

Memorandum

To:	Kempsey Shire Council	Date:	1 February 2024
Attention:	Jason Magill	Project No.:	89781.24
Email:	jason.magill@kempsey.nsw.gov.au	Reference:	R.003.Rev0 Q2 Jan 2024 - Memo
From:	Chris Bozinovski		
	Quarterly Monitoring Memo - Q2 January 2024 Kempsey Landfill-		
Subject:	Groundwater, Surface water and Gas Monitoring 2023 - 2024 638 Crescent Head Road, Kempsey		

1. Introduction

This memo presents the January 2024 (Q2) results of groundwater, surface water and gas monitoring at the Kempsey Landfill site located at 638 Crescent Head Road, South Kempsey New South Wales (NSW). Monitoring was commissioned by Kempsey Shire Council (KSC).

The site is licensed by the Environmental Protection Authority under Environmental Protection Licence (EPL) 6269. The EPL notice specifies requirements for surface water, groundwater, and gas monitoring including test locations, analytes, and threshold concentration. Monitoring was conducted with reference to EPL 6269 requirements.

2. Scope of Works

The current round of monitoring was undertaken on 16 and 17 January 2024 (Q2) and comprised;

- Assessment of methane gas concentrations within existing buildings and capped landfill areas on 16 January 2024;
- Collection of surface water samples at Locations S4, S5, S6 S7 and L8 on 16 January 2024, and
- Gas monitoring using landfill gas analyser at Wells BH1-02, BH1, BH2, BH3 and BH4 on 17 January 2024.

3. Field Work Results

3.1 Discussions with Site Personnel

It is understood that there have been two separate discharge events since the previous September 2023 (Q1) monitoring round. It is understood that these events were directly reported to the EPA by KSC.

3.2 Surface Water

Refer to attached laboratory testing results (341739-[R00]) and summary tables as follows:

- Table F3: Field and Laboratory Results for Surface water - January 2024 – Q2;
- Table A2: Surface water field parameters – Q2 January 2024.

With reference to Kempsey Landfill EPL there were some exceedances reported within the lab samples as indicated by the highlighted cells in the attached summary tables.

The reported exceedances from surface water quality were generally within the historical ranges for these analytes at these locations. As such the exceedance results are generally not considered to be significant. Further information and limitations will be provided in the annual report.

3.3 Gas

The methane walkover was conducted on 16 January 2024 with reference to EPA Environmental Guidelines for Solid Waste Landfills (2016).

No methane exceedances were recorded within on-site structures (former EPL monitored structures) or within the groundwater monitoring bores (see results in Table A1 attached).

Past surface methane exceedance locations (E1 to E14) were accessed where possible. Results of current methane monitoring at these locations are outlined in Table 1 below:

Table 1: Summary of Surface Methane Monitoring – 16 January 2024 (Q2)

Location ID	Methane (ppm)	Description of Location
E1	-	Not accessible (under clay stockpile)
E2	5 – 10	Grassed area
E3	80 – 100	Grassed area
E4	-	Not accessible (under clay stockpile)
E5	-	Not accessible (under clay stockpile)
E6	-	Not accessible (under clay stockpile)
E7	4 – 6	Grassed area
E8	100 – 140	Edge of capping area
E9	60 – 180	Grassed area
E10	5 – 10	Grassed area
E11	5 – 10	Dead grass, edge of batter
E12	20 – 30	Edge of capping area
E13	130 – 280	Edge of stockpile batter
E14	50 - 150	Grassed area

Coordinates of surface methane monitoring locations can be provided as required.

No methane exceedances (ie at existing or new locations) were found in the current round of monitoring. It is noted, however, that 21 mm of rainfall was recorded on the day of monitoring, which may have impacted on the results of surface methane monitoring.

Refer to Figure 1 below for approximate locations of E1 to E14.



Figure 1: Approximate locations of historic methane exceedances

Historic surface methane monitoring has indicated some elevated results and localised exceedances. Further assessment was recommended to confirm subsurface conditions and capping within areas identified to contain methane exceedance in order to confirm possible capping rehabilitation requirements. Further details will be provided in the annual report.

4. Limitations

The above interim results have been provided for the exclusive use of Kempsey Shire Council. Further details will be provided in the annual report.

5. References

CRC CARE. (2017). Risk-based Management and Remediation Guidance for Benzo(a)pyrene. Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]. Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). Contaminated Sites, Sampling Design Guidelines. NSW Environment Protection Authority.

NSW EPA. (2016). Environmental Guidelines, Solid Waste Landfills, Second Edition, 2016. NSW Environment Protection Authority.

NSW EPA. (2020). Assessment and Management of Hazardous Ground Gases. NSW Environment Protection Authority.

NSW EPA. (2020). Guidelines for Consultants Reporting on Contaminated Land. Contaminated Land Guidelines: NSW Environment Protection Authority.

Please contact the undersigned if you have any questions on this matter.

Douglas Partners Pty Ltd

Reviewed by

Sarah Krebs
Environmental Scientist



Chris Bozinovski
Principal

Attachments:

Table A1 – Gas monitoring results - Q2 January 2024
Table A2 – Surface water field parameters- Q2 January 2024
Table F3 - Field and Laboratory Results for Surface Water – January 2024 – Q2
Laboratory Test Results - (341739-[R00])
Drawing – 89781.00.D.001.Rev0

Table A1: Gas monitoring Results - Q2 January 2024

Well ID	Gauging Date	Max Methane (ppm)	Max Carbon Dioxide (%)	Oxygen(%)	Max Hydrogen Sulfide (ppm)	Max Carbon Monoxide (ppm)	Atmospheric Pressure (mb)	Flow (l/hr)
BH1	17/01/2024	0	0.9	20.4	0	0	1007	0.5
BH1-2	17/01/2024	0	0.1	20.1	0	0	1010	0.1
BH2	17/01/2024	0	0.1	20.0	0	1	1009	16.0
BH3	17/01/2024	0	0.0	20.0	0	1	1009	0.7
BH4	17/01/2024	0	0.1	19.7	1	1	1009	7.5

Notes to Table A1:

ppm parts per million

mb millibars

l/hr litres per hour

Table A2: Surface Water field parameters - Q2 January 2024

Location ID	Gauging Date	PID	pH	EC (uS/cm)	mV	DO (mg/L)	Temp (°C)	Turbidity (NTU)	Comments
S4	16/01/2024	<1	6.9	188	146	1.42	23.4	10	Clear, pale brown, no odour
S5	16/01/2024	<1	6.2	554	100	4.57	23.1	181	Slightly turbid, pale brown, no odour
S6	16/01/2024	<1	5.5	513	153	1.65	23.3	17	Clear, pale brown, no odour
S7	16/01/2024	<1	7.9	643	82	6.24	26.0	692	Very turbid, brown, no odour
L8	16/01/2024	<1	8.4	3160	45	1.96	25.2	75	slightly turbid, pale brown, no odour

Notes to Table A2:

AHD Australian Height Datum

mbTOC metres below top of PVC casing

PID photo-ionisation detector

EC electrical conductivity

ppm parts per million

ORP oxidation reduction potential

DO Dissolved Oxygen

NTU nephelometric turbidity unit

H₂S Hydrogen Sulfide

uS/cm microsiemens

Table F3 - Field and Laboratory Results for Surface water - January 2024 - Q2

Analytes	Units	ANZECC 2000 FW 95%	EPL Surface Water Trigger Levels Licence 6269	S4	S5	S6	S7	L8
				MP4	MP5	MP6	MP7	MP8
				16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Field	Dissolved Oxygen (Filtered)	mg/L	12.057	1.42	4.57	1.65	6.24	1.96
	EC (field)	µS/cm	1065	188	554	513	643	3160
	pH (Field)	pH_Units	6.5 - 8.0	6.9	6.2	5.5	7.9	8.4
	Temp	°C		23.43	23.1	23.3	26.0	25.2
HM in water - dissolved	Iron (Filtered)	mg/L	1.84	1.1	1.1	0.8	0.04	2.6
	Manganese (Filtered)	mg/L	1.9	0.035	0.11	0.17	<0.005	0.18
HM in water - total	Iron	mg/L	1.84	1.6	2.9	3.4	2.2	4.7
	Manganese	mg/L	1.9	0.058	0.12	0.26	0.054	0.26
Ion Balance	Alkalinity (Carbonate)	mg/L		<5	<5	<5	<5	<5
	Alkalinity (Hydroxide) as	mg/L		<5	<5	<5	<5	<5
	Alkalinity (total) as CaCO3	mg/L	12.283	13	46	25	58	450
	Alkalinity (Bicarbonate as	mg/L		13	46	25	58	450
	Calcium (Filtered)	mg/L	2.05	2	16	12	24	37
	Chloride	mg/L	54.49	33	120	100	99	730
	Ionic Balance	%		5	2	3	3	0
	Magnesium (Filtered)	mg/L	10.05	3	9	8.3	8.1	24
	Potassium (Filtered)	mg/L	2.282	3	10	7.9	10	94
	Sodium (Filtered)	mg/L	34	23	83	69	78	550
Sulphate	mg/L	3.1	2	45	43	58	32	
Miscellaneous Inorganics	Ammonia as N	mg/L	0.9	0.28	0.024	0.046	<0.005	11
	Fluoride	mg/L		<0.1	<0.1	<0.1	<0.1	0.2
	Nitrate (as N)	mg/L	0.7	<0.005	<0.005	0.007	0.11	<0.005
	TOC	mg/L	33.1	76	27	29	28	150
	TSS	mg/L	33.415	13	14	8	180	20
Total Phenolics	Phenolics Total	mg/L	0.32	<0.05	<0.05	<0.05	<0.05	<0.05

Notes
Only EPL Trigger Level Exceedances highlighted

CERTIFICATE OF ANALYSIS 341739

Client Details

Client	Douglas Partners Pty Ltd (Port Macquarie)
Attention	Joel Cowan
Address	PO Box 5463, Port Macquarie, NSW, 2444

Sample Details

Your Reference	89781.24, Kempsey
Number of Samples	6 Water
Date samples received	17/01/2024
Date completed instructions received	17/01/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	24/01/2024
Date of Issue	25/01/2024
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Greta Petzold, Operation Manager
 Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Total Phenolics in Water						
Our Reference		341739-1	341739-2	341739-3	341739-4	341739-5
Your Reference	UNITS	S4	S5	S6	S7	L8
Sampling Period Dates		16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/01/2024	18/01/2024	18/01/2024	18/01/2024	18/01/2024
Date analysed	-	18/01/2024	18/01/2024	18/01/2024	18/01/2024	18/01/2024
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Total Phenolics in Water		
Our Reference		341739-6
Your Reference	UNITS	D1-16/1
Sampling Period Dates		16/01/2024
Type of sample		Water
Date extracted	-	18/01/2024
Date analysed	-	18/01/2024
Total Phenolics (as Phenol)	mg/L	<0.05

Miscellaneous Inorganics						
Our Reference		341739-1	341739-2	341739-3	341739-4	341739-5
Your Reference	UNITS	S4	S5	S6	S7	L8
Sampling Period Dates		16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/01/2024	17/01/2024	17/01/2024	17/01/2024	17/01/2024
Date analysed	-	17/01/2024	17/01/2024	17/01/2024	17/01/2024	17/01/2024
Ammonia as N in water	mg/L	0.28	0.024	0.046	<0.005	11
Nitrate as N in water	mg/L	<0.005	<0.005	0.007	0.11	<0.005
Fluoride, F	mg/L	<0.1	<0.1	<0.1	<0.1	0.2
Total Organic Carbon	mg/L	76	27	29	28	150
Total Suspended Solids	mg/L	13	14	8	180	20

Miscellaneous Inorganics		
Our Reference		341739-6
Your Reference	UNITS	D1-16/1
Sampling Period Dates		16/01/2024
Type of sample		Water
Date prepared	-	17/01/2024
Date analysed	-	17/01/2024
Ammonia as N in water	mg/L	0.022
Nitrate as N in water	mg/L	<0.005
Fluoride, F	mg/L	<0.1
Total Organic Carbon	mg/L	32
Total Suspended Solids	mg/L	13

Ion Balance						
Our Reference		341739-1	341739-2	341739-3	341739-4	341739-5
Your Reference	UNITS	S4	S5	S6	S7	L8
Sampling Period Dates		16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/01/2024	17/01/2024	17/01/2024	17/01/2024	17/01/2024
Date analysed	-	17/01/2024	17/01/2024	17/01/2024	17/01/2024	17/01/2024
Calcium - Dissolved	mg/L	2	16	12	24	37
Potassium - Dissolved	mg/L	3	10	7.9	10	94
Sodium - Dissolved	mg/L	23	83	69	78	550
Magnesium - Dissolved	mg/L	3	9.0	8.3	8.1	24
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	13	46	25	58	450
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	13	46	25	58	450
Sulphate, SO ₄	mg/L	2	45	43	58	32
Chloride, Cl	mg/L	33	120	100	99	730
Ionic Balance	%	5.0	2.0	3.0	3.0	0

Ion Balance		
Our Reference		341739-6
Your Reference	UNITS	D1-16/1
Sampling Period Dates		16/01/2024
Type of sample		Water
Date prepared	-	17/01/2024
Date analysed	-	17/01/2024
Calcium - Dissolved	mg/L	14
Potassium - Dissolved	mg/L	10
Sodium - Dissolved	mg/L	82
Magnesium - Dissolved	mg/L	8.3
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	44
Carbonate Alkalinity as CaCO ₃	mg/L	<5
Total Alkalinity as CaCO ₃	mg/L	44
Sulphate, SO ₄	mg/L	44
Chloride, Cl	mg/L	120
Ionic Balance	%	1.0

HM in water - dissolved						
Our Reference		341739-1	341739-2	341739-3	341739-4	341739-5
Your Reference	UNITS	S4	S5	S6	S7	L8
Sampling Period Dates		16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	22/01/2024	22/01/2024	22/01/2024	22/01/2024	22/01/2024
Date analysed	-	22/01/2024	22/01/2024	22/01/2024	22/01/2024	22/01/2024
Iron-Dissolved	µg/L	1,100	1,100	800	40	2,600
Manganese-Dissolved	µg/L	35	110	170	<5	180

HM in water - dissolved		
Our Reference		341739-6
Your Reference	UNITS	D1-16/1
Sampling Period Dates		16/01/2024
Type of sample		Water
Date prepared	-	22/01/2024
Date analysed	-	22/01/2024
Iron-Dissolved	µg/L	1,100
Manganese-Dissolved	µg/L	98

HM in water - total						
Our Reference		341739-1	341739-2	341739-3	341739-4	341739-5
Your Reference	UNITS	S4	S5	S6	S7	L8
Sampling Period Dates		16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	19/01/2024	19/01/2024	19/01/2024	19/01/2024	19/01/2024
Date analysed	-	22/01/2024	22/01/2024	22/01/2024	22/01/2024	22/01/2024
Iron-Total	µg/L	1,600	2,900	3,400	2,200	4,700
Manganese-Total	µg/L	58	120	260	54	260

HM in water - total		
Our Reference		341739-6
Your Reference	UNITS	D1-16/1
Sampling Period Dates		16/01/2024
Type of sample		Water
Date prepared	-	19/01/2024
Date analysed	-	22/01/2024
Iron-Total	µg/L	2,900
Manganese-Total	µg/L	120

Method ID	Methodology Summary
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-019	Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5°C.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms (e.g. FeO, PbO, ZnO) are determined stoichiometrically from the base metal concentration.

Client Reference: 89781.24, Kempsey

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			18/01/2024	1	18/01/2024	18/01/2024		18/01/2024	[NT]
Date analysed	-			18/01/2024	1	18/01/2024	18/01/2024		18/01/2024	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	104	[NT]

Client Reference: 89781.24, Kempsey

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate			Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	341739-1
Date prepared	-			17/01/2024	2	17/01/2024	17/01/2024		17/01/2024	17/01/2024
Date analysed	-			17/01/2024	2	17/01/2024	17/01/2024		17/01/2024	17/01/2024
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	2	0.024	[NT]		94	95
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	2	<0.005	[NT]		96	83
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	2	<0.1	[NT]		109	103
Total Organic Carbon	mg/L	1	Inorg-079	<1	2	27	27	0	102	106
Total Suspended Solids	mg/L	5	Inorg-019	<5	2	14	[NT]		103	[NT]

Client Reference: 89781.24, Kempsey

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			17/01/2024	3	17/01/2024	17/01/2024		17/01/2024	[NT]
Date analysed	-			17/01/2024	3	17/01/2024	17/01/2024		17/01/2024	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	3	12	[NT]		98	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	3	7.9	[NT]		98	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	3	69	[NT]		105	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	3	8.3	[NT]		97	[NT]
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	5	Inorg-006	<5	3	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	3	25	23	8	[NT]	[NT]
Carbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	3	<5	<5	0	[NT]	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	3	25	23	8	114	[NT]
Sulphate, SO ₄	mg/L	1	Inorg-081	<1	3	43	[NT]		109	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	3	100	[NT]		94	[NT]
Ionic Balance	%		Inorg-040	[NT]	3	3.0	[NT]		[NT]	[NT]

Client Reference: 89781.24, Kempsey

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	341739-2
Date prepared	-			22/01/2024	1	22/01/2024	22/01/2024		22/01/2024	22/01/2024
Date analysed	-			22/01/2024	1	22/01/2024	22/01/2024		22/01/2024	22/01/2024
Iron-Dissolved	µg/L	10	Metals-022	<10	1	1100	1100	0	94	#
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	35	36	3	96	97

Client Reference: 89781.24, Kempsey

QUALITY CONTROL: HM in water - total				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	341739-2
Date prepared	-			22/01/2024	1	19/01/2024	19/01/2024		22/01/2024	22/01/2024
Date analysed	-			22/01/2024	1	22/01/2024	22/01/2024		22/01/2024	22/01/2024
Iron-Total	µg/L	10	Metals-022	<10	1	1600	1500	6	96	#
Manganese-Total	µg/L	5	Metals-022	<5	1	58	57	2	100	96

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

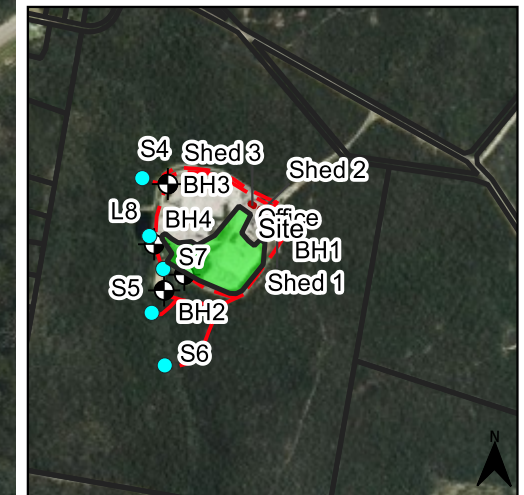
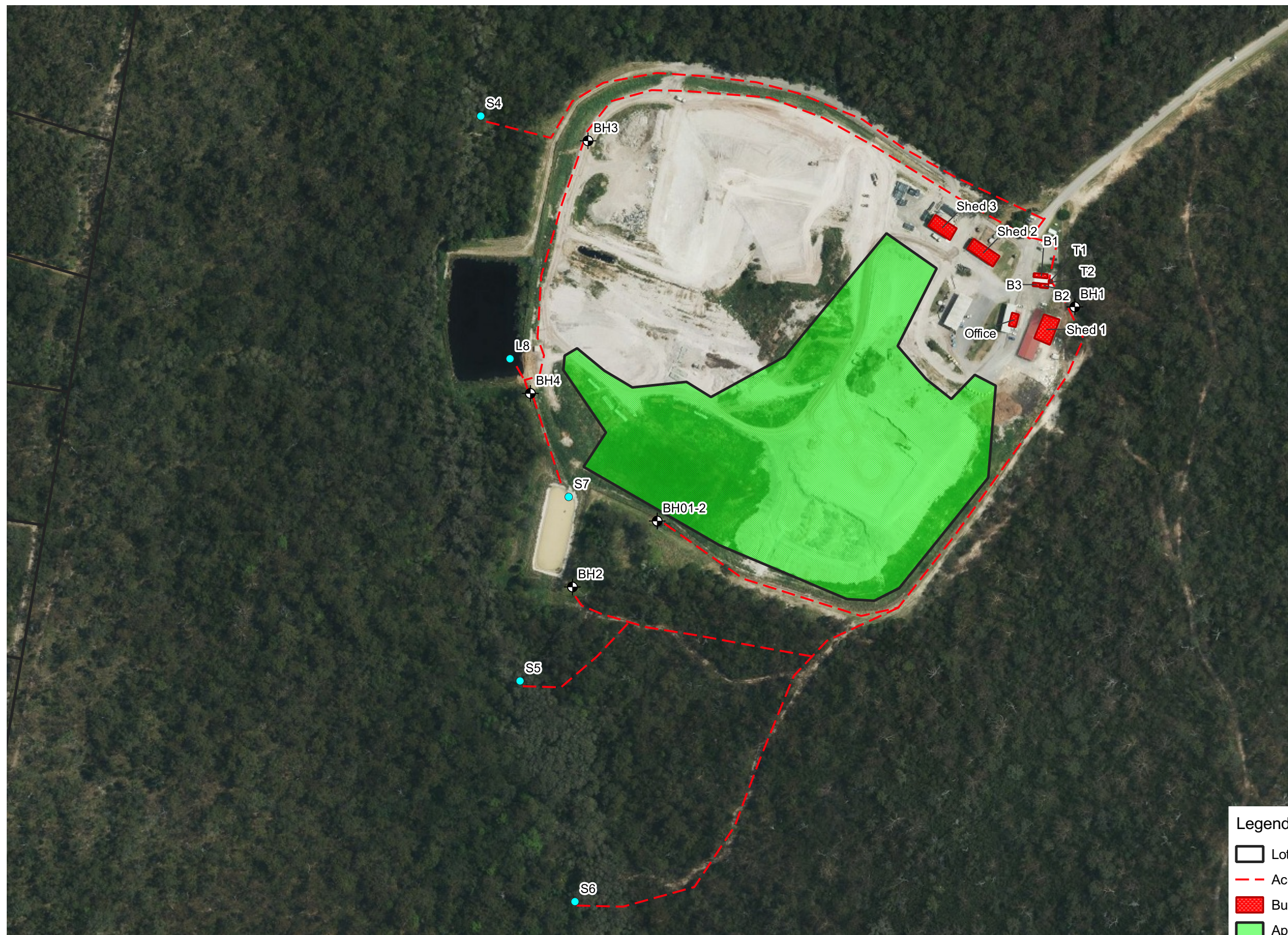
Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

8 HM in water - total - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

8 HM in water - dissolved - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Total Organic Carbon analysed by MPL Laboratories. Report No. PFA1137

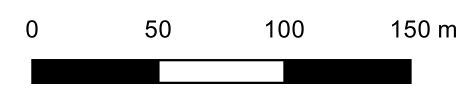


Site Location

Legend

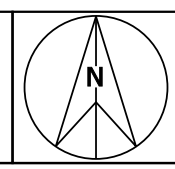
- Lot Boundary
- Access Tracks
- Building Locations Monitored for Gas
- Approximate Area of Surface Gas Monitoring
- Approximate Surface Water Location
- Approximate Well Location

NOTE:
1. Drawing adapted from Metromap Image dated 22.11.2022.



CLIENT:	Kempsey Shire Council	
OFFICE:	Port Macquarie	DRAWN BY: PLH
SCALE:	1:3000@A3	DATE: 21.August.2023

TITLE: **Test Location Plan**
Proposed Kempsey Landfill Water and Gas Monitoring
638 Crescent Head Road, Kempsey, NSW



Project:	89781.00
DRAWING No:	1
REVISION:	0

DP:QGIS.A3LandscapeDrawingLayout.3.26.3 - \\DPPMQNAS01\Projects\89781.00 - KEMPSEY, 638 Crescent Head Road\7.0 Drawings\7.2 Out\QGIS\QGIS\89781.00.Master Layers.qgz