U/S BH3, @ BH3, D/S BH3	----	----	----	16-Feb-2023	15-Feb-2023	**1**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	Extraction / Preparation			Analysis		
Container */ Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) BH4, BH14, BLIND, U/S BH3, @ BH3, D/S BH3	**13-Feb-2023**	**----**	----	----	**16-Feb-2023**	13-Feb-2023	✘

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**16-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**17-Feb-2023**	20-Feb-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**16-Feb-2023**	27-Feb-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**20-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**20-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**17-Feb-2023**	20-Feb-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH4,	BH14,	**13-Feb-2023**	**16-Feb-2023**	12-Aug-2023	✓	**16-Feb-2023**	12-Aug-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**17-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**16-Feb-2023**	15-Feb-2023	×
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**16-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH4,	BH14,	**13-Feb-2023**	**19-Feb-2023**	13-Mar-2023	✓	**20-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EP005: Total Organic Carbon (TOC)								
Amber VOC Vial - Sulfuric Acid (EP005)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**17-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**15-Feb-2023**	13-Mar-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH4,	BH14,	**13-Feb-2023**	**----**	----	----	**15-Feb-2023**	27-Feb-2023	✓
BLIND,	U/S BH3,							
@ BH3,	D/S BH3							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	34	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	**Actual**	**Expected**	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2302400**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 14-Feb-2023 10:05	Issue Date	: 14-Feb-2023
Client Requested Due Date	: 21-Feb-2023	Scheduled Reporting Date	: **21-Feb-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3.4°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2302400-001	13-Feb-2023 14:02	BH4	✓	✓	✓	✓	✓	✓	✓
EM2302400-002	13-Feb-2023 11:52	BH14	✓	✓	✓	✓	✓	✓	✓
EM2302400-003	13-Feb-2023 00:00	BLIND	✓	✓	✓	✓	✓	✓	✓
EM2302400-005	13-Feb-2023 13:15	U/S BH3	✓	✓	✓	✓	✓	✓	✓
EM2302400-006	13-Feb-2023 12:55	@ BH3	✓	✓	✓	✓	✓	✓	✓
EM2302400-007	13-Feb-2023 10:50	D/S BH3	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2302400-001	13-Feb-2023 14:02	BH4	✓	✓	✓	✓	✓
EM2302400-002	13-Feb-2023 11:52	BH14	✓	✓	✓	✓	✓
EM2302400-003	13-Feb-2023 00:00	BLIND	✓	✓		✓	✓
EM2302400-005	13-Feb-2023 13:15	U/S BH3	✓	✓	✓	✓	✓
EM2302400-006	13-Feb-2023 12:55	@ BH3	✓	✓	✓	✓	✓
EM2302400-007	13-Feb-2023 10:50	D/S BH3	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
@ BH3	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	×	----	----
BH14	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	×	----	----
BH4	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	×	----	----
BLIND	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	×	----	----
D/S BH3	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	×	----	----

U/S BH3	Clear Plastic Bottle - Natural	----	13-Feb-2023	14-Feb-2023	✘	----	----

Requested Deliverables

ACCOUNTS PAYABLE - VIC ONLY

- A4 - AU Tax Invoice (INV)	Email	Nicole.Robins@ventia.com

LUCY EDWARDS

- *AU Certificate of Analysis - NATA (COA)	Email	lucy.edwards@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	lucy.edwards@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	lucy.edwards@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	lucy.edwards@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	lucy.edwards@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	lucy.edwards@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	lucy.edwards@ventia.com.au

Ping Yao

- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com

ROBERT CALLANDER

- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com.au
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com.au

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 1 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	ME/412/16
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
BH1	Groundwater Bore														
BH2	Groundwater Bore														
BH3	Groundwater Bore														
BH4	Groundwater Bore	4	13/2/23	1402	w	5.77	1840	0.37	14.36	6.5	4.88				
BH6	Groundwater Bore														
BH7	Groundwater Bore														
BH8	Groundwater Bore														
BH9	Groundwater Bore														

Environmental Division
Melbourne
Work Order Reference
EM2302400

Telephone : + 61-3-8549 9600

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	13/2/23	1700	Marta	Cmy	14/2	10:05

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

SH 14/2

CHAIN OF COSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	**Job Ref:**	Creswick Landfill 2 of 3
Contact:	Robert Callander		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
	BH10	Groundwater bore														
2	BH1~~3~~4	Groundwater bore	4	13/2/23	1152		6.40	1190	0.12	14.53	8.5	3.19				
	LB1	Leachate bore														
	LB2	Leachate bore														
	LB3	Leachate bore					NO SAMPLE – SWL ONLY									
3	BLIND	Blind dup (analysed by ALS)	4	13/2/23												
4	RINSATE	Rinsate blank	4	13/2/23												

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	13/2/23	1700	[signature]			

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions: Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 3 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL					
5	U/S BH3	Creek Sample		13/2/23	~~[illegible]~~ 1315		6.83	668.5	4.96	19.4	20.4	–					
6	@ BH3	Creek Sample		13/2/23	1255		6.04	799.1	0.69	15.55	2.5	–					
7	D/S BH3	Creek Sample		13/2/23	1050		6.66	549.7	1.12	16.81	-7.7	–					
	Leachate	Surface water sample															
	Wetland	Surface water sample															
	Dredge	Surface water sample															

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	13/2/23	1700	[signature]			

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CERTIFICATE OF ANALYSIS

Work Order	: **EM2302525**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 15-Feb-2023 12:35
Order number	: Creswick Landfill	Date Analysis Commenced	: 16-Feb-2023
C-O-C number	: ----	Issue Date	: 22-Feb-2023 21:15
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EA015H: EM2302525 #1: 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.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	BH3	BH6	BH7	BH8	BH10
Sampling date / time				14-Feb-2023 12:06	14-Feb-2023 09:15	14-Feb-2023 13:51	14-Feb-2023 11:06	14-Feb-2023 10:24
				EM2302525-001	EM2302525-002	EM2302525-003	EM2302525-004	EM2302525-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.67	5.66	6.53	6.85	5.76
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	2390	661	924	823	806
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1380	395	573	656	563
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	227	13	152	275	46
Total Alkalinity as CaCO3	----	1	mg/L	227	13	152	275	46
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	18	19	10	7	23
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	669	182	205	96	215
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	39	5	18	13	8
Magnesium	7439-95-4	1	mg/L	71	17	24	26	20
Sodium	7440-23-5	1	mg/L	304	91	111	114	103
Potassium	7440-09-7	1	mg/L	18	1	15	4	9
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	0.010	0.003	0.035	0.102	0.005
Zinc	7440-66-6	0.005	mg/L	0.090	0.043	0.070	0.098	0.062
Iron	7439-89-6	0.05	mg/L	49.9	0.41	85.1	162	22.8
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.13	<0.01	0.79	1.43	1.52
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	1.91	<0.01	<0.01	0.03
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	1.91	<0.01	<0.01	0.03
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.3	0.9	4.0	1.8

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH3	BH6	BH7	BH8	BH10
			Sampling date / time	14-Feb-2023 12:06	14-Feb-2023 09:15	14-Feb-2023 13:51	14-Feb-2023 11:06	14-Feb-2023 10:24
Compound	CAS Number	LOR	Unit	EM2302525-001	EM2302525-002	EM2302525-003	EM2302525-004	EM2302525-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	23.8	5.79	9.03	8.35	7.46
ø Total Cations	----	0.01	meq/L	21.5	5.63	8.08	7.85	6.76
ø Ionic Balance	----	0.01	%	5.10	1.37	5.51	3.08	4.97
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	2480	632	975	928	795
ø Dissolved Oxygen	----	0.1	mg/L	0.16	0.28	0.16	0.13	0.25
ø pH	----	0.01	pH Unit	6.52	5.05	6.54	6.68	5.61
ø Redox Potential	----	0.1	mV	-17.2	220.1	-8.5	-47.7	114.7
ø Temperature	----	0.1	°C	17.20	14.9	15.34	16.67	16.22
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	0.87	11.65	2.69	3.02	2.44
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	30	4	15	30	11
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	13	16	196	439	83
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	<5	9	9

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RINSATE	Leachate	Wetland	----	----
			Sampling date / time	14-Feb-2023 00:00	14-Feb-2023 14:15	14-Feb-2023 12:40	----	----
Compound	CAS Number	LOR	Unit	EM2302525-006	EM2302525-007	EM2302525-008	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**5.49**	**7.54**	**7.70**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	**1180**	**1660**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	<10	**638**	**892**	----	----
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	**1**	**194**	**244**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**1**	**194**	**244**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	**3**	<1	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	<1	**264**	**404**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	**40**	**30**	----	----
Magnesium	7439-95-4	1	mg/L	<1	**30**	**50**	----	----
Sodium	7440-23-5	1	mg/L	<1	**130**	**207**	----	----
Potassium	7440-09-7	1	mg/L	<1	**24**	**33**	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.010**	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	**5.48**	**7.65**	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	**6.26**	**0.01**	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	**0.04**	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	**0.06**	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	**0.10**	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	**6.6**	**10.4**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	RINSATE	Leachate	Wetland	----	----
			Sampling date / time	14-Feb-2023 00:00	14-Feb-2023 14:15	14-Feb-2023 12:40	----	----
Compound	CAS Number	LOR	Unit	EM2302525-006	EM2302525-007	EM2302525-008	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	0.02	11.4	16.3	----	----
ø Total Cations	----	0.01	meq/L	<0.01	10.7	15.5	----	----
ø Ionic Balance	----	0.01	%	----	2.95	2.56	----	----
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	1160	1610	----	----
ø Dissolved Oxygen	----	0.1	mg/L	----	12.09	8.72	----	----
ø pH	----	0.01	pH Unit	----	7.32	7.44	----	----
ø Redox Potential	----	0.1	mV	----	-28.9	14.9	----	----
ø Temperature	----	0.1	°C	----	23.13	21.72	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	13	44	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	53	374	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	7	<5	17	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2302525**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 15-Feb-2023
Order number	: Creswick Landfill	Date Analysis Commenced	: 16-Feb-2023
C-O-C number	: ----	Issue Date	: 22-Feb-2023
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4878798)									
EM2302499-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.35	8.69	4.0	0% - 20%
EM2302625-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.33	7.35	0.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4878796)									
EM2302447-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	16500	16700	1.3	0% - 20%
EM2302381-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	16000	16200	0.9	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4878802)									
EM2302525-007	Leachate	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1180	1180	0.0	0% - 20%
EM2302625-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	5710	5720	0.1	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4881384)									
EM2302447-004	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	13300	13600	1.6	0% - 20%
EM2302502-004	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	83	78	6.2	No Limit
EM2302525-002	BH6	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	395	377	4.5	0% - 20%
EM2302783-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	2920	2920	0.1	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4878799)									
EM2302525-007	Leachate	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	194	195	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	194	195	0.0	0% - 20%
EM2302474-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	12	12	0.0	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	12	12	0.0	0% - 50%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4876169)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4876169) - continued									
EM2302525-002	BH6	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	19	20	0.0	0% - 50%
EM2302484-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	886	879	0.8	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4876326)									
EM2302493-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	143	143	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4876170)									
EM2302525-002	BH6	ED045G: Chloride	16887-00-6	1	mg/L	182	180	1.2	0% - 20%
EM2302484-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	13	13	0.0	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 4876324)									
EM2302487-006	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	12	12	0.0	0% - 50%
EM2302456-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	65	66	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4878277)									
EM2302494-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	284	292	2.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	19	22	12.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1020	1040	2.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	68	69	1.8	0% - 20%
EM2302525-007	Leachate	ED093F: Calcium	7440-70-2	1	mg/L	40	39	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	30	30	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	130	130	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	24	24	0.0	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 4881401)									
EM2301244-013	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EM2302421-006	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4880973)									
EM2302525-004	BH8	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.43	1.38	3.9	0% - 20%
EM2302221-006	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.19	0.17	9.9	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4876168)									
EM2302525-002	BH6	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2302484-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.28	0.28	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4876325)									
EM2302493-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2302486-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4880972)									
EM2302493-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.28	0.29	0.0	0% - 20%
EM2302221-006	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.28	4.27	0.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4880974)									
EM2302525-005	BH10	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4881365)									
EM2302525-001	BH3	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.9	0.0	No Limit
EM2302596-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.7	1.8	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 4878505)									
EM2302421-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	23	24	0.0	0% - 20%
EM2302525-008	Wetland	EP005: Total Organic Carbon	----	1	mg/L	44	43	3.1	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4881021)									
EM2302376-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	60	<10	143	No Limit
EM2302525-008	Wetland	EP026SP: Chemical Oxygen Demand	----	10	mg/L	374	361	3.5	0% - 20%
EP045: Volatile Acids as CH3COOH (QC Lot: 4881553)									
EM2302525-001	BH3	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	<5	0.0	No Limit
EM2302629-003	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	15	15	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4878798)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.2	98.8	101
				----	7 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4878796)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	104	85.0	119
EA010P: Conductivity by PC Titrator (QCLot: 4878802)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	106	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4881384)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	91.0	110
				<10	2440 mg/L	107	81.6	118
				<10	293 mg/L	101	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4878799)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	93.9	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4876169)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	90.0	110
				<1	500 mg/L	106	90.0	110
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4876326)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	108	90.0	110
				<1	500 mg/L	100	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 4876170)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	90.0	110
				<1	1000 mg/L	106	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 4876324)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	90.0	110
				<1	1000 mg/L	105	90.0	110
ED093F: Dissolved Major Cations (QCLot: 4878277)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	105	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4881401)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.4	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	92.8	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4880973)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	96.2	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4876168)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	97.2	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4876325)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4880972)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4880974)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4881365)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	91.7	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 4878505)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	99.8	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4881021)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	106	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4881553)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	185 mg/L	100	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4876169)							
EM2302421-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4876326)							
EM2302493-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	96.3	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4876170)							
EM2302421-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	101	70.0	142
ED045G: Chloride by Discrete Analyser (QCLot: 4876324)							
EM2302456-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4881401)							

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EG020T: Total Metals by ICP-MS (QCLot: 4881401) - continued							
EM2301244-013	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	93.8	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	90.9	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4880973)							
EM2302221-007	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	125	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4876168)							
EM2302488-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	95.7	80.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4876325)							
EM2302486-007	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	97.3	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4880972)							
EM2302221-007	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4880974)							
EM2302525-006	RINSATE	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	94.9	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4881365)							
EM2302525-002	BH6	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.7	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4878505)							
EM2302421-005	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	102	76.6	125

Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2302525**	Page	: 1 of 9
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill	Date Samples Received	: 15-Feb-2023
Site	: ----	Issue Date	: 22-Feb-2023
Sampler	: ----	No. of samples received	: 8
Order number	: Creswick Landfill	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	**Analyte**	CAS Number	Data	Limits	**Comment**
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2302421--002	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	EM2302456--002	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EM2302221--007	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH3,	BH6,	----	----	----	20-Feb-2023	14-Feb-2023	**6**
BH7,	BH8,						
BH10,	RINSATE,						
Leachate,	Wetland						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Chemical Oxygen Demand (COD) (Spectrophotometric)	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container */ Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	 Due for extraction	 Evaluation	Analysis Date analysed	 Due for analysis	 Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	14-Feb-2023	✘
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	14-Mar-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**19-Feb-2023**	21-Feb-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	28-Feb-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) BH3, BH6, BH7, BH8, BH10, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**16-Feb-2023**	14-Mar-2023	✓
Clear Plastic Bottle - Natural (ED041G) RINSATE	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	14-Mar-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) BH3, BH6, BH7, BH8, BH10, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**16-Feb-2023**	14-Mar-2023	✓
Clear Plastic Bottle - Natural (ED045G) RINSATE	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	14-Mar-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH3,	BH6,	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	21-Feb-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH3,	BH6,	**14-Feb-2023**	**20-Feb-2023**	13-Aug-2023	✓	**20-Feb-2023**	13-Aug-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH3,	BH6,	**14-Feb-2023**	**----**	----	----	**22-Feb-2023**	14-Mar-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH3,	BH6,	**14-Feb-2023**	**----**	----	----	**16-Feb-2023**	16-Feb-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH3,	BH6,	**14-Feb-2023**	**----**	----	----	**21-Feb-2023**	14-Mar-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH3,	BH6,	**14-Feb-2023**	**22-Feb-2023**	14-Mar-2023	✓	**22-Feb-2023**	14-Mar-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
BH3,	BH6,	**14-Feb-2023**	**----**	----	----	**17-Feb-2023**	14-Mar-2023	✓
BH7,	BH8,							
BH10,	RINSATE,							
Leachate,	Wetland							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	Due for extraction	Evaluation	Analysis Date analysed	Due for analysis	Evaluation
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**18-Feb-2023**	14-Mar-2023	✓
EP045: Volatile Acids as CH3COOH							
Clear Plastic Bottle - Natural (EP045) BH3, BH6, BH7, BH8, BH10, RINSATE, Leachate, Wetland	**14-Feb-2023**	**----**	----	----	**20-Feb-2023**	28-Feb-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	28	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	3	17	**17.65**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	28	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	3	28	**10.71**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	28	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	28	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	31	**9.68**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	0	20	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.76**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	28	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2302525**

Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 15-Feb-2023 12:35	Issue Date	: 15-Feb-2023
Client Requested Due Date	: 22-Feb-2023	Scheduled Reporting Date	: **22-Feb-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 2.8°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2302525-001	14-Feb-2023 12:06	BH3	✓	✓	✓	✓	✓	✓	✓
EM2302525-002	14-Feb-2023 09:15	BH6	✓	✓	✓	✓	✓	✓	✓
EM2302525-003	14-Feb-2023 13:51	BH7	✓	✓	✓	✓	✓	✓	✓
EM2302525-004	14-Feb-2023 11:06	BH8	✓	✓	✓	✓	✓	✓	✓
EM2302525-005	14-Feb-2023 10:24	BH10	✓	✓	✓	✓	✓	✓	✓
EM2302525-006	14-Feb-2023 00:00	RINSATE	✓	✓	✓	✓	✓	✓	✓
EM2302525-007	14-Feb-2023 14:15	Leachate	✓	✓	✓	✓	✓	✓	✓
EM2302525-008	14-Feb-2023 12:40	Wetland	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2302525-001	14-Feb-2023 12:06	BH3	✓	✓	✓	✓	✓
EM2302525-002	14-Feb-2023 09:15	BH6	✓	✓	✓	✓	✓
EM2302525-003	14-Feb-2023 13:51	BH7	✓	✓	✓	✓	✓
EM2302525-004	14-Feb-2023 11:06	BH8	✓	✓	✓	✓	✓
EM2302525-005	14-Feb-2023 10:24	BH10	✓	✓	✓	✓	✓
EM2302525-006	14-Feb-2023 00:00	RINSATE	✓	✓		✓	✓
EM2302525-007	14-Feb-2023 14:15	Leachate	✓	✓	✓	✓	✓
EM2302525-008	14-Feb-2023 12:40	Wetland	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							

BH10	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
BH3	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
BH6	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
BH7	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
BH8	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
Leachate	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
RINSATE	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----
Wetland	Clear Plastic Bottle - Natural	----	14-Feb-2023	15-Feb-2023	✘	----	----

Requested Deliverables

ACCOUNTS PAYABLE - VIC ONLY		
- A4 - AU Tax Invoice (INV)	Email	Nicole.Robins@ventia.com
LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	Lucy.Edwards@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lucy.Edwards@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lucy.Edwards@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lucy.Edwards@ventia.com
- Chain of Custody (CoC) (COC)	Email	Lucy.Edwards@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	Lucy.Edwards@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	Lucy.Edwards@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	robert.callander@ventia.com

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

ALS Group

Client:	Ventia	Job Ref:	Creswick Landfill 1 of 3 793/19
Contact:	Robert Callander		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		Quote No.:	ME/412/16
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
	BH1	Groundwater Bore														
	BH2	Groundwater Bore														
1	BH3	Groundwater Bore	4	14/2/23	1206	W	6.52	2481	0.16	17.20	-17.2	0.87				
	BH4	Groundwater Bore														
2	BH6	Groundwater Bore	4	14/2/23	915	W	5.05	632	0.28	14.9	220.1	11.65				
3	BH7	Groundwater Bore	4	14/2/23	1361	1	~~9~~6.54	975	0.16	15.34	-8.5	2.69				
4	BH8	Groundwater Bore	4	14/2/23	1106	W	6.68	928	0.13	16.67	-47.7	3.02				
	BH9	Groundwater Bore														

Environmental Division
Melbourne
Work Order Reference
EM2302525

Telephone : + 61-3-8549 9600

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com						
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
R Callander	Ventia	14/2/23	1700	Heath	ALS	15.02.23	12.35

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.	*LAB USE ONLY*	Sample conditions: Samples received undamaged [Yes/No] Samples adequately preserved [Yes/No]
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.		Samples within recommended holding times: [Yes/No] Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill 2 of 3
Contact:	Robert Callander		TESTS REQUIRED AS PER QUOTE ME/412/16
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051	Fax:	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		Quote No.:	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
5	BH10	Groundwater bore	4	14/2/23	1024	W	5.61	795	0.25	16.22	114.7	2.44				
	BH13	Groundwater bore														
	LB1	Leachate bore														
	LB2	Leachate bore														
	LB3	Leachate bore					NO SAMPLE – SWL ONLY									
	BLIND	Blind dup (analysed by ALS)														
6	RINSATE	Rinsate blank	4	14/2/23		W										

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com						
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
A Callander	Ventia	14/2/23	1700				

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions: Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

CHAIN OF CUSTODY

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 3 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
U/S BH3	**Creek Sample**														
@ BH3	**Creek Sample**														
D/S BH3	**Creek Sample**														
Leachate	**Surface water sample**	4	14/2/23	1415	W	7.32	1158	12.09	23.13	-28.9	–				
Wetland	**Surface water sample**	4	14/2/23	1240	W	~~8.83~~ 7.44	1607	8.72	21.72	14.9	–				
Dredge	**Surface water sample**														

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	14/2/23	1700				

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:

Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CERTIFICATE OF ANALYSIS

Work Order	: **EM2302773**	Page	: 1 of 4
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 3 of 3	Date Samples Received	: 17-Feb-2023 12:55
Order number	: Creswick Landfill 3 of 3	Date Analysis Commenced	: 17-Feb-2023
C-O-C number	: ----	Issue Date	: 24-Feb-2023 19:23
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Tom Maloney	Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

- Field Readings -
  sample ID:Dredge, SWL = -m, EC = 914uS/cm, pH =6.85 , Temp = 22.0°C, DO = 7.53mg/L, ORP =63.6mV
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Ionic Balance out of acceptable limits for sample #1 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Sample ID	Dredge Surface Water Sample	----	----	----	----
			Sampling date / time	16-Feb-2023 16:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302773-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.93**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**976**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**518**	----	----	----	----
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	**58**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**58**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**16**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**286**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**11**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**24**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**126**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**3**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**1.42**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	----	----
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								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Dredge Surface Water Sample	----	----	----	----
			Sampling date / time	16-Feb-2023 16:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302773-001	--------	--------	--------	--------
				Result	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.7**	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**9.56**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**8.08**	----	----	----	----
ø Ionic Balance	----	0.01	%	**8.38**	----	----	----	----
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	**914**	----	----	----	----
ø Dissolved Oxygen	----	0.1	mg/L	**7.53**	----	----	----	----
ø pH	----	0.01	pH Unit	**6.85**	----	----	----	----
ø Redox Potential	----	0.1	mV	**63.6**	----	----	----	----
ø Temperature	----	0.1	°C	**22.0**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**6**	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**47**	----	----	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**8**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2302773**	Page	: 1 of 5
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 3 of 3	Date Samples Received	: 17-Feb-2023
Order number	: Creswick Landfill 3 of 3	Date Analysis Commenced	: 17-Feb-2023
C-O-C number	: ----	Issue Date	: 24-Feb-2023
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Tom Maloney	Laboratory Manager	Melbourne External Subcontracting, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 4884669)									
EM2302765-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.03	7.15	1.7	0% - 20%
EM2302782-008	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	5.84	5.64	3.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4884670)									
EM2302765-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	411	429	4.3	0% - 20%
EM2302782-008	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2	1	0.0	No Limit
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4889801)									
EM2302719-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	613	605	1.3	0% - 20%
EM2302771-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1250	1180	5.3	0% - 20%
EM2302778-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	8830	9090	3.0	0% - 20%
EM2302879-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7180	7610	5.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4884668)									
EM2302765-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	120	121	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	120	121	0.0	0% - 20%
EM2302782-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4880707)									
EM2302787-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	273	267	2.3	0% - 20%
EM2302668-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2470	2420	2.1	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 4880708)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
ED045G: Chloride by Discrete Analyser (QC Lot: 4880708) - continued									
EM2302668-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3690	3650	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 4884270)									
EM2302775-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1	1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	14	14	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	103	104	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.0	No Limit
EM2302782-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4887233)									
EM2301023-015	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.757	0.749	1.0	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	31.1	31.8	2.3	0% - 20%
EM2302747-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.010	0.008	26.6	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.026	0.022	15.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	3.62	3.64	0.7	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4884420)									
EM2302781-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2302688-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	5.78	5.73	0.9	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4880706)									
EM2302787-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.11	0.11	0.0	0% - 50%
EM2302668-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4884421)									
EM2302756-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	5.46	5.54	1.5	0% - 20%
EM2302688-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4884194)									
EM2302747-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.0	No Limit
EM2302867-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4887576)									
EM2302767-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	2	0.0	No Limit
EM2302906-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4890950)									
EM2302694-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	88	86	2.3	No Limit
EM2302703-004	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	49	45	8.5	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 4887593)									
EM2302623-001	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	13	13	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4884669)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4884670)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	97.8	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4889801)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	91.0	110
				<10	2440 mg/L	105	81.6	118
				<10	293 mg/L	104	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4884668)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.5	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4880707)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	108	90.0	110
				<1	500 mg/L	110	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 4880708)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	105	90.0	110
				<1	1000 mg/L	107	90.0	110
ED093F: Dissolved Major Cations (QCLot: 4884270)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.8	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4887233)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.5	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	107	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.8	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4884420)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	96.4	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4880706)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	90.9	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4884421)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.9	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4884194)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	93.7	70.0	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP005: Total Organic Carbon (TOC) (QCLot: 4887576)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	94.9	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4890950)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	102	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4887593)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	185 mg/L	101	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4880707)							
EM2302668-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4880708)							
EM2302668-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4887233)							
EM2301023-015	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	94.9	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4884420)							
EM2302747-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	130	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4880706)							
EM2302668-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	95.5	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4884421)							
EM2302700-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4884194)							
EM2302747-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.9	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4887576)							
EM2302773-001	Dredge Surface Water Sample	EP005: Total Organic Carbon	----	100 mg/L	105	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4890950)							
EM2302694-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	5000 mg/L	90.8	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2302773**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill 3 of 3	Date Samples Received	: 17-Feb-2023
Site	: ----	Issue Date	: 24-Feb-2023
Sampler	: ----	No. of samples received	: 1
Order number	: Creswick Landfill 3 of 3	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EM2302668--002	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	EM2302668--002	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural Dredge - Surface Water Sample	----	----	----	22-Feb-2023	16-Feb-2023	**6**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) Dredge - Surface Water Sample	**16-Feb-2023**	**----**	----	----	**22-Feb-2023**	16-Feb-2023	✘
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) Dredge - Surface Water Sample	**16-Feb-2023**	**----**	----	----	**22-Feb-2023**	16-Mar-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) Dredge - Surface Water Sample	**16-Feb-2023**	**----**	----	----	**23-Feb-2023**	23-Feb-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) Dredge - Surface Water Sample	**16-Feb-2023**	**----**	----	----	**22-Feb-2023**	02-Mar-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	22-Feb-2023	16-Mar-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	22-Feb-2023	16-Mar-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	21-Feb-2023	23-Feb-2023	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) Dredge - Surface Water Sample	16-Feb-2023	22-Feb-2023	15-Aug-2023	✓	22-Feb-2023	15-Aug-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	23-Feb-2023	16-Mar-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	17-Feb-2023	18-Feb-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	23-Feb-2023	16-Mar-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) Dredge - Surface Water Sample	16-Feb-2023	24-Feb-2023	16-Mar-2023	✓	24-Feb-2023	16-Mar-2023	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	23-Feb-2023	16-Mar-2023	✓
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	23-Feb-2023	16-Mar-2023	✓
EP045: Volatile Acids as CH3COOH							
Clear Plastic Bottle - Natural (EP045) Dredge - Surface Water Sample	16-Feb-2023	----	----	----	22-Feb-2023	02-Mar-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	6	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of \`filterable\` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2302773**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 3 of 3	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 17-Feb-2023 12:55	Issue Date	: 17-Feb-2023
Client Requested Due Date	: 24-Feb-2023	Scheduled Reporting Date	: **24-Feb-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 8.3°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EM2302773-001 : 16-Feb-2023 16:15 : Dredge - Surface Water Sample

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2302773-001	16-Feb-2023 16:15	Dredge Surface Wate...	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2302773-001	16-Feb-2023 16:15	Dredge Surface Wate...	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
Dredge	Clear Plastic Bottle - Natural	----	16-Feb-2023	17-Feb-2023	×	----	----

Requested Deliverables

LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	lucy.edwards@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	lucy.edwards@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	lucy.edwards@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	lucy.edwards@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	lucy.edwards@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	lucy.edwards@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	lucy.edwards@ventia.com.au
NICOLE ROBBINS		
- *AU Certificate of Analysis - NATA (COA)	Email	nicole.robbins@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nicole.robbins@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nicole.robbins@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nicole.robbins@ventia.com
- Chain of Custody (CoC) (COC)	Email	nicole.robbins@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	nicole.robbins@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	nicole.robbins@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

ME/793/19

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 3 of 3**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
U/S BH3	Creek Sample														
@ BH3	Creek Sample														
D/S BH3	Creek Sample														
Leachate	Surface water sample														
Wetland	Surface water sample	~~4~~	~~16/2/23~~	~~1615~~	W										
Dredge	Surface water sample	4	16/2/23	1615	W	6.85	914	7.53	22.0	63.6	—				

Environmental Division
Melbourne
Work Order Reference
EM2302773

Telephone : + 61-3-8549 9600

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	17/2/23	1250	Heath	ALS	17.02.23	12:55

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2302775**	Page	: 1 of 4
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 17-Feb-2023 12:55
Order number	: Creswick Landfill 1 of 3	Date Analysis Commenced	: 18-Feb-2023
C-O-C number	: ----	Issue Date	: 24-Feb-2023 18:45
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

NATA

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

- Field Readings -
  sample ID:BH2, SWL = 2.98m, EC = 685uS/cm, pH = 5.73, Temp = 19.7°C, Redox = 122.2mV, DO = 2.69mg/L
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Ionic Balance out of acceptable limits for sample #1 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2 Groundwater Bore	----	----	----	----
			Sampling date / time	17-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302775-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.39**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**734**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**385**	----	----	----	----
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	**32**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**32**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**20**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**199**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**1**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**14**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**103**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**1**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.053**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**3.95**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.32**	----	----	----	----
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	**0.89**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.89**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.6**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2 Groundwater Bore	----	----	----	----
			Sampling date / time	17-Feb-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2302775-001	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	6.67	----	----	----	----
ø Total Cations	----	0.01	meq/L	5.71	----	----	----	----
ø Ionic Balance	----	0.01	%	7.77	----	----	----	----
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	68	----	----	----	----
ø Dissolved Oxygen	----	0.1	mg/L	2.69	----	----	----	----
ø pH	----	0.01	pH Unit	5.73	----	----	----	----
ø Redox Potential	----	0.1	mV	122.2	----	----	----	----
ø Temperature	----	0.1	°C	19.7	----	----	----	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	2.98	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	1	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	34	----	----	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	12	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2302775**	Page	: 1 of 5
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 17-Feb-2023
Order number	: Creswick Landfill 1 of 3	Date Analysis Commenced	: 18-Feb-2023
C-O-C number	: ----	Issue Date	: 24-Feb-2023
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 1		
No. of samples analysed	: 1		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 4884669)									
EM2302765-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.03	7.15	1.7	0% - 20%
EM2302782-008	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	5.84	5.64	3.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4884670)									
EM2302765-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	411	429	4.3	0% - 20%
EM2302782-008	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2	1	0.0	No Limit
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 4889801)									
EM2302719-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	613	605	1.3	0% - 20%
EM2302771-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1250	1180	5.3	0% - 20%
EM2302778-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	8830	9090	3.0	0% - 20%
EM2302879-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7180	7610	5.9	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4884668)									
EM2302765-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	120	121	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	120	121	0.0	0% - 20%
EM2302782-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4880723)									
EM2302763-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	8	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4880724)									
EM2302763-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	101	96	4.6	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED093F: Dissolved Major Cations (QC Lot: 4884270)									
EM2302775-001	BH2 Groundwater Bore	ED093F: Calcium	7440-70-2	1	mg/L	1	1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	14	14	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	103	104	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.0	No Limit
EM2302782-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4887233)									
EM2301023-015	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.757	0.749	1.0	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	31.1	31.8	2.3	0% - 20%
EM2302747-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.010	0.008	26.6	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.026	0.022	15.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	3.62	3.64	0.7	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4884420)									
EM2302781-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2302688-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	5.78	5.73	0.9	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4880722)									
EM2302763-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4884421)									
EM2302756-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	5.46	5.54	1.5	0% - 20%
EM2302688-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4884194)									
EM2302747-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.0	No Limit
EM2302867-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4887576)									
EM2302767-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	2	0.0	No Limit
EM2302906-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.0	No Limit
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 4890950)									
EM2302694-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	88	86	2.3	No Limit
EM2302703-004	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	49	45	8.5	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 4887593)									
EM2302623-001	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	13	13	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4884669)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 4884670)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	97.8	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 4889801)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	91.0	110
				<10	2440 mg/L	105	81.6	118
				<10	293 mg/L	104	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 4884668)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.5	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4880723)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	90.0	110
				<1	500 mg/L	105	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 4880724)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	106	90.0	110
				<1	1000 mg/L	103	90.0	110
ED093F: Dissolved Major Cations (QCLot: 4884270)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.8	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 4887233)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.5	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	107	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.8	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4884420)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	96.4	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4880722)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	91.4	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4884421)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.9	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4884194)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	93.7	70.0	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP005: Total Organic Carbon (TOC) (QCLot: 4887576)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	94.9	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4890950)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	102	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 4887593)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	185 mg/L	101	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4880723)							
EM2302775-001	BH2 Groundwater Bore	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	97.6	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4880724)							
EM2302775-001	BH2 Groundwater Bore	ED045G: Chloride	16887-00-6	400 mg/L	91.7	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 4887233)							
EM2301023-015	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	94.9	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4884420)							
EM2302747-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	130	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4880722)							
EM2302775-001	BH2 Groundwater Bore	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.2	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4884421)							
EM2302700-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4884194)							
EM2302747-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.9	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4887576)							
EM2302773-001	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	105	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 4890950)							
EM2302694-002	Anonymous	EP026SP: Chemical Oxygen Demand	----	5000 mg/L	90.8	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2302775**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 17-Feb-2023
Site	: ----	Issue Date	: 24-Feb-2023
Sampler	: ----	No. of samples received	: 1
Order number	: Creswick Landfill 1 of 3	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
BH2 - Groundwater Bore	----	----	----	22-Feb-2023	17-Feb-2023	**5**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**22-Feb-2023**	17-Feb-2023	✘
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**22-Feb-2023**	17-Mar-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	24-Feb-2023	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**22-Feb-2023**	03-Mar-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**21-Feb-2023**	24-Feb-2023	✓

Work Order : EM2302775
Client : VENTIA UTILITY SERVICES PTY LTD
Project : Creswick Landfill 1 of 3

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
BH2 - Groundwater Bore	**17-Feb-2023**	**22-Feb-2023**	16-Aug-2023	✓	**22-Feb-2023**	16-Aug-2023	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**18-Feb-2023**	19-Feb-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
BH2 - Groundwater Bore	**17-Feb-2023**	**24-Feb-2023**	17-Mar-2023	✓	**24-Feb-2023**	17-Mar-2023	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**23-Feb-2023**	17-Mar-2023	✓
EP045: Volatile Acids as CH3COOH							
Clear Plastic Bottle - Natural (EP045)							
BH2 - Groundwater Bore	**17-Feb-2023**	**----**	----	----	**22-Feb-2023**	03-Mar-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of \`filterable\` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2302775**

Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 1 of 3	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 17-Feb-2023 12:55	Issue Date	: 17-Feb-2023
Client Requested Due Date	: 24-Feb-2023	Scheduled Reporting Date	: **24-Feb-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 8.3°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EM2302775-001 : [17-Feb-2023] : BH2 - Groundwater Bore

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2302775-001	17-Feb-2023 00:00	BH2 Groundwater Bore	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2302775-001	17-Feb-2023 00:00	BH2 Groundwater Bore	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	lucy.edwards@ventia.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	lucy.edwards@ventia.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	lucy.edwards@ventia.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	lucy.edwards@ventia.com.au
- Chain of Custody (CoC) (COC)	Email	lucy.edwards@ventia.com.au
- EDI Format - ENMRG (ENMRG)	Email	lucy.edwards@ventia.com.au
- EDI Format - ESDAT (ESDAT)	Email	lucy.edwards@ventia.com.au
NICOLE ROBBINS		
- A4 - AU Tax Invoice (INV)	Email	nicole.robbins@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	robert.callander@ventia.com

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

ME/793/19

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 1 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	ME/412/16
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
BH1	Groundwater Bore	0	17/2/23		Bore lost due to road resurfacing										
BH2	Groundwater Bore	4	17/2/23	0730	W	5.73	685	2.69	19.7	122.2	2.98				
BH3	Groundwater Bore														
BH4	Groundwater Bore														
BH6	Groundwater Bore														
BH7	Groundwater Bore														
BH8	Groundwater Bore														
BH9	Groundwater Bore														

Environmental Division
Melbourne
Work Order Reference
EM2302775

Telephone : + 61-3-8549 9600

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
R Callander	Ventia	17/2/23	1250	Heath	ALS	17.02.23	12:55

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	Groundwater bore														
BH13	Groundwater bore														
LB1	Leachate bore	0				BLOCKED NO SAMPLE									
LB2	Leachate bore	0													
LB3	Leachate bore					NO SAMPLE – SWL ONLY									
BLIND	Blind dup (analysed by ALS)														
RINSATE	Rinsate blank														

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	17/2/23	1250	Hean	ALS	17.02.23	17:55

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

171

Client:	Ventia	Job Ref:	Creswick Landfill
Contact:	Robert Callander		Please forward to EUROFINS for analysis
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051 Fax:		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	Quote No.: 190924VENV		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
Creswick SPLIT	Groundwater	5	10/5/23	1011	W	4.97	563	0.56	14.9	229.4	11.96				

Special Instructions: Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
R Callander	Ventia	10/5/23	1700	[signature]	[signature]	11/5	10-20
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
ELP	ALS	11/5/23	1815	Sam Dobson	EF	12/5/23	9:25

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Document: OF002 i1

Ice 6.4C°

#989018
[signature]
12/5/23

Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Ventia Utility Services P/L (Burwood)
Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Attention: **Robert Callander**

Report **989018-W**
Project name CRESWICK LANDFILL
Received Date May 12, 2023

Client Sample ID			CRESWICK SPLIT
Sample Matrix			**Water**
Eurofins Sample No.			**M23-My0031166**
Date Sampled			**May 10, 2023**
Test/Reference	LOR	Unit	
Volatile Fatty Acids (VFA) by GC-MS			
Acetic Acid	5	mg/L	< 5
Propionic acid	5	mg/L	< 5
Isobutyric acid	5	mg/L	< 5
Butyric acid	5	mg/L	< 5
Isovaleric acid	5	mg/L	< 5
Valeric acid	5	mg/L	< 5
4-Methylvaleric acid	5	mg/L	< 5
Hexanoic acid	5	mg/L	< 5
Heptanoic acid	5	mg/L	< 5
Total VFA as Acetic Acid Equivalents	5	mg/L	< 5
Ammonia (as N)	0.01	mg/L	0.03
Chemical Oxygen Demand (COD)	25	mg/L	< 25
Chloride	1	mg/L	190
Nitrate (as N)	0.02	mg/L	2.4
Organic Nitrogen (as N)*	0.2	mg/L	0.27
Sulphate (as SO4)	5	mg/L	19
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	280
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.3
Total Organic Carbon	5	mg/L	< 5
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20
Heavy Metals			
Arsenic	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.002
Lead	0.001	mg/L	< 0.001
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.016
Zinc	0.005	mg/L	0.031

Environment Testing

Client Sample ID			**CRESWICK SPLIT**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-My0031166**
Date Sampled			**May 10, 2023**
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	3.6
Magnesium	0.5	mg/L	15
Potassium	0.5	mg/L	1.3
Sodium	0.5	mg/L	86

Environment Testing

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Volatile Fatty Acids (VFA) by GC-MS	Melbourne	May 12, 2023	28 Day
- Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS			
Chemical Oxygen Demand (COD)	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4220 Determination of COD in Water			
Nitrate (as N)	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Organic Carbon	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Metals M8	Melbourne	May 12, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	May 12, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Ammonia (as N)	Melbourne	May 12, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Organic Nitrogen (as N)*	Melbourne	May 12, 2023	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	May 12, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	May 12, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	May 12, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254
Geelong 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403
Sydney 179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217
Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466
Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794
Newcastle 1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327
Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290

Company Name: Ventia Utility Services P/L (Burwood)
Address: Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Project Name: CRESWICK LANDFILL

Order No.:
Report #: 989018
Phone: 03 9861 8169
Fax: 03 9861 8101

Received: May 12, 2023 9:25 AM
Due: May 19, 2023
Priority: 5 Day
Contact Name: Robert Callander

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Nitrate (as N)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	CRESWICK SPLIT	May 10, 2023		Water	M23-My0031166	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**μg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Eurofins Environment Testing

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	mg/L	< 5			5	Pass	
Propionic acid	mg/L	< 5			5	Pass	
Isobutyric acid	mg/L	< 5			5	Pass	
Butyric acid	mg/L	< 5			5	Pass	
Isovaleric acid	mg/L	< 5			5	Pass	
Valeric acid	mg/L	< 5			5	Pass	
4-Methylvaleric acid	mg/L	< 5			5	Pass	
Hexanoic acid	mg/L	< 5			5	Pass	
Heptanoic acid	mg/L	< 5			5	Pass	
Total VFA as Acetic Acid Equivalents	mg/L	< 5			5	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chemical Oxygen Demand (COD)	mg/L	< 25			25	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Organic Carbon	mg/L	< 5			5	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Volatile Fatty Acids (VFA) by GC-MS							
Acetic Acid	%	126			70-130	Pass	
Propionic acid	%	110			70-130	Pass	
Isobutyric acid	%	124			70-130	Pass	
Butyric acid	%	118			70-130	Pass	
Isovaleric acid	%	101			70-130	Pass	
Valeric acid	%	104			70-130	Pass	
4-Methylvaleric acid	%	117			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexanoic acid			%	104			70-130	Pass	
Heptanoic acid			%	108			70-130	Pass	
Total VFA as Acetic Acid Equivalents			%	111			70-130	Pass	
LCS - % Recovery									
Ammonia (as N)			%	101			70-130	Pass	
Chemical Oxygen Demand (COD)			%	113			70-130	Pass	
Chloride			%	106			70-130	Pass	
Nitrate (as N)			%	100			70-130	Pass	
Sulphate (as SO4)			%	102			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C			%	97			70-130	Pass	
Total Kjeldahl Nitrogen (as N)			%	73			70-130	Pass	
Total Organic Carbon			%	97			70-130	Pass	
LCS - % Recovery									
Alkalinity (speciated)									
Carbonate Alkalinity (as CaCO3)			%	96			70-130	Pass	
Total Alkalinity (as CaCO3)			%	97			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	96			80-120	Pass	
Cadmium			%	97			80-120	Pass	
Chromium			%	98			80-120	Pass	
Copper			%	96			80-120	Pass	
Lead			%	93			80-120	Pass	
Mercury			%	89			80-120	Pass	
Nickel			%	96			80-120	Pass	
Zinc			%	99			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	99			80-120	Pass	
Magnesium			%	98			80-120	Pass	
Potassium			%	103			80-120	Pass	
Sodium			%	104			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Volatile Fatty Acids (VFA) by GC-MS				Result 1					
Isobutyric acid	M23-My0021536	NCP	%	98			70-130	Pass	
Isovaleric acid	M23-My0021536	NCP	%	75			70-130	Pass	
Valeric acid	M23-My0021536	NCP	%	77			70-130	Pass	
4-Methylvaleric acid	M23-My0021536	NCP	%	86			70-130	Pass	
Hexanoic acid	M23-My0021536	NCP	%	77			70-130	Pass	
Heptanoic acid	M23-My0021536	NCP	%	80			70-130	Pass	
Total VFA as Acetic Acid Equivalents	M23-My0021536	NCP	%	87			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chemical Oxygen Demand (COD)	B23-My0033030	NCP	%	100			70-130	Pass	
Nitrate (as N)	B23-My0035442	NCP	%	105			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M23-My0029197	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M23-My0027553	NCP	%	94			75-125	Pass	
Cadmium	M23-My0027553	NCP	%	101			75-125	Pass	
Chromium	M23-My0027553	NCP	%	94			75-125	Pass	
Copper	M23-My0027553	NCP	%	95			75-125	Pass	

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead	M23-My0027553	NCP	%	95			75-125	Pass	
Mercury	M23-My0027553	NCP	%	91			75-125	Pass	
Nickel	M23-My0027553	NCP	%	94			75-125	Pass	
Zinc	M23-My0027553	NCP	%	94			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M23-My0034670	NCP	%	98			75-125	Pass	
Magnesium	M23-My0034670	NCP	%	96			75-125	Pass	
Potassium	M23-My0034670	NCP	%	101			75-125	Pass	
Sodium	M23-My0034670	NCP	%	103			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Volatile Fatty Acids (VFA) by GC-MS				Result 1	Result 2	RPD			
Acetic Acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Propionic acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isobutyric acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Butyric acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Isovaleric acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Valeric acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
4-Methylvaleric acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Hexanoic acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Heptanoic acid	M23-My0021535	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M23-My0031516	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chemical Oxygen Demand (COD)	B23-My0033031	NCP	mg/L	< 25	< 25	<1	30%	Pass	
Chloride	M23-My0032389	NCP	mg/L	1400	1400	<1	30%	Pass	
Nitrate (as N)	M23-My0031516	NCP	mg/L	0.06	0.06	3.8	30%	Pass	
Sulphate (as SO4)	M23-My0032389	NCP	mg/L	130	140	<1	30%	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	M23-My0027749	NCP	mg/L	180	190	3.9	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M23-My0034670	NCP	mg/L	1.0	0.3	110	30%	Fail	Q15
Total Organic Carbon	M23-My0027336	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M23-My0056925	NCP	mg/L	560	540	2.6	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M23-My0056925	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	M23-My0056925	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	M23-My0056925	NCP	mg/L	560	540	2.6	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-My0027553	NCP	mg/L	0.014	0.014	1.1	30%	Pass	
Cadmium	M23-My0027553	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	M23-My0027553	NCP	mg/L	0.017	0.016	5.4	30%	Pass	
Copper	M23-My0027553	NCP	mg/L	0.003	0.003	2.1	30%	Pass	
Lead	M23-My0027553	NCP	mg/L	0.008	0.008	3.5	30%	Pass	
Mercury	M23-My0027553	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	M23-My0027553	NCP	mg/L	0.003	0.003	6.3	30%	Pass	
Zinc	M23-My0027553	NCP	mg/L	0.032	0.031	1.0	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M23-My0034670	NCP	mg/L	1.7	1.7	<1	30%	Pass	
Magnesium	M23-My0034670	NCP	mg/L	2.0	2.0	1.7	30%	Pass	
Potassium	M23-My0034670	NCP	mg/L	1.4	1.4	2.0	30%	Pass	
Sodium	M23-My0034670	NCP	mg/L	16	16	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Catherine Wilson	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Joseph Edouard	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CERTIFICATE OF ANALYSIS

Work Order	: **EM2308222**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 10-May-2023 10:10
Order number	: Project: Creswick Landfill 2 of 3	Date Analysis Commenced	: 11-May-2023
C-O-C number	: ----	Issue Date	: 15-May-2023 22:03
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

NATA

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

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 is recognised that TKN is less than Ammonia as N for sample EM2308222 #2. However, the difference is within experimental variation of the methods.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EA015H: EM2308222 #3: 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.
- Ionic Balance out of acceptable limits for sample #1 due to analytes not quantified in this report.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium, sodium and ammonia for sample #1 and #2.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	BH10	----	----	----	----
			Sampling date / time	09-May-2023 15:31	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2308222-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.32**	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**761**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**459**	----	----	----	----
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	**47**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**47**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**24**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**200**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**6**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**19**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**95**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**9**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	**0.003**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.028**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**7.10**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**1.23**	----	----	----	----
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	**0.25**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.25**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.3**	----	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			*Sample ID*	BH10	----	----	----	----
			Sampling date / time	09-May-2023 15:31	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	EM2308222-001	--------	--------	--------	--------
				Result	----	----	----	----
EN055: Ionic Balance								
ø **Total Anions**	----	0.01	meq/L	**7.08**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L	**6.31**	----	----	----	----
ø **Ionic Balance**	----	0.01	%	**5.73**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**11**	----	----	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**24**	----	----	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**18**	----	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	Leachate	Wetland	Dredge	----	----
			Sampling date / time	09-May-2023 16:01	09-May-2023 16:09	09-May-2023 16:24	----	----
Compound	CAS Number	LOR	Unit	EM2308222-002	EM2308222-003	EM2308222-004	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.58**	**6.92**	**6.91**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**950**	**1060**	**878**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**518**	**768**	**533**	----	----
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	**163**	**195**	**49**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**163**	**195**	**49**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**4**	**1**	**12**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**210**	**236**	**246**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**29**	**33**	**10**	----	----
Magnesium	7439-95-4	1	mg/L	**23**	**26**	**22**	----	----
Sodium	7440-23-5	1	mg/L	**100**	**108**	**113**	----	----
Potassium	7440-09-7	1	mg/L	**22**	**25**	**3**	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----
Iron	7439-89-6	0.05	mg/L	**1.42**	**69.4**	**3.93**	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**4.11**	**3.32**	**0.43**	----	----
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	**0.09**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.02**	<0.01	**0.09**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**3.8**	**3.8**	**1.1**	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	Leachate	Wetland	Dredge	----	----
			Sampling date / time	09-May-2023 16:01	09-May-2023 16:09	09-May-2023 16:24	----	----
Compound	CAS Number	LOR	Unit	EM2308222-002	EM2308222-003	EM2308222-004	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**9.26**	**10.6**	**8.17**	----	----
ø Total Cations	----	0.01	meq/L	**8.55**	----	----	----	----
ø Total Cations	----	0.01	meq/L	----	**9.12**	**7.30**	----	----
ø Ionic Balance	----	0.01	%	**4.05**	----	----	----	----
ø Ionic Balance	----	0.01	%	----	**7.36**	**5.60**	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**10**	**13**	**7**	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**34**	<10	**21**	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**26**	**38**	**13**	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2308222**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 10-May-2023
Order number	: Project: Creswick Landfill 2 of 3	Date Analysis Commenced	: 11-May-2023
C-O-C number	: ----	Issue Date	: 15-May-2023
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	***Sample ID***	***Method: Compound***	***CAS Number***	***LOR***	***Unit***	***Original Result***	***Duplicate Result***	***RPD (%)***	***Acceptable RPD (%)***
EA005P: pH by PC Titrator (QC Lot: 5041782)									
EM2308192-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	1.52	1.48	2.7	0% - 20%
EM2308194-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.69	7.74	0.6	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 5041784)									
EM2308232-013	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.81	8.82	0.1	0% - 20%
EM2308222-004	Dredge	EA005-P: pH Value	----	0.01	pH Unit	6.91	7.03	1.7	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 5041783)									
EM2308194-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	7530	7470	0.8	0% - 20%
EM2308222-004	Dredge	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	878	876	0.1	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5044588)									
EM2308043-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	205	192	6.4	0% - 20%
EM2308156-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1440	1420	1.1	0% - 20%
EM2308187-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6610	6710	1.5	0% - 20%
EM2307888-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1190	1130	4.7	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5041780)									
EM2308176-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	288	290	0.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	288	290	0.8	0% - 20%
EM2308222-004	Dredge	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	49	50	3.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	49	50	3.1	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5041671)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5041671) - continued									
EM2308232-012	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	27	27	0.0	0% - 20%
EM2308226-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	572	575	0.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5041674)									
EM2308232-012	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	473	467	1.4	0% - 20%
EM2308226-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	15	15	0.0	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 5043348)									
EM2308137-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	5	5	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EM2308222-002	Leachate	ED093F: Calcium	7440-70-2	1	mg/L	29	29	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	23	23	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	100	100	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	22	22	0.0	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 5043249)									
EM2308182-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.109	0.095	13.4	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.160	0.143	11.2	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	61.7	53.2	14.9	0% - 20%
EM2308122-002	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.004	0.006	24.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.005	0.0	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	3.15	3.24	2.8	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5042232)									
EM2308222-001	BH10	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.23	1.24	1.0	0% - 20%
EM2308241-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5041672)									
EM2308232-012	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.11	0.11	0.0	0% - 50%
EM2308226-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.31	0.31	0.0	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5042233)									
EM2308222-001	BH10	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.25	0.25	0.0	0% - 20%
EM2308241-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.06	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5042266)									
EM2308194-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.3	0.0	No Limit
EM2308083-008	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	116	118	1.2	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5042267)									
EM2308254-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.6	34.9	No Limit
EM2308240-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 5042790)									
EM2307830-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	45	46	0.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP005: Total Organic Carbon (TOC) (QC Lot: 5042790) - continued									
EM2308222-003	Wetland	EP005: Total Organic Carbon	----	1	mg/L	13	13	0.0	0% - 50%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 5043003)									
EM2308222-001	BH10	EP026SP: Chemical Oxygen Demand	----	10	mg/L	24	24	0.0	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 5048079)									
EM2307797-004	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	90	90	0.0	0% - 50%
EM2307885-010	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	93	93	0.0	0% - 50%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 5041782)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.5	98.8	101
				----	7 pH Unit	100	99.3	101
EA005P: pH by PC Titrator (QCLot: 5041784)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 5041783)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	108	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5044588)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	91.0	110
				<10	2440 mg/L	108	81.6	118
				<10	293 mg/L	109	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 5041780)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.3	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5041671)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	102	90.0	110
				<1	500 mg/L	104	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 5041674)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	103	90.0	110
				<1	1000 mg/L	101	90.0	110
ED093F: Dissolved Major Cations (QCLot: 5043348)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	95.6	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	96.6	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	108	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	92.8	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 5043249)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	109	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	109	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	109	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5042232)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	90.0	110

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5041672)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5042233)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5042266)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	75.5	70.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5042267)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	79.6	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 5042790)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	99.9	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5043003)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	500 mg/L	100	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 5048079)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	175 mg/L	86.6	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5041671)							
EM2308222-001	BH10	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	92.1	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5041674)							
EM2308222-001	BH10	ED045G: Chloride	16887-00-6	400 mg/L	98.8	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 5043249)							
EM2308100-001	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	103	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	93.0	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5042232)							
EM2308222-002	Leachate	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5041672)							
EM2308226-006	Anonymous	EK057G: Nitrite as N	14797-65-0	1 mg/L	101	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5042233)							
EM2308222-002	Leachate	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	89.6	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5042266)							
EM2308083-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.4	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5042267)							
EM2308240-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	91.8	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 5042790)							
EM2307830-006	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	115	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5043003)							
EM2308222-002	Leachate	EP026SP: Chemical Oxygen Demand	----	500 mg/L	108	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2308222**	Page	: 1 of 8
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 10-May-2023
Site	: ----	Issue Date	: 15-May-2023
Sampler	: AC	No. of samples received	: 4
Order number	: Project: Creswick Landfill 2 of 3	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	EM2308222--002	Leachate	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural BH10, Leachate, Wetland, Dredge	----	----	----	12-May-2023	09-May-2023	**3**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		**Date extracted**	Due for extraction	Evaluation	**Date analysed**	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) BH10, Leachate, Wetland, Dredge	**09-May-2023**	**----**	----	----	**12-May-2023**	09-May-2023	✘
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) BH10, Leachate, Wetland, Dredge	**09-May-2023**	**----**	----	----	**12-May-2023**	06-Jun-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) BH10, Leachate, Wetland, Dredge	**09-May-2023**	**----**	----	----	**12-May-2023**	16-May-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**12-May-2023**	23-May-2023	✓
Wetland,	Dredge							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**11-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**11-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**13-May-2023**	16-May-2023	✓
Wetland,	Dredge							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH10,	Leachate,	**09-May-2023**	**11-May-2023**	05-Nov-2023	✓	**11-May-2023**	05-Nov-2023	✓
Wetland,	Dredge							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**12-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**11-May-2023**	11-May-2023	✓
Wetland,	Dredge							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**12-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH10,	Leachate,	**09-May-2023**	**11-May-2023**	06-Jun-2023	✓	**13-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
BH10,	Leachate,	**09-May-2023**	**----**	----	----	**12-May-2023**	06-Jun-2023	✓
Wetland,	Dredge							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP026SP: Chemical Oxygen Demand (Spectrophotometric)							
Clear Plastic Bottle - Sulfuric Acid (EP026SP) BH10, Leachate, Wetland, Dredge	**09-May-2023**	**----**	----	----	**11-May-2023**	06-Jun-2023	✓
EP045: Volatile Acids as CH3COOH							
Clear Plastic Bottle - Natural (EP045) BH10, Leachate, Wetland, Dredge	**09-May-2023**	**----**	----	----	**15-May-2023**	23-May-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	29	**13.79**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2308222**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: LUCY EDWARDS	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: Lucy.Edwards@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 2 of 3	Page	: 1 of 3
Order number	: Project: Creswick Landfill 2 of 3	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: AC		

Dates

Date Samples Received	: 10-May-2023 10:10	Issue Date	: 10-May-2023
Client Requested Due Date	: 17-May-2023	Scheduled Reporting Date	: **17-May-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 2.4°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 4 / 4

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2308222-001	09-May-2023 15:31	BH10	✓	✓	✓	✓	✓	✓	✓
EM2308222-002	09-May-2023 16:01	Leachate	✓	✓	✓	✓	✓	✓	✓
EM2308222-003	09-May-2023 16:09	Wetland	✓	✓	✓	✓	✓	✓	✓
EM2308222-004	09-May-2023 16:24	Dredge	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2308222-001	09-May-2023 15:31	BH10	✓	✓	✓	✓
EM2308222-002	09-May-2023 16:01	Leachate	✓	✓	✓	✓
EM2308222-003	09-May-2023 16:09	Wetland	✓	✓	✓	✓
EM2308222-004	09-May-2023 16:24	Dredge	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EA005-P: pH by Auto Titrator							
BH10	Clear Plastic Bottle - Natural	----	09-May-2023	10-May-2023	×	----	----
Dredge	Clear Plastic Bottle - Natural	----	09-May-2023	10-May-2023	×	----	----
Leachate	Clear Plastic Bottle - Natural	----	09-May-2023	10-May-2023	×	----	----
Wetland	Clear Plastic Bottle - Natural	----	09-May-2023	10-May-2023	×	----	----

Requested Deliverables

ACCOUNTS PAYABLE - VIC ONLY		
- A4 - AU Tax Invoice (INV)	Email	Nicole.Robins@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	Nicole.Robins@ventia.com
LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	Lucy.Edwards@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lucy.Edwards@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lucy.Edwards@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lucy.Edwards@ventia.com
- A4 - AU Tax Invoice (INV)	Email	Lucy.Edwards@ventia.com
- Chain of Custody (CoC) (COC)	Email	Lucy.Edwards@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	Lucy.Edwards@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	Lucy.Edwards@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	Lucy.Edwards@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	Ventia	Job Ref:	Creswick Landfill 2 of 3
Contact:	Robert Callander		TESTS REQUIRED AS PER QUOTE ME/412/16
Address:	25-37 Huntingdale Road, Burwood, 3125		
Phone:	0427529051 Fax:		
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:	Quote No.:		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	Groundwater bore	5	9/6/23	1531	W	5.57	645	0.26	15.24	90.5	2.44				
BH13	Groundwater bore														
LB1	Leachate bore														
LB2	Leachate bore														
LB3	Leachate bore					NO SAMPLE – SWL ONLY									
BLIND	Blind dup (analysed by ALS)														
RINSATE	Rinsate blank														

Environmental Division
Melbourne
Work Order Reference
EM2308222

Telephone : + 61-3-8549 9600

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com						
Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	9/5/23	1700	[signature]	ALS	10/5	10:00

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
	U/S BH3	Creek Sample														
	@ BH3	Creek Sample														
	D/S BH3	Creek Sample														
2	Leachate	Surface water sample	5	9/5/23	1601	W	6.84	900	3.57	12.32	46.3	—				
3	Wetland	Surface water sample	5	9/5/23	1609	W	6.94	1170	0.32	13.33	-30.8	—				
4	Dredge	Surface water sample	5	9/5/23	1624	W	6.63	818	4.03	11.86	3.8	—				

Special Instructions: Please email Invoices to Nicole.robins@ventia.com
Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	9/5/23	1700	[illegible]	[illegible]	10/5	10:00

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CERTIFICATE OF ANALYSIS

Work Order	: **EM2308315**	Page	: 1 of 6
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 11-May-2023 10:10
Order number	: Creswick Landfill 1 of 3	Date Analysis Commenced	: 12-May-2023
C-O-C number	: ----	Issue Date	: 18-May-2023 22:12
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- It is recognised that TKN is less than ammonia for sample #5. However, the difference is within experimental variation of the methods.
- EK057G: EM2308315 #2 Sample required dilution for Nitrite as N prior to analysis due to sample matrix. LOR has been raised accordingly.
- ED041G, ED045G: EM2308315 #2 and 5 has been confirmed by re-prep and reanalysis.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2	BH3	BH4	BH6	BH7
			Sampling date / time	10-May-2023 14:26	10-May-2023 12:22	10-May-2023 16:15	10-May-2023 10:11	10-May-2023 13:39
Compound	CAS Number	LOR	Unit	EM2308315-001	EM2308315-002	EM2308315-003	EM2308315-004	EM2308315-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.43**	**8.15**	**7.71**	**6.92**	**8.03**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**756**	**3350**	**2300**	**674**	**928**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**469**	**2030**	**1510**	**425**	**500**
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	**34**	**196**	**96**	**10**	**146**
Total Alkalinity as CaCO3	----	1	mg/L	**34**	**196**	**96**	**10**	**146**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**18**	**29**	**2**	**20**	**2**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**226**	**917**	**720**	**180**	**210**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**1**	**51**	**20**	**4**	**25**
Magnesium	7439-95-4	1	mg/L	**17**	**94**	**58**	**17**	**25**
Sodium	7440-23-5	1	mg/L	**117**	**406**	**303**	**90**	**106**
Potassium	7440-09-7	1	mg/L	**1**	**18**	<1	**1**	**18**
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	**0.012**	**0.001**	**0.003**
Zinc	7440-66-6	0.005	mg/L	**0.057**	**0.045**	**0.017**	**0.034**	**0.013**
Iron	7439-89-6	0.05	mg/L	**8.46**	**68.9**	**82.9**	**0.12**	**16.1**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.08**	**0.14**	**0.16**	<0.01	**1.51**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.01**	<0.02	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**3.14**	<0.02	**0.08**	**2.01**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**3.15**	**0.01**	**0.08**	**2.01**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.7**	**0.9**	**0.7**	**0.4**	**1.5**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH2	BH3	BH4	BH6	BH7
			Sampling date / time	10-May-2023 14:26	10-May-2023 12:22	10-May-2023 16:15	10-May-2023 10:11	10-May-2023 13:39
Compound	CAS Number	LOR	Unit	EM2308315-001	EM2308315-002	EM2308315-003	EM2308315-004	EM2308315-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**7.43**	**30.4**	**22.3**	**5.69**	**8.88**
ø Total Cations	----	0.01	meq/L	**6.56**	**28.4**	**19.0**	**5.54**	**8.38**
ø Ionic Balance	----	0.01	%	**6.18**	**3.38**	**8.05**	**1.38**	**2.93**
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	**4.53**	**0.18**	**0.50**	**0.56**	**0.18**
ø pH	----	0.01	pH Unit	**5.59**	**6.51**	**5.83**	**4.97**	**6.76**
ø Redox Potential	----	0.1	mV	**117.7**	**-36.9**	**29.9**	**229.4**	**-28.4**
ø Temperature	----	0.1	°C	**16.1**	**13.29**	**13.41**	**14.9**	**13.83**
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	**673**	**2541**	**1907**	**563**	**736**
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**2.90**	**0.60**	**5.33**	**11.96**	**2.31**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**6**	**23**	**35**	<1	**12**
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**58**	**117**	**149**	<10	**65**
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**11**	**18**	**60**	**11**	**29**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH8	BLIND	RINSATE	----	----
			Sampling date / time	10-May-2023 11:38	10-May-2023 00:00	10-May-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2308315-006	EM2308315-007	EM2308315-008	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.46**	**6.94**	**6.32**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**809**	**680**	**2**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**489**	**355**	<10	----	----
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	**16**	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**282**	**11**	**1**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**298**	**11**	**1**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**3**	**19**	<1	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**94**	**194**	<1	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**13**	**4**	<1	----	----
Magnesium	7439-95-4	1	mg/L	**30**	**17**	<1	----	----
Sodium	7440-23-5	1	mg/L	**112**	**90**	<1	----	----
Potassium	7440-09-7	1	mg/L	**4**	**1**	<1	----	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	**0.011**	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	**0.009**	**0.032**	<0.005	----	----
Iron	7439-89-6	0.05	mg/L	**51.2**	**0.11**	<0.05	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**3.60**	<0.01	<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	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.02**	**2.12**	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.02**	**2.12**	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**3.7**	**0.4**	<0.1	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH8	BLIND	RINSATE	----	----
			Sampling date / time	10-May-2023 11:38	10-May-2023 00:00	10-May-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2308315-006	EM2308315-007	EM2308315-008	--------	--------
				Result	Result	Result	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**8.67**	**6.09**	**0.02**	----	----
ø Total Cations	----	0.01	meq/L	**8.09**	**5.54**	<0.01	----	----
ø Ionic Balance	----	0.01	%	**3.44**	**4.72**	----	----	----
EN67: Field Tests								
ø Dissolved Oxygen	----	0.1	mg/L	**0.22**	----	----	----	----
ø pH	----	0.01	pH Unit	**6.62**	----	----	----	----
ø Redox Potential	----	0.1	mV	**-74.4**	----	----	----	----
ø Temperature	----	0.1	°C	**15.36**	----	----	----	----
ø Electrical Conductivity (Temperature Compensated)	COND_TEMP	1	µS/cm	**728**	----	----	----	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**3.00**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**21**	<1	<1	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	**134**	<10	<10	----	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**55**	**8**	<10	----	----

QUALITY CONTROL REPORT

Work Order	: **EM2308315**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 11-May-2023
Order number	: Creswick Landfill 1 of 3	Date Analysis Commenced	: 12-May-2023
C-O-C number	: ----	Issue Date	: 18-May-2023
Sampler	: AC		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 8		
No. of samples analysed	: 8		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne External Subcontracting, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 5044577)									
EM2308330-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.20	8.25	0.6	0% - 20%
EM2308264-020	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.45	6.44	0.2	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 5044579)									
EM2308283-012	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	39	39	0.0	0% - 20%
EM2308264-020	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	728	728	0.0	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5050879)									
EM2308312-003	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6430	6520	1.4	0% - 20%
EM2308313-009	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	7810	7870	0.7	0% - 20%
EM2308313-019	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	6390	6740	5.3	0% - 20%
EM2308315-008	RINSATE	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	<10	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 5044581)									
EM2308283-012	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2	2	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	2	2	0.0	No Limit
EM2308330-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	144	146	0.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	144	146	0.9	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5044937)									
EM2308312-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	226	223	1.0	0% - 20%
EM2308296-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	228	231	1.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5045362)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5045362) - continued									
EM2308309-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	230	229	0.0	0% - 20%
EM2308245-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	862	864	0.1	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5044938)									
EM2308312-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3660	3640	0.5	0% - 20%
EM2308296-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1960	1960	0.2	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5045363)									
EM2308309-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4550	4350	4.6	0% - 20%
EM2308245-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	648	647	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5046643)									
EM2308305-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EM2308307-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	120	121	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	17	17	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	106	107	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	9	9	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 5046644)									
EM2308315-003	BH4	ED093F: Calcium	7440-70-2	1	mg/L	20	20	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	58	58	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	303	304	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	1	0.0	No Limit
EM2308322-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	342	343	0.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	6	5	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	63	64	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5047472)									
EM2308214-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.005	0.004	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.259	0.251	3.0	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	12.5	12.0	4.6	0% - 20%
EM2308238-004	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	1.05	1.06	0.5	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5045178)									
EM2308213-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	3.19	3.17	0.6	0% - 20%
EM2308309-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5045181)									
EM2308315-006	BH8	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	3.60	3.72	3.1	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5044935)									
EM2308205-007	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.44	0.44	0.0	0% - 20%
EM2308297-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.02	<0.05	85.7	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5044939)									
EM2308315-006	BH8	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5045361)									
EM2308217-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2308309-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5045364)									
EM2308315-008	RINSATE	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5045179)									
EM2308213-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	6.92	6.88	0.5	0% - 20%
EM2308309-009	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.07	0.07	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5045180)									
EM2308315-006	BH8	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.06	120	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5050937)									
EM2308309-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.3	85.8	No Limit
EM2308309-010	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 5046294)									
EM2308309-004	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	31	29	6.7	0% - 20%
EM2308315-003	BH4	EP005: Total Organic Carbon	----	1	mg/L	35	36	4.1	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 5052136)									
EM2308208-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	25	23	8.8	No Limit
EM2308309-009	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	15	12	21.9	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 5053496)									
EM2308315-001	BH2	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	11	11	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 5044577)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.8	101
				----	7 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 5044579)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	94.9	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5050879)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	106	91.0	110
				<10	2440 mg/L	88.0	81.6	118
				<10	293 mg/L	106	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 5044581)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	103	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5044937)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	90.0	110
				<1	500 mg/L	105	90.0	110
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5045362)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	90.0	110
				<1	500 mg/L	109	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 5044938)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	109	90.0	110
				<1	1000 mg/L	105	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 5045363)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	97.9	90.0	110
				<1	1000 mg/L	108	90.0	110
ED093F: Dissolved Major Cations (QCLot: 5046643)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	105	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.0	80.0	120
ED093F: Dissolved Major Cations (QCLot: 5046644)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	88.8	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	88.4	80.0	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
ED093F: Dissolved Major Cations (QCLot: 5046644) - continued								
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	89.2	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	82.9	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 5047472)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5045178)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.0	90.0	110
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5045181)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	92.2	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5044935)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5044939)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	106	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5045361)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5045364)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	108	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5045179)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5045180)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5050937)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	90.9	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 5046294)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	101	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5052136)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	25 mg/L	98.8	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 5053496)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	182 mg/L	97.6	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5044937)							
EM2308296-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	96.7	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5045362)							
EM2308245-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	200 mg/L	72.4	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5044938)							
EM2308296-003	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	102	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 5047472)							
EM2308214-001	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	94.2	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.7	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5045178)							
EM2308309-001	Anonymous	EK055G: Ammonia as N	7664-41-7	2 mg/L	130	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5045181)							
EM2308315-007	BLIND	EK055G: Ammonia as N	7664-41-7	1 mg/L	130	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5044935)							
EM2308205-008	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	# Not Determined	80.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5044939)							
EM2308363-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	80.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5045361)							
EM2308297-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	95.1	80.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5045364)							
EM2308331-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5045179)							
EM2308309-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	74.7	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5045180)							
EM2308315-007	BLIND	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5050937)							
EM2308309-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	105	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 5046294)							
EM2308309-005	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	118	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5052136)							
EM2308309-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	2500 mg/L	112	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM2308315	Page	: 1 of 9
Client	: VENTIA UTILITY SERVICES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill 1 of 3	Date Samples Received	: 11-May-2023
Site	: ----	Issue Date	: 18-May-2023
Sampler	: AC	No. of samples received	: 8
Order number	: Creswick Landfill 1 of 3	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK057G: Nitrite as N by Discrete Analyser	EM2308205--008	Anonymous	**Nitrite as N**	14797-65-0	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EM2308315--007	BLIND	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	**Days overdue**	*Date analysed*	*Due for analysis*	**Days overdue**
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
BH2, BH3, BH4, BH6, BH7, BH8, BLIND, RINSATE	----	----	----	16-May-2023	10-May-2023	**6**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
	1				
Matrix Spikes (MS)					
Chloride by Discrete Analyser	1	36	2.78	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) BH2, BH4, BH7, BLIND,	BH3, BH6, BH8, RINSATE	**10-May-2023**	**----**	----	----	**16-May-2023**	10-May-2023	×
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) BH2, BH4, BH7, BLIND,	BH3, BH6, BH8, RINSATE	**10-May-2023**	**----**	----	----	**16-May-2023**	07-Jun-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H) BH2, BH4, BH7, BLIND,	BH3, BH6, BH8, RINSATE	**10-May-2023**	**----**	----	----	**16-May-2023**	17-May-2023	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) BH2, BH4, BH7, BLIND,	BH3, BH6, BH8, RINSATE	**10-May-2023**	**----**	----	----	**16-May-2023**	24-May-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) BH2, BH6, BH8	BH3, BH7,	**10-May-2023**	**----**	----	----	**12-May-2023**	07-Jun-2023	✓
Clear Plastic Bottle - Natural (ED041G) BH4, RINSATE	BLIND,	**10-May-2023**	**----**	----	----	**15-May-2023**	07-Jun-2023	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) BH2, BH6, BH8	BH3, BH7,	**10-May-2023**	**----**	----	----	**12-May-2023**	07-Jun-2023	✓
Clear Plastic Bottle - Natural (ED045G) BH4, RINSATE	BLIND,	**10-May-2023**	**----**	----	----	**15-May-2023**	07-Jun-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH2,	BH3,	**10-May-2023**	----	----	----	**17-May-2023**	17-May-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH2,	BH3,	**10-May-2023**	**13-May-2023**	06-Nov-2023	✓	**15-May-2023**	06-Nov-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH6,	BLIND,	**10-May-2023**	----	----	----	**12-May-2023**	07-Jun-2023	✓
RINSATE								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH2,	BH3,	**10-May-2023**	----	----	----	**13-May-2023**	07-Jun-2023	✓
BH4,	BH7,							
BH8								
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH2,	BH3,	**10-May-2023**	----	----	----	**12-May-2023**	12-May-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH2,	BH3,	**10-May-2023**	----	----	----	**13-May-2023**	07-Jun-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH2,	BH3,	**10-May-2023**	**17-May-2023**	07-Jun-2023	✓	**18-May-2023**	07-Jun-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
BH2,	BH3,	**10-May-2023**	----	----	----	**15-May-2023**	07-Jun-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH2,	BH3,	**10-May-2023**	----	----	----	**16-May-2023**	07-Jun-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH2,	BH3,	**10-May-2023**	----	----	----	**17-May-2023**	24-May-2023	✓
BH4,	BH6,							
BH7,	BH8,							
BLIND,	RINSATE							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	3	22	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	3	24	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	6	44	**13.64**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	44	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	44	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	22	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	36	**2.78**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	24	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	44	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of \`filterable\` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2308315**		
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 1 of 3	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: AC		

Dates

Date Samples Received	: 11-May-2023 10:10	Issue Date	: 11-May-2023
Client Requested Due Date	: 18-May-2023	Scheduled Reporting Date	: **18-May-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 5.2°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2308315-001	10-May-2023 14:26	BH2	✓	✓	✓	✓	✓	✓	✓
EM2308315-002	10-May-2023 12:22	BH3	✓	✓	✓	✓	✓	✓	✓
EM2308315-003	10-May-2023 16:15	BH4	✓	✓	✓	✓	✓	✓	✓
EM2308315-004	10-May-2023 10:11	BH6	✓	✓	✓	✓	✓	✓	✓
EM2308315-005	10-May-2023 13:39	BH7	✓	✓	✓	✓	✓	✓	✓
EM2308315-006	10-May-2023 11:38	BH8	✓	✓	✓	✓	✓	✓	✓
EM2308315-007	10-May-2023 00:00	BLIND	✓	✓	✓	✓	✓	✓	✓
EM2308315-008	10-May-2023 00:00	RINSATE	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2308315-001	10-May-2023 14:26	BH2	✓	✓	✓	✓	✓
EM2308315-002	10-May-2023 12:22	BH3	✓	✓	✓	✓	✓
EM2308315-003	10-May-2023 16:15	BH4	✓	✓	✓	✓	✓
EM2308315-004	10-May-2023 10:11	BH6	✓	✓	✓	✓	✓
EM2308315-005	10-May-2023 13:39	BH7	✓	✓	✓	✓	✓
EM2308315-006	10-May-2023 11:38	BH8	✓	✓	✓	✓	✓
EM2308315-007	10-May-2023 00:00	BLIND	✓	✓		✓	✓
EM2308315-008	10-May-2023 00:00	RINSATE	✓	✓		✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							

BH2	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BH3	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BH4	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BH6	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BH7	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BH8	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
BLIND	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----
RINSATE	Clear Plastic Bottle - Natural	----	10-May-2023	11-May-2023	✗	----	----

Requested Deliverables

LUCY EDWARDS		
- *AU Certificate of Analysis - NATA (COA)	Email	Lucy.Edwards@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Lucy.Edwards@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Lucy.Edwards@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Lucy.Edwards@ventia.com
- A4 - AU Tax Invoice (INV)	Email	Lucy.Edwards@ventia.com
- Chain of Custody (CoC) (COC)	Email	Lucy.Edwards@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	Lucy.Edwards@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	Lucy.Edwards@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	Lucy.Edwards@ventia.com
NICOLE ROBINS		
- A4 - AU Tax Invoice (INV)	Email	nicole.robins@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com
- Purchase Order Request Letter (PO_Request)	Email	robert.callander@ventia.com

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 1 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	lucy.edwards@ventia.com ping.yao@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	ME/412/16
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	PH	EC	DO	TEMP	ORP	SWL				
–	BH1	Groundwater Bore	0	10/5/23	–	–	bore ~~[illegible]~~ lost not sampled									
1	BH2	Groundwater Bore	5	10/5/23	1426	W	5.59	673	4.53	16.1	117.7	2.90				
2	BH3	Groundwater Bore	5	10/5/23	1222	W	6.51	2541	0.18	13.29	-36.9	0.60				
3	BH4	Groundwater Bore	5	10/5/23	1615	W	5.83	1907	0.50	13.41	29.9	5.33				
4	BH6	Groundwater Bore	5	10/5/23	1011	W	4.97	563	0.56	14.9	229.4	11.96				
5	BH7	Groundwater Bore	5	10/5/23	1339	W	6.76	736	0.18	13.83	-28.4	2.31				
6	BH8	Groundwater Bore	5	10/5/23	1138	W	6.62	728	0.22	15.36	-74.4	3.00				
–	BH9	Groundwater Bore														

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com Lucy.edwards@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	~~[illegible]~~ 10/5/23	1700	[signature]	[signature]	11/5	10:40

Environmental Division
Melbourne
Work Order Reference
EM2308315

Telephone : + 61-3-8549 9600

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

CHAIN OF CUSTODY

ALS Group

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3**
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051	**Fax:**	
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:		**Quote No.:**	
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
—	BH10	Groundwater bore														
—	BH13	Groundwater bore														
	LB1	Leachate bore	0	10/5/23		Bores Blocked No Sample						13.33				
	LB2	Leachate bore	0	10/5/23								14.17				
	LB3	Leachate bore	0	10/5/23			NO SAMPLE – SWL ONLY					10.70				
7	BLIND	Blind dup (analysed by ALS)	5	10/5/23												
8	RINSATE	Rinsate blank	5	10/5/23												

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com						
Relinquished By:	**Company:**	**Date:**	**Time:**	**Received By:**	**Company:**	**Date:**	**Time:**
A Callander	Ventia	10/5/23	1700	[signature]	[illegible]	4/5	10:00

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:

Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

Document: OF002 i1

CERTIFICATE OF ANALYSIS

Work Order	: **EM2308446**	Page	: 1 of 4
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 12-May-2023 09:45
Order number	: Creswick Landfill	Date Analysis Commenced	: 13-May-2023
C-O-C number	: ----	Issue Date	: 19-May-2023 23:12
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne External Subcontracting, Springvale, VIC
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ED093F : EM2308446 #3 and #4 results for dissolved cations have been confirmed by re-preparation and re-analysis.
- EA015H: EM2308446 #2: 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.
- Ionic Balance out of acceptable limits for sample #3 and 4 due to analytes not quantified in this report. Major cations have been confirmed by re-prep and reanalysis.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	BH14	U/S BH3	@ BH3	D/S BH3	----
			Sampling date / time	11-May-2023 11:59	11-May-2023 12:45	11-May-2023 12:30	11-May-2023 10:30	----
				EM2308446-001	EM2308446-002	EM2308446-003	EM2308446-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.70**	**7.10**	**7.67**	**7.21**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1290**	**700**	**996**	**695**	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**893**	**537**	**561**	**470**	----
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	**103**	**62**	**187**	**70**	----
Total Alkalinity as CaCO3	----	1	mg/L	**103**	**62**	**187**	**70**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**9**	**7**	**1**	**6**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**378**	**189**	**220**	**186**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**26**	**16**	**16**	**28**	----
Magnesium	7439-95-4	1	mg/L	**42**	**23**	**22**	**31**	----
Sodium	7440-23-5	1	mg/L	**158**	**84**	**80**	**108**	----
Potassium	7440-09-7	1	mg/L	**4**	**3**	**4**	**19**	----
EG020T: Total Metals by ICP-MS								
Chromium	7440-47-3	0.001	mg/L	**0.004**	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	**0.016**	**0.011**	**0.010**	**0.010**	----
Iron	7439-89-6	0.05	mg/L	**36.6**	**9.10**	**2.68**	**6.54**	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.74**	**0.10**	**0.11**	**1.17**	----
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	**0.03**	**0.09**	**0.05**	**0.02**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.03**	**0.09**	**0.06**	**0.02**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.3**	**0.7**	**0.7**	**1.8**	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	BH14	U/S BH3	@ BH3	D/S BH3	----
Sampling date / time				11-May-2023 11:59	11-May-2023 12:45	11-May-2023 12:30	11-May-2023 10:30	----
				EM2308446-001	EM2308446-002	EM2308446-003	EM2308446-004	--------
				Result	Result	Result	Result	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**12.9**	**6.72**	**9.96**	**6.77**	----
ø Total Cations	----	0.01	meq/L	**11.7**	**6.42**	**6.19**	**9.13**	----
ø Ionic Balance	----	0.01	%	**4.79**	**2.24**	**23.3**	**14.8**	----
EN67: Field Tests								
ø Electrical Conductivity (Non Compensated)	----	1	µS/cm	**1140**	**622**	**911**	**648**	----
ø Dissolved Oxygen	----	0.1	mg/L	**0.25**	**4.92**	**4.47**	**5.71**	----
ø pH	----	0.01	pH Unit	**6.40**	**6.71**	**7.08**	**6.91**	----
ø Redox Potential	----	0.1	mV	**9.2**	**43.6**	**18.18**	**94.4**	----
ø Temperature	----	0.1	°C	**14.94**	**9.9**	**9.42**	**9.6**	----
EN67: Field Tests (non-NATA)								
ø Standing Water Level	----	0.01	m	**2.85**	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**7**	**7**	**11**	**7**	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Chemical Oxygen Demand	----	10	mg/L	<10	<10	**15**	**31**	----
EP045: Volatile Acids as CH3COOH								
Volatile Acids as Acetic Acid	----	5	mg/L	**21**	**10**	**16**	**13**	----

QUALITY CONTROL REPORT

Work Order	: **EM2308446**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 12-May-2023
Order number	: Creswick Landfill	Date Analysis Commenced	: 13-May-2023
C-O-C number	: ----	Issue Date	: 19-May-2023
Sampler	: ----		
Site	: ----		
Quote number	: ME/793/19		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne External Subcontracting, Springvale, VIC
Arenie Vijayaratnam	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
\# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 5048372)									
EM2308375-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.55	7.51	0.5	0% - 20%
EM2308440-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.30	7.30	0.0	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 5048369)									
EM2308375-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3460	3580	3.4	0% - 20%
EM2308440-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	10400	10600	2.7	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 5048375)									
EM2308492-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	14900	15100	1.0	0% - 20%
EM2308454-005	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3900	3950	1.2	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 5056244)									
EM2308361-007	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	5200	5270	1.2	0% - 20%
EM2308443-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	3340	3600	7.6	0% - 20%
EM2308443-012	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	722	736	1.9	0% - 20%
EM2308446-001	BH14	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	893	824	8.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5048374)									
EM2308443-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	561	562	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	561	562	0.3	0% - 20%
EM2308443-020	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	393	394	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	393	394	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5046997)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5046997) - continued									
EM2308443-021	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.0	No Limit
EM2308468-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<5	133	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 5046996)									
EM2308443-021	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.0	No Limit
EM2308468-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1360	1360	0.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5052535)									
EM2308443-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	113	113	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	174	175	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	638	642	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	163	164	0.7	0% - 20%
EM2308465-006	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 5056399)									
EM2308443-019	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.185	0.184	0.0	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.12	0.12	0.0	No Limit
EM2308562-001	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.017	0.018	0.0	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.123	0.125	1.8	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	9.74	10.2	4.2	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5051021)									
EM2308443-016	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	4.26	4.29	0.8	0% - 20%
EM2308446-004	D/S BH3	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.17	1.16	0.0	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5046995)									
EM2308443-021	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2308468-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5051022)									
EM2308443-016	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.0	No Limit
EM2308446-004	D/S BH3	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5057280)									
EM2308521-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.3	0.0	No Limit
EM2308299-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	1.9	5.6	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 5053700)									
EM2308083-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	9	5	50.1	No Limit
EM2308446-003	@ BH3	EP005: Total Organic Carbon	----	1	mg/L	11	12	0.0	0% - 50%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 5057792)									
EM2308443-013	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	18	14	23.5	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 5057792) - continued									
EM2308446-001	BH14	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	<10	0.0	No Limit
EP045: Volatile Acids as CH3COOH (QC Lot: 5053502)									
EM2308205-001	Anonymous	EP045: Volatile Acids as Acetic Acid	----	5	mg/L	1000	952	5.3	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 5048372)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	100	98.8	101
				----	9 pH Unit	100	99.3	101
EA010P: Conductivity by PC Titrator (QCLot: 5048369)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	99.9	85.0	119
EA010P: Conductivity by PC Titrator (QCLot: 5048375)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.7	85.0	119
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 5056244)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.8	91.0	110
				<10	2440 mg/L	101	81.6	118
				<10	293 mg/L	95.9	91.0	110
ED037P: Alkalinity by PC Titrator (QCLot: 5048374)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	100.0	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5046997)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	90.0	110
				<1	500 mg/L	103	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 5046996)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	105	90.0	110
				<1	1000 mg/L	100.0	90.0	110
ED093F: Dissolved Major Cations (QCLot: 5052535)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	106	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.8	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 5056399)								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86.9	112
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	86.7	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	92.8	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5051021)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	94.5	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5046995)								

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5046995) - continued								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5051022)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	90.0	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5057280)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	102	70.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 5053700)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	103	81.2	110
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5057792)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	25 mg/L	107	89.7	111
EP045: Volatile Acids as CH3COOH (QCLot: 5053502)								
EP045: Volatile Acids as Acetic Acid	----	5	mg/L	<5	182 mg/L	97.6	85.5	116

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5046997)							
EM2308446-001	BH14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	99.4	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5046996)							
EM2308446-001	BH14	ED045G: Chloride	16887-00-6	400 mg/L	95.0	70.0	142
EG020T: Total Metals by ICP-MS (QCLot: 5056399)							
EM2308443-019	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	93.8	78.9	119
		EG020A-T: Zinc	7440-66-6	1 mg/L	93.8	74.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5051021)							
EM2308443-017	Anonymous	EK055G: Ammonia as N	7664-41-7	10 mg/L	113	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5046995)							
EM2308446-001	BH14	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	101	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5051022)							
EM2308443-017	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.3	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5057280)							
EM2308299-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	108	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 5053700)							
EM2308083-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	121	76.6	125
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 5057792)							
EM2308443-014	Anonymous	EP026SP: Chemical Oxygen Demand	----	500 mg/L	109	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2308446**	Page	: 1 of 7
Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Telephone	: +6138549 9645
Project	: Creswick Landfill 2 of 3	Date Samples Received	: 12-May-2023
Site	: ----	Issue Date	: 19-May-2023
Sampler	: ----	No. of samples received	: 4
Order number	: Creswick Landfill	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Due for extraction	Days overdue	Analysis: Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
BH14, @ BH3,	U/S BH3, D/S BH3	----	----	----	17-May-2023	11-May-2023	**6**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	11-May-2023	✘
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	08-Jun-2023	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**18-May-2023**	18-May-2023	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	25-May-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**16-May-2023**	08-Jun-2023	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**16-May-2023**	08-Jun-2023	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	18-May-2023	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**18-May-2023**	07-Nov-2023	✓	**18-May-2023**	07-Nov-2023	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	08-Jun-2023	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**13-May-2023**	13-May-2023	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	08-Jun-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**19-May-2023**	08-Jun-2023	✓	**19-May-2023**	08-Jun-2023	✓
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**18-May-2023**	08-Jun-2023	✓
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**18-May-2023**	08-Jun-2023	✓
EP045: Volatile Acids as CH3COOH								
Clear Plastic Bottle - Natural (EP045)								
BH14, @ BH3,	U/S BH3, D/S BH3	**11-May-2023**	**----**	----	----	**17-May-2023**	25-May-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	40	**7.50**	**7.50**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Volatile Acids as CH3COOH	EP045	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Field Tests (performed by external sampler)	* EN67-B02	WATER	Field determinations as per methods described in APHA or supplied by client. The analysis is performed in the field by non-ALS samplers. ALS NATA accreditation does not apply for this service.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloured and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.
Volatile Acids as CH3COOH	EP045	WATER	In house: Referenced to APHA 5560 C. Steam distillable acids are captured in caustic solution and determined titremetrically. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2308446**

Client	: **VENTIA UTILITY SERVICES PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ROBERT CALLANDER	Contact	: Peter Ravlic
Address	: 25-37 HUNTINGDALE ROAD BURWOOD VIC 3125	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: robert.callander@ventia.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: Creswick Landfill 2 of 3	Page	: 1 of 3
Order number	: Creswick Landfill	Quote number	: EM2016THISER0010 (ME/793/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 12-May-2023 09:45	Issue Date	: 12-May-2023
Client Requested Due Date	: 19-May-2023	Scheduled Reporting Date	: **19-May-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3.8°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 4 / 4

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK061G Total Kjeldahl Nitrogen as N (TKN) By Discrete	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP045 Volatile Acids as CH3COOH
EM2308446-001	11-May-2023 11:59	BH14	✓	✓	✓	✓	✓	✓	✓
EM2308446-002	11-May-2023 12:45	U/S BH3	✓	✓	✓	✓	✓	✓	✓
EM2308446-003	11-May-2023 12:30	@ BH3	✓	✓	✓	✓	✓	✓	✓
EM2308446-004	11-May-2023 10:30	D/S BH3	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - EN67-B02 Field Tests (performed by external sampler)	WATER - EP026SP Chemical Oxygen Demand (COD)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EM2308446-001	11-May-2023 11:59	BH14	✓	✓	✓	✓	✓
EM2308446-002	11-May-2023 12:45	U/S BH3	✓	✓	✓	✓	✓
EM2308446-003	11-May-2023 12:30	@ BH3	✓	✓	✓	✓	✓
EM2308446-004	11-May-2023 10:30	D/S BH3	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
@ BH3	Clear Plastic Bottle - Natural	----	11-May-2023	12-May-2023	✘	----	----
BH14	Clear Plastic Bottle - Natural	----	11-May-2023	12-May-2023	✘	----	----
D/S BH3	Clear Plastic Bottle - Natural	----	11-May-2023	12-May-2023	✘	----	----
U/S BH3	Clear Plastic Bottle - Natural	----	11-May-2023	12-May-2023	✘	----	----

Requested Deliverables

NICOLE ROBINS		
- A4 - AU Tax Invoice (INV)	Email	nicole.robins@ventia.com
Ping Yao		
- *AU Certificate of Analysis - NATA (COA)	Email	ping.yao@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ping.yao@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ping.yao@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ping.yao@ventia.com
- Chain of Custody (CoC) (COC)	Email	ping.yao@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	ping.yao@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	ping.yao@ventia.com
ROBERT CALLANDER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.callander@ventia.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.callander@ventia.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.callander@ventia.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.callander@ventia.com
- A4 - AU Tax Invoice (INV)	Email	robert.callander@ventia.com
- Chain of Custody (CoC) (COC)	Email	robert.callander@ventia.com
- EDI Format - ENMRG (ENMRG)	Email	robert.callander@ventia.com
- EDI Format - ESDAT (ESDAT)	Email	robert.callander@ventia.com

CHAIN OF CUSTODY

ALS Group
2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 2 of 3** ME/793/19
Contact:	**Robert Callander**		**TESTS REQUIRED AS PER QUOTE ME/412/16**
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:**		
T/A Time:			

Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
BH10	Groundwater bore														
BH14	Groundwater bore	5	11/5/23	1159	W	6.40	1141	0.25	14.94	9.2	2.85				
LB1	Leachate bore														
LB2	Leachate bore														
LB3	Leachate bore					NO SAMPLE – SWL ONLY									
BLIND	Blind dup (analysed by ALS)														
RINSATE	Rinsate blank														

Environmental Division
Melbourne
Work Order Reference
EM2308446
Telephone : + 61-3-8549 9600

Special Instructions:	Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	11/5/23	1700	[signature]	[illegible]	12/5	9:45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions: Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
es transported at appropriate temperature [Yes/No]

ALS Group

CHAIN OF CUSTODY

2-4 Westall Rd,
Springvale VIC 3171

Client:	**Ventia**	**Job Ref:**	**Creswick Landfill 3 of 3**
Contact:	**Robert Callander**	**TESTS REQUIRED AS PER QUOTE ME/412/16**	
Address:	**25-37 Huntingdale Road, Burwood, 3125**		
Phone:	0427529051 **Fax:**		
Email:	ping.yao@ventia.com lucy.edwards@ventia.com robert.callander@ventia.com		
P/O No.:	**Quote No.:**		
T/A Time:			

	Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled		PH	EC	DO	TEMP	ORP	SWL				
2	U/S BH3	Creek Sample	5	11/5/23	1245	W	6.71	622	4.92	9.9	43.6	–				
3	@ BH3	Creek Sample	5	11/5/23	1230	W	7.08	91[illegible]	4.47	9.42	18.18	–				
4	D/S BH3	Creek Sample	5	11/5/23	1030	W	6.91	648	5.71	~~10.6~~ 9.6	94.4	–				
	Leachate	Surface water sample														
	Wetland	Surface water sample														
	Dredge	Surface water sample														

Special Instructions: Please email Invoices to Nicole.robins@ventia.com

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
A Callander	Ventia	11/5/23	1700	[illegible]	[illegible]	12/5	[illegible]

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.
As an Occupational Health and Safety consideration, it is a requirement of Ecowise Environmental (Victoria), that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

Sample Receipt Advice

Company name:	Ventia Utility Services P/L (Burwood)
Contact name:	Robert Callander
Project name:	CRESWICK LANDFILL
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	May 12, 2023 9:25 AM
Eurofins reference	989018

Sample Information

✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

✓ All samples have been received as described on the above COC.

✓ COC has been completed correctly.

✓ Attempt to chill was evident.

✓ Appropriately preserved sample containers have been used.

✓ All samples were received in good condition.

✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

✓ Appropriate sample containers have been used.

✓ Sample containers for volatile analysis received with zero headspace.

✗ Split sample sent to requested external lab.

✗ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Robert Callander - Robert.callander@ventia.com.au.

Note: A copy of these results will also be delivered to the general Ventia Utility Services P/L (Burwood) email address.

Global Leader - Results you can trust

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Company Name: Ventia Utility Services P/L (Burwood)
Address: Unit 11, 25-37 Huntingdale Rd
Burwood
VIC 3125

Project Name: CRESWICK LANDFILL

Order No.:
Report #: 989018
Phone: 03 9861 8169
Fax: 03 9861 8101

Received: May 12, 2023 9:25 AM
Due: May 19, 2023
Priority: 5 Day
Contact Name: Robert Callander

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chemical Oxygen Demand (COD)	Nitrate (as N)	Total Organic Carbon	Metals M8	Organic Nitrogen Set (as N)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C	Volatile Fatty Acids (VFA) by GC-MS
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	CRESWICK SPLIT	May 10, 2023		Water	M23-My0031166	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1

APPENDIX E – ALL HISTORICAL RECORDS

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH1	31-Oct-2003	619301	2.3	90	<0.01	0.4	<0.01	1.3	0.5	1.1	28	-	-	-	20	6.2	<0.1	0.03	3.4	-	-	5.9	<1	25	22	130	-
BH1	29-Jan-2004	648473	3.22	100	<0.01	0.27	<0.01	<0.05	1.2	2.6	13	-	-	-	12	<10	<0.1	0.07	16	-	-	5.6	4	-	23	150	-
BH1	07-Apr-2004	673235	3.01	530	<0.01	0.28	<0.01	2	<0.1	2.9	20	-	-	-	8	<1.0	0.1	0.09	0.7	-	-	5.6	3	3	20	140	-
BH1	21-Jul-2004	707745	2.34	420	<0.01	<0.05	0.06	0.16	4.9	3.4	30	-	-	-	16	14	0.2	0.03	1.1	-	-	8	5	12	24	150	-
BH1	26-Oct-2004	743326	2.41	140	<0.01	2.9	<0.01	<0.05	3.7	2.9	34	-	-	-	14	21	0.2	0.03	1.8	-	-	5.3	4	16	40	140	-
BH1	20-Jan-2005	775529	2.74	190	<0.01	0.37	<0.01	1.8	4.5	8.9	31	-	-	-	13	12	0.6	0.05	<0.3	-	-	5.7	6	7	35	150	-
BH1	13-Apr-2005	804580	2.86	150	<0.01	21	0.06	1.4	0.7	8.6	30	-	-	-	8	15	0.2	<0.01	0.3	-	-	5.8	4	16	25	170	-
BH1	28-Jul-2005	841923	2.84	120	<0.01	22	0.05	<1.0	<1.0	<1.0	<1.0	-	-	-	10	14	<0.1	0.09	1.7	-	-	5.2	6	17	30	140	-
BH1	31-Oct-2005	872629	2.31	140	<0.01	9.5	0.03	1.5	0.5	7.7	30	-	-	-	14	29	0.2	0.02	0.5	-	-	5.5	7	13	33	180	-
BH1	30-Jan-2006	903878	2.77	250	<0.00	0.28	<0.01	1.3	0.5	7.4	32	-	-	-	16	27	<0.1	0.19	1	-	-	6.6	5	5	32	160	-
BH1	20-Apr-2006	933443	3.1	380	<0.01	0.48	<0.01	0.59	<0.1	2.8	31	-	-	-	16	10	<0.1	<0.01	<0.3	-	-	5.8	8	3	32	170	-
BH1	25-Jul-2006	965726	2.89	140	<0.01	1.6	0.13	0.7	<0.5	3.5	33	-	-	-	32	8	<0.1	<0.01	<0.3	-	-	6	4	13	32	190	-
BH1	24-Oct-2006	993112	3	110	<0.01	2.2	<0.01	0.74	0.7	3.6	30	-	-	-	55	15	<0.1	0.02	<0.3	-	-	5.8	4	5	31	170	-
BH1	24-Jan-2007	1108115	3.2	450	<0.01	1.6	0.02	<0.05	2.6	3.7	32	-	-	-	12	21	<0.1	0.08	0.4	-	-	5.6	12	25	46	190	-
BH1	17-Apr-2007	1150661	3.42	300	<0.01	1.4	<0.01	2.8	4.5	2.6	30	-	-	-	40	13	<0.1	<0.01	<0.1	-	-	5.7	7	40	30	160	-
BH1	25-Jul-2007	1219303	2.42	160	<0.01	3.0	<0.02	1.0	2.4	4.0	28	-	-	-	29	12	<0.1	<0.01	<0.1	-	-	6.4	5	6	33	190	-
BH1	22-Oct-2007	1297214	2.85	170	<0.01	<0.2	<0.02	0.27	1.3	0.24	27	-	-	-	16	14	0.1	0.02	0.2	-	-	6.6	6	150	33	170	-
BH1	22-Jan-2008	1375491	3.15	350	<0.01	0.8	0.01	1.0	4.3	2.2	27	-	-	-	17	12	<0.1	1.3	0.6	-	-	6.4	4	20	32	180	-
BH1	22-Apr-2008	1458428	3.425	200	<0.01	9.6	0.15	<0.5	2.0	3.4	40	-	-	-	32	14	<0.1	0.02	0.5	-	-	6.15	12	18	45	260	-
BH1	22-Jul-2008	1539821	2.81	170	<0.01	0.8	0.01	0.58	3.3	2.9	30	-	-	-	33	52	0.1	0.01	0.3	-	-	6.36	19	<2	29	230	-
BH1	21-Oct-2008	1620239	2.74	150	<0.01	4.9	0.02	0.54	2.5	2.5	34	-	-	-	25	14	<0.1	0.30	0.5	-	-	5.31	4	13	36	220	-
BH1	28-Apr-2009	1791390	3.02	290	<0.01	15	0.15	5.2	4.9	7.4	69	-	-	-	53	18	0.8	0.15	3.6	-	-	6.3	39	70	61	340	-
BH1	29-Jul-2009	-	2.96	190	<0.01	12	0.11	<1	3	6	42	-	-	-	44	18	0.5	0.075	1.0	-	-	6.4	6	19	39	280	-
BH1	29-Oct-2009	1976818	2.52	170	< 0.01	15	0.19	2	2	6	40	57	< 2	< 2	57	19	0.3	< 0.01	0.4	-	-	5.8	9	< 5	33	260	-
BH1	28-Jan-2010	2070255	2.81	150	< 0.001	0.92	0.006	3.2	5.4	9.1	57	84	< 2	< 2	84	16	0.3	< 0.01	0.5	-	-	6	12	23	36	310	-
BH1	28-Jul-2011	2688215	1.39	220	0.034	16	0.022	1.8	2.1	4.1	60	30	< 2	< 2	30	14	0.4	< 0.01	0.5	-	-	5.7	7	33	85	350	-
BH1	18-Oct-2011	2784843	1.51	220	< 0.01	1.7	0.11	2.7	2.2	4.7	59	37	< 2	< 2	37	16	0.2	0.25	0.5	-	-	5.8	-	15	84	350	-
BH1	19-Jan-2012	2895496	1.97	200	0.03	13	0.02	1	3	2	48	38	< 2	< 2	38	19	0.2	< 0.01	0.5	-	-	5.9	9	10	63	330	-
BH1	09-Aug-2012	3137525	1.36	230	0.01	22	0.02	2.2	2.2	6	49	39	< 2	< 2	39	15	0.4	0.21	0.8	-	-	5.8	9	5	63	310	-
BH1	28-Nov-2012	3274903	1.64	580	0.03	15	0.03	2.9	16	16	65	24	< 2	< 2	24	21	0.2	< 0.01	1.4	-	-	5.6	40	110	84	380	-
BH1	27-Feb-2013	3383769	2.29	410	< 0.01	4.1	< 0.01	0.4	2.6	0.7	61	14	< 2	< 2	14	24	0.5	0.79	2.6	-	-	5.9	34	42	90	400	-
BH1	16-May-2013	3478280	2.5	170	0.07	74	0.09	2.5	3.2	6.6	49	28	< 2	< 2	28	14	0.3	0.03	0.9	-	-	5.8	10	8	64	290	-
BH1	28-Aug-2013	3598479	1.65	260	< 0.01	10	< 0.01	2	1.8	4.8	51	39	< 2	< 2	39	14	0.3	0.52	0.6	-	-	6	6	5	67	330	-
BH1	26-Nov-2013	3705702	1.82	190	< 0.01	2	0.02	3.1	2	3.2	41	32	< 2	< 2	32	16	0.2	1.8	0.5	-	-	5.9	6	< 5	73	350	-
BH1	25-Feb-2014	3807898	2.43	200	< 0.01	32	0.11	5.4	4.2	12	60	9	< 2	< 2	9	16	0.6	0.18	0.8	-	-	5.5	9	< 5	79	300	-
BH1	28-May-2014	3917832	2.49	230	< 0.01	4.5	0.02	3	3	6	48	34	< 2	< 2	34	18	0.4	0.02	1.1	-	0.87	5.9	16	10	82	380	-
BH1	26-Aug-2014	4022966	1.9	150	< 0.01	4	0.02	1.2	1.8	2.9	45	15	< 2	< 2	15	22	0.2	0.08	0.3	-	0.21	5.8	6	< 5	67	300	-
BH1	27-Nov-2014	4134768	2.21	280	< 0.01	< 0.2	0.02	0.8	1.7	2.3	48	16	< 2	< 2	16	18	< 0.1	0.94	0.8	-	0.17	6	3	< 5	64	280	-
BH1	25-Feb-2015	4243098	2.46	280	<0.01	0.5	0.02	2.2	5.3	3.5	38	20	<2	<2	20	17	<0.1	2.1	0.15	-	1	5.7	8.2	23	56	280	-
BH1	27-Aug-2015	4455817	2.31	260	0.031	15	0.047	1.1	3.1	3.8	53	22	< 2	< 2	22	16	< 0.1	0.57	0.8	-	-	6.1	6.8	17	65	280	-
BH1	16-Jan-2017	-	-	402	<0.001	0.1	0.052	4	4	9	112	38	<1	<1	38	38	0.02	2.8	1.2	-	-	6.21	7	21	183	684	11
BH1	21-Mar-2017	-	2.81	564	0.003	2.38	0.144	2	4	5	82	39	<1	<1	39	28	0.07	0.69	0.9	-	-	6.13	14	51	118	516	13
BH1	23-May-2017	-	2.11	841	0.002	1.13	0.04	1	4	4	66	35	<1	<1	35	20	0.09	0.4	1.2	-	-	6.35	12	64	61	328	13
BH1	22-Aug-2017	EM1711311001	1.56	699	0.002	0.68	0.01	2	3	3	50	40	<1	<1	40	15	0.12	0.98	1.2	-	-	6.15	20	105	53	312	6
BH1	09-Nov-2017	EM1715406001	1.92	730	0.006	2.08	0.037	2	4	4	50	42	<1	<1	42	22	0.21	0.74	2.1	-	-	6.52	12	81	61	315	19
BH1	26-Feb-2018	EM1803674001	2.41	335	0.001	0.42	0.04	<1	4	2	52	34	<1	<1	34	15	0.14	1.25	0.2	-	-	5.6	5	<10	57	320	23
BH1	28-May-2018	EM1808721001	2.38	2,090	0.001	1.43	0.199	<1	2	<1	36	23	<1	<1	23	14	0.09	0.74	0.9	2,000	-	6.22	24	316	38	210	14
BH1	01-Aug-2018	EM1812302001	1.83	2,320	0.002	4.82	0.612	2	3	2	41	36	<1	<1	36	22	0.28	0.11	2	--	-	6.44	9	196	42	245	19
BH1	28-Nov-2018	EM1819277001	2.28	330	0.001	0.7	0.03	<1	3	2	48	29	<1	<1	29	17	0.05	1.58	0.8	--	-	6.24	6	61	56	273	44
BH1	26-Feb-2019	EM1902808001	2.62	478	0.009	5.03	0.055	<1	3	2	44	22	<1	<1	22	10	0.03	1.83	1.1	--	-	6.15	6	<10	65	277	21
BH1	20-May-2019	EM1907716001	2.21	593	0.003	1.64	0.014	<1	5	2	37	20	<1	<1	20	12	0.06	3.46	2.8	-	--	5.7	10	20	49	824	7
BH1	20-Aug-2019	EM1913616	1.2	509	0.002	0.9	0.015	<1	4	2	43	32	<1	<1	32	14	0.07	1.42	1.4	1.43	--	6.1	5	<10	53	308	21
BH1	04-Dec-2019	EM1920907	1.93	290	<0.001	0.08	0.044	2	6	8	73	31	<1	<1	31	23	<0.01	4.23	0.9	4.25	--	5.88	8	<10	116	494	21
BH1	11-Feb-2020	EM2002157	2.28	314	<0.001	0.05	0.023	2	5	6	63	25	<1	<1	25	16	0.04	2.61	2.7	2.62	--	6.42	1	90	91	406	11
BH1	19-May-2020	EM2008425	2.15	432	0.015	6.51	0.04	1	5	5	60	25	<1	<1	25	24	<0.01	8.42	2.5	8.43	--	6.17	16	46	57	357	13
BH1	18-Aug-2020	EM2014393	1.63	421	-	-	-	2	12	5	43	48	<1	<1	48	14	0.02	5.06	3.3	5.07	-	6.84	22	77	40	300	47
BH1	24-Nov-2020	EM2021040	1.7	476	0.006	2.17	0.162	5	18	14	94	78	<1	<1	78	33	0.04	10.3	2.7	10.3	-	7.17	20	48	131	723	17
BH1	24-Feb-2021	-	Unable to access																								
BH1	26-May-2021	-	Bore location lost due to road resurfacing																								
BH1	13-Sep-2021	-	Bore location lost due to road resurfacing																								
BH1	18-Nov-2021	-	Bore location lost due to road resurfacing																								
BH1	01-Mar-2022	-	Bore location lost due to road resurfacing																								
BH1	17-May-2022	-	Bore location lost due to road resurfacing																								
BH1	-	-	Bore location lost due to road resurfacing																								
BH1	-	-	Bore location lost due to road resurfacing																								
BH1	-	-	Bore location lost due to road resurfacing																								
BH1	-	-	Bore location lost due to road resurfacing																								

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH2	31-Oct-2003	619302	2.7	330	<0.01	<0.05	<0.01	16	1	32	83	-	-	-	130	8	0.2	<0.01	<0.3	-	-	7.4	3	17	110	500	-
BH2	29-Jan-2004	648474	4.4	320	<0.01	9	<0.01	<5.0	<5.0	14	70	-	-	-	130	7	0.2	0.07	1.4	-	-	6.7	4	-	100	600	-
BH2	07-Apr-2004	673236	3.43	310	<0.01	2.4	<0.01	4.6	3.1	25	52	-	-	-	150	7.8	0.2	0.03	0.5	-	-	6.9	4	9	110	690	-
BH2	21-Jul-2004	707746	2.69	320	<0.01	1.6	<0.01	2.7	5.6	29	62	-	-	-	130	16	0.2	0.01	<0.3	-	-	7.6	4	17	100	650	-
BH2	26-Oct-2004	743327	2.9	230	<0.01	0.94	<0.01	1.5	3.5	22	51	-	-	-	120	<1	0.2	<0.01	<0.3	-	-	6.9	2	11	72	490	-
BH2	20-Jan-2005	775528	3.02	220	<0.01	19	<0.01	2.2	4.1	19	48	-	-	-	110	8	0.2	<0.01	<0.3	-	-	6.9	1	<2	130	420	-
BH2	13-Apr-2005	804581	3.16	210	<0.01	24	0.02	1.9	0.5	20	47	-	-	-	110	6	0.2	<0.01	0.3	-	-	6.8	3	9	59	400	-
BH2	28-Jul-2005	841924	3.14	200	<0.01	35	0.27	2.1	1	19	33	-	-	-	120	2	0.1	0.04	<0.3	-	-	6.9	3	14	68	440	-
BH2	31-Oct-2005	872630	2.6	200	<0.01	24	<0.01	2	0.5	18	40	-	-	-	160	2	0.2	<0.01	0.5	-	-	6.7	4	4	61	390	-
BH2	30-Jan-2006	903879	3.03	190	<0.00	17	0.2	1.9	0.8	17	44	-	-	-	100	7	0.1	<0.01	0.7	-	-	7.9	2	<2	59	380	-
BH2	20-Apr-2006	933444	3.44	200	<0.01	22	0.04	2.1	0.3	19	42	-	-	-	110	2	0.2	<0.01	<0.3	-	-	6.8	6	7	63	400	-
BH2	25-Jul-2006	965727	3.22	180	<0.01	20	0.02	1.9	<0.5	18	60	-	-	-	100	2	0.2	<0.01	<0.3	-	-	6.8	5	10	68	400	-
BH2	24-Oct-2006	993113	3.47	170	<0.01	23	<0.01	2	0.6	18	43	-	-	-	140	3	0.1	<0.01	0.8	-	-	6.8	3	10	65	400	-
BH2	24-Jan-2007	1108116	3.48	180	<0.01	23	0.02	1.6	5.8	17	43	-	-	-	110	2.4	0.2	<0.01	<0.1	-	-	6.8	4	9	78	400	-
BH2	17-Apr-2007	1150662	3.71	200	<0.01	24	0.05	2.5	4.5	18	44	-	-	-	140	2	0.2	<0.01	0.4	-	-	6.8	9	60	69	410	-
BH2	25-Jul-2007	1219304	2.73	220	<0.01	27	<0.02	2.1	2.0	18	37	-	-	-	98	<1	0.2	<0.01	0.1	-	-	7.2	4	6	86	420	-
BH2	22-Oct-2007	1297215	3.16	210	<0.01	2.6	<0.02	2.3	1.5	20	44	-	-	-	100	<1	0.2	0.01	0.2	-	-	7.8	3	18	75	420	-
BH2	22-Jan-2008	1375492	3.48	220	<0.01	<0.2	<0.01	2.4	3.1	18	39	-	-	-	94	1	0.2	1.2	0.2	-	-	7.2	3	10	80	420	-
BH2	22-Apr-2008	1458429	3.745	210	<0.01	11	0.04	0.38	<0.5	16	39	-	-	-	88	<1	0.1	<0.01	0.4	-	-	6.89	3	8	76	410	-
BH2	22-Jul-2008	1539822	3.14	110	<0.01	0.8	<0.01	2.3	3.3	18	43	-	-	-	86	<1	0.3	<0.01	1.1	-	-	6.84	3	<2	91	440	-
BH2	21-Oct-2008	1620240	3.06	220	<0.01	5.1	0.02	1.9	2.4	17	42	-	-	-	94	3	0.1	<0.01	0.2	-	-	6.55	2	12	80	420	-
BH2	28-Jan-2009	1706035	3.41	220	<0.01	2.3	0.01	2.2	0.6	18	44	-	-	-	79	13	0.2	0.02	0.3	-	-	7.2	4	<10	82	450	-
BH2	28-Apr-2009	1791391	3.85	210	<0.01	3.3	0.02	5.1	1.3	19	57	-	-	-	91	<1	0.2	0.02	0.2	-	-	7.1	2	<5	80	420	-
BH2	29-Jul-2009	-	3.38	210	<0.01	6.3	0.02	2	<1	17	46	-	-	-	81	2	0.2	0.031	0.3	-	-	6.8	2	<5	85	430	-
BH2	29-Oct-2009	1976819	2.95	200	< 0.01	6.3	< 0.01	2	< 1	17	44	92	< 2	< 2	92	2	0.2	< 0.01	0.3	-	-	6.6	3	< 5	79	410	-
BH2	28-Jan-2010	2070256	3.29	180	< 0.001	0.17	0.001	1.7	1.8	17	46	97	< 2	< 2	97	1	0.2	< 0.01	0.2	-	-	6.6	3	8	77	430	-
BH2	20-Jul-2010	2259580	2.59	200	< 0.001	0.32	< 0.001	1.9	2.2	21	43	100	< 2	< 2	100	< 1	0.2	0.01	0.2	-	-	6.6	5	11	78	420	-
BH2	20-Oct-2010	2367031	2.9	210	< 0.001	2	< 0.001	1.6	0.4	19	42	100	< 2	< 2	100	2	0.2	< 0.01	0.4	-	-	6.6	5	< 5	81	410	-
BH2	24-Jan-2011	2474615	2.43	210	< 0.001	1.5	< 0.001	1.7	0.4	20	50	100	< 2	< 2	100	3	0.3	0.03	0.5	-	-	6.6	7	12	77	430	-
BH2	19-Apr-2011	2574914	2.65	210	< 0.001	1.4	0.022	1.6	0.8	18	53	94	< 2	< 2	94	7	0.6	0.07	0.7	-	-	6.6	4	12	74	430	-
BH2	28-Jul-2011	2688216	2.28	240	< 0.001	8.8	< 0.001	1.7	0.5	20	48	100	< 2	< 2	100	1	0.3	< 0.1	0.3	-	-	6.6	5	14	87	440	-
BH2	18-Oct-2011	2784844	2.59	230	< 0.01	1.6	< 0.01	1.8	0.5	20	50	100	< 2	< 2	100	2	0.3	0.02	0.5	-	-	6.7	-	8	89	450	-
BH2	19-Jan-2012	2895497	2.92	260	< 0.01	5.7	< 0.01	2	< 1	18	48	100	< 2	< 2	100	2	0.1	< 0.05	0.3	-	-	6.7	4	< 5	85	470	-
BH2	09-Aug-2012	3137526	2.3	250	< 0.01	24	< 0.01	2.1	0.6	20	51	95	< 2	< 2	95	2	0.3	0.15	0.4	-	-	6.7	4	< 5	89	460	-
BH2	28-Nov-2012	3274904	2.75	240	< 0.01	0.9	< 0.01	1.3	0.5	16	48	97	< 2	< 2	97	< 5	0.3	< 0.01	0.4	-	-	6.6	3	6	90	460	-
BH2	27-Feb-2013	3383770	3.24	260	< 0.01	2.2	< 0.01	1.5	0.6	15	51	33	< 2	< 2	33	4	0.3	< 0.01	0.4	-	-	6.6	4	< 5	110	500	-
BH2	16-May-2013	3478281	3.41	290	< 0.01	35	< 0.01	2.2	0.6	21	60	87	< 2	< 2	87	< 5	0.3	< 0.01	0.3	-	-	6.6	3	< 5	140	570	-
BH2	28-Aug-2013	3598517	2.57	390	< 0.01	34	< 0.01	3.1	0.7	26	68	91	< 2	< 2	91	< 5	0.3	0.03	0.3	-	-	6.6	4	< 5	160	670	-
BH2	26-Nov-2013	3705703	2.86	280	< 0.01	7	0.04	1.8	0.5	16	48	94	< 2	< 2	94	< 10	0.2	< 0.05	0.2	-	-	6.7	3	< 5	110	520	-
BH2	25-Feb-2014	3807899	3.43	340	< 0.01	27	< 0.01	3	0.8	25	78	96	< 2	< 2	96	3	0.4	0.03	0.4	-	-	6.7	3	< 5	150	640	-
BH2	28-May-2014	3917833	3.52	360	< 0.01	17	< 0.01	2	< 1	20	59	110	< 2	< 2	110	4	0.4	< 0.01	0.5	-	0.06	6.6	5	< 5	170	720	-
BH2	26-Aug-2014	4022967	2.76	270	< 0.01	5.8	< 0.01	1.9	0.5	21	56	95	< 2	< 2	95	10	0.2	< 0.05	0.2	-	0.09	6.7	2	< 5	120	550	-
BH2	27-Nov-2014	4134769	3.27	270	< 0.01	< 0.2	< 0.01	1.7	0.5	21	59	94	< 2	< 2	94	7	0.2	< 0.01	0.4	-	0.16	6.6	2	< 5	110	510	-
BH2	25-Feb-2015	4243096	3.52	280	<0.01	3.6	0.02	1.5	0.7	18	52	93	<2	< 2	93	11	0.2	0.04	0.05	-	0.4	6.6	2.1	<5	94	500	-
BH2	27-Aug-2015	4455818	3.37	350	0.005	38	0.025	3	0.7	26	88	110	< 2	< 2	110	6	0.3	0.01	0.5	-	-	6.7	2.1	< 5	170	720	-
BH2	24-Feb-2016	4674179	3.84	460	<0.01	11	<0.01	3.9	0.9	26	96	80	< 2	< 2	80	12	0.6	0.04	0.9	-	-	6.5	3.5	< 5	210	890	-
BH2	16-Jan-2017	-	3.02	412	<0.001	0.09	<0.005	2	<1	19	87	86	<1	<1	86	14	0.59	0.01	0.8	-	-	6.5	3	<10	179	715	24
BH2	21-Mar-2017	-	3.27	400	<0.001	28.4	0.031	2	<1	19	86	76	<1	<1	76	13	1.29	<0.01	1.8	-	-	6.47	3	<10	192	750	24
BH2	23-May-2017	-	3.18	394	<0.001	25	0.017	2	1	23	108	92	<1	<1	92	10	0.81	0.01	1.1	-	-	6.57	2	13	191	720	22
BH2	23-Aug-2017	EM1711442001	3.18	600	<0.001	30.2	0.02	4	<1	28	113	87	<1	<1	87	25	0.36	0.01	0.7	-	-	6.79	4	22	260	980	28
BH2	09-Nov-2017	EM1715406002	2.99	435	<0.001	28.6	0.01	3	<1	27	94	96	<1	<1	96	14	0.83	<0.01	0.8	-	-	6.54	<1	<10	228	803	32
BH2	27-Feb-2018	EM1803772001	3.46	415	<0.001	16.4	0.015	2	<1	19	81	87	<1	<1	87	11	0.71	0.04	0.7	-	-	6.4	3	<10	155	725	11
BH2	28-May-2018	EM1808721002	3.44	355	<0.001	11.9	0.044	2	1	19	79	93	<1	<1	93	14	1.79	<0.01	2.3	--	-	6.73	4	12	163	704	37
BH2	01-Aug-2018	EM1812302002	2.9	398	0.002	4.86	0.362	2	<1	26	89	92	<1	<1	92	19	0.36	0.02	1	-	-	6.78	<1	74	190	745	13
BH2	28-Nov-2018	EM1819277002	2.82	355	<0.001	1.41	0.007	2	<1	21	107	86	<1	<1	86	14	0.33	0.08	0.8	-	-	6.87	4	61	182	683	42
BH2	26-Feb-2019	EM1902808002	3.69	372	0.001	21.2	0.024	2	<1	19	90	90	<1	<1	90	19	0.47	0.14	0.9	-	-	6.82	5	<10	202	750	30
BH2	20-May-2019	EM1907716002	3.11	474	<0.001	2.64	0.083	2	<1	23	94	79	<1	<1	79	18	0.3	0.07	0.5	-	-	6.40	2	<10	214	809	10
BH2	20-Aug-2019	EM1913616	2.27	493	<0.001	4.34	0.011	1	<1	23	97	104	<1	<1	104	15	0.21	0.03	0.4	<0.01	--	6.37	3	<10	200	813	26
BH2	04-Dec-2019	EM1920907	2.82	329	<0.001	0.3	0.013	2	1	21	87	84	<1	<1	84	19	0.37	0.1	0.6	<0.01	--	6.47	4	<10	171	693	17
BH2	11-Feb-2020	EM2002157	3.18	392	<0.001	2.93	0.013	2	<1	21	87	78	<1	<1	78	20	0.3	0.03	1.1	0.53	--	7	<1	36	170	679	22
BH2	18-May-2020	EM2008378	3.09	602	<0.001	25	0.017	2	<1	20	86	86	<1	<1	86	21	0.23	0.1	0.5	0.62	--	7.45	<1	<10	175	701	8
BH2	18-Aug-2020	EM2014393	2.56	442	-	-	-	2	1	23	98	97	<1	<1	97	19	0.36	0.12	0.9	0.14	-	7.16	<1	<10	208	822	45
BH2	24-Nov-2020	EM2021040	2.76	382	<0.001	31.8	0.031	1	<1	17	90	90	<1	<1	90	16	0.68	0.08	2.2	0.09	-	7.13	3	<10	167	703	11

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH2	24-Feb-2021	EM2103002	2.72	380	<0.001	-	0.023	2	2	13	84	68	<1	<1	68	28	1.66	0.77	2.1	0.87	-	-	1	<10	149	-	22
BH2	26-May-2021	EM2109946	3.22	354	0.001	12.9	0.068	1	<1	15	82	53	<1	<1	53	28	0.35	0.11	0.6	0.11	-	6.87	<1	<10	138	592	6
BH2	14-Sep-2021	EM2118437	2.27	359	0.001	106	0.073	1	<1	15	84	54	<1	<1	54	22	0.75	0.07	0.6	0.07	--	6.81	<1	<10	157	654	22
BH2	18-Nov-2021	EM2123390	2.58	372	0.002	77.9	0.109	1	1	13	84	50	<1	<1	50	22	0.86	0.03	1	0.21	--	7.2	4	<20	153	646	15
BH2	03-Mar-2022	EM2203751	2.92	295	0.001	33.1	0.064	3	1	13	82	57	<1	<1	57	31	0.43	0.27	0.6	0.27	--	6.74	2	<10	137	575	20
BH2	17-May-2022	EM2209266	3.13	272	0.002	8.62	0.025	1	<1	10	79	41	<1	<1	41	28	0.18	0.09	0.3	0.09	--	6.47	<1	<20	141	562	21
BH2	31-Aug-2022	EM2216860	2.12	417	<0.001	23	0.04	2	<1	18	96	56	<1	<1	56	22	0.08	0.01	0.3	0.01	--	6.78	2	<10	209	763	16
BH2	17-Nov-2022	EM2222858	1.93	342	<0.001	27.4	0.044	1	1	14	97	32	<1	<1	32	20	0.03	0.15	0.9	0.19	--	6.07	<1	<10	181	730	23
BH2	17-Feb-2023	EM2302775	2.98	385	<0.001	3.95	0.053	1	1	14	103	32	<1	<1	32	20	0.32	0.89	0.6	0.89	--	6.39	1	34	199	734	12
BH2	10-May-2023	EM2308315	2.9	469	<0.001	8.46	0.057	1	1	17	117	34	<1	<1	34	18	0.08	3.14	0.7	3.15	--	6.43	6	58	226	756	11

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH3	31-Oct-2003	619303	0.4	950	<0.01	12	0.02	13	2.7	56	280	-	< 2	< 2	48	37	0.2	<0.01	0.5	-	-	6	10	31	590	1200	-
BH3	29-Jan-2004	648475	0.65	560	<0.01	0.09	0.02	<0.05	2.9	20	60	-	< 2	< 2	12	15	<0.1	0.29	<0.3	-	-	5.4	<1	-	240	820	-
BH3	07-Apr-2004	673237	0.9	1500	<0.01	17	<0.01	28	11	75	290	-	< 2	< 2	200	30	0.2	<0.01	1.4	-	-	6.4	19	45	740	2900	-
BH3	21-Jul-2004	707747	0.4	1800	<0.01	0.2	<0.01	29	13	93	390	-	< 2	< 2	120	47	0.1	0.03	0.8	-	-	7.6	15	58	860	3100	-
BH3	26-Oct-2004	743328	0.55	1500	<0.01	4.9	<0.01	27	11	83	390	-	< 2	< 2	100	<1	0.1	<0.01	0.5	-	-	6.2	15	45	790	2700	-
BH3	20-Jan-2005	775527	0.75	1100	<0.01	32	0.02	17	10	67	290	-	< 2	< 2	140	35	0.1	<0.01	0.7	-	-	6.6	16	30	690	2200	-
BH3	13-Apr-2005	804582	0.74	1200	<0.01	38	0.08	22	10	68	310	-	< 2	< 2	160	27	0.2	<0.01	0.9	-	-	6.4	17	7	570	2000	-
BH3	28-Jul-2005	841925	0.51	1400	<0.01	56	0.03	30	10	81	400	-	< 2	< 2	160	35	0.1	0.43	0.8	-	-	6.4	16	45	790	2800	-
BH3	31-Oct-2005	872631	0.5	1500	<0.01	35	0.02	27	9.2	75	340	-	< 2	< 2	150	27	0.1	0.02	1.1	-	-	6.4	17	32	740	2600	-
BH3	30-Jan-2006	903880	0.63	1200	0.05	<0.05	0.06	26	12	65	280	-	< 2	< 2	220	27	<0.1	0.44	1	-	-	7.6	13	38	490	2100	-
BH3	20-Apr-2006	933445	0.705	1800	<0.01	37	0.08	44	24	97	410	-	< 2	< 2	230	31	0.1	<0.01	1.4	-	-	6.6	35	50	830	3200	-
BH3	25-Jul-2006	965728	0.51	1600	<0.01	35	0.06	38	13	88	500	-	< 2	< 2	190	28	0.1	<0.01	1.1	-	-	6.5	22	39	830	3100	-
BH3	24-Oct-2006	993114	0.58	1400	<0.01	44	0.02	31	16	76	350	-	< 2	< 2	220	27	<0.1	<0.01	1.8	-	-	6.6	11	54	680	2700	-
BH3	24-Jan-2007	1108117	0.81	1700	<0.01	35	0.03	49	38	110	490	-	< 2	< 2	280	27	0.1	0.01	0.9	-	-	6.7	21	60	1000	1000	-
BH3	17-Apr-2007	1150663	0.81	1200	<0.01	57	<0.01	24	18	64	270	-	< 2	< 2	270	33	0.2	<0.01	0.5	-	-	6.6	10	240	560	2200	-
BH3	25-Jul-2007	1219305	0.52	1,800	<0.01	47	0.03	38	21	98	470	-	< 2	< 2	130	47	0.1	<0.01	0.7	-	-	6.9	16	62	1,200	3,600	-
BH3	22-Oct-2007	1297216	0.52	1,800	<0.01	22	<0.02	41	18	100	480	-	< 2	< 2	170	35	0.3	<0.01	0.7	-	-	8.1	15	100	1,000	3,400	-
BH3	22-Jan-2008	1375493	0.90	1,800	<0.01	3.5	0.02	56	39	100	460	-	< 2	< 2	280	5	<0.1	0.03	1.3	-	-	7.3	25	65	990	2,800	-
BH3	22-Apr-2008	1458430	1.250	1,500	<0.01	37	0.05	27	14	79	370	-	< 2	< 2	91	35	<0.1	0.03	0.8	-	-	6.61	15	35	910	2,900	-
BH3	22-Jul-2008	1539823	0.54	1,900	<0.01	12	0.02	43	20	100	500	-	< 2	< 2	34	43	<0.1	<0.01	0.7	-	-	6.25	14	37	1,200	3,800	-
BH3	21-Oct-2008	1620241	0.52	2,000	<0.01	28	0.02	38	19	97	480	-	< 2	< 2	110	39	0.1	<0.01	1.1	-	-	6.07	14	38	1,200	3,700	-
BH3	28-Jan-2009	1706036	0.80	1,700	<0.01	4.9	0.01	46	25	89	420	-	< 2	< 2	240	21	0.1	0.03	1.3	-	-	6.6	16	52	960	3,100	-
BH3	28-Apr-2009	1791389	1.03	2,000	<0.01	43	0.05	73	20	110	490	-	< 2	< 2	120	47	0.2	0.03	0.9	-	-	6.7	17	52	1,300	3,800	-
BH3	29-Jul-2009	-	0.58	2,200	<0.01	6.8	0.05	43	20	110	580	-	< 2	< 2	80	43	<0.1	0.005	0.8	-	-	6.5	14	46	1,300	4,200	-
BH3	29-Oct-2009	1976820	0.054	2200	< 0.01	38	0.04	45	21	120	580	140	< 2	< 2	140	47	0.2	< 0.01	0.8	-	-	6.3	15	45	1300	4100	-
BH3	28-Jan-2010	2070257	0.78	1700	< 0.001	1.6	0.013	45	28	95	460	260	< 2	< 2	260	23	< 0.1	< 0.01	0.8	-	-	6.5	< 1	55	880	3300	-
BH3	20-Jul-2010	2259581	0.51	2200	< 0.001	15	0.006	54	25	130	590	230	< 2	< 2	230	29	0.3	< 0.05	0.9	-	-	6.4	22	63	1300	3700	-
BH3	20-Oct-2010	2367032	0.49	2000	< 0.001	37	0.008	47	20	120	540	210	< 2	< 2	210	32	0.1	< 0.05	1	-	-	6.3	22	43	1300	3800	-
BH3	24-Jan-2011	2474616	0.53	2100	< 0.001	19	0.095	38	16	110	530	170	< 2	< 2	170	35	0.2	< 0.01	1.3	-	-	6.2	19	59	960	3200	-
BH3	19-Apr-2011	2574915	0.52	2200	< 0.001	36	0.01	41	16	120	540	220	< 2	< 2	220	37	0.2	0.01	0.7	-	-	6.4	20	64	1200	3900	-
BH3	28-Jul-2011	2688217	0.52	2000	< 0.001	52	0.011	44	15	120	510	210	< 2	< 2	210	34	0.2	< 0.1	0.7	-	-	6.2	24	70	1100	3700	-
BH3	18-Oct-2011	2784845	0.53	2300	< 0.01	45	< 0.01	38	13	110	540	190	< 2	< 2	190	36	0.4	0.03	0.8	-	-	6.4	-	62	2100	3800	-
BH3	19-Jan-2012	2895498	0.66	1700	< 0.01	40	< 0.01	32	14	82	370	210	< 2	< 2	210	30	< 0.1	< 0.1	1	-	-	6.5	24	31	760	2800	-
BH3	02-Aug-2012	3131138	0.47	1900	< 0.001	71	0.099	47	14	110	390	210	< 2	< 2	210	29	0.1	0.02	0.9	-	-	6.4	20	28	1000	3300	-
BH3	28-Nov-2012	3274905	0.59	1500	< 0.01	25	< 0.01	29	13	71	330	240	< 2	< 2	240	28	0.1	< 0.05	0.7	-	-	6.4	21	46	700	2600	-
BH3	28-Feb-2013	3383772	1.19	1600	< 0.01	27	< 0.01	37	16	78	370	180	< 2	< 2	180	37	0.2	< 0.05	0.9	-	-	6.4	21	20	800	2600	-
BH3	16-May-2013	3478110	0.99	1500	< 0.01	34	< 0.01	33	11	80	390	130	< 2	< 2	130	74	0.2	0.02	0.7	-	-	6.4	13	27	860	2800	-
BH3	28-Aug-2013	3598480	0.51	2500	< 0.01	52	0.02	56	15	120	570	130	< 2	< 2	130	67	0.3	< 0.1	0.8	-	-	6.3	15	23	1400	4300	-
BH3	26-Nov-2013	3705704	0.54	2200	< 0.01	19	0.06	37	12	86	480	90	< 2	< 2	90	58	0.1	< 0.05	0.7	-	-	6.3	14	7	1300	4100	-
BH3	25-Feb-2014	3808278	1.42	1700	< 0.01	65	0.02	41	18	89	390	150	< 2	< 2	150	57	0.2	< 0.01	1	-	-	6.5	16	30	930	3000	-
BH3	28-May-2014	3917834	0.75	2900	< 0.01	35	< 0.01	66	20	140	670	95	< 2	< 2	95	84	0.1	0.02	0.7	-	< 0.05	6.1	12	10	1500	4700	-
BH3	26-Aug-2014	4022971	0.52	2200	< 0.01	28	0.03	59	16	140	650	55	< 2	< 2	55	55	0.1	< 0.05	0.6	-	0.07	6.2	9	13	1500	4500	-
BH3	26-Nov-2014	4133546	0.71	1500	< 0.01	< 0.2	< 0.01	41	18	86	440	150	< 2	< 2	150	36	< 0.1	< 0.1	1	-	-	6.7	14	18	800	2700	-
BH3	25-Feb-2015	4243094	1.17	1800	<0.01	17	0.04	40	21	80	360	110	< 2	< 2	110	76	0.2	0.1	0.07	-	0.8	6.4	15	16	940	3200	-
BH3	27-Aug-2015	4455819	0.54	2200	0.004	53	0.035	57	14	130	650	120	< 2	< 2	120	56	0.1	0.02	0.6	-	-	6.4	9.8	13	1200	4400	-
BH3	24-Feb-2016	4674178	1.49	2000	<0.01	35	0.03	44	19	87	440	130	< 2	< 2	130	60	0.2	0.04	0.9	-	-	6.3	15	<5	980	3400	-
BH3	16-Jan-2017	-	0.85	1650	<0.001	2.35	0.015	38	21	80	403	165	<1	<1	165	26	0.17	0.02	1.1	-	-	6.75	25	95	901	2820	24
BH3	21-Mar-2017	-	1.4	1930	<0.001	32.1	0.301	41	23	76	411	130	<1	<1	130	52	0.14	0.66	2.1	-	-	6.43	19	93	932	3590	33
BH3	24-May-2017	-	0.67	2190	<0.001	37.9	0.064	50	18	108	556	81	<1	<1	81	66	0.13	<0.01	0.9	-	-	6.56	14	96	1210	3810	37
BH3	23-Aug-2017	EM1711311001	0.5	2,460	<0.001	30.1	0.066	53	13	124	652	90	<1	<1	90	63	0.09	0.03	0.4	-	-	6.68	18	63	1,440	4,580	21
BH3	09-Nov-2017	EM1715406003	0.57	2,450	<0.001	43.6	0.067	45	10	108	576	96	<1	<1	96	62	0.12	0.06	0.9	-	-	6.62	8	<10	1,310	4,350	36
BH3	09-Nov-2017	EM1803674002	1.63	1,900	<0.001	39.6	0.033	42	22	79	354	158	<1	<1	158	56	0.26	<0.01	0.4	-	-	6.3	14	<10	819	3150	42
BH3	28-May-2018	EM1808881007	0.76	2,790	<0.001	7.67	0.031	60	18	119	712	46	<1	<1	46	55	0.06	0.02	0.6	--	-	6.22	10	28	1370	4780	30
BH3	02-Aug-2018	EM1812371008	0.57	2,060	<0.001	8.87	0.113	46	18	94	458	63	<1	<1	63	49	0.06	0.02	<0.1	-	-	6.49	6	22	1,170	3,530	25
BH3	28-Nov-2018	EM1819277003	0.62	1,540	<0.001	23.3	0.014	34	17	74	360	148	<1	<1	148	38	0.18	0.01	0.8	-	-	6.59	18	<10	867	2,780	31
BH3	25-Feb-2019	EM1902711001	1.9	1,680	0.001	54.9	0.043	40	22	74	336	194	<1	<1	194	63	0.19	0.04	0.9	-	-	6.58	26	<10	997	2,770	45
BH3	20-May-2019	EM1907716003	0.46	2,980	<0.001	11	0.034	58	21	130	606	62	<1	<1	62	67	0.11	0.04	1	-	-	5.9	14	<10	1,530	4,390	12
BH3	20-Aug-2019	EM1913616	0.5	2,840	<0.001	5.04	0.019	60	17	135	724	50	<1	<1	50	67	0.06	0.02	1.2	0.53	--	6.01	11	<10	1,570	4,820	32
BH3	04-Dec-2019	EM1920907	0.61	2,150	<0.001	54.5	0.033	43	17	100	460	71	<1	<1	71	68	0.25	<0.01	1.3	0.52	--	6.45	21	<10	1,320	3,750	21
BH3	10-Feb-2020	EM2002050	1.18	2,500	<0.001	32.1	0.016	50	25	102	501	146	<1	<1	146	48	0.14	<0.01	1.3	<0.01	--	6.49	6	95	1,130	3,580	41
BH3	19-May-2020	EM2008425	0.63	2,610	0.002	18.7	0.027	55	18	118	594	85	<1	<1	85	63	0.05	<0.01	0.6	<0.01	--	6.55	12	44	1,380	4,480	16
BH3	17-Aug-2020	EM2014279	0.51	2840	0.003	45.4	0.039	67	19	159	643	114	<1	<1	114	69	0.21	<0.01	0.7	<0.01	-	6.41	12	<10	1580	5220	47
BH3	23-Nov-2020	EM2020734	0.6	2380	0.001	44.8	0.075	48	18	114	559	144	<1	<1	144	54	0.42	<0.01	0.8	<0.01	-	6.42	16	<10	1180	4170	23

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH3	23-Feb-2021	EM2102910	0.7	1600	0.002	36.3	0.025	37	20	74	352	221	<1	<1	221	27	0.1	0.06	1	0.06	-	6.77	26	12	761	2840	28
BH3	25-May-2021	EM2109822	0.63	1800	0.002	0.22	<0.005	49	27	88	379	242	<1	<1	242	13	0.03	0.01	0.9	0.01	-	7.02	19	40	888	3250	23
BH3	14-Sep-2021	EM2118437	0.63	2260	0.003	56	0.021	48	15	109	533	172	<1	<1	172	31	0.47	<0.01	0.9	<0.01	--	6.93	15	14	1210	4250	39
BH3	18-Nov-2021	EM2123390	0.62	2340	0.003	58.7	0.022	41	14	100	483	144	<1	<1	144	35	0.62	<0.01	0.7	<0.01	--	7.09	17	<10	1110	3920	33
BH3	01-Mar-2022	EM2203633	0.64	1540	0.002	35.3	0.088	45	22	80	358	298	<1	<1	298	15	0.69	0.04	1.8	0.04	--	6.86	19	33	747	2430	142
BH3	17-May-2022	EM2209266	0.61	2010	0.006	63.2	0.115	53	19	110	461	284	<1	<1	284	26	0.07	<0.01	1	<0.01	--	6.71	18	<20	1130	3590	30
BH3	31-Aug-2022	EM2216860	0.45	1,830	<0.001	58.4	0.061	39	12	83	423	241	<1	<1	241	14	0.68	<0.01	0.9	<0.01	--	6.93	30	18	932	3,240	14
BH3	17-Nov-2022	EM2222858	0.59	1,820	0.002	68.4	0.159	44	14	95	431	226	<1	<1	226	18	0.42	0.03	1	0.03	--	6.58	17	12	991	2,950	26
BH3	14-Feb-2023	EM2302525	0.87	1,380	0.01	49.9	0.09	39	18	71	304	227	<1	<1	227	18	0.13	<0.01	0.9	<0.01	--	6.67	30	13	669	2,390	<5
BH3	10-May-2023	EM2308315	0.60	2,030	0.003	68.9	0.045	51	18	94	406	196	<1	<1	196	29	0.14	<0.02	0.9	0.01	--	8.15	23	117	917	3,350	18

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH4	31-Oct-2003	619304	5	590	<0.01	18	0.02	9.4	0.2	27	150	-	< 2	< 2	54	94	<0.1	<0.01	<0.3	-	-	5.8	15	41	170	680	-
BH4	29-Jan-2004	648476	5.56	620	<0.01	50	0.04	1.3	1.7	21	93	-	< 2	< 2	96	120	0.1	<0.01	1.7	-	-	6	10	-	160	870	-
BH4	07-Apr-2004	673238	6.11	590	<0.01	47	<0.01	12	1.9	31	74	-	< 2	< 2	250	85	0.1	0.03	<0.3	-	-	6.5	6	19	120	1000	-
BH4	21-Jul-2004	707748	5.46	470	<0.01	1.1	<0.01	7.4	4.9	22	92	-	< 2	< 2	94	80	<0.1	0.02	0.4	-	-	8.2	6	17	140	770	-
BH4	26-Oct-2004	743329	4.78	500	<0.01	6.1	0.03	4.9	3.4	14	120	-	< 2	< 2	8	2	<0.1	0.2	<0.3	-	-	5.1	13	31	230	800	-
BH4	20-Jan-2005	775526	5.39	470	<0.01	21	0.05	0.37	3.2	13	130	-	< 2	< 2	30	35	<0.1	0.16	<0.3	-	-	5.8	12	29	240	790	-
BH4	13-Apr-2005	804583	5.53	570	<0.01	41	0.05	6.6	0.4	18	100	-	< 2	< 2	35	43	<0.1	<0.01	<0.3	-	-	5.6	11	20	130	660	-
BH4	28-Jul-2005	841921	5.54	430	<0.01	24	0.03	5.5	0.7	13	100	-	< 2	< 2	18	86	<0.1	0.23	0.7	-	-	5.4	6	21	170	730	-
BH4	31-Oct-2005	872632	4.82	1100	<0.01	16	0.02	3.6	0.2	8.9	76	-	< 2	< 2	16	44	<0.1	0.28	0.3	-	-	5.3	9	16	100	450	-
BH4	30-Jan-2006	903881	5.58	300	<0.00	0.35	0.03	4.5	1.1	11	89	-	< 2	< 2	20	33	<0.1	0.02	0.6	-	-	6.6	12	13	110	470	-
BH4	20-Apr-2006	933446	6.245	390	<0.01	15	<0.01	5.5	<0.1	15	95	-	< 2	< 2	100	45	0.4	<0.01	0.4	-	-	6.4	16	20	110	680	-
BH4	25-Jul-2006	965729	5.86	400	<0.01	37	0.13	8.7	1.2	22	83	-	< 2	< 2	140	38	<0.1	0.01	<0.3	-	-	6.4	7	15	110	690	-
BH4	24-Oct-2006	993115	6.13	370	<0.01	28	0.03	7.5	0.6	20	100	-	< 2	< 2	130	34	<0.1	0.03	0.7	-	-	6.4	6	21	100	680	-
BH4	24-Jan-2007	1108118	7.72	530	0.01	66	1.3	17	6.3	28	63	-	< 2	< 2	<2	230	0.1	20	0.4	-	-	3.2	17	96	84	1000	-
BH4	25-Jul-2007	1219306	6.56	420	<0.01	2.8	0.22	4.5	2.0	11	81	-	< 2	< 2	38	62	<0.1	0.25	0.2	-	-	6.3	6	8	120	560	-
BH4	22-Oct-2007	1297217	5.82	400	<0.01	4.2	0.05	4.6	1.1	11	84	-	< 2	< 2	32	34	<0.1	0.02	0.4	-	-	6.9	11	54	130	590	-
BH4	22-Jul-2008	1539824	7.26	330	<0.01	1	0.1	4.6	3.7	12	89	-	< 2	< 2	12	85	<0.1	0.06	0.8	-	-	5.22	4	11	110	600	-
BH4	21-Oct-2008	1620242	5.97	600	<0.01	24	0.03	6.6	2.0	16	100	-	< 2	< 2	57	37	1.0	<0.01	1.1	-	-	-	43	160	170	720	-
BH4	29-Oct-2009	1976821	6.9	570	< 0.01	3.4	0.06	4	< 1	11	96	95	< 2	< 2	95	44	< 0.1	< 0.01	1	-	-	6.1	12	< 5	110	580	-
BH4	20-Jul-2010	2259582	7.05	370	0.011	4.3	0.064	5.3	7.2	15	110	160	< 2	< 2	160	32	0.3	0.05	0.5	-	-	6.3	15	23	98	640	-
BH4	20-Oct-2010	2367033	4.45	1100	0.021	130	0.008	17	0.2	40	140	290	< 2	< 2	290	< 5	< 0.1	< 0.2	3	-	-	6.3	180	420	150	1200	-
BH4	24-Jan-2011	2474617	3.43	940	0.013	96	0.008	12	0.2	32	210	160	< 2	< 2	160	46	0.1	< 0.05	1.5	-	-	5.8	66	170	360	1400	-
BH4	19-Apr-2011	2574916	4.4	930	0.014	97	0.009	11	0.3	29	190	180	< 2	< 2	180	13	0.1	< 0.01	0.6	-	-	5.8	63	190	280	1400	-
BH4	28-Jul-2011	2688218	4.58	920	0.011	89	0.005	10	0.2	31	200	230	< 2	< 2	230	13	0.2	< 0.1	0.9	-	-	5.8	60	170	320	1400	-
BH4	18-Oct-2011	2784846	4.47	860	< 0.01	64	< 0.01	11	0.3	30	190	160	< 2	< 2	160	20	< 0.1	< 0.1	0.6	-	-	5.8	-	100	340	1400	-
BH4	19-Jan-2012	2895499	4.84	960	< 0.01	88	< 0.01	11	< 1	30	180	130	< 2	< 2	130	11	< 0.1	< 0.1	0.8	-	-	5.9	43	27	340	1500	-
BH4	09-Aug-2012	3137527	4.38	910	< 0.01	120	0.02	17	0.4	43	190	210	< 2	< 2	210	< 50	0.2	< 0.2	0.4	-	-	5.9	21	13	340	1500	-
BH4	28-Nov-2012	3274906	4.69	830	< 0.01	45	< 0.01	10	0.2	34	180	190	< 2	< 2	190	41	< 0.1	< 0.1	0.3	-	-	6	23	14	340	1500	-
BH4	28-Feb-2013	3383773	5.47	1000	< 0.01	72	< 0.01	15	0.4	48	230	210	< 2	< 2	210	26	0.4	< 0.1	1	-	-	6	29	16	390	1700	-
BH4	16-May-2013	3478111	5.86	1000	< 0.01	110	0.02	19	< 1	49	200	380	< 2	< 2	380	34	0.2	< 0.01	0.7	-	-	6.2	24	21	400	1800	-
BH4	28-Aug-2013	3598481	5.72	1100	< 0.01	140	0.07	20	0.4	53	210	260	< 2	< 2	260	71	< 0.1	< 0.1	0.5	-	-	6.2	17	61	410	1800	-
BH4	26-Nov-2013	3705735	5.32	960	< 0.01	67	0.06	14	0.4	34	160	230	< 2	< 2	230	45	0.3	< 0.1	0.7	-	-	6.2	27	< 5	420	1700	-
BH4	25-Feb-2014	3808279	6.36	920	< 0.01	120	0.06	23	0.9	58	200	280	< 2	< 2	280	29	0.3	< 0.01	0.9	-	-	6.4	18	< 5	310	1500	-
BH4	26-Aug-2014	4022972	6.32	670	< 0.01	60	0.05	17	< 1	51	160	270	< 2	< 2	270	49	0.3	< 0.1	0.5	-	0.18	6.5	11	< 5	240	1300	-
BH4	27-Aug-2015	4455822	7.11	480	0.011	11	0.14	5.6	1.2	16	120	43	< 2	< 2	43	83	0.3	0.04	0.3	-	-	5.9	2.8	7	160	770	-
BH4	16-Jan-2017	-	5.44	1540	0.026	129	0.031	15	<1	49	233	334	<1	<1	334	<10	0.07	0.01	5	-	-	6.15	145	436	457	1740	200
BH4	21-Mar-2017	-	6.73	1300	0.037	193	0.063	18	<1	52	204	410	<1	<1	410	<10	0.14	<0.01	2.6	-	-	6.29	108	347	432	1940	44
BH4	24-May-2017	-	6.89	1020	0.012	99	0.076	14	<1	53	198	334	<1	<1	334	20	0.17	0.02	1	-	-	6.31	48	191	355	1530	82
BH4	24-Aug-2017	EM1711445001	6.67	861	0.01	117	0.201	16	<1	54	181	374	<1	<1	374	12	0.38	<0.01	1.8	-	-	6.54	44	310	288	1430	56
BH4	09-Nov-2017	EM1715406004	6.82	756	0.009	102	0.271	14	<1	47	155	351	<1	<1	351	<1	0.16	<0.01	0.8	-	-	6.54	26	171	240	1280	78
BH4	19-Aug-2019	EM1913513	5.3	1,900	0.007	30.8	0.081	18	<1	49	272	53	<1	<1	53	25	<0.01	<0.01	3.5	<0.01	--	5.5	77	300	663	2,270	41
BH4	03-Dec-2019	EM1920764	5.59	1,600	0.024	124	0.012	18	<1	56	288	196	<1	<1	196	<20	0.1	<0.01	2.9	0.03	-77.3	5.87	89	285	782	2,600	27
BH4	17-Aug-2020	EM2014279	7.17	625	0.006	12.6	0.091	7	<1	19	158	43	<1	<1	43	27	0.17	0.02	1.8	0.02	-	5.65	<1	39	321	1150	42
BH4	23-Nov-2020	EM2020734	5.74	1510	0.01	51.6	0.125	19	<1	56	335	49	<1	<1	49	25	0.14	<0.01	1.9	<0.01	-	5.65	21	23	795	2570	23
BH4	23-Feb-2021	EM2102910	5.9	1450	0.016	26.1	0.136	14	<1	39	277	<1	<1	<1	<1	23	0.04	<0.01	1.1	<0.01	-	4.76	22	29	607	2000	26
BH4	24-May-2021	EM2109755	7.02	1130	0.018	47.8	0.106	11	<1	38	229	113	<1	<1	113	20	0.08	<0.01	2.4	0.01	-	6.14	11	142	504	1760	15
BH4	13-Sep-2021	EM2118306	4.69	1600	0.023	64.7	0.01	19	<1	59	344	51	<1	<1	51	5	0.29	<0.01	1.4	0.01	--	5.74	108	349	820	2750	47
BH4	17-Nov-2021	EM2123379	4.68	2460	0.036	171	0.041	29	<1	102	497	131	<1	<1	131	2	0.38	<0.01	2.6	<0.01	--	5.84	108	350	1080	3370	40
BH4	28-Feb-2022	EM2203466	5.4	3740	0.061	141	0.112	21	<1	70	353	110	<1	<1	110	2	0.26	<0.01	8.3	<0.01	--	5.93	77	721	770	2420	74
BH4	16-May-2022	EM2209019	5.79	2570	0.032	144	0.089	24	<1	73	307	84	<1	<1	84	8	0.54	0.02	1.5	0.02	--	6.25	62	252	674	2320	42
BH4	01-Sep-2022	EM2217005	4.52	1,380	0.019	123	0.061	20	<1	58	253	213	<1	<1	213	9	0.62	<0.01	1.4	<0.01	--	6.55	58	142	570	2,030	28
BH4	16-Nov-2022	EM2222748	3.25	1,410	0.03	116	0.077	23	<1	64	283	167	<1	<1	167	8	0.67	<0.02	2.3	<0.01	--	6.34	28	210	688	2,100	56
BH4	13-Feb-2023	EM2302400	4.88	1,060	0.012	39.5	0.035	12	<1	37	239	71	<1	<1	71	6	<0.01	0.03	0.7	0.03	--	5.96	39	145	550	1,770	25
BH4	10-May-2023	EM2308315	5.33	1,510	0.012	82.9	0.017	20	<1	58	303	96	<1	<1	96	2	0.16	0.08	0.7	0.08	--	7.71	35	149	720	2,300	60

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH5	31-Oct-2003	619300	11	420	<0.01	<0.05	0.02	5.3	1.4	27	140	-	-	-	8	14	<0.1	0.29	<0.3	-	-	5.4	<1	<2	220	670	-
BH5	29-Jan-2004	648472	11.45	1200	<0.01	22	0.01	9.7	5.8	44	200	-	-	-	120	33	0.1	<0.01	4.8	-	-	6.4	10	-	500	1500	-
BH5	07-Apr-2004	673234	11.55	430	<0.01	<0.05	<0.01	6.8	<0.1	22	88	-	-	-	10	3.3	<0.1	0.29	<0.3	-	-	5.7	<1	<2	240	930	-
BH5	21-Jul-2004	707744	11.485	450	<0.01	<0.05	0.07	4.7	5.6	25	100	-	-	-	8	17	0.1	0.24	0.5	-	-	5.9	1	12	250	920	-
BH5	26-Oct-2004	743325	11.5	460	<0.01	<0.05	0.02	5.2	3.9	23	110	-	-	-	<2	16	<0.1	0.2	<0.3	-	-	5.6	1	6	250	880	-
BH5	20-Jan-2005	775530	11.55	460	<0.01	<0.05	0.03	0.49	4	23	110	-	-	-	10	17	<0.1	0.15	<0.3	-	-	5.6	<1	4	280	850	-
BH5	13-Apr-2005	804579	11.65	480	<0.01	0.26	0.03	5.3	1.6	25	120	-	-	-	15	18	<0.1	0.26	0.3	-	-	5.3	2	<2	210	850	-
BH5	28-Jul-2005	841922	11.81	430	<0.01	0.23	0.03	5	1.7	22	120	-	-	-	10	21	<0.1	0.25	<0.3	-	-	5.4	2	10	260	860	-
BH5	31-Oct-2005	872628	11.55	430	<0.01	<0.05	0.03	5	1.4	22	110	-	-	-	10	17	<0.1	0.23	0.3	-	-	5.5	5	<2	260	850	-
BH5	30-Jan-2006	903877	11.67	490	<0.00	<0.05	0.11	5	1.7	20	130	-	-	-	10	23	<0.1	0.16	0.7	-	-	6.5	4	4	270	870	-
BH5	20-Apr-2006	933442	11.93	510	<0.01	<0.05	0.07	5.5	1.3	25	130	-	-	-	4	16	0.2	0.14	<0.3	-	-	5.4	7	<2	260	910	-
BH5	25-Jul-2006	965725	11.93	450	<0.01	<0.05	0.09	5.2	<0.5	23	150	-	-	-	18	15	<0.1	0.1	<0.3	-	-	5.3	3	<2	260	900	-
BH5	24-Oct-2006	993111	12.11	460	<0.01	0.08	0.03	5.4	1.2	25	140	-	-	-	52	17	<0.1	0.14	0.3	-	-	5.4	3	<2	240	940	-
BH5	24-Jan-2007	1108114	12.19	460	0.03	65	1	7.3	5.2	35	140	-	-	-	7	18	<0.1	<0.01	<0.1	-	-	5.4	19	<2	290	950	-
BH5	17-Apr-2007	1150660	12.25	530	<0.01	4	0.14	10	6.5	27	140	-	-	-	38	17	<0.1	0.03	<0.1	-	-	5.4	9	<2	350	940	-
BH5	25-Jul-2007	1219302	13.23	460	<0.01	0.3	0.03	5.2	2.9	24	130	-	-	-	15	15	<0.1	0.07	<0.1	-	-	6.1	4	7	300	970	-
BH5	22-Oct-2007	1297213	12.25	480	<0.01	<0.2	0.04	7.0	2.6	30	140	-	-	-	16	18	<0.1	0.04	<0.05	-	-	6.5	2	30	270	1,000	-
BH5	22-Jan-2008	1375490	12.44	510	<0.01	<0.2	0.04	6.2	1.2	27	140	-	-	-	13	17	<0.1	0.25	<0.1	-	-	6.0	2	4	290	950	-
BH5	22-Apr-2008	1458427	12.60	500	<0.01	<0.2	0.05	3.8	<0.5	24	130	-	-	-	12	19	<0.1	0.09	0.1	-	-	5.22	2	<2	300	1,000	-
BH5	22-Jul-2008	1539820	12.55	440	<0.01	<0.2	0.06	6.9	2.0	29	130	-	-	-	43	17	<0.1	<0.01	<0.1	-	-	5.07	2	<2	280	1,000	-
BH5	21-Oct-2008	1620238	12.25	510	<0.01	0.4	0.03	4.9	1.2	23	120	-	-	-	12	18	<0.1	0.02	0.2	-	-	4.75	1	<10	310	1,000	-
BH5	28-Jan-2009	1706033	12.42	500	<0.01	<0.2	0.09	6.2	1.7	27	130	-	-	-	11	18	<0.1	0.06	0.2	-	-	5.1	2	31	280	1,000	-
BH5	28-Apr-2009	1791386	12.66	510	<0.01	0.3	0.1	11	1.8	25	140	-	-	-	11	20	<0.1	0.02	0.3	-	-	3.4	1	6	280	1,200	-
BH5	29-Jul-2009	-	12.58	480	<0.01	0.3	0.1	6	2	27	140	-	-	-	13	19	<0.1	0.003	<0.1	-	-	5.5	2	<5	280	1,000	-
BH5	29-Oct-2009	1976817	12.27	530	< 0.01	0.4	0.04	6	2	26	130	21	< 2	< 2	21	21	< 0.1	< 0.01	< 0.1	-	-	5.2	2	< 5	290	1000	-
BH5	28-Jan-2010	2070254	12.28	480	< 0.001	0.34	0.05	6.1	3.2	29	130	12	< 2	< 2	12	19	< 0.1	0.02	< 0.1	-	-	5.1	2	< 5	310	1000	-
BH5	20-Jul-2010	2259579	11.89	570	< 0.001	0.37	0.038	6.3	3.2	29	130	13	< 2	< 2	13	20	< 0.1	0.06	< 0.1	-	-	5.2	2	10	280	970	-
BH5	20-Oct-2010	2367030	10.34	510	< 0.001	0.4	0.038	6.8	1.4	31	130	12	< 2	< 2	12	20	< 0.1	< 0.01	0.1	-	-	5.1	5	< 5	330	1000	-
BH5	24-Jan-2011	2474614	9.68	570	< 0.001	0.12	0.036	6.5	1.5	30	150	11	< 2	< 2	11	22	< 0.1	< 0.01	0.2	-	-	5.1	6	< 10	330	1100	-
BH5	19-Apr-2011	2574913	9.95	520	< 0.001	0.13	0.033	6.4	1.5	28	150	12	< 2	< 2	12	21	< 0.1	0.05	< 0.1	-	-	5.2	2	6	280	1100	-
BH5	28-Jul-2011	2688214	10.03	480	< 0.001	0.28	0.036	5.8	1.5	26	140	12	< 2	< 2	12	22	< 0.1	0.01	0.1	-	-	5.2	3	9	320	1000	-
BH5	28-Nov-2012	3274902	10.08	360	< 0.01	< 0.2	0.03	3	1.2	16	100	15	< 2	< 2	15	20	< 0.1	0.7	< 0.1	-	-	5.4	3	< 5	190	720	-
BH5	27-Feb-2013	3383768	10.4	380	< 0.01	< 0.2	0.01	3	1.1	16	100	39	< 2	< 2	39	21	< 0.1	0.98	< 0.1	-	-	5.2	3	< 5	190	700	-

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH6	16-Jan-2017	-	12.09	422	<0.001	0.17	0.142	4	1	20	107	7	<1	<1	7	20	0.02	0.51	<0.1	-	-	5.22	1	<10	245	790	18
BH6	21-Mar-2017	-	12.3	478	<0.001	0.1	0.106	4	1	19	102	11	<1	<1	410	20	0.02	0.53	0.2	-	-	5.39	1	<10	234	784	18
BH6	23-May-2017	-	12.41	548	<0.001	<0.05	0.086	5	2	23	127	8	<1	<1	8	20	0.03	0.53	0.3	-	-	5.44	2	17	256	776	11
BH6	23-Aug-2017	EM1711442003	12.42	593	<0.001	0.2	0.14	6	2	22	107	9	<1	<1	9	21	0.02	0.48	<0.1	-	-	6.62	3	28	249	848	9
BH6	08-Nov-2017	EM1715369001	12.51	508	<0.001	0.11	0.045	5	1	23	108	13	<1	<1	13	20	0.02	0.55	<0.1	-	-	5.82	<1	<10	235	786	23
BH6	26-Feb-2018	EM1803674003	12.77	516	<0.001	0.2	0.117	4	2	19	106	12	<1	<1	12	20	0.02	0.7	<0.1	-	-	5	<1	<10	227	795	28
BH6	28-May-2018	EM1808540001	12.98	484	<0.001	<0.05	0.069	6	1	18	93	12	<1	<1	12	18	0.04	0.74	0.1	--	-	5.7	1	<10	225	728	32
BH6	31-Jul-2018	EM1812248001	12.93	483	<0.001	0.18	0.096	5	2	20	98	27	<1	<1	27	18	<0.01	0.85	<0.1	-	-	6.11	<1	38	226	780	34
BH6	28-Nov-2018	EM1819277004	13.02	398	<0.001	0.06	0.05	4	1	18	93	30	<1	<1	30	20	0.02	0.85	0.2	-	-	5.62	2	34	216	732	17
BH6	26-Feb-2019	EM1902808003	13.22	427	<0.001	0.13	0.046	3	1	17	96	9	<1	<1	9	22	0.09	0.73	<0.1	-	-	5.62	4	<10	254	731	30
BH6	21-May-2019	EM1907812006	13.23	410	0.002	0.31	0.067	4	1	17	96	10	<1	<1	10	18	0.04	0.58	<0.1	-	-	5.05	<1	<10	231	785	9
BH6	20-Aug-2019	EM1913616	12.45	447	<0.001	<0.05	0.054	4	1	18	96	11	<1	<1	11	21	0.01	0.53	<0.1	<0.01	--	5.37	<1	<10	234	745	21
BH6	05-Dec-2019	EM1920919	12.41	466	<0.001	0.07	0.05	4	2	19	96	6	<1	<1	6	33	0.02	0.62	1.4	0.02	--	5.04	2	<10	225	800	6
BH6	11-Feb-2020	EM2002157	12.6	515	<0.001	<0.05	0.054	4	2	20	97	8	<1	<1	8	18	0.01	0.53	0.4	0.04	--	6.02	<1	<10	238	757	9
BH6	20-May-2020	EM2008511	12.69	494	0.001	0.26	0.043	4	1	21	100	12	<1	<1	12	19	<0.01	0.52	<0.1	0.72	--	5.87	<1	<10	234	821	11
BH6	19-Aug-2020	EM2014471	12.59	427	<0.001	0.11	0.055	4	2	21	102	13	<1	<1	13	18	<0.01	0.47	0.2	0.47	-	6.82	<1	<10	250	847	40
BH6	24-Nov-2020	EM2021040	12.38	454	<0.001	<0.05	0.113	4	1	21	102	12	<1	<1	12	18	0.06	0.57	<0.1	0.57	-	6.05	<1	<10	228	799	15
BH6	22-Feb-2021	EM2102856	12.41	444	<0.001	0.07	0.041	4	1	20	101	9	<1	<1	9	19	<0.01	0.6	0.4	0.6	-	5.37	<1	<10	260	795	18
BH6	24-May-2021	EM2109755	12.6	506	0.003	0.49	0.052	4	1	20	98	11	<1	<1	11	20	0.02	0.63	0.2	0.63	-	5.43	<1	<10	226	782	15
BH6	15-Sep-2021	EM2118538	12.04	494	0.001	0.25	0.042	4	2	21	100	11	<1	<1	11	21	0.07	0.76	<0.1	0.76	--	5.62	<10	<10	255	804	19
BH6	19-Nov-2021	EM2123116	12.03	426	0.002	0.25	0.042	4	2	19	94	10	<1	<1	10	22	0.1	0.82	0.1	0.82	--	5.19	<5	<10	233	736	12
BH6	02-Mar-2022	EM2203679	12.19	450	<0.001	--	0.062	4	1	19	96	10	<1	<1	10	20	0.19	0.89	1.6	0.89	--	--	<1	<10	213	--	16
BH6	16-May-2022	EM2209138	12.37	365	<0.001	--	0.041	4	1	18	94	15	<1	<1	15	20	0.08	0.79	<0.1	0.79	--	--	5	<10	218	--	12
BH6	02-Sep-2022	EM2217005	11.72	439	0.001	0.3	0.059	4	1	17	94	10	<1	<1	10	20	<0.01	0.97	0.4	0.97	--	5.79	5	<10	215	746	11
BH6	17-Nov-2022	EM2222858	11.20	375	0.001	0.22	0.077	4	1	18	91	12	<1	<1	12	20	<0.01	1.39	0.3	1.39	--	5.57	<1	12	197	754	30
BH6	14-Feb-2023	EM2302525	11.65	395	0.003	0.41	0.043	5	1	17	91	13	<1	<1	13	19	<0.01	1.91	0.3	1.91	--	5.66	4	16	182	661	<5
BH6	10-May-2023	EM2308315	11.96	425	0.001	0.12	0.034	4	1	17	90	10	<1	<1	10	20	<0.01	2.01	0.4	2.01	--	6.92	<1	<10	180	674	11

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH7	16-Jan-2017	-	2.7	542	<0.001	5.41	0.013	19	13	22	123	148	<1	<1	148	11	0.62	<0.01	1.2	-	-	6.34	8	28	250	1010	27
BH7	21-Mar-2017	-	2.85	685	<0.001	57.6	0.033	17	10	22	116	162	<1	<1	162	3	0.73	<0.01	0.08	-	-	6.42	6	22	272	1080	31
BH7	24-May-2017	-	2.57	690	<0.001	48.2	0.029	19	13	26	132	110	<1	<1	110	18	0.61	<0.01	1.1	-	-	6.4	7	79	319	1070	40
BH7	22-Aug-2017	EM1711311002	2.37	863	<0.001	11.4	0.009	36	19	35	146	172	<1	<1	172	3	0.48	0.01	1.5	-	-	6.48	7	65	390	1,410	11
BH7	08-Nov-2017	EM1715369002	2.47	840	<0.001	43.2	0.027	29	15	31	149	192	<1	<1	192	3	0.71	0.01	1.4	-	-	6.6	3	105	363	1,310	60
BH7	26-Feb-2018	EM1803674004	3.14	636	<0.001	47.5	0.033	18	12	25	116	142	<1	<1	142	<1	0.32	<0.01	0.4	-	-	6.7	7	73	250	1215	32
BH7	28-May-2018	EM1808721003	2.73	657	<0.001	51.4	0.044	22	14	27	128	166	<1	<1	166	10	0.91	<0.01	1	--	-	6.55	6	58	306	1150	76
BH7	02-Aug-2018	EM1812371007	2.46	865	<0.001	57.9	0.06	36	19	36	152	180	<1	<1	180	6	0.82	0.01	1.3	-	-	6.46	<5	<10	411	1,280	23
BH7	27-Nov-2018	EM1819190001	2.63	956	<0.001	11.3	0.012	28	16	33	160	111	<1	<1	111	21	0.76	0.02	2.4	-	-	6.96	12	<10	391	1,450	38
BH7	25-Feb-2019	EM1902711002	3.38	639	0.027	79.1	0.024	16	11	25	115	171	<1	<1	171	1	0.66	0.06	0.8	-	-	6.46	17	<10	314	959	58
BH7	20-May-2019	EM1907716004	2.6	714	<0.001	14.8	0.009	19	13	25	136	119	<1	<1	119	24	0.73	<0.01	1.5	-	-	6.38	6	<10	352	1,160	16
BH7	19-Aug-2019	EM1913513	2.38	840	<0.001	31.9	0.011	31	18	33	154	206	<1	<1	206	45	0.8	<0.01	1.8	4.04	--	6.41	12	136	377	1,630	48
BH7	04-Dec-2019	EM1920907	2.51	769	<0.001	63.7	0.007	28	15	34	151	122	<1	<1	122	29	0.81	<0.01	1.2	0.14	--	6.6	14	64	406	1,410	17
BH7	11-Feb-2020	EM2002157	2.97	960	<0.001	62.6	0.015	31	18	36	165	146	<1	<1	146	32	0.69	<0.01	1.5	0.07	--	6.74	6	70	401	1,410	17
BH7	19-May-2020	EM2008425	2.53	748	0.113	115	0.114	22	14	28	153	154	<1	<1	154	31	0.43	0.03	1.8	0.14	--	6.44	9	<10	365	1,270	24
BH7	17-Aug-2020	EM2014279	2.39	996	0.023	83.4	0.032	42	22	47	183	210	<1	<1	210	15	1.01	<0.01	1.4	<0.01	-	6.4	<1	56	483	1790	88
BH7	23-Nov-2020	EM2020734	2.48	935	0.028	86.9	0.13	33	18	38	205	181	<1	<1	181	40	1.4	<0.01	7.4	<0.01	-	6.31	3	<10	484	1640	36
BH7	23-Feb-2021	EM2102910	2.57	950	0.033	75.5	0.051	21	14	29	187	142	<1	<1	142	45	0.39	<0.01	1.5	<0.01	-	6.44	10	<10	421	1540	24
BH7	25-May-2021	EM2109822	2.52	885	0.02	64.2	0.029	20	15	28	180	66	<1	<1	66	30	0.41	<0.01	0.9	<0.01	-	6.18	5	62	412	1500	16
BH7	14-Sep-2021	EM2118437	2.5	613	0.022	64.5	0.026	17	12	23	136	141	<1	<1	141	31	0.65	0.01	0.9	0.03	--	6.79	2	<10	264	1240	40
BH7	18-Nov-2021	EM2123390	2.5	641	0.014	62	0.018	13	11	22	130	127	<1	<1	127	25	1	0.01	2.2	0.01	--	7.04	6	<20	252	1070	36
BH7	01-Mar-2022	EM2203633	2.6	621	0.003	48.3	0.034	17	12	24	135	133	<1	<1	133	31	1.19	0.02	1.2	0.02	--	6.39	6	<10	296	1020	18
BH7	17-May-2022	EM2209266	2.49	590	0.012	43.9	0.028	21	16	23	116	134	<1	<1	134	5	0.41	0.02	0.8	0.02	--	6.6	4	<20	290	1050	37
BH7	31-Aug-2022	EM2216860	2.42	588	0.002	44.9	0.037	24	16	26	119	146	<1	<1	146	12	0.8	0.02	1.2	0.02	--	6.79	9	<10	263	1,090	25
BH7	17-Nov-2022	EM2222858	2.42	462	0.004	39.2	0.018	22	15	24	100	181	<1	<1	181	9	0.43	0.01	1	0.01	--	6.63	13	<10	168	934	31
BH7	14-Feb-2023	EM2302525	2.69	573	0.035	85.1	0.07	18	15	24	111	152	<1	<1	152	10	0.79	<0.01	0.9	<0.01	--	6.53	15	196	205	924	<5
BH7	10-May-2023	EM2308315	2.31	500	0.003	16.1	0.013	25	18	25	106	146	<1	<1	146	2	1.51	0.02	1.5	0.02	--	8.03	12	65	210	928	29

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH8	16-Jan-2017	-	3.15	627	<0.001	10.2	0.035	16	8	47	129	430	<1	<1	430	15	9.35	0.13	9.7	-	-	6.46	34	117	144	1150	76
BH8	21-Mar-2017	-	3.39	614	0.001	77.6	0.047	11	7	38	114	414	<1	<1	414	<1	7.52	<0.01	7.8	-	-	6.56	41	129	162	1180	64
BH8	24-May-2017	-	3.38	447	<0.001	31.2	0.016	4	3	28	102	252	<1	<1	252	2	3.1	0.04	3.2	-	-	6.84	17	117	118	783	40
BH8	22-Aug-2017	EM1711311003	3.26	510	<0.001	4.43	0.049	10	4	28	94	252	<1	<1	252	3	3.93	0.04	4.3	-	-	7.01	17	317	112	769	9
BH8	08-Nov-2017	EM1715369003	3.24	596	0.001	39.9	0.034	9	5	36	103	313	<1	<1	313	2	6.84	0.01	7.6	-	-	6.76	21	194	127	920	74
BH8	27-Feb-2018	EM1803772002	3.54	533	<0.001	19.4	0.027	5	3	28	97	250	<1	<1	250	3	1.67	0.06	4.9	-	-	6.9	21	<50	100	-	-
BH8	28-May-2018	EM1808721004	3.6	434	<0.001	30.9	0.024	2	<1	25	97	236	<1	<1	236	3	1.06	<0.01	1.4	--	-	6.92	10	<10	107	730	70
BH8	01-Aug-2018	EM1812302003	3.5	398	<0.001	31.6	0.07	2	1	24	105	233	<1	<1	233	2	1.06	<0.01	1.5	-	-	6.93	10	85	106	717	23
BH8	27-Nov-2018	EM1819190002	3.48	418	<0.001	1.61	0.006	2	<1	22	105	208	<1	<1	208	3	0.7	0.03	1.1	-	-	7.83	9	<10	105	747	30
BH8	25-Feb-2019	EM1902711003	3.68	528	0.099	121	0.128	2	1	21	95	244	<1	<1	244	6	0.91	0.23	3.5	-	-	6.71	33	<10	115	671	42
BH8	20-May-2019	EM1907716005	3.74	469	<0.001	<0.05	0.006	2	<1	20	103	227	<1	<1	227	3	0.78	0.02	1.6	-	-	6.75	10	<10	123	748	18
BH8	20-Aug-2019	EM1913616	2.75	504	<0.001	14.8	0.013	13	5	25	110	192	<1	<1	192	108	3.7	<0.01	6	0.17	--	6.21	25	200	99	877	57
BH8	04-Dec-2019	EM1920907	3.14	515	0.002	60.9	0.021	14	5	37	113	309	<1	<1	309	19	5.47	0.02	9.6	<0.01	--	7.07	42	109	138	1,010	6
BH8	10-Feb-2020	EM2002050	3.35	640	<0.001	59.8	0.029	9	5	34	111	331	<1	<1	331	4	3.83	0.02	5.9	0.02	--	6.6	11	114	131	905	20
BH8	19-May-2020	EM2008425	3.47	466	0.059	78	0.055	4	2	24	102	249	<1	<1	249	2	0.99	0.72	3.5	0.27	--	6.93	10	75	43	747	21
BH8	18-Aug-2020	EM2014393	3.34	430	-	-	-	3	3	25	107	238	<1	<1	238	3	2.45	0.02	5.4	0.02	-	8	5	96	134	828	67
BH8	23-Nov-2020	EM2020734	3.03	523	0.016	80.7	0.067	16	6	35	116	367	<1	<1	367	27	5.39	0.01	5.5	0.01	-	6.6	21	114	118	965	15
BH8	23-Feb-2021	EM2102910	3.15	682	0.103	122	0.086	12	4	30	118	299	<1	<1	299	18	1.78	0.02	6.7	0.02	-	6.78	25	196	130	986	31
BH8	25-May-2021	EM2109822	3.32	489	0.028	69.7	0.033	10	4	33	106	297	<1	<1	297	2	1.5	<0.01	3.6	<0.01	-	6.61	30	141	128	901	26
BH8	14-Sep-2021	EM2118437	2.73	534	0.028	85.8	0.033	16	4	37	112	276	<1	<1	276	29	3.13	0.01	5.2	0.01	--	7.11	14	138	147	1020	45
BH8	18-Nov-2021	EM2123390	2.85	536	0.01	69.4	0.017	12	3	31	104	258	<1	<1	258	34	2.01	<0.01	4	<0.01	--	7.37	21	<10	112	914	48
BH8	01-Mar-2022	EM2203633	2.96	1120	0.061	118	0.088	17	4	32	114	293	<1	<1	293	14	4.79	0.04	6.7	0.04	--	6.8	18	143	147	980	47
BH8	17-May-2022	EM2209266	3.18	539	0.022	76.6	0.043	12	5	31	119	317	<1	<1	317	2	5.49	<0.01	6.2	<0.01	--	6.71	24	<20	165	993	35
BH8	31-Aug-2022	EM2216860	2.25	521	0.013	70	0.072	17	4	33	116	242	<1	<1	242	56	3.7	0.01	5.4	0.01	--	7.05	21	<10	139	1,020	17
BH8	16-Nov-2022	EM2222748	1.87	455	0.01	56.5	0.023	15	4	31	101	277	<1	<1	277	28	4.56	<0.01	4.9	<0.01	--	7.06	19	105	100	875	31
BH8	14-Feb-2023	EM2302525	3.02	656	0.102	162	0.098	13	4	26	114	275	<1	<1	275	7	1.43	<0.01	4	<0.01	--	6.85	30	439	96	823	9
BH8	10-May-2023	EM2308315	3.00	489	0.011	51.2	0.009	13	4	30	112	282	16	<1	298	3	3.6	0.02	3.7	0.02	--	8.46	21	134	94	809	55

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH10	16-Jan-2017	-	2.93	466	0.002	2.91	0.178	5	8	15	96	44	<1	<1	44	31	1.3	0.25	1.9	-	-	5.72	8	22	205	753	26
BH10	21-Mar-2017	-	2.96	599	0.001	7.6	0.089	5	6	16	97	49	<1	<1	49	24	1.32	0.07	1.5	-	-	5.8	6	17	224	796	27
BH10	23-May-2017	-	2.98	596	0.001	7.98	0.058	7	6	23	129	52	<1	<1	52	21	1.76	0.02	2.1	-	-	6.37	6	47	238	821	24
BH10	23-Aug-2017	EM1711442004	2.94	478	<0.001	12.9	0.059	7	3	22	105	63	<1	<1	63	19	1.81	0.02	2.6	-	-	6.94	5	147	230	886	12
BH10	08-Nov-2017	EM1715369004	2.97	498	0.001	10.5	0.032	5	5	21	97	59	<1	<1	59	25	1.44	0.02	1.4	-	-	6.09	2	53	208	785	34
BH10	26-Feb-2018	EM1803674005	3.13	554	<0.001	14.6	0.069	5	4	20	101	67	<1	<1	67	16	2.4	0.02	2.4	-	-	6	2	<10	226	923	17
BH10	28-May-2018	EM1808540002	3.24	614	<0.001	5.12	0.027	6	4	22	102	60	<1	<1	60	18	1.34	0.06	1.4	--	-	6.28	8	<10	242	860	40
BH10	01-Aug-2018	EM1812302004	3.2	849	<0.001	8.02	0.354	6	4	21	110	70	<1	<1	70	21	2.02	0.09	2.6	-	-	6.36	6	96	244	819	32
BH10	27-Nov-2018	EM1819190003	3.31	937	<0.001	1.85	0.015	5	3	21	105	34	<1	<1	34	18	1.94	0.05	10.2	-	-	7.09	8	<10	243	845	19
BH10	25-Feb-2019	EM1902711004	3.44	623	0.041	45.4	0.055	5	4	19	102	60	<1	<1	60	18	1.89	0.06	3.9	-	-	6.49	13	<10	287	840	23
BH10	21-May-2019	EM1907812004	3.44	424	0.004	6.08	0.067	4	4	13	87	14	<1	<1	14	16	1.13	1.53	2.7	-	-	5.22	5	<10	206	717	7
BH10	20-Aug-2019	EM1913616	2.97	597	0.019	1.48	0.06	2	8	7	56	25	<1	<1	25	32	0.21	4.02	3.7	0.03	--	5.86	36	215	70	372	23
BH10	04-Dec-2019	EM1920907	2.94	657	0.001	4.49	0.034	5	8	19	94	33	<1	<1	33	26	1.2	0.13	2.8	0.1	--	6.06	8	251	220	754	13
BH10	11-Feb-2020	EM2002157	3.05	530	0.001	7.9	0.032	6	7	20	96	44	<1	<1	44	21	1.34	0.07	1.9	0.03	--	6.34	2	48	232	791	15
BH10	19-May-2020	EM2008425	2.94	449	0.008	22.3	0.03	5	4	21	99	57	<1	<1	57	18	1.42	0.14	1.8	0.1	--	6.28	<1	25	242	812	11
BH10	18-Aug-2020	EM2014393	2.89	390	-	-	-	4	6	18	93	51	<1	<1	51	26	1.26	2.11	1.8	2.12	-	6.52	1	15	218	750	51
BH10	24-Nov-2020	EM2021040	2.68	485	0.003	20.3	0.104	5	6	20	102	64	<1	<1	64	20	1.34	0.3	2.3	0.3	-	6.3	<1	<10	222	831	14
BH10	22-Feb-2021	EM2102856	2.7	484	0.004	3.88	0.048	4	6	18	97	33	<1	<1	33	24	1.63	2.1	2	2.13	-	5.7	5	<10	238	805	13
BH10	25-May-2021	EM2109822	2.72	470	0.009	29.2	0.044	6	4	22	101	58	<1	<1	58	18	1.11	0.21	1.9	0.22	-	6.23	<1	41	229	933	16
BH10	13-Sep-2021	EM2118306	2.55	920	0.051	147	0.151	6	7	20	103	49	<1	<1	49	21	1.61	0.22	5	0.24	--	6.15	10	<20	239	875	16
BH10	17-Nov-2021	EM2123379	2.54	748	0.019	55	0.071	8	5	24	111	48	<1	<1	48	19	1.74	0.15	2.1	0.22	--	5.92	7	<20	237	841	17
BH10	28-Feb-2022	EM2203466	2.52	1720	0.068	151	0.255	6	12	16	108	41	<1	<1	41	24	1.93	0.44	10.6	0.44	--	6.26	14	<50	222	780	46
BH10	16-May-2022	EM2209019	2.59	732	0.024	64	0.137	5	4	21	102	59	<1	<1	59	17	1.76	<0.01	4	<0.01	--	6.53	6	<10	235	889	18
BH10	01-Sep-2022	EM2217005	2.26	764	0.021	35.9	0.108	8	19	17	85	95	<1	<1	95	30	1.06	0.57	4.8	0.57	--	6.44	33	61	150	708	30
BH10	18-Nov-2022	EM2222858	2.06	566	0.016	31	0.071	8	11	19	96	58	<1	<1	58	23	1.28	0.03	3.2	0.03	--	6	11	17	206	845	17
BH10	14-Feb-2023	EM2302525	2.44	563	0.005	22.8	0.062	8	9	20	103	46	<1	<1	46	23	1.52	0.03	1.8	0.03	--	5.76	11	83	215	806	9
BH10	09-May-2023	EM2308222	--	459	0.003	7.1	0.028	6	9	19	95	47	<1	<1	47	24	1.23	0.25	1.3	0.25	--	6.32	11	24	200	761	18

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
BH14	09-Nov-2017	EM1715406005	2.99	833	0.003	1.42	0.125	4	<1	11	87	107	<1	<1	107	22	0.17	0.01	1	-	-	6.78	8	600	134	603	34
BH14	27-Feb-2018	EM1803772003	4.15	2,170	0.002	1.93	0.284	6	<1	18	209	274	<1	<1	274	8	0.46	0.02	3.6	-	-	6.6	11	<100	254	1255	22
BH14	28-May-2018	EM1808881008	3.3	755	<0.001	4.17	0.029	9	<1	24	180	172	<1	<1	172	39	0.06	0.88	0.3	--	-	6.99	4	<10	233	1100	40
BH14	02-Aug-2018	EM1812371009	2.68	595	0.002	0.47	0.188	16	3	24	87	52	<1	<1	52	26	0.01	0.19	0.8	-	-	6.21	<1	111	220	714	15
BH14	28-Nov-2018	EM1819277005	3.14	258	<0.001	0.07	0.02	6	2	10	48	52	<1	<1	52	13	0.05	0.18	0.1	-	-	6.33	5	41	85	388	24
BH14	26-Feb-2019	EM1902808004	4.13	876	0.038	39.7	0.053	4	<1	17	207	302	<1	<1	302	4	0.1	0.03	0.1	-	-	7.08	13	<10	313	1260	41
BH14	21-May-2019	EM1907812005	3.24	498	0.018	9.34	0.036	13	3	19	73	26	<1	<1	26	24	0.03	1.67	0.8	-	-	5.92	1	<10	199	738	7
BH14	19-Aug-2019	EM1913513	2.31	1,520	<0.001	0.05	0.021	43	4	74	278	64	<1	<1	64	49	0.04	0.16	1.2	0.02	--	5.92	7	<10	715	2,500	32
BH14	05-Dec-2019	EM1920919	2.88	466	<0.001	7.91	0.018	9	2	15	68	94	<1	<1	94	15	0.13	<0.01	5.8	<0.01	--	6.27	8	<10	114	541	13
BH14	10-Feb-2020	EM2002050	3.74	502	<0.001	16.5	0.023	10	2	21	92	129	<1	<1	129	2	0.38	0.02	0.7	<0.01	--	6.91	5	46	178	736	16
BH14	19-May-2020	EM2008425	3.04	444	0.011	9.8	0.028	11	2	19	78	60	<1	<1	60	11	0.07	0.27	0.5	<0.01	--	6.48	<1	<10	188	662	16
BH14	18-Aug-2020	EM2014393	2.55	416	-	-	-	10	2	19	86	84	<1	<1	84	16	0.22	0.01	2.2	0.01	-	6.8	4	112	178	699	36
BH14	23-Nov-2020	EM2020734	2.61	248	0.004	22.6	0.036	8	2	16	47	133	<1	<1	133	1	0.38	0.01	0.8	0.01	-	6.69	9	54	60	422	12
BH14	23-Feb-2021	EM2102910	3.36	284	0.031	27.7	0.049	8	2	15	64	103	<1	<1	103	5	0.24	0.04	1	0.04	-	6.74	10	94	109	550	24
BH14	26-May-2021	EM2109946	2.81	619	0.193	177	0.246	9	2	19	91	92	<1	<1	92	3	0.56	0.02	6.3	0.02	-	6.84	18	142	197	768	16
BH14	15-Sep-2021	EM2118538	2.55	642	0.016	34.6	0.032	19	2	33	127	115	<1	<1	115	13	0.29	0.02	0.6	0.02	--	6.64	2	103	322	1230	24
BH14	18-Nov-2021	EM2123390	2.66	980	0.09	91.4	0.104	8	2	19	111	134	<1	<1	134	5	0.87	<0.01	2.6	<0.01	--	7.15	10	<20	195	856	31
BH14	01-Mar-2022	EM2203633	3.46	2010	0.037	53	0.129	11	1	24	136	150	<1	<1	150	6	0.86	0.02	5.8	0.02	--	6.92	10	80	251	866	34
BH14	17-May-2022	EM2209266	2.85	570	0.007	40.2	0.018	20	3	31	101	97	<1	<1	97	1	0.67	0.03	0.9	0.03	--	6.54	7	<20	295	993	23
BH14	01-Sep-2022	EM2217005	2.23	1,240	0.014	48.2	0.046	33	3	52	187	97	<1	<1	97	17	0.24	0.04	1.5	0.04	--	6.68	10	<10	517	1,780	14
BH14	16-Nov-2022	EM2222748	2.01	820	0.024	40.9	0.073	22	3	45	168	124	<1	<1	124	37	0.32	0.03	1.4	0.03	--	6.88	11	131	409	1,520	34
BH14	13-Feb-2023	EM2302400	3.19	978	0.048	47.5	0.059	21	4	39	163	138	<1	<1	138	22	0.51	0.01	0.9	0.01	--	6.65	16	90	363	1,330	19
BH14	11-May-2023	EM2308446	2.85	893	0.004	36.6	0.016	26	4	42	158	103	<1	<1	103	9	0.74	0.03	1.3	0.03	--	6.7	7	<10	378	1,290	24

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
LB1	16-Jan-2017	-	11.92	564	0.009	16.4	0.23	47	15	22	115	212	<1	<1	212	<1	3.28	<0.01	5.1	-	-	7.15	4	23	231	1060	36
LB1	21-Mar-2017	-	12	604	0.006	18.1	0.274	44	12	20	103	202	<1	<1	202	<1	2.02	<0.01	2.2	-	-	7.21	3	14	245	1070	46
LB1	23-May-2017	-	12.04	728	0.171	161	9.21	52	22	25	133	217	<1	<1	217	<1	5.25	<0.01	8.4	-	-	7.23	11	402	251	1080	64
LB1	23-Aug-2017	EM1711442005	12.07	608	0.099	92.3	4.88	49	14	23	111	218	<1	<1	218	<1	3.02	<0.01	3	-	-	7.83	8	390	255	1,120	35
LB1	08-Nov-2017	EM1715369005	12.09	588	0.002	10.1	0.09	45	8	22	110	176	<1	<1	176	<1	1.79	<0.01	1.8	-	-	7.71	<1	<10	230	1,020	29
LB1	26-Feb-2018	EM1803674006	12.21	622	0.014	14.7	0.536	41	12	17	112	163	<1	<1	163	<1	2.26	<0.01	2.4	-	-	6.9	5	96	225	1,041	25
LB1	27-Nov-2018	EM1819193001	-	620	<0.001	<0.05	<0.005	63	23	25	107	267	<1	<1	267	<1	5.19	0.04	12.3	-	-	7.93	13	101	244	1,170	23
LB1	18-Aug-2020	-	13.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	24-Nov-2020	-	13.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	24-Feb-2021	EM2103002	13.56	815	0.012	-	1.57	47	13	21	120	217	<1	<1	217	<1	3.26	<0.01	3.7	<0.01	-	-	6	82	262	-	31
LB1	26-May-2021	-	13.63	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	15-Sep-2021	-	13.36	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	18-Nov-2021	-	13.31	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	03-Mar-2022	-	13.45	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB1	17-May-2022	-	13.5	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
LB2	16-Jan-2017	-	14.59	737	0.035	47.7	0.316	35	45	27	143	330	<1	<1	330	<1	18.6	0.04	20.9	-	-	6.56	31	238	308	1440	66
LB2	21-Mar-2017	-	14.44	792	0.114	97.5	1.07	33	35	26	128	325	<1	<1	325	<1	19.9	0.08	27.1	-	-	6.7	19	200	282	1420	48
LB2	23-May-2017	-	14.78	862	0.368	232	3.69	35	56	29	163	326	<1	<1	326	<1	23.8	0.02	26.7	-	-	6.66	22	607	281	1350	51
LB2	24-Aug-2017	EM1711445006	14.88	774	0.138	102	1.64	40	35	28	126	331	<1	<1	331	<1	21.7	0.01	20.6	-	-	7.28	20	359	261	1,420	53
LB2	09-Nov-2017	EM1715406006	14.81	784	0.107	85.8	1.06	39	30	30	136	320	<1	<1	320	2	20.5	0.01	20.1	-	-	6.9	16	1,280	296	1,360	69
LB2	27-Feb-2018	EM1803772004	14.82	698	<0.001	28.5	0.021	41	33	27	123	334	<1	<1	334	<1	21.2	0.04	24.7	-	-	6.5	14	51	256	1475	36
LB2	28-May-2018	EM1808540003	1480	753	<0.001	1.19	0.008	44	35	30	123	351	<1	<1	351	1	19.1	0.02	24.6	--	-	7.03	8	11	264	1380	70
LB2	01-Aug-2018	EM1812302005	-	712	0.001	28	0.3	41	34	31	125	350	<1	<1	350	<1	19.1	0.02	19.5	-	-	6.98	9	173	276	1,420	69
LB2	27-Nov-2018	EM1819193002	-	661	<0.001	0.19	<0.005	38	35	29	125	316	<1	<1	316	<1	16.9	<0.01	18.1	-	-	7.64	20	70	272	1,440	64
LB2	26-Feb-2019	EM1902808005	15.01	1680	0.034	72.6	0.143	38	35	29	127	373	<1	<1	373	<1	20.4	<0.01	28.1	-	-	6.95	31	<10	319	1,450	50
LB2	21-May-2019	EM1907812007	14.78	869	0.012	50.3	0.332	39	36	29	125	352	<1	<1	352	1	24.7	<0.01	28.7	-	-	6.62	15	<10	293	1,610	45
LB2	20-Aug-2019	EM1913616	14.66	931	0.061	72.8	0.274	48	38	33	130	371	<1	<1	371	<1	26.1	0.01	30.3	0.01	--	6.61	22	181	311	1,530	83
LB2	04-Dec-2019	EM1920907	14.73	697	0.001	45.2	<0.005	44	34	31	125	307	<1	<1	307	<1	25.9	<0.01	26.5	<0.01	--	7.11	22	103	316	1,450	21
LB2	11-Feb-2020	EM2002157	14.75	678	0.01	52	0.186	42	36	28	124	254	<1	<1	254	<1	20.8	<0.01	24.2	<0.01	--	7.38	16	131	274	1,330	22
LB2	18-May-2020	EM2008378	16.7	721	0.023	58.5	0.188	36	35	27	125	319	<1	<1	319	<1	18	0.01	26.1	0.01	--	7.37	7	155	286	1,380	24
LB2	18-Aug-2020	EM2014393	14.67	683	0.01	40.7	0.054	35	35	26	124	292	<1	<1	292	<1	18.4	<0.01	18.4	<0.01	-	7.33	12	51	299	1400	51
LB2	24-Nov-2020	EM2021040	14.54	709	0.024	52.4	0.167	32	34	24	118	301	<1	<1	301	5	17.6	0.01	25.5	0.01	-	7.38	15	<10	264	1290	32
LB2	24-Feb-2021	EM2103002	14.68	697	0.034	-	0.249	32	33	24	124	298	<1	<1	298	<1	19.7	<0.01	21.3	<0.01	-	-	11	139	284	-	36
LB2	26-May-2021	EM2109946	14.67	678	0.048	65.4	0.296	39	31	26	119	278	<1	<1	278	<1	13	0.02	15.4	0.02	-	7.22	11	<10	256	1290	49
LB2	15-Sep-2021	EM2118538	14.6	754	0.114	96.7	0.924	34	31	24	122	260	<1	<1	260	<1	18	<0.01	25.2	<0.01	--	6.78	21	<50	309	1310	19
LB2	18-Nov-2021	EM2123390	14.58	810	0.084	83.8	0.742	29	27	23	119	246	<1	<1	246	2	16.3	<0.01	19.1	<0.01	--	7.46	15	23	264	1280	38
LB2	03-Mar-2022	-	14.32	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB2	17-May-2022	-	14.26	Bore blo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Historical Groundwater Lab Results
Hepburn Shire Council
Creswick Landfill

SAMPLE NO.	SAMPLE DATE	LAB REPORT NO.	SWL	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			m BGL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
LB3	18-Aug-2020	-	11.1	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	24-Nov-2020	-	10.95	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	24-Feb-2021	-	10.94	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	26-May-2021	-	11.01	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	15-Sep-2021	-	10.76	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	18-Nov-2021	-	10.48	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	03-Mar-2022	-	10.82	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LB3	17-May-2022	-	11.88	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Creek @ BH3	21-Oct-08	1620319	290	<0.01	7.4	<0.01	11	4.1	16	55	-	-	-	77	4	0.1	<0.01	0.7	-	7.9	10	31	120	560	-
Creek @ BH3	29-Jul-09	1882853	180	-	-	0.01	7.9	1.9	11	38	-	-	-	32	19	-	-	0.4	-	7.1	4	9	79	350	-
Creek @ BH3	29-Oct-09	1976835	150	< 0.01	0.7	0.04	7.2	1.3	8	33	38	< 2	< 2	38	8	< 0.1	< 0.01	0.4	-	7	6	12	56	260	-
Creek @ BH3	20-Jul-10	2259587	170	< 0.001	1.6	0.014	6.2	3.9	8.5	32	32	< 2	< 2	32	8	< 0.1	0.41	0.6	-	7.1	12	22	64	280	-
Creek @ BH3	03-Nov-10	2382975	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-	-	-	0.8	-	7.4	-	19	-	210	-
Creek @ BH3	22-May-12	3045888	200	< 0.01	5	< 0.01	10	1.7	13	39	60	< 2	< 2	60	3	< 0.1	1.6	0.8	-	7.4	7	16	87	370	-
Creek @ BH3	02-Aug-12	3131175	160	0.001	1.2	0.01	6	5	7.5	22	33	< 2	< 2	33	6	< 0.1	1.1	0.7	-	7.1	9	17	46	240	-
Creek @ BH3	29-Nov-12	3276020	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	0.4	-	7.1	-	16	-	380	-
Creek @ BH3	28-Aug-13	3598537	180	< 0.01	1.7	< 0.01	6.6	2	8.2	30	30	< 2	< 2	30	7	< 0.1	0.53	0.3	-	7.3	8	16	53	250	-
Creek @ BH3	26-Nov-13	3705776	120	< 0.01	1.2	< 0.01	6.6	1.2	8.1	25	46	< 2	< 2	46	5	< 0.1	0.13	0.2	-	7.3	5	10	53	270	-
Creek @ BH3	27-Aug-14	4024248	160	< 0.01	1.1	< 0.01	5.7	1.5	7.6	20	31	< 2	< 2	31	7	< 0.1	1	0.5	-	7.2	6	10	55	250	-
Creek @ BH3	26-Nov-14	4133479	290	< 0.01	0.7	< 0.01	14	2.1	19	57	56	< 2	< 2	56	3	< 0.1	< 0.01	0.3	-	6.7	5	9	120	530	-
Creek @ BH3	17-Jan-17	-	416	0.001	12	<0.005	14	2	22	84	83	<1	<1	83	2	0.08	0.01	<0.1	-	6.61	9	16	175	708	-
Creek @ BH3	21-Mar-17	-	327	0.001	7.14	0.018	10	4	13	52	48	<1	<1	48	7	0.1	0.50	1.3	-	6.79	19	45	129	517	-
Creek @ BH3	24-May-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creek @ BH3	24-Aug-17	EM1711445003	523	<0.001	1.03	<0.005	26	14	27	104	174	<1	<1	174	205	<0.01	0.05	0.6	-	7.68	13	26	205	954	16
Creek @ BH3	09-Nov-17	EM1715409002	182	<0.001	2.3	<0.005	7	1	11	32	57	<1	<1	57	4	0.1	0.08	0.3	-	7.45	5	16	72	326	11
Creek @ BH3	29-May-18	EM1808881002	214	<0.001	1.26	0.031	7	3	10	33	25	<1	<1	25	11	0.06	0.33	0.6	-	6.56	8	25	80	351	26
Creek @ BH3	02-Aug-18	EM1812371002	151	<0.001	0.77	0.009	6	2	8	30	24	<1	<1	24	7	0.02	0.39	0.4	-	7.04	8	26	58	247	10
Creek @ BH3	29-Nov-18	EM1819464002	266	<0.001	7.49	<0.005	10	2	15	56	62	<1	<1	62	2	0.09	0.02	0.3	-	7.04	7	10	126	505	23
Creek @ BH3	19-Aug-19	EM1913513	140	0.001	1.01	<0.005	5	2	6	26	30	<1	<1	30	7	0.01	2.23	0.6	-	6.99	10	24	39	249	32
Creek @ BH3	03-Dec-19	EM1920764	205	<0.001	0.99	<0.005	4	2	6	30	51	<1	<1	51	6	0.02	0.06	0.3	44.1	6.89	8	14	58	308	8
Creek @ BH3	14-Feb-20	EM2002405	640	<0.001	16.4	<0.005	18	3	30	92	80	<1	<1	80	<1	0.08	<0.01	0.4	-	6.87	4	10	264	905	9
Creek @ BH3	18-May-20	EM2008378	374	<0.001	12.5	0.009	11	2	19	70	83	<1	<1	83	1	0.08	0.01	0.5	-	6.88	8	<10	160	594	16
Creek @ BH3	17-Aug-20	EM2014279	148	0.001	1.27	<0.005	6	1	9	29	45	<1	<1	45	5	<0.01	<0.01	0.4	-	6.75	6	<10	49	274	35
Creek @ BH3	25-Nov-20	EM2021046	180	<0.001	1.6	<0.005	5	2	7	26	56	<1	<1	56	4	0.05	<0.01	0.3	-	7.14	6	11	44	256	12
Creek @ BH3	23-Feb-21	EM2102910	532	<0.001	35.5	<0.005	17	3	28	97	114	<1	<1	114	<1	0.15	<0.01	0.8	-	6.81	16	<10	233	927	20
Creek @ BH3	24-May-21	EM2109755	614	<0.001	17.6	<0.005	16	3	28	100	92	<1	<1	92	<1	0.19	<0.01	0.5	-	6.69	6	<10	272	965	13
Creek @ BH3	13-Sep-21	EM2118306	134	<0.001	0.76	<0.005	6	2	7	24	42	<1	<1	42	6	0.02	1.55	-	7	21	43	251	19	-	-
Creek @ BH3	17-Nov-21	EM2123379	175	<0.001	1.2	<0.005	5	1	8	28	48	<1	<1	48	4	0.09	0.36	-	7	23	48	264	19	-	-
Creek @ BH3	28-Feb-22	EM2203466	950	<0.001	38.8	<0.005	25	4	42	138	94	<1	<1	94	2	1.17	<0.01	-	9	<10	371	1160	56	-	-
Creek @ BH3	16-May-22	EM2209019	318	<0.001	7.04	<0.005	10	3	15	66	71	<1	<1	71	4	0.19	0.02	-	7	12	131	572	21	-	-
Creek @ BH3	01-Sep-22	EM2217005	217	0.002	1.2	<0.005	6	2	7	24	35	<1	<1	35	7	<0.01	1.68	0.8	-	7.44	10	29	34	228	10
Creek @ BH3	16-Nov-22	EM2222748	158	0.005	2.82	0.012	6	2	7	19	33	<1	<1	33	3	0.01	0.73	1.3	-	7.04	20	69	31	204	16
Creek @ BH3	13-Feb-23	EM2302400	477	<0.001	14.7	<0.005	18	3	26	84	90	<1	<1	90	<1	0.15	<0.01	0.8	-	7.1	11	11	205	782	8
Creek @ BH3	11-May-23	EM2308446	561	<0.001	2.68	0.01	16	4	22	80	187	<1	<1	187	1	0.11	0.05	0.7	-	7.67	11	15	220	996	16

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Creek D/S BH3	08-Sep-08	1580862	150	<0.01	0.4	<0.01	4.7	1.3	6.6	27	-	-	-	24	11	<0.1	0.39	0.5	-	7.2	8	7	57	240	-
Creek D/S BH3	21-Oct-08	1620320	210	<0.01	2.1	<0.01	7.0	3.6	9.6	36	-	-	-	46	9	<0.1	0.03	0.6	-	7.7	8	24	78	370	-
Creek D/S BH3	29-Jul-09	1882854	200	-	-	0.01	8.5	2.1	12	45	-	-	-	32	20	-	-	0.2	-	7.2	4	7	91	400	-
Creek D/S BH3	29-Oct-09	1976836	150	< 0.01	0.8	0.06	7	1.3	7.9	32	38	< 2	< 2	38	8	< 0.1	< 0.01	0.4	-	7	7	14	58	270	-
Creek D/S BH3	20-Jul-10	2259588	180	0.001	1.7	0.011	5.7	3.5	8	30	28	< 2	< 2	28	9	< 0.1	0.38	0.5	-	7	12	21	60	270	-
Creek D/S BH3	03-Nov-10	2382976	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-	-	-	0.6	-	7.4	-	18	-	210	-
Creek D/S BH3	22-May-12	3045889	180	< 0.01	3.8	< 0.01	9.7	1.7	13	38	60	< 2	< 2	60	3	< 0.1	0.07	0.5	-	7.5	7	17	85	370	-
Creek D/S BH3	02-Aug-12	3131176	160	0.001	1.3	0.004	6	1.7	7.3	21	35	< 2	< 2	35	5	< 0.1	1.1	0.5	-	7.5	9	15	42	220	-
Creek D/S BH3	29-Nov-12	3276021	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-	-	-	0.3	-	7	-	15	-	350	-
Creek D/S BH3	28-Aug-13	3598538	180	< 0.01	1	< 0.01	6.9	1.8	8.3	33	30	< 2	< 2	30	8	< 0.1	0.48	0.4	-	7	7	18	60	270	-
Creek D/S BH3	26-Nov-13	3705777	130	< 0.01	1.2	< 0.01	7.2	1.2	8.5	22	45	< 2	< 2	45	5	0.1	0.12	0.3	-	7.3	5	10	53	270	-
Creek D/S BH3	27-Aug-14	4024249	100	< 0.01	0.6	< 0.01	6	1.4	7.9	21	30	< 2	< 2	30	6	0	1	0.3	-	7.3	6	11	48	240	-
Creek D/S BH3	26-Nov-14	4133480	270	< 0.01	0.4	< 0.01	14	2	16	49	57	< 2	< 2	57	4	< 0.1	0.01	0.3	-	6.7	5	9	110	480	-
Creek D/S BH3	17-Jan-17	-	290	0.001	4.41	<0.005	12	2	15	54	84	<1	<1	84	3	0.19	0.06	0.3	-	6.46	10	22	100	506	-
Creek D/S BH3	21-Mar-17	-	194	<0.001	2.43	0.142	8	2	8	28	38	<1	<1	38	40	0.13	0.09	0.6	-	6.6	7	17	35	295	-
Creek D/S BH3	24-May-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creek D/S BH3	24-Aug-17	EM1711445004	152	0.002	1.43	0.009	5	2	8	30	34	<1	<1	34	6	0.03	0.42	0.3	-	7.16	10	26	45	255	18
Creek D/S BH3	09-Nov-17	EM1715409003	173	<0.001	1.61	<0.005	7	1	11	31	56	<1	<1	56	5	0.11	0.13	0.4	-	7	6	18	66	319	11
Creek D/S BH3	29-May-18	EM1808881003	450	<0.001	2.57	0.056	15	3	21	75	34	<1	<1	34	16	0.13	0.39	0.4	-	6.59	5	15	207	754	18
Creek D/S BH3	02-Aug-18	EM1812371003	155	<0.001	0.76	0.009	6	2	7	28	24	<1	<1	24	7	0.05	0.38	0.1	-	7.02	8	24	56	246	13
Creek D/S BH3	29-Nov-18	EM1819464003	319	<0.001	4.18	0.008	9	2	12	46	63	<1	<1	63	3	0.03	0.01	0.4	-	7.15	7	15	96	408	29
Creek D/S BH3	19-Aug-19	EM1913513	130	0.002	0.93	<0.005	4	2	6	23	25	<1	<1	25	7	0.03	2.34	0.7	-	6.98	9	24	34	223	13
Creek D/S BH3	03-Dec-19	EM1920764	214	<0.001	0.8	0.005	4	2	6	27	49	<1	<1	49	6	0.03	0.06	0.3	50.7	6.96	7	13	49	476	8
Creek D/S BH3	18-May-20	EM2008378	272	0.002	1.23	0.01	12	3	14	46	59	<1	<1	59	4	0.03	0.02	0.2	-	7.02	6	13	102	389	13
Creek D/S BH3	17-Aug-20	EM2014279	166	<0.001	1.01	<0.005	6	1	9	28	48	<1	<1	48	5	<0.01	<0.01	0.5	-	6.79	7	<10	49	279	35
Creek D/S BH3	25-Nov-20	EM2021046	185	<0.001	1.61	<0.005	5	2	7	26	56	<1	<1	56	4	0.03	<0.01	0.5	-	7.11	6	12	45	252	11
Creek D/S BH3	23-Feb-21	EM2102910	340	<0.001	10.5	0.006	14	2	17	52	95	<1	<1	95	1	0.16	<0.01	0.6	-	6.96	11	18	112	544	20
Creek D/S BH3	24-May-21	EM2109755	437	<0.001	8.21	<0.005	14	2	18	65	62	<1	<1	62	2	0.17	<0.01	0.3	-	6.9	4	<10	170	640	34
Creek D/S BH3	13-Sep-21	EM2118306	144	<0.001	0.9	0.006	6	2	8	24	44	<1	<1	44	6	<0.01	1.52	-	8	22	44	260	12	-	-
Creek D/S BH3	17-Nov-21	EM2123379	180	<0.001	1.93	0.008	6	1	8	29	52	<1	<1	52	4	0.11	0.31	-	8	24	50	284	15	-	-
Creek D/S BH3	28-Feb-22	EM2203466	470	<0.001	13	0.018	17	2	22	66	96	<1	<1	96	<1	0.6	0.02	-	9	18	149	591	52	-	-
Creek D/S BH3	16-May-22	EM2209019	344	<0.001	4.95	<0.005	10	3	16	69	70	<1	<1	70	4	0.24	0.02	-	6	11	142	600	16	-	-
Creek D/S BH3	01-Sep-22	EM2217005	216	0.002	1.28	<0.005	6	2	7	24	33	<1	<1	33	8	<0.01	1.65	1	-	7.22	10	31	34	230	10
Creek D/S BH3	16-Nov-22	EM2222748	154	0.003	2.54	0.012	6	2	7	19	32	<1	<1	32	3	0.03	0.73	1.2	-	7.04	19	69	30	207	22
Creek D/S BH3	13-Feb-23	EM2302400	429	<0.001	4.82	<0.005	16	3	22	77	82	<1	<1	82	6	<0.01	0.14	0.8	-	7.5	10	15	172	687	11
Creek D/S BH3	11-May-23	EM2308446	537	<0.001	9.1	0.011	16	3	23	84	62	<1	<1	62	7	0.1	0.09	0.7	-	7.1	7	<10	189	700	10

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Creek U/S BH3	08-Sep-08	1580861	140	<0.01	0.4	<0.01	4.8	1.4	7.4	30	-	-	-	22	9	<0.1	0.60	0.6	-	7.3	8	10	51	230	-
Creek U/S BH3	21-Oct-08	1620318	220	<0.01	2.9	0.02	9.3	3.4	12	39	-	-	-	62	7	<0.1	0.01	0.7	-	8.0	11	31	77	390	-
Creek U/S BH3	29-Jul-09	1882852	140	-	-	0.04	7.2	2.8	8.4	30	-	-	-	30	19	-	-	0.2	-	7.0	4	7	58	290	-
Creek U/S BH3	29-Oct-09	1976834	190	< 0.01	0.3	0.01	7.1	1.4	7.9	33	34	< 2	< 2	34	9	< 0.1	< 0.01	0.4	-	6.8	7	10	53	260	-
Creek U/S BH3	20-Jul-10	2259586	160	0.001	1.4	0.012	5.2	3.4	7.3	28	27	< 2	< 2	27	8	< 0.1	0.42	0.5	-	7.1	12	17	57	250	-
Creek U/S BH3	03-Nov-10	2382974	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-	-	-	0.8	-	7.4	-	18	-	220	-
Creek U/S BH3	22-May-12	3045887	180	< 0.01	3.8	< 0.01	9.5	1.6	12	38	60	< 2	< 2	60	4	< 0.1	0.07	0.3	-	7.3	7	13	82	360	-
Creek U/S BH3	02-Aug-12	3131174	160	0.001	1.2	0.003	5.4	1.7	7.2	21	31	< 2	< 2	31	5	< 0.1	1.2	0.8	-	7.5	9	16	41	220	-
Creek U/S BH3	29-Nov-12	3276019	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	0.2	-	6.9	-	17	-	370	-
Creek U/S BH3	28-Aug-13	3598536	170	< 0.01	0.6	< 0.01	6.2	1.7	8	29	30	< 2	< 2	30	7	< 0.1	0.52	0.5	-	7.3	8	17	53	250	-
Creek U/S BH3	26-Nov-13	3705775	140	< 0.01	1.1	0.01	6.4	1.1	7.8	21	42	< 2	< 2	42	6	0.2	0.13	0.3	-	7.2	5	8	52	260	-
Creek U/S BH3	27-Aug-14	4024247	110	< 0.01	0.4	< 0.01	5.3	1.3	7	16	30	< 2	< 2	30	7	< 0.1	1	0.3	-	7.3	6	11	49	230	-
Creek U/S BH3	26-Nov-14	4133478	220	< 0.01	0.3	< 0.01	8.8	2.3	11	34	38	< 2	< 2	38	4	< 0.1	0.2	0.6	-	6.9	7	16	74	320	-
Creek U/S BH3	17-Jan-17	-	414	0.001	3.22	<0.005	15	2	22	84	81.00	<1	<1	81	7	0.08	0.08	<0.1	-	7.25	9	16	172	708	-
Creek U/S BH3	21-Mar-17	-	242	0.001	5.21	0.028	7	4	9	34	35.00	<1	<1	35	8	0.08	0.57	1	-	6.67	14	37	78	352	-
Creek U/S BH3	24-May-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creek U/S BH3	24-Aug-17	EM1711445002	141	0.002	1.21	0.007	6	1	8	29	34	<1	<1	34	7	<0.01	0.42	0.3	-	6.95	11	22	43	248	11
Creek U/S BH3	09-Nov-17	EM1715409001	170	<0.001	1.84	<0.005	7	1	11	31	55	<1	<1	55	5	0.11	0.08	0.3	-	7.29	5	16	73	312	10
Creek U/S BH3	29-May-18	EM1808881001	173	<0.001	0.98	0.037	5	3	7	25	24	<1	<1	24	8	0.05	0.36	0.3	-	6.75	8	23	54	263	7
Creek U/S BH3	02-Aug-18	EM1812371001	166	0.001	0.74	0.009	5	1	7	27	27	<1	<1	27	11	0.03	0.43	<0.1	-	7.19	8	25	72	241	13
Creek U/S BH3	29-Nov-18	EM1819464001	330	<0.001	3.86	0.009	7	1	11	42	60	<1	<1	60	4	0.02	0.05	0.4	-	7.27	7	16	102	441	11
Creek U/S BH3	19-Aug-19	EM1913513	165	0.001	0.84	<0.005	4	2	6	23	25	<1	<1	25	8	0.01	2.34	0.6	-	6.88	10	26	34	223	96
Creek U/S BH3	03-Dec-19	EM1920764	200	<0.001	0.95	0.005	4	2	6	30	52	<1	<1	52	6	0.02	0.08	0.2	81.7	6.79	7	12	57	289	10
Creek U/S BH3	14-Feb-20	EM2002405	1,270	<0.001	1.69	0.012	35	4	57	171	95	<1	<1	95	11	0.08	0.01	0.3	-	7.21	3	16	512	1,680	10
Creek U/S BH3	18-May-20	EM2008378	312	<0.001	8.86	0.018	9	3	15	62	67	<1	<1	67	4	0.09	0.02	0.5	-	7	6	16	134	506	10
Creek U/S BH3	17-Aug-20	EM2014279	150	<0.001	1.03	0.006	6	1	9	27	48	<1	<1	48	5	<0.01	<0.01	0.3	-	6.81	6	<10	48	276	35
Creek U/S BH3	25-Nov-20	EM2021046	210	<0.001	1.39	<0.005	5	2	7	26	56	<1	<1	56	4	0.06	<0.01	0.4	-	7.37	6	<10	43	254	14
Creek U/S BH3	23-Feb-21	EM2102910	480	<0.001	3.07	<0.005	16	2	24	84	94	<1	<1	94	2	0.01	<0.01	0.6	-	7.17	11	22	202	808	13
Creek U/S BH3	24-May-21	EM2109755	378	<0.001	3.66	0.005	12	2	21	82	66	<1	<1	66	3	0.16	<0.01	0.4	-	6.74	4	<10	208	764	24
Creek U/S BH3	13-Sep-21	EM2118306	168	<0.001	0.78	<0.005	6	2	7	24	39	<1	<1	39	6	0.02	1.59	-	8	23	42	264	17	-	-
Creek U/S BH3	17-Nov-21	EM2123379	188	<0.001	1.32	<0.005	5	1	8	27	49	<1	<1	49	4	0.2	0.36	-	7	22	49	271	19	-	-
Creek U/S BH3	28-Feb-22	EM2203466	1030	0.002	4.21	0.007	27	4	43	149	103	<1	<1	103	2	0.52	<0.01	-	9	26	383	1270	49	-	-
Creek U/S BH3	16-May-22	EM2209019	301	<0.001	5.67	<0.005	9	3	14	58	67	<1	<1	67	4	0.15	0.03	-	6	10	113	516	14	-	-
Creek U/S BH3	31-Aug-22	EM2216860	162	0.002	1.41	<0.005	6	2	7	25	28	<1	<1	28	9	<0.01	1.63	1	-	6.9	11	35	39	229	10
Creek U/S BH3	16-Nov-22	EM2222748	160	0.004	2.56	0.013	6	2	7	19	34	<1	<1	34	3	0.03	0.72	1.2	-	7.05	20	72	31	207	23
Creek U/S BH3	13-Feb-23	EM2302400	341	<0.001	13.8	<0.005	17	3	18	55	88	<1	<1	88	<1	0.21	<0.01	1	-	7.06	13	14	122	545	14
Creek U/S BH3	11-May-23	EM2308446	470	<0.001	6.54	0.01	28	19	31	108	70	<1	<1	70	6	1.17	0.02	1.8	-	7.21	7	31	186	695	13

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Dredge Hole	31-Oct-03	619306	560	<0.01	<0.05	0.03	11	2.9	34	160	-	-	-	28	15	0.1	0.21	<0.3	-	6.9	3	13	290	780	-
Dredge Hole	29-Jan-04	648478	680	<0.01	0.11	<0.01	19	21	29	110	-	-	-	38	17	<0.1	0.11	<0.3	-	6.9	4	-	320	1000	-
Dredge Hole	7-Apr-04	673240	600	<0.01	0.73	<0.01	13	4.6	31	120	-	-	-	26	16	<0.1	0.08	0.6	-	7.1	5	4	330	1200	-
Dredge Hole	21-Jul-04	707750	590	<0.01	2.4	<0.01	9.8	6.8	33	120	-	-	-	22	18	<0.1	0.04	1.2	-	8.2	6	19	320	1100	-
Dredge Hole	27-Oct-04	743751	600	<0.01	0.89	<0.01	10	4.8	30	120	-	-	-	28	19	<0.1	0.03	0.3	-	8.2	6	5	310	-	-
Dredge Hole	20-Jan-05	775532	630	<0.01	0.1	0.01	6.8	4.2	35	150	-	-	-	32	19	<0.1	0.03	0.6	-	7.2	3	17	380	1200	-
Dredge Hole	13-Apr-05	804585	680	<0.01	1.6	0.01	13	3.3	36	170	-	-	-	35	18	<0.1	<0.01	1	-	6.7	7	15	350	1200	-
Dredge Hole	28-Jul-05	841927	660	<0.01	2.1	<0.01	11	3.3	29	140	-	-	-	30	18	<0.1	0.24	1	-	6.9	6	19	330	1100	-
Dredge Hole	31-Oct-05	872634	580	<0.01	0.99	0.01	11	2.4	29	130	-	-	-	28	15	<0.1	<0.01	1	-	6.9	5	7	310	1000	-
Dredge Hole	30-Jan-06	903883	690	<0.00	0.06	0.04	13	3.1	33	160	-	-	-	32	18	<0.1	0.01	1.1	-	7.7	3	8	360	1200	-
Dredge Hole	20-Apr-06	933448	710	<0.01	0.28	0.07	13	3.7	36	160	-	-	-	30	15	0.2	0.07	1.2	-	7.1	9	9	340	1200	-
Dredge Hole	25-Jul-06	965731	550	<0.01	0.23	0.03	11	3.2	30	170	-	-	-	34	15	<0.1	0.01	1.1	-	7	8	14	320	1100	-
Dredge Hole	24-Oct-06	993117	560	<0.01	0.7	<0.01	11	2.9	33	150	-	-	-	62	17	<0.1	0.01	1.5	-	7.1	7	22	320	1200	-
Dredge Hole	24-Jan-07	1108120	590	<0.01	0.68	<0.01	11	10	34	180	-	-	-	26	16	<0.1	<0.01	0.5	-	7.2	9	17	350	1200	-
Dredge Hole	17-Apr-07	1150665	700	<0.01	0.81	<0.01	13	6.4	40	190	-	-	-	56	15	<0.1	0.01	0.9	-	6.9	12	<2	370	1200	-
Dredge Hole	25-Jul-07	1219308	560	<0.01	0.7	<0.02	9.8	4.4	31	150	-	-	-	27	15	<0.1	0.10	0.9	-	6.9	5	20	380	1,200	-
Dredge Hole	22-Oct-07	1297219	590	<0.01	<0.2	<0.02	12	3.6	36	170	-	-	-	26	17	0.2	0.06	0.8	-	6.9	6	18	330	1,200	-
Dredge Hole	22-Jan-08	1375496	660	<0.01	<0.2	0.01	12	3.0	37	190	-	-	-	28	<1	<0.1	<0.01	0.5	-	7.2	6	17	370	1,200	-
Dredge Hole	22-Apr-08	1458431	640	<0.01	<0.2	0.05	10	2.2	35	190	-	-	-	23	14	<0.1	<0.01	0.7	-	7.21	8	13	400	1,400	-
Dredge Hole	22-Jul-08	1539826	530	<0.01	<0.2	0.01	11	3.1	34	150	-	-	-	8	16	<0.1	<0.01	1.0	-	6.85	5	17	380	1,300	-
Dredge Hole	21-Oct-08	1620244	620	<0.01	<0.2	0.03	10	4.3	33	160	-	-	-	19	17	<0.1	<0.01	0.9	-	6.43	5	18	340	1,200	-
Dredge Hole	28-Jan-09	1706039	730	<0.01	<0.2	0.02	12	2.9	37	170	-	-	-	24	15	<0.1	0.09	0.6	-	7.0	5	<10	380	1,300	-
Dredge Hole	28-Apr-09	-	670	<0.01	0.2	0.05	18	2.9	32	180	-	-	-	22	17	<0.1	0.05	0.5	-	7.2	5	11	380	1,400	-
Dredge Hole	29-Jul-09	1882869	620	-	-	0.03	10	3	35	160	-	-	-	18	20	-	-	0.7	-	7.1	4	14	340	1,200	-
Dredge Hole	29-Oct-09	1976823	610	< 0.01	0.4	0.07	11	3	35	180	17	< 2	< 2	17	20	< 0.1	< 0.01	0.6	-	6.7	4	11	360	1200	-
Dredge Hole	28-Jan-10	2070260	670	< 0.001	0.27	0.004	10	3	38	160	23	< 2	< 2	23	19	< 0.1	0.02	0.4	-	6.8	34	14	390	1300	-
Dredge Hole	20-Jul-10	2259584	580	< 0.001	0.49	0.003	11	4.7	34	160	20	< 2	< 2	20	18	< 0.1	0.02	0.5	-	6.8	4	7	330	1100	-
Dredge Hole	20-Oct-10	2367035	590	< 0.001	1.4	0.008	17	2.9	33	150	42	< 2	< 2	42	22	< 0.1	0.26	1.3	-	6.8	9	16	360	1200	-
Dredge Hole	24-Jan-11	2474619	530	0.002	2.5	0.008	14	3.7	27	140	48	< 2	< 2	48	18	0.2	0.47	1.1	-	6.8	12	33	280	980	-
Dredge Hole	19-Apr-11	2574918	590	< 0.001	1.2	0.004	15	2.9	30	160	50	< 2	< 2	50	14	< 0.1	< 0.01	0.6	-	6.8	7	18	300	1100	-
Dredge Hole	28-Jul-11	2688220	580	< 0.001	1.2	0.003	13	2.4	30	160	42	< 2	< 2	42	16	0.3	0.22	0.7	-	6.7	6	17	330	1100	-
Dredge Hole	18-Oct-11	2784848	600	< 0.01	1	< 0.01	11	2.3	27	140	38	< 2	< 2	38	17	< 0.1	< 0.01	0.6	-	6.9	-	14	310	1100	-
Dredge Hole	19-Jan-12	2895501	610	< 0.01	0.8	< 0.01	10	2	30	150	40	< 2	< 2	40	17	< 0.1	< 0.01	0.6	-	7	5	12	290	1100	-
Dredge Hole	22-May-12	3045829	530	< 0.01	2.2	< 0.01	8.7	2.4	25	120	36	< 2	< 2	36	15	0.1	0.18	1	-	7.1	6	15	290	980	-
Dredge Hole	02-Aug-12	3131140	470	< 0.001	1	0.01	7.9	2.7	24	130	34	< 2	< 2	34	19	0.3	0.22	0.7	-	6.8	4	7	250	890	-
Dredge Hole	29-Nov-12	3274868	590	< 0.01	0.6	< 0.01	6.8	2.9	23	120	41	< 2	< 2	41	16	< 0.1	0.05	0.7	-	7	20	14	250	900	-
Dredge Hole	27-Feb-13	3383771	490	< 0.01	0.5	< 0.01	7.3	2.5	25	130	90	< 2	< 2	90	17	< 0.1	0.06	0.5	-	7	5	8	250	940	-
Dredge Hole	16-May-13	3478282	430	< 0.01	1.3	< 0.01	8.6	2.3	23	130	40	< 2	< 2	40	15	0.1	0.16	0.9	-	7	5	11	240	900	-
Dredge Hole	28-Aug-13	3598518	430	< 0.01	1.4	< 0.01	8.1	2.1	22	67	31	< 2	< 2	31	16	< 0.1	0.1	0.8	-	6.8	4	12	220	790	-
Dredge Hole	26-Nov-13	3705736	430	< 0.01	1	< 0.01	4.9	2.1	17	90	34	< 2	< 2	34	17	0.3	< 0.01	0.7	-	7	5	10	230	820	-
Dredge Hole	25-Feb-14	3807900	500	< 0.01	1.5	< 0.01	7.6	3	24	140	44	< 2	< 2	44	16	0.1	0.06	0.7	-	7.2	5	11	240	880	-
Dredge Hole	28-May-14	3917836	420	< 0.01	0.8	< 0.01	6	2	18	99	34	< 2	< 2	34	< 100	< 0.1	0.13	0.8	< 0.05	6.8	5	14	230	820	-
Dredge Hole	26-Aug-14	4022969	350	< 0.01	0.8	< 0.01	6.1	2.1	20	99	30	< 2	< 2	30	16	< 0.1	0.04	1.3	0.17	6.9	4	16	220	770	-
Dredge Hole	26-Nov-14	4133549	420	< 0.01	< 0.2	< 0.01	6.5	2.5	20	110	30	< 2	< 2	30	16	< 0.1	< 0.01	0.8	-	7	6	11	220	810	-
Dredge Hole	23-Feb-15	4237814	430	<0.01	0.6	<0.01	8.3	3.9	17	96	32	<2	<2	32	16	<0.1	0.02	0.8	0.06	7	4.1	13	260	850	-
Dredge Hole	24-Feb-16	4674182	470	< 0.01	0.6	< 0.01	6.5	2.7	22	120	28	< 2	< 2	28	16	< 0.1	0.02	0.1	-	6.8	3	9	220	870	-
Dredge Hole	17-Jan-17	-	550	0.001	0.8	0.007	9	2	25	148	35	<1	<1	35	18	0.03	0.03	<0.1	-	7.03	5	<10	296	1010	11
Dredge Hole	21-Mar-17	-	568	<0.001	1.11	0.006	8	2	22	130	36	<1	<1	36	16	0.02	0.02	0.4	-	7.08	5	12	307	1020	13
Dredge Hole	24-May-17	-	511	<0.001	1.17	<0.005	48	13	92	440	68	<1	<1	35	16	0.06	0.24	0.5	-	7.22	6	15	318	939	18
Dredge Hole	24-Aug-17	EM1711445005	434	<0.001	1.2	0.024	7	2	21	110	23	<1	<1	23	16	0.11	1.34	0.5	-	6.97	6	14	244	848	19
Dredge Hole	09-Nov-17	EM1715409006	455	<0.001	0.81	0.008	7	2	23	118	29	<1	<1	29	17	0.04	0.02	0.4	-	7.17	5	14	290	856	13
Dredge Hole	26-Feb-18	EM1803674010	524	<0.001	1.27	0.006	6	3	21	121	30	<1	<1	30	15	0.04	0.06	0.3	-	6.82	4	10	255	917	15
Dredge Hole	29-May-18	EM1808881006	490	<0.001	0.34	0.008	7	2	22	119	29	<1	<1	29	14	0.18	0.05	0.4	-	6.7	4	14	261	894	18
Dredge Hole	02-Aug-18	EM1812371006	464	<0.001	0.99	<0.005	7	3	20	101	25	<1	<1	25	15	0.1	0.15	0.3	-	6.8	4	12	263	785	10
Dredge Hole	28-Nov-18	EM1819277008	412	<0.001	0.75	<0.005	5	2	20	103	23	<1	<1	23	16	0.03	<0.01	0.5	-	7.3	5	13	257	808	26
Dredge Hole	26-Feb-19	EM1902808009	536	<0.001	0.8	0.009	5	3	20	116	29	<1	<1	29	15	0.03	<0.01	0.6	-	7.18	4	11	308	900	20
Dredge Hole	21-May-19	EM1907812003	484	<0.001	0.75	<0.005	6	2	20	110	26	<1	<1	26	13	0.15	0.08	0.5	-	6.66	4	<10	284	925	10
Dredge Hole	19-Aug-19	EM1913513	420	0.002	1.29	<0.005	5	2	18	99	26	<1	<1	26	12	0.08	0.02	1.1	-	6.94	9	22	222	788	18
Dredge Hole	03-Dec-19	EM1920764	367	<0.001	0.18	<0.005	5	2	19	109	36	<1	<1	36	15	0.03	<0.01	0.6	33.2	6.95	5	<10	272	853	6
Dredge Hole	14-Feb-20	EM2002405	684	<0.001	0.68	<0.005	7	3	23	119	32	<1	<1	32	12	0.01	<0.01	0.2	-	7	2	12	285	914	10
Dredge Hole	18-May-20	EM2008378	460	<0.001	1.7	<0.005	6	3	22	111	29	<1	<1	29	13	0.11	0.1	0.6	-	6.47	3	10	276	852	15
Dredge Hole	19-Aug-20	EM2014471	417	<0.001	2.31	0.006	5	2	20	104	31	<1	<1	31	14	0.14	<0.01	0.7	-	7.19	<1	14	262	876	38
Dredge Hole	23-Nov-20	EM2020734	415	<0.001	0.82	<0.005	5	2	19	105	33	<1	<1	33	14	0.01	<0.01	0.8	-	6.94	4	<10	238	816	7
Dredge Hole	22-Feb-21	EM2102856	490	<0.001	1.24	<0.005	6	3	20	114	30	<1	<1	30	13	0.02	<0.01	0.5	-	6.69	4	<10	288	886	13
Dredge Hole	26-May-21	EM2109946	520	<0.001	2.43	<0.005	6	3	20	104	31	<1	<1	31	12	0.24	<0.01	0.7	-	7.12	4	<10	252	840	16
Dredge Hole	14-Sep-21	EM2118437	453	<0.001	0.87	0.008	6	2	21	109	31	<1	<1	31	14	<0.01	0.09	-	4	15	244	876	14	-	-
Dredge Hole	18-Nov-21	EM2123390	524	<0.001	0.88	<0.005	7	2	21	113	34	<1	<1	34	15	0.21	0.63	-	4	16	270	921	13	-	-
Dredge Hole	03-Mar-22	EM2203751	359	<0.001	<0.05	0.01	7	4	18	90	36	<1	<1	36	10	0.35	0.02	-	4	11	198	678	14	-	-
Dredge Hole	17-May-22	EM2209262	396	<0.001	3.9	<0.005	6	4	17	94	41	<1	<1	41	11	0.51	0.03	-	5	15	223	759	18	-	-
Dredge Hole	31-Aug-22	EM2216860	400	<0.001	2.16	0.007	6	2	17	99	30	<1	<1	30	14	<0.01	0.22	0.7	-	7.19	5	15	235	799	11
Dredge Hole	18-Nov-22	EM2222858	503	<0.001	2.45	0.005	12	3	24	118	65	<1	<1	65	15	0.01	0.11	1.1	-	6.85	9	28	248	940	25
Dredge Hole	16-Feb-23	EM2302773	518	<0.001	1.42	<0.005	11	3	24	126	58	<1	<1	58	16	<0.01	0.01	0.7	-	6.93	6	47	286	976	8
Dredge Hole	09-May-23	EM2308222	533	<0.001	3.93	<0.005	10	3	22	113	49	<1	<1	49	12	0.43	0.09	1.1	-	6.91	7	21	246	878	13

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Leachate Pond	31-Oct-03	619305	420	<0.01	0.17	<0.01	32	16	21	80	-	-	-	140	1.2	0.3	0.32	0.7	-	7.9	8	30	140	590	-
Leachate Pond	29-Jan-04	648477	650	<0.01	0.24	<0.01	13	10	22	94	-	-	-	160	<1.0	0.3	0.17	1.2	-	8	17	-	260	1100	-
Leachate Pond	7-Apr-04	673239	800	<0.01	1.6	<0.01	45	30	41	140	-	-	-	240	<1.0	1.1	0.09	2.5	-	8	18	38	350	1600	-
Leachate Pond	21-Jul-04	707749	490	<0.01	23	0.02	36	17	26	78	-	-	-	160	17	1.8	0.52	2.3	-	7.4	9	22	180	910	-
Leachate Pond	27-Oct-04	743750	530	<0.01	2.5	<0.01	30	17	27	87	-	-	-	170	1.8	0.6	0.44	1.2	-	7.2	15	42	210	-	-
Leachate Pond	20-Jan-05	775531	700	<0.01	<0.05	<0.01	46	30	39	140	-	-	-	260	3	1.3	0.14	2.4	-	7.9	13	36	320	1300	-
Leachate Pond	13-Apr-05	804584	680	<0.01	3.2	0.02	50	28	35	130	-	-	-	220	6	2.1	0.14	2.6	-	7.4	15	28	230	1200	-
Leachate Pond	28-Jul-05	841926	620	<0.01	3.2	0.26	49	27	30	130	-	-	-	230	1	2.5	1.5	2.9	-	7.7	12	35	220	1200	-
Leachate Pond	31-Oct-05	872633	250	<0.01	2.9	0.03	20	12	12	41	-	-	-	94	<1	0.1	<0.01	1.5	-	7.3	12	28	74	440	-
Leachate Pond	30-Jan-06	903882	550	<0.00	0.64	0.43	45	24	28	110	-	-	-	210	4	1.6	0.03	3.8	-	8.4	15	83	220	1000	-
Leachate Pond	20-Apr-06	933447	770	<0.01	0.35	0.03	54	33	39	150	-	-	-	250	<1	2	0.04	3.7	-	7.9	24	34	290	1400	-
Leachate Pond	25-Jul-06	965730	550	<0.01	0.38	0.04	45	31	30	150	-	-	-	190	8	0.8	0.56	3	-	7.7	23	47	230	1100	-
Leachate Pond	24-Oct-06	993116	680	<0.01	1.9	<0.01	57	36	37	140	-	-	-	290	<1	1.7	0.01	5.4	-	7.7	11	45	280	1400	-
Leachate Pond	24-Jan-07	1108119	1100	<0.01	2.8	0.02	46	52	63	280	-	-	-	69	<0.5	<0.1	0.2	0.7	-	8	22	76	490	2000	-
Leachate Pond	17-Apr-07	1150664	1100	<0.01	27	0.02	77	37	60	210	-	-	-	460	5	3.2	<0.01	5.9	-	7.4	32	360	380	1800	-
Leachate Pond	25-Jul-07	1219307	680	<0.01	1.3	<0.02	41	30	38	130	-	-	-	240	8	<0.1	<0.01	1.5	-	8.4	16	48	300	1,300	-
Leachate Pond	22-Oct-07	1297218	880	<0.01	0.5	<0.02	53	34	57	200	-	-	-	270	<1	0.1	0.11	1.2	-	8.6	23	64	350	1,600	-
Leachate Pond	22-Jan-08	1375495	1,600	<0.01	0.4	0.01	76	52	95	370	-	-	-	460	<1	<0.1	0.22	1.8	-	8.4	30	91	730	2,600	-
Leachate Pond	22-Jul-08	1539825	670	<0.01	0.7	0.01	46	31	39	150	-	-	-	74	9	<0.1	<0.01	1.0	-	7.70	16	39	290	1,400	-
Leachate Pond	21-Oct-08	1620243	990	<0.01	0.2	0.01	46	37	53	210	-	-	-	280	<1	<0.1	<0.01	1.8	-	7.4	20	42	440	1,700	-
Leachate Pond	28-Jan-09	1706038	1,600	<0.01	<0.2	<0.01	79	55	89	360	-	-	-	440	<1	<0.1	0.01	2.5	-	7.6	23	74	750	2,900	-
Leachate Pond	28-Apr-09	-	2,900	<0.01	0.3	0.03	220	110	140	690	-	-	-	170	190	0.2	1.2	3.0	-	8.0	40	110	1,500	4,900	-
Leachate Pond	29-Jul-09	-	820	<0.01	0.3	0.02	48	35	42	170	-	-	-	240	9	<0.1	0.089	1.3	-	8.1	20	45	310	1,500	-
Leachate Pond	29-Oct-09	1976822	710	< 0.01	0.3	0.01	43	34	43	160	220	10	< 2	240	< 1	< 0.1	< 0.01	2.1	-	8.5	27	65	300	1300	-
Leachate Pond	28-Jan-10	2070259	1400	< 0.001	0.06	0.005	66	50	81	320	430	< 2	< 2	430	< 1	< 0.1	< 0.01	1.5	-	7.9	2	81	610	2600	-
Leachate Pond	20-Jul-10	2259583	540	< 0.001	0.3	0.017	30	16	33	130	180	< 2	< 2	180	< 1	0.1	0.01	0.6	-	7.9	21	43	230	1000	-
Leachate Pond	20-Oct-10	2367034	440	< 0.001	1.2	0.001	30	13	27	90	170	< 2	< 2	170	< 1	< 0.1	0.21	1.4	-	7.5	20	33	170	810	-
Leachate Pond	24-Jan-11	2474618	290	< 0.001	1.7	0.001	21	10	18	65	130	< 2	< 2	130	< 1	0.1	< 0.01	1.3	-	7.3	22	57	100	550	-
Leachate Pond	19-Apr-11	2574917	570	< 0.001	0.21	0.001	30	22	29	120	190	< 2	< 2	190	< 1	< 0.1	< 0.01	0.6	-	7.8	16	41	210	1000	-
Leachate Pond	28-Jul-11	2688219	500	< 0.001	0.73	< 0.001	29	16	26	110	160	< 2	< 2	160	12	< 0.1	< 0.01	0.6	-	7.5	14	32	210	930	-
Leachate Pond	18-Oct-11	2784847	520	< 0.01	0.8	< 0.01	29	15	28	100	190	< 2	< 2	190	9	< 0.1	< 0.01	1.9	-	7.6	-	65	200	940	-
Leachate Pond	19-Jan-12	2895500	740	< 0.01	0.7	< 0.01	39	20	38	130	240	22	< 2	260	1	< 0.1	< 0.05	1.6	-	7.5	24	46	250	1300	-
Leachate Pond	22-May-12	3045828	740	< 0.01	1.7	< 0.01	36	25	38	140	240	< 2	< 2	240	< 1	< 0.1	0.08	1.6	-	7.7	23	43	270	1300	-
Leachate Pond	02-Aug-12	3131139	430	< 0.001	0.74	0.003	22	13	24	96	140	< 2	< 2	140	11	0.3	0.02	0.8	-	7.7	10	24	180	810	-
Leachate Pond	29-Nov-12	3274867	770	< 0.01	0.9	< 0.01	42	21	40	140	260	< 2	< 2	260	< 1	0.1	0.01	0.8	-	7.5	6	44	280	1300	-
Leachate Pond	28-Feb-13	3383774	1600	< 0.01	0.9	< 0.01	80	57	75	330	130	< 2	< 2	130	210	0.2	0.06	2.6	-	7.6	30	72	730	2600	-
Leachate Pond	16-May-13	3478112	1700	< 0.01	1.7	< 0.01	67	44	71	290	260	< 2	< 2	260	66	< 0.1	0.44	1.8	-	7.6	27	76	810	2900	-
Leachate Pond	28-Aug-13	3598482	650	< 0.01	1.4	< 0.01	41	23	37	120	190	< 2	< 2	190	< 1	< 0.1	< 0.01	0.8	-	7.6	16	40	230	1100	-
Leachate Pond	26-Nov-13	3705705	710	< 0.01	1.6	0.01	31	13	28	100	220	< 2	< 2	220	< 1	< 0.1	0.01	1	-	7.5	18	43	250	1200	-
Leachate Pond	28-May-14	3917835	1200	< 0.01	0.9	< 0.01	72	46	60	260	240	< 2	< 2	240	63	< 0.1	< 0.01	1.1	0.06	7.4	19	45	510	2100	-
Leachate Pond	26-Aug-14	4022973	650	< 0.01	0.7	< 0.01	42	23	39	140	220	< 2	< 2	220	< 1	< 0.1	< 0.01	0.6	< 0.05	7.8	13	35	260	1200	-
Leachate Pond	26-Nov-14	4133548	1100	< 0.01	< 0.2	< 0.01	61	28	60	220	320	< 2	< 2	320	< 1	< 0.1	< 0.01	1.1	-	7.7	21	51	480	2000	-
Leachate Pond	27-Aug-15	4455822	640	<0.001	0.89	0.02	46	21	43	160	230	<2	<2	230	<5 LINT	<0.1	0.020	0.8	-	7.9	13	48	270	1300	-
Leachate Pond	17-Jan-17	-	701	0.002	1.77	0.034	42	24	34	154	243.00	<1	<1	243	1	4.77	0.02	4.2	-	7.37	13	36	287	1300	19
Leachate Pond	21-Mar-17	-	718	<0.001	2.01	0.007	39	26	29	135	231.00	<1	<1	231	2	2.41	0.07	3.7	-	7.53	18	49	303	1330	27
Leachate Pond	24-May-17	-	769	0.027	5.42	0.078	33	41	32	140	284.00	<1	<1	284	<1	9.58	0.01	9.6	-	7.4	21	120	326	1380	59
Leachate Pond	23-Aug-17	EM1711442007	503	0.016	19.4	0.594	24	22	22	97	161	<1	<1	161	2	1.22	0.53	44.9	-	7.53	14	1810	204	931	19
Leachate Pond	09-Nov-17	EM1715409004	611	0.004	7.51	0.145	34	19	30	129	206	<1	<1	206	1	6.7	0.12	6.7	-	7.66	7	65	298	1170	16
Leachate Pond	26-Feb-18	EM1803674009	794	0.043	109	1.44	36	29	32	143	224	<1	<1	224	4	2.02	0.06	14.5	-	7.2	17	398	316	1384	38
Leachate Pond	29-May-18	EM1808881004	608	<0.001	0.1	0.008	32	19	28	125	196	<1	<1	196	2	4.41	0.02	5.4	-	7.5	7	49	267	1180	37
Leachate Pond	02-Aug-18	EM1812371004	477	<0.001	4.17	0.007	24	21	22	93	165	<1	<1	165	3	4.56	0.04	11.9	-	7.44	5	26	221	850	21
Leachate Pond	27-Nov-18	EM1819193003	602	<0.001	<0.05	<0.005	30	22	28	127	194	<1	<1	194	<1	6.29	0.01	7.2	-	8.16	11	36	291	1,220	30
Leachate Pond	26-Feb-19	EM1902808008	895	<0.001	3.23	0.006	28	26	34	161	201	<1	<1	201	4	1.33	0.02	2.9	-	7.96	17	37	429	1,440	28
Leachate Pond	21-May-19	EM1907812001	718	<0.001	1.37	<0.005	26	23	26	128	133	<1	<1	133	9	1.92	0.01	2.1	-	7.29	11	27	327	1,280	9
Leachate Pond	19-Aug-19	EM1913513	398	0.001	9.72	0.016	20	20	18	83	154	<1	<1	154	7	4.42	0.07	5.3	-	7.17	14	36	164	821	36
Leachate Pond	03-Dec-19	EM1920764	600	<0.001	0.08	<0.005	27	23	27	122	214	<1	<1	214	1	7.27	<0.01	7.5	-93.3	7.45	12	30	274	1,170	10
Leachate Pond	10-Feb-20	EM2002050	754	<0.001	1.61	<0.005	28	24	31	138	204	<1	<1	204	<1	2.67	0.06	3.6	-	8.11	8	24	322	1,280	20
Leachate Pond	18-May-20	EM2008378	588	<0.001	3.12	<0.005	29	21	27	114	196	<1	<1	196	1	3.1	0.02	3.8	-	7.44	6	33	273	1,030	15
Leachate Pond	17-Aug-20	EM2014279	561	<0.001	2.56	<0.005	31	19	27	101	194	<1	<1	194	2	6.2	0.02	6.2	-	7.43	6	11	227	1070	38
Leachate Pond	23-Nov-20	EM2020734	643	<0.001	2.04	<0.005	23	21	27	112	193	<1	<1	193	3	3.62	0.03	3.8	-	7.6	10	22	243	1070	12
Leachate Pond	22-Feb-21	EM2102856	629	0.002	15.8	0.032	28	32	28	122	221	<1	<1	221	1	4.95	<0.01	9.4	-	7.45	11	136	292	1220	20
Leachate Pond	25-May-21	EM2109822	460	0.015	8.68	0.322	8	29	5	32	66	<1	<1	66	28	0.07	0.04	3.7	-	6.62	42	203	42	357	13
Leachate Pond	14-Sep-21	EM2118437	536	<0.001	12.7	0.008	31	25	26	101	210	<1	<1	210	5	5.15	0.05	-	13	46	224	1060	31	-	-
Leachate Pond	18-Nov-21	EM2123390	554	<0.001	2.04	<0.005	25	18	24	107	181	<1	<1	181	4	4.76	0.13	-	10	29	254	1040	27	-	-
Leachate Pond	01-Mar-22	EM2203633	635	<0.001	2	<0.005	41	26	32	124	214	<1	<1	214	1	4.18	0.02	-	9	35	303	1120	30	-	-
Leachate Pond	17-May-22	EM2209262	622	<0.001	3.1	<0.005	37	26	28	117	246	<1	<1	246	1	5.6	<0.01	-	11	29	275	1220	28	-	-
Leachate Pond	31-Aug-22	EM2216860	466	0.005	18.3	0.033	23	28	17	72	160	<1	<1	160	4	3.78	0.05	6	-	7.55	38	147	132	745	14
Leachate Pond	17-Nov-22	EM2222858	480	0.006	23.5	0.036	27	32	19	73	171	<1	<1	171	5	5.35	<0.01	5.5	-	7.25	29	108	136	834	28
Leachate Pond	14-Feb-23	EM2302525	638	<0.001	5.48	<0.005	40	24	30	130	194	<1	<1	194	3	6.26	0.06	6.6	-	7.54	13	53	264	1,180	<5
Leachate Pond	09-May-23	EM2308222	518	<0.001	1.42	<0.005	29	22	23	100	163	<1	<1	163	4	4.11	0.01	3.8	-	7.58	10	34	210	950	26

Historical Surface Water / Leachate Lab Results
Hepburn Shire Council

SAMPLE NO.	SAMPLE DATE	REPROT No.	TDS	Chromium	Iron	Zinc	Calcium	Potassium	Magnesium	Sodium	Bicarbonate	Carbonate	Hydroxide	Total Alkalinity	Sulphate	Ammonia	Nitrate	Total Kjeldahl Nitrogen	Total Phosphate	pH	Total Organic Carbon	Chemical Oxygen Demand	Chloride	EC	Volatile Fatty Acids (as Acetic Acid)
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg CaCO3/L	mg/L	mg N / L	mg N / L	mg N / L	mg P / L	Units	mg/L	mg/L	mg/L	uS/cm	mg/L
Wetland	17-Jan-17	-	1160	<0.001	5.82	<0.005	59	33	66	279	322	<1	<1	322	<1	0.06	0.01	2.2	-	7.54	29	91	511	2090	-
Wetland	21-Mar-17	-	1330	<0.001	9.62	0.041	67	20	51	234	54	<1	<1	54	219	0.5	0.35	1.7	-	7.21	12	29	564	2320	-
Wetland	24-May-17	-	901	<0.001	0.18	<0.005	35	29	42	202	211	<1	<1	211	27	0.03	<0.01	0.8	-	7.63	16	48	454	1610	-
Wetland	23-Aug-17	EM1711442008	604	<0.001	1.38	<0.005	32	17	31	129	211	<1	<1	211	2	<0.01	<0.01	0.7	-	7.99	13	33	277	1160	25
Wetland	09-Nov-17	EM1715409005	821	<0.001	3.18	0.006	47	17	50	189	290	<1	<1	290	<1	0.05	0.01	6.1	-	7.71	33	89	410	1570	16
Wetland	29-May-18	EM1808881005	900	<0.001	0.18	<0.005	37	29	36	187	135	<1	<1	135	42	0.04	0.01	0.8	-	7.41	16	50	403	1570	33
Wetland	02-Aug-18	EM1812371005	806	0.006	4.06	0.008	29	26	26	140	128	<1	<1	128	2	0.09	0.01	1.6	-	7.32	18	68	374	1,150	23
Wetland	28-Nov-18	EM1819277007	986	<0.001	1.64	0.008	50	34	48	198	291	<1	<1	291	<1	0.06	0.01	1.3	-	7.92	24	52	476	1,670	30
Wetland	21-May-19	EM1907812002	801	<0.001	1.42	0.008	32	31	28	144	98	<1	<1	98	33	0.07	<0.01	1.8	-	6.47	18	56	397	1470	12
Wetland	19-Aug-19	EM1913513	438	<0.001	4.39	<0.005	22	15	20	84	143	<1	<1	143	5	0.04	<0.01	1.4	-	7.62	19	63	176	821	22
Wetland	03-Dec-19	EM1920764	757	<0.001	0.24	0.024	30	24	34	149	242	<1	<1	242	14	0.08	<0.01	1.2	-49.8	7.52	23	51	330	1,370	12
Wetland	18-May-20	EM2008378	652	<0.001	6.24	0.005	32	30	30	124	214	<1	<1	214	10	0.02	<0.01	1.8	-	7.4	19	52	282	1,110	18
Wetland	17-Aug-20	EM2014279	587	<0.001	4.41	0.008	33	20	31	103	218	<1	<1	218	3	0.1	0.01	0.9	-	7.45	8	30	214	1050	38
Wetland	23-Nov-20	EM2020734	370	<0.001	10.8	0.03	20	16	20	70	174	<1	<1	174	6	0.48	0.06	1.7	-	7.34	16	39	129	712	16
Wetland	22-Feb-21	EM2102856	900	<0.001	5	<0.005	46	33	47	176	326	<1	<1	326	<1	0.3	<0.01	1.1	-	7.7	16	36	419	1690	24
Wetland	25-May-21	EM2109822	2190	0.005	60.5	0.02	55	25	110	490	217	<1	<1	217	19	0.05	<0.01	0.8	-	6.76	22	<50	1140	4120	8
Wetland	14-Sep-21	EM2118437	492	<0.001	2.38	<0.005	18	11	24	112	122	<1	<1	122	9	<0.01	<0.01	-	18	50	234	962	25	-	-
Wetland	18-Nov-21	EM2123390	641	<0.001	0.71	<0.005	23	16	32	141	196	<1	<1	196	2	0.14	<0.01	-	15	50	302	1280	23	-	-
Wetland	01-Mar-22	EM2203633	997	<0.001	3.36	<0.005	49	37	58	202	342	<1	<1	342	<1	0.14	<0.01	-	31	69	473	1720	32	-	-
Wetland	17-May-22	EM2209262	730	<0.001	2.89	<0.005	36	27	41	151	300	<1	<1	300	1	0.03	<0.01	-	15	155	333	1470	23	-	-
Wetland	31-Aug-22	EM2216860	313	0.002	2.43	<0.005	9	6	12	67	64	<1	<1	64	13	0.01	0.08	0.8	-	7.56	13	37	123	544	10
Wetland	17-Nov-22	EM2222858	236	0.004	9.71	0.006	9	5	10	38	66	<1	<1	66	3	0.04	0.01	0.9	-	6.99	18	45	55	361	17
Wetland	14-Feb-23	EM2302525	892	<0.001	7.65	0.01	30	33	50	207	244	<1	<1	244	<1	0.01	<0.01	10.4	-	7.7	44	374	404	1,660	17
Wetland	09-May-23	EM2308222	768	<0.001	69.4	<0.005	33	25	26	108	195	<1	<1	195	1	3.32	<0.01	3.8	-	6.92	13	<10	236	1,060	38