Annual Environmental Monitoring Report (AEMR) 2024

Project No: ENRS0033
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Executive Summary

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants by ALS Environmental (Wollongong) on behalf of Shellharbour City Council (SCC) to prepare the Annual Environmental Monitoring Report (AEMR) for the Dunmore Recycling and Waste Depot (herein referred to as the Site).

This (AEMR) summarises the results of field testing and laboratory analysis conducted by ALS for the 2023-2024 monitoring period comprising of four (4) quarterly sampling events, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984.

The Site was established in 1945 and has been managed by Shellharbour City Council (SSC) since 1983. The Site accepts putrescible and non-putrescible waste within its managed landfill cell. Recycling activities conducted at the site include Resource Recovery Centre, Revolve Centre and Food Organics and garden Organics (FOGO) processing.

In late 2020 to July 2021 Shellharbour City Council moved away from sole reliance on traditional onsite leachate management techniques through initiating a secondary leachate treatment option in which leachate was transported from site for processing at a contractor facility.

In early 2021 Shellharbour City Council constructed a new Leachate Treatment Plant (LTP) on site, which was commissioned in July/August 2021. The LTP is comprised of three (3) primary biological treatment units, including an anoxic reactor, nitrifying reactor, and sequencing batch reactor. The treated stream meets Sydney Water requirements for discharge into Sydney Water sewer, under a trade waste agreement. On average the LTP discharges 60kL/day of treated water, equating to approximately 22ML of leachate removal from site per annum.

Waste regulation in NSW is administered by the EPA under the Protection of the Environment Operations (POEO) Act (1997); the Waste Avoidance and Resource Recovery Act (2001).

The Site operates under the conditions of two (2) EPLs:

- EPL No. 5984. Landfill activities. Consisting of; extractive activities, waste disposal and composting.
- EPL No. 12903. Resource recovery activities. Consisting of; composting and waste storage within the FOGO Facilities and Resource Recovery Centre.

A copy of the relevant EPL sections outlining the sampling requirements is provided in Appendix A (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

Based on the findings obtained during the 2023-2024 annual monitoring program the following conclusions and recommendations are provided:

- Shallow groundwater flow is expected to mimic topography with low hydraulic gradients flowing towards the south and southeast towards Rocklow Creek. Depth to groundwater was generally <5mBGL. The nearest sensitive receptors are likely to include; recreational users of the Minnamurra River estuary environs; down gradient stakeholders; and downgradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems near discharge zones;

- Groundwater throughout the annual monitoring period reported exceedances above the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within groundwater wells across the Site. The analytes were considered to be key indicators of leachate. The exceedances were within range of historical values with no significant changes in concentrations;
- Offsite sample locations within Rocklow Creek generally reported concentrations of analytes below the SAC. However, concentrations of ammonia were reported above the ecological stressor value on multiple occasions;
- Surface gas methane monitoring of the landfill cap reported satisfactory results all within the adopted assessment criteria;
- Methane levels of enclosed structures on or withing 250m of deposited waste or leachate storage were tested and found to be below the acceptable threshold for 1% (volume/volume) in all cases;
- Dust deposition gauges generally recorded satisfactory results below the guidelines provided in AS3580.10.1. Minor exceedances were reported in dust gauges DDG3 and DDG4 through the annual monitoring period. The potential source of the dust should be reviewed by the client. Monitoring should continue in accordance with EPL 5984 requirements;
- Gas Flare temperatures were reported below the required KPI of 760 degrees Celsius throughout the first three (3) quarters. An increase in temperature was reported within the fourth quarter;
- Based on the data reviewed for the 2023-2024 annual monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses were present within groundwater and consistent with the historical data;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional monitoring; and
- This report must be read in conjunction with the attached Statement of Limitations.

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1 Introduction

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants by ALS Environmental (Wollongong) on behalf of Shellharbour City Council (SCC) to prepare the Annual Environmental Monitoring Report (AEMR) for the Dunmore Recycling and Waste Depot (herein referred to as the Site).

This (AEMR) summarises the results of field testing and laboratory analysis conducted by ALS for the 2023-2024 monitoring period comprising of four (4) quarterly sampling events, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984.

1.1 Project Background

1.1.1 Site History

The Site was established in 1945 and has been managed by Shellharbour City Council (SSC) since 1983. The Site accepts putrescible and non-putrescible waste within its managed landfill cell. Recycling activities conducted at the site include Resource Recovery Centre, Revolve Centre and Food Organics and garden Organics (FOGO) processing.

In late 2020 to July 2021 Shellharbour City Council moved away from sole reliance on traditional onsite leachate management techniques through initiating a secondary leachate treatment option in which leachate was transported from site for processing at a contractor facility.

In early 2021 Shellharbour City Council constructed a new Leachate Treatment Plant (LTP) on site, which was commissioned in July/August 2021. The LTP is comprised of three (3) primary biological treatment units, including an anoxic reactor, nitrifying reactor, and sequencing batch reactor. The treated stream meets Sydney Water requirements for discharge into Sydney Water sewer, under a trade waste agreement. On average the LTP discharges 60kL/day of treated water, equating to approximately 22ML of leachate removal from site per annum.

1.2 EPL Requirements

Waste regulation in NSW is administered by the EPA under the Protection of the Environment Operations (POEO) Act (1997); the Waste Avoidance and Resource Recovery Act (2001).

The Site operates under the conditions of two (2) EPLs:

- EPL No. 5984. Landfill activities. Consisting of; extractive activities, waste disposal and composting.
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A copy of the relevant EPL sections outlining the sampling requirements is provided in Appendix A (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

1.3 Objectives

The objectives of this AEMR are to:

- Meet the environmental monitoring requirements of Sites EPLs; No. 5984;
- Assess and analyse the environmental monitoring data for the Site against NSW EPA endorsed criteria;
- Identify trends of the environmental monitoring data over the reporting period;
- Identify any on-site or off-site impacts associated with operation of the Site;
- Advise SCC if the current environmental monitoring program is providing adequate information to identify potential environmental impacts from existing operations (if any) and provide recommendations on improvement to the monitoring program if required; and
- Document monitoring results in an Annual Environmental Monitoring Report.

1.4 Scope of Work

The scope of work for this AEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the monitoring events in regard to the following tasks:

- Review previous reports and document the hydrogeological setting;
- Tabulate results of all monitoring data for water, dust samples and methane gas collected and provided by ALS and landfill gas flare temperatures collected by LGI, as required by the EPLs for the respective reporting period.
- Analysis and interpretation of all monitoring data (water, dust, methane gas, gas flare temperatures);
- Review all quarterly environmental monitoring reports from the 2023-2024 reporting period and available data from at least the last three (3) years;
- Identification of any deficiencies in environmental performance identified by the monitoring data, trends or environmental incidents, and identification of remedial actions taken or proposed to be taken to address these deficiencies; and
- Recommendations on improving the environmental performance of the facility including improvement to the monitoring program.

2 Site Identification

2.1 Site Identification

The Site is located at 44 Buckleys Road, Dunmore, NSW, 2529, legally defined as Lot 21 in Deposited Plan 653009 and Lot 1 Deposited Plan 419907. The Site is situated approximately three and a half (3.5) kilometres southwest of the Shellharbour town centre. The area's regional location is defined in **Figure 2-1** below. Details of the Site boundary and sampling points are provided in the Site Plan as **Figure 14-1**. The key features required to identify the Site are summarised in **Table 2-1**.

Table 2-1: Site Identification

Site	Description
Site name	Dunmore Recycling and Waste Depot
Street address	44 Buckleys Road, Dunmore, NSW 2529
Property description	-
(Lot / Deposited Plan)	21 / 653009 and 1 / 419907
Easting/Northing (GDA2020) (approximate centre of Site)	Zone 56H Easting: 302280 Northing: 6168169 (Approximate centre of Site)
Current owners	Shellharbour City Council
Current occupiers	Shellharbour City Council
Site area (total)	54.78 hectares
Site dimensions	Irregular shaped boundary. Please refer to **Figure 14-1.**
Areas excluded or inaccessible	Assessment was limited to the available data for the sample points listed in the EPL.
Local government area	Shellharbour City Council
Current zoning	RU1 Primary Production
Locality map	Albion Park 9028
Trigger for assessment	Reporting requirements of EPL 5984.
State or Local government statutory controls	• EPL 5984; • Contaminated Land Management Act 1997; • Environment Protection Act 1997; • Waste Avoidance and Resource Recovery Act (2001). • Work Health and Safety Act 2011; and • Work Health and Safety Regulations 2011.
Legal permissions to access the Site obtained or required	N/A. ENRS did not access the Site.
Consent of adjoining landowners and/or occupiers to access land (if required)	N/A. Not required for this scope of work.

Figure 2-1 Project Location

Source: Nearmap.com.au (cited 15/10/2024)

2.2 Surrounding Land Use

The current activities and operations on adjacent properties and the surrounding area include:

Table 2-2: Summary of surrounding land use

Direction	Land Use
North	Buckleys Road, commercial infrastructure and open grassland. Residential dwellings along the northwest border of the Site. Golf course further to the northeast.
East	Dunmore Resources and Recycling facility immediately to the east, bushland to the southeast.
South	Bushland, Rocklow Creek (300m from landfill activities). Further to Kiama Community Recycling Centre and Riverside Drive.
West	Bushland to the southwest, scattered trees immediately to the west and further to the Princes Highway. Boral Quarries complex beyond the Highway. Residential dwellings to the Northwest.

2.2.1 Sensitive Receptors

The nearest sensitive receptors are likely to include:

- Recreational users of the Minnamurra River estuary environs;
- Neighbouring and down gradient stakeholders;
- Ecological receptors - flora and fauna.
- Shallow soil, groundwater and stormwater – vertical and lateral migration of contaminants (if any) and connectivity with shallow groundwater, drainage waterways and nearby tributaries; and
- Down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE) near discharge zones.

2.3 Topography

A review of the current series Albion Park (90281N) 1:25,000 topographic map sheet was conducted to assess the regional topography and to identify potential runoff and groundwater controls in the region. Topography provides a useful indicator for groundwater controls including gradient and flow path.

The Site presents low topographic relief, remaining between approximately 3-5 mAHD across the entirety of the Site. The regional topographic gradient trends south-southeast towards Rocklow Creek and Minnamurra River.

2.4 Soil Landscape

Review of the Sites soil landscape was conducted with reference to the Kiama 1:100,000 soil landscape map. The Site was mapped as underlain by the Mangrove Creek Estuarine (mc) organic, black, massive sandy loam topsoil overlying loose bleached light grey sand with iron staining in the subsoil.

Landscape – vegetated tidal flats in estuarine areas on Holocene sediments. Relief <3 m. Slopes <3%. Mangrove open-scrub, saltmarsh herbland, sedgeland and low open-forest

Soils - deep (>150 cm) Siliceous Sands (Uc1.21) and Calcareous Sands (Uc1.11) and Solonchaks (Uc1.11) occur on mangrove flats. Humic Gley Soils (Uc4.53) and Solonchaks (Uc1.11) occur on saltmarshes.

Review of the online *Shellharbour City Council* Acid Sulphate Soil Risk Map indicates that the Site lies within a **Class 3** area, suggesting that works beyond 1 metre below the ground level (mbGL) have the potential to encounter Acid Sulphate Soils.

2.5 Geology

A review of the Site geology was undertaken with reference to the Wollongong 1:250,000 geological series sheet (Si56.9) and the Shellharbour-Kiama area coastal quaternary 1:50,000 geology sheet (See Figure 4). The Site is predominately underlain by the Quaternary alluvial deposits (Qal) characterised as Holocene backbarrier flat; marine sand, silt, clay, gravel and shell (Qhbf). The northern most corner of the site is intersected by the Gerringong Volcanics (Pbb) characterised by Latite. Based on the mapped geology, previous investigations and borehole logs, the Site infrastructure including the landfill cell is located within the alluvial deposits.

2.6 Hydrogeology

Groundwater resources in the area are expected to be associated with Shallow unconfined alluvial and unconsolidated systems, generally less than 20 m in depth with moderate to high transmissivity, variable water quality, and strongly controlled by rainfall recharge.

2.6.1 Existing Bores

A network of groundwater monitoring bores is installed at the Site to provide specific data on the quality and nature of groundwater. Given the spatial distribution of the bores and disturbed ground condition expected within the land fill cell, groundwater contours could not be accurately mapped.

A review of the NSW Office of Water (NOW) existing bore records was conducted to develop the conceptual understanding of regional groundwater conditions, including aquifer depths, yields, water quality, and distribution. A search of the Bureau of Meteorology Australian Groundwater Explorer groundwater database identified a total of eighty-eight (88) registered bores within one and a half (1.5) kilometres of the Site (see Figure 5). Registered bores in the area are predominantly associated with the Landfill Site and with the quarry complex (Boral Site) to the west of the EPL Site. The majority of bores are registered for monitoring purposes, excluding a single well (GW044447), which is registered for stock and domestic purposes. The stock bore is located approximately one (1) kilometre to the north of the Site, on the western side of the Princes Highway, which is considered to be up gradient of the Site and not in direct hydraulic connectivity. Registered bore depths are between 1.25 m and 22 m. Bore records indicate shallow unconsolidated aquifer systems.

2.6.2 Flow Regime

Previous reports (Environmental Earth Sciences, 2018) have identified that groundwater flows vary across the Site, but the general trend is south, towards Rocklow Creek.

Based on the unconfined nature of the aquifers, the shallow groundwater flow is inferred to mimic topography with low to moderate hydraulic gradients flowing towards the south.

The Site and adjoining land, was largely unsealed with potential for local recharge from rainfall infiltration. Likely discharge areas are predominantly to the south and east of the Site including swamps and Rocklow Creek. The waterbodies surrounding the Site are recognised as State

Environmental Planning Policy No.14 (SEPP14) registered wetlands and Proximity Areas for Coastal Wetlands border the eastern, southern and western boundaries of the Site.

2.7 Surface Water

The Site topography indicates that surface water flow will generally trend to the east towards off Site wetlands and southeast towards Rocklow Creek. These present the primary regional drainage structures for natural surface water and runoff. A series of stormwater infrastructure is present at the Site which is expected to capture run off. Infrastructure includes but not limited to; stormwater drains; sedimentation ponds; levee banks; collection and diversion drains; and leachate dams.

3 Assessment Criteria

ENRS have adopted the most appropriate criteria in accordance with current state and national guidelines. Where available, Australian and NSW EPA endorsed guidelines have been referenced in preference to international standards.

3.1 Water Quality Guidelines

Nationally developed guidelines are provided in the National Water Quality Management Strategy (NWQMS): Guidelines for Groundwater Protection in Australia (ARMCANZ & ANZECC;2013). The relevant criteria to protect environmental values are provided in **Table 3-1**:

Table 3-1: Water Quality Assessment Criteria

Environmental Value	Relevant Guideline
Ecosystems / Health Screening Levels	• ANZG (2018) (Australian and New Zealand Guidelines for Fresh and Marine Water Quality); • ASC NEPM (2013); and • Health Screening Levels for Petroleum Hydrocarbons in Soil & Groundwater (CRC CARE, Sept. 2011)
Drinking Water	• Australian Drinking Water Guidelines (ADWG)

3.1 Groundwater & Surface water Assessment Criteria

The ANZG (2018) provide default guideline values (DGVs) for four (4) levels of protection categorised by the percent of species possibly affected, being 80%, 90%, 95% or 99% of species. Where DGVs are not available reference is made against the ANZECC (2000) Trigger Values (TV). The NSW Office of Water (DECCW;2007) endorsed groundwater management guidelines recommend assessment for aquatic ecosystems based on the 95 per cent of species level of protection. This assessment has adopted the assessment criteria considered most appropriate for the contaminants of concern based on the Site's EPL and results provided by ALS. The adopted TV for the Site Assessment Criteria (SAC) are summarised in **Table 3-2** below.

Table 3-2: Groundwater & Surface Water Assessment Criteria

Analyte	Units	Fresh Water[A]	Marine Water[A]	Drinking Water[B]	
				Health	Aesthetic
Chloride	mg/L	-	-	-	250
Calcium	mg/L	-	-	-	-
Magnesium	mg/L	-	-	-	-
Sodium	mg/L	-	-	-	180
Potassium	mg/L	-	-	-	-
Manganese	mg/L	1.9	-	0.5	0.1
Total iron	mg/L	-	-	-	0.3
Dissolved iron	mg/L	-	-	-	0.3
Fluoride	mg/L	-	-	1.5	-
Ammonia as N[C]	mg/L	0.91 (pH 8)	0.91 (pH 8)	-	0.5
Nitrate as N	mg/L	0.7	-	50	-
Nitrite as N	mg/L	-	-	3	-
Total Organic Carbon	mg/L	-	-	-	-
Bicarbonate alkalinity as CaCO3	mg/L	-	-	-	-
Total alkalinity as CaCO3	mg/L	-	-	-	-
Sulfate as SO4 - turbidimetric	mg/L	-	-	-	250
Dissolved Oxygen - % Saturation (surface water only)	%	85-110%	-	-	-
Suspended Solids (SS) (surface water only)	mg/L	-	-	-	-
Turbidity (surface water only)	NTU	-	-	-	5
pH	pH	6.5-8.5		6.5-8.5	6.5-8.5
Electrical Conductivity	µS/cm	2200	-	-	-

Table notes:
Criteria is only provided for the analytes test by ALS and listed within EPL 5984.
A: Investigation levels apply to typical slightly-moderately disturbed systems. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions.
B: Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2011).
D. Criteria for ammonia. See Section 3.1.1:

3.1.1 Ammonia Assessment criteria

In addition to the default TV of 0.91mg/L (pH 8) for ammonia, Table 3.3.2 of the ANZECC (2000) also provides stressor values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems. The table provides a stressor guideline for ammonia of **0.2mg/L** at pH 8 for lowland rivers. For the purposes of this assessment, the value has been applied to all water samples, excluding the leachate tank.

pH specific ammonia TVs. Additional sample point specific pH dependant trigger values for total ammonia were also adopted when a sample was outside of 8 pH units. Sample specific values were

based on Table 8.3.7 of the ANZECC (2000). The additional criteria and results are presented in Table 14-5 to Table 14-8 attached.

3.2 Dust Deposition Assessment Criteria

Criteria for collection and assessment of dust deposition concentrations are provided within the Australian standard AS3580.10.1 - Methods for sampling and analysis of ambient air; method 10.1-Determination of particulate matter - Deposited matter - Gravimetric method. AS3580.10.1 provides an acceptable level of 4 g/m2/month.

3.3 Surface Methane Gas Assessment Criteria

The NSW EPA Solid Waste Landfill Guidelines 2nd Edition (2016) provides sampling methodologies and threshold for surface methane gas concentrations at landfill sites. The acceptable threshold for capped landfills is 500 parts per million (ppm) at 5 cm above the capping surface.

3.4 Gas Accumulation Assessment Criteria within Enclosed Structures

The NSW EPA Solid Waste Landfill Guidelines 2nd Edition (2016) provides sampling methodologies and threshold gas levels to ensure that gas is not accumulating within enclosed structures on or within 250m of deposited waste or leachate storage. The acceptable threshold for 1% (volume/volume).

4 Data Quality Objectives (DQO)

If sampling is conducted, Data Quality Objectives (DQO) are required to define the quality and quantity of data needed to support management decisions. The process for establishing DQO's is documented in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC;2013).

4.1 Step 1: State the problem

The Site is currently operating as an active landfill and requires regular environmental monitoring in accordance with the EPL 5984.

4.2 Step 2: Identify the decision/goal of the study

The primary goals / objectives of the investigation program were to:

- Meet the environmental monitoring requirements of Sites EPLs; No. 5984 and 12903;
- Assess and analyse the environmental monitoring data for the Site against NSW EPA endorsed criteria;
- Identify trends of the environmental monitoring data over the reporting period;
- Identify any on-site or off-site impacts associated with operation of the Site;
- Advise SCC if the current environmental monitoring program is providing adequate information to identify potential environmental impacts from existing operations (if any) and provide recommendations on improvement to the monitoring program if required; and
- Document monitoring results in a Quarterly Environmental Monitoring Report.

4.3 Step 3: Identify the information inputs

The provided results shall be used to identify any risks to the sensitive receptors or change in site conditions. The following inputs were required:

- Representative environmental samples;
- Measurements of environmental parameters;
- Comparison of the parameter results against the adopted Site Assessment Criteria (SAC);
- The completion of an Quarterly Environmental Monitoring Report.

4.4 Step 4: Define the study boundaries

The assessment was limited to sampling locations listed in EPL 5984. As listed in **Appendix A** and depicted in **Figure 14-1** - **Figure 14-2**.

4.5 Step 5: Develop the analytical approach (decision rule)

The site information and results obtained from this assessment scope will be compared against the NSW EPA endorsed SAC documented in **Section 3** with considerations of the land use and nearby receptors. The decision rule process is defined by the following:

- QA/QC indicate the results are reliable;
- Laboratory Practical Quantitation Limits (PQL) or Limits of Reporting (LOR) are less than the SAC; and
- Results meet the adopted SAC and/or are within background levels and regulatory criteria.

4.6 Step 6: Specify performance or acceptance criteria

To ensure the quality of the environmental data collected during the assessment, detailed quality assurance and quality control (QA/QC) measures will be applied by ALS. The QA/QC measures will be followed from the inception of the project, during field sampling, laboratory analysis of samples and data reporting. The QAQC measures understood to have been adopted by ALS are documented in detail below within **Table 5-1**.

4.7 Step 7: Develop the plan for obtaining data

The seventh and final step involves identifying the most effective sampling and analysis design for generating the data that is required to satisfy the data quality objectives. The required sampling program is based on and accounts for the following key points:

- Requirements of Sites EPLs; No. 5984 and 12903;
- The results will be compared against the adopted SAC for the proposed land use.

The indicators (DQI) used to identify that data obtained and provided by ALS has been done so in a way which meets project data quality objectives (DQO) summarised below.

Table 4-1: Summary of Data Quality Objectives (DQO)

DQO	Evaluation Criteria
Documentation completeness	• Completion of field records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratories.

DQO	Evaluation Criteria
Data comparability	• Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory using NEPM endorsed procedures.
Data representativeness	• Adequate sampling coverage of all required EPL sample points.
Precision and accuracy for sampling and analysis	• Use properly trained and qualified field personnel and achieve laboratory QC criteria. • Blind field duplicates to be collected at a minimum rate of 1 in 20 samples. • RPD's to be less than 30% for inorganic and 50% for organic analyses. • Rinsate samples not considered necessary as all PCoC measured by the lab were assumed to be present at the site. • Disposable single use items used for the collection of samples.

5 Sampling Methodology

Field sampling was conducted by ALS Environmental (Wollongong) as commissioned by SCC on quarterly basis. ENRS understands that sampling was conducted in accordance with ALS sampling protocols with reference to current industry standards and Code of Practices. The following sub-sections provide a summary of the sampling methodologies.

Monitoring frequency is defined by the EPL's and is designed to capture necessary site data to support assessment of Site conditions (quarterly and annual), any long-term trends or overflow events. Monitoring is conducted quarterly and annually for selected analytes with additional overflow and event-based sampling triggered by Site conditions.

5.1 Water Sampling

5.1.1 Location of Water Monitoring Points

Groundwater and surface water monitoring requirements are defined by the EPL No. 5984, as provided in Appendix A. The water sampling regime includes; five (5) surface waters, one (1) located onsite and four (4) located off-site; twelve (12) groundwater monitoring wells surrounding the landfill operations; and one (1) leachate point. Sampling locations are illustrated in Figure 2 attached.

5.1.2 Depth to Water

Prior to sampling, the depth to the groundwater table was measured from the top of casing (TOC) using a water dipper and clear disposable bailer. The bores were inspected for the presence of hydrocarbon and the thickness of any LNAPL was measured visually in clear disposable bailers. No LNAPL was reported on field sheets provided by ALS.

5.1.3 Sample Collection

Sampling is conducted independently by ALS Environmental under contract with SCC. Chain of Custody records and field sheets are provided in Appendix D. ENRS understand sampling was conducted in accordance with ALS sampling protocols.

5.1.4 Groundwater Sampling

Groundwater wells were sampled in order of distance from any areas of known contamination to ensure that lower contaminated wells are sampled before likely higher contaminated wells. Groundwater bores were purged prior to sampling by removing at least three (3) well volumes with samples being collected using clear disposal bailers or low flow parameter stabilisation methods applied with field sheets provided to document pumping volumes and field parameters. Post sampling all samples were sealed in laboratory-prepared sampling containers appropriate for the analysis.

Surface water samples were collected as 'grab samples' from the midpoint of the source at mid-depth.

Post flushing, leachate samples were sampled from a tap on the discharge line directly into purpose specific, pre preserved sample containers.

All samples were stored on ice immediately after their collection and transported to the laboratory under Chain of Custody (CoC) documentation.

Any loss of volatile compounds was kept to a minimum by employing the following sampling techniques:

- Minimal practical disturbance during sampling;
- Samples placed in sample containers as soon as possible;
- Sample containers contain zero headspace;
- Samples placed directly on ice and transported to the laboratory as soon as possible; and
- Employing the most appropriate analytical method to minimise volatile losses at the laboratory.

5.1.5 Field Testing

Field testing was conducted during bore purging and sampling to record physical water parameters. A multi-probe water quality meter was used to measure the following parameters:

- Oxygen Reduction Potential (ORP, representing redox).
- Electrical Conductivity (Salinity - EC);
- Temperature; and
- pH (Acidity).

5.2 Dust Deposition Sampling

Measurement of dust deposition was carried out in accordance with the Australian Standard AS3580.10.1 (2016). This Australian Standard provides a mean of determining the mean surface concentration of deposited matter from the atmosphere.

Dust collection gauges were set up for a one (1) month periods at during each quarterly sampling event. A total of four (4) dust monitoring locations were considered adequate to assess site conditions.

5.3 Surface Methane Gas Monitoring

The concentration of methane gas (in units of ppm) at the Site was carried out in accordance with EPA Guidelines Solid Waste Landfill 2nd Edition 2016. On the day of sampling the wind speed was

below 10 km/hr. Testing was conducted using a calibrated LaserOne portable gas monitor specifically designed for landfill gas monitoring. A calibration Certificate is provided in Appendix F.

One field technician commenced data collection along transect lines in a grid pattern across the landfill surface at 25-metre spacings. A site plan depicting the sampled transect line is provide in Figure 3. Transects were recorded using a Magellan SporTrak GPS. The concentration of methane gas was measured at a height of 5 cm above the ground in areas with intermediate or final cover over the emplaced waste.

5.4 Gas Accumulation Monitoring in Enclosed Structures

The concentration of methane gas (in units of percent volume/volume) inside all enclosed structures within 250m of emplaced waste or leachate storage facility at the Site was carried out in accordance with EPA Guidelines Solid Waste Landfill 2nd Edition 2016. On the day of sampling testing was conducted using a calibrated LaserOne portable gas monitor specifically designed for landfill gas monitoring. A calibration Certificate is provided in Appendix F.

The internal methane concentrations for each enclosed structure were recorded by a field technician. A site plan depicting the location onsite of each structure provided in Figure 3. Any depressions or surface fissures away from the sampling grid were also investigated.

5.5 Laboratory Analysis

ALS, a NATA accredited laboratory, was contracted by SCC to undertake the sample analysis in accordance with current standards. Laboratory QA/QC results are detailed in the Laboratory reports contained in the appendices section of this report.

5.6 Flare Monitoring

Landfill gases (LFG) are formed through bacterial action on emplaced waste and are a normal by-product of Landfilling operations. Landfill gas is a mixture of many different gases, typically its major components include methane and carbon dioxide. Smaller concentrations of nitrogen, oxygen, ammonia, sulphides, hydrogen, carbon monoxide, and nonmethane organic compounds (NMOCs) and Volatile Organic Compounds (VOC's) may also be present.

When operated efficiently the use of a gas flare to burn landfill gas can significantly reduce emissions of methane, NMOCs and VOC's.

The flare was monitored, maintained and operated by LGI LTD. Copies of LFG reports for the relevant reporting period are included as Appendix G.

5.7 QAQC

The Quality Assurance and Quality Control (QA/QC) protocols for the sample program conducted by ALS are summarised in **Table 5-1**.

Table 5-1: Summary of QAQC for Sample Program

Protocol	Description
Sampling Team	Site personnel comprised only experienced and qualified environmental professionals trained in conducting site contamination investigations.

Sample Method	Samples obtained in laboratory prepared containers with preservatives appropriate for the required analysis.
Calibration	Equipment calibration certificates for each sampling event.
Sample Equipment	All sample equipment disposed or decontaminated between sample sites.
Field Screening	Visual and manual inspection of sample materials for potential contamination recorded on field sheets.
Chain of Custody Forms	All samples logged and transferred under appropriately completed Chain of Custody (COC) forms with Sample Receipts issued by the laboratory.
Blind Field Duplicate	At least one (1) blind field duplicate collected per 20 samples and submitted for analysis accompanied by COC forms.

6 Water Quality Results

Laboratory results for groundwater and surface water were provided to ENRS for tabulation and comparison with relevant EPL assessment criteria. A summary of results is provided in Table 14-1 - Table 14-8 with comparison against the relevant Site Assessment Criteria (SAC). The laboratory certificates of analysis are provided in Appendix B, Appendix C, Appendix D and Appendix E.

6.1 Overflow Results

ENRS understands that four (4) overflow event occurred during the 2023-2024 annual monitoring period. Overflow water samples were collected by ALS at the SWP1 overflow point (EPA Point 1). The samples were analysed for pH and total suspended solids (TSS) as specified within Section 5 of EPL5984. Results generally reports concentrations of analytes below the SAC as listed in Table 6-1 below. NATA accredited laboratory certificates of analysis and chain of custody documentation are provided within Appendix C.

Table 6-1: Summary of Overflow Events

Sample Date	pH	TSS	Comment
20/12/2023	7.7	<5 mg/L	<SAC Satisfactory.
6/02/2024	7.6	<5 mg/L	<SAC Satisfactory.
18/03/2024	7.5	6 mg/L	<SAC Satisfactory.
7/06/2024	7.7	61	Minor exceedance for TSS above the SAC of 50mg/L.

6.2 Physical Indicators

6.2.1 Groundwater Depth

The measured depth to groundwater remained relatively consistent through the monitoring period with a low degree of variance. The Site was charactered by a shallow water table of generally less than 5.0 mbgl. The depth to water was measured between:

- Quarter 1 December 2023: 2.19 mbgl (BH-18) and 21.2 mbgl (BH-15);

- Quarter 2 March 2024: 0.73 mbgl (BH-15) and 4.82 mbgl (BH-14);
- Quarter 3 June 2024: 0.75 mbgl (BH-15) to 4.33 mbgl (BH-18); and
- Quarter 4 September 2024: 0.69 mbgl (BH-15) and 4.57 mbgl (BH-18).

6.2.2 Salinity

Salinity is reported by the laboratory as either Electrical Conductivity (EC) or Total Dissolved Solids (TDS). The ANZECC guidelines document a conversion ratio of 0.68 mg/L = 0.68 EC (µS/cm). Table 3.3.3 of the ANZECC (2000) guidelines document default TV for EC in lowland freshwater rivers between 125 µS/cm - 2,200 µS/cm (~1,500 mg/L). Marine waters may be characterised by an EC between 35,000 µS/cm - 50,000 µS/cm.

Groundwater

During the annual monitoring period, salinity in groundwater samples reported a relatively low degree of variance between each quarterly sampling event. The Site was generally characterised by freshwater EC values in the upgradient northern portions of the Sites, tending to become more saline towards Rocklow Creek, being a tidal river system. Results for groundwater were reported between 11 µS/cm (BH18 Q1, BH19r Q2-3) and 994 µS/cm (BH1c Q1). The results were all considered to be in range of historical values.

Surface Waters

Surface water samples collected from Rocklow Creek reported EC values between 67 µS/cm (SW_Up Q1) and 11,200 µS/cm (SWC_Down 2 Q2). EC values were expected to be elevated and fluctuate due to Rocklow Creek being a tidal system.

Results for onsite surface water location SWP1 was reported between 526 µS/cm (Q1) and 1,340 µS/cm (Q4) which was in range of historical data.

Leachate

Leachate salinity was reported between 3,520 µS/cm (Q2) and 8,410 µS/cm (Q1) which was in range of historical data. Salinity in leachate is expected to vary significantly with leachate concentration and stormwater dilution.

6.2.3 Dissolved Oxygen

Levels of Dissolved Oxygen (DO) were measured in the field for surface waters only. DO reflects the equilibrium between oxygen-consuming processes and oxygen-releasing processes. DO can initiate redox reactions resulting in the uptake or release of nutrients. Low DO concentrations can result in adverse effects on many aquatic organisms which depend on oxygen for their efficient metabolism. At reduced DO concentrations many compounds become increasingly toxic, for example Zinc, Lead, Copper, phenols, cyanide, hydrogen sulphide and Ammonia.

The ANZG (2018) guidelines Table 3.3.2 outlines a range between 85% to 110% saturation for low land rivers. Assuming a water temperature of 18°C this is equivalent to approximately 7-11 mg/L or ppm. DO is reported by the laboratory in mg/L which be converted to a percentage.

Surface Waters

Dissolved Oxygen within onsite surface water location SWP-1 ranged between 3.53mg/L or 38.6% (Q2) and . 12.0mg/L or 131.9% (Q1). The results were outside of the TV and consistent with historical data.

Results for DO within offsite surface water locations within Rocklow Creek ranged from 3.39 mg/L or 37.1% (SWC_ 2 Q2) and to 10.4 mg/L or 113.7% (SWC_2 Q4). The results were generally consistent with the historical data.

Leachate

Dissolved oxygen within leachate tank LP1 ranged between 1.27 mg/L or 13.9% (Q3) and 3.4 mg/L or 37.2% (Q1). The results were generally in range of the historical data.

6.2.4 pH

pH is a measure of hydrogen activity. pH determines the balance between positive hydrogen ions (H+) and negative hydroxyl ions (OH-) and provides a test of water acidity (low pH) or alkalinity (high pH). Most natural freshwaters have a pH in the range 6.5 to 8.0. Changes in pH may affect the physiological functioning of biota and affect the toxicity of contaminants. Both increases and decreases in pH can result in adverse effects, although decreases are likely to cause more significant problems. Low pH indicates acidic conditions which may increase the mobility of heavy metals, whilst high pH indicates alkaline conditions which may also generate Ammonia. Previous investigations of other regional Landfill Sites in the Illawarra-Shoalhaven (Forbes Rigby;1996) report regionally acidic groundwater with low readings in the range of 4.3 pH associated with silica saturation and oxidation of accessory marcasites grains (iron sulphide).

Groundwater

Results pH in groundwater was reported between 6.6 (BH18 Q1, and BH12r, BH22 Q3) and 7.60 (BH18 Q2). The results were relatively neutral and within the SAC. No exceedances were recorded. The results were considered to be satisfactory and within range of historical data.

Surface Water

Results for pH in surface waters of Rocklow Creek reported neutral and constant conditions between 7.2 and 7.50. The results were within the SAC and range of historical values.

Leachate

The pH of leachate tank LP1 ranged between 8.10 and 8.2 which was within the range of historical values.

6.2.5 Total Suspended Solids (TSS)

TSS provides a measure of turbidity reported as the mass of fine inorganic particles suspended in the water. Measurement of TSS provides a valuable indication of the sediment and potential nutrient load. Elevated TSS decreases light penetration whilst phosphorus is absorbed onto sediment surfaces. TSS was measured for surface water sample points only.

Results for TSS in Rocklow Creek samples were generally reported below the LOR of <5mg/L. A result of 10mg/L was reported in sample SWC_Up (Q1). The results were within range of historical values.

Results for TSS in onsite SWP1 were reported between <5 mg/L and 12 mg/L which was within range of historical values.

6.3 Inorganic Analytes

Water samples were analysed for select nutrients including Ammonia, Ammonium, Nitrate and Nitrite. The most bio-available forms of Nitrogen are Ammonium (NH4+) and Nitrate (NO3-). Ammonia is an oxygen-consuming compound and is toxic to aquatic biota at elevated concentrations. Ammonia toxicity increases under low oxygen levels and higher pH.

6.3.1 Ammonia

Groundwater

Results for ammonia in groundwater over the monitoring period reported exceedances above the ecological stressor value of 0.2 mg/L, 95% TV of 0.91 mg/L and pH modified TV's in all samples. Results were considered to be significantly above the SAC and within range of the previous values.

Surface Water

Ammonia in onsite surface water dam SWP-1 ranged between 0.02 mg/L (Q4) and 2.1 mg/L (Q3) which was within range of historical values.

Ammonia concentrations in Rocklow Creek generally reported minor detections below the SAC. Minor concentrations above the ecological stressor value of 0.2 mg/L were reported in Quarter 1 and Quarter 2, and Quarter 4, up to a maximum result of 0.8mg/L (SWC_Down Q4). Results were below the 95% TV and pH modified SAC. The results were within range of historical data.

Leachate

Ammonia in leachate tank LP1 ranged between 0.73 mg/L (Q2) and 330 mg/L (Q1). Results were generally above the SAC which is charact eristic of untreated leachate. The results were within range of historical values.

6.3.2 Nitrate

Groundwater

Results for Nitrate in groundwater samples varied throughout the 2023-2024 monitoring period. Various exceedances above the SAC of 0.7 mg/L were reported in monitoring wells BH3, BH13, BH14, BH15, BH21. The maximum results was 52.3 mg/L (BH21 Q1). All other monitoring wells reported satisfactory results below the SAC. The results were within range of historical data.

Surface Water

Nitrate concentrations for all surface water samples for the 2023-2024 monitoring period were reported below the SAC and considered satisfactory.

Leachate

Nitrate concentrations for leachate tank LP1 were reported between the LOR of <0.1 mg/L and 8.53 mg/L (Q2). Increased concentrations of nitrate may be characterised of untreated leachate. The results were reported within range of historical values.

6.3.3 Nitrite

Results for nitrate in all groundwater, surface water and Leachate Tank LP1 were all reported below the SAC. The results were reported within range of historical values

6.4 Anions

6.4.1 Chloride

The results for chloride in groundwater across the Site varied throughout the 2023-2024 monitoring period. Results were reported between 11 mg/L (BH19r, Q3) and 994 mg/L (BH1c Q1). Onsite surface water dam SWP1 reported concentrations of chloride between 67 mg/L (Q1) and 183 mg/L (Q3). Chloride within Leachate Tank LP1 was reported between 591 mg/L (Q3) and 1,570 mg/L (Q1).

Elevated chloride results were measured within Rocklow Creek which may be characteristic of A marine tidal river system. In comparison, upgradient groundwater results reported slightly lower chloride concentrations. Results were generally consistent with historical data.

6.4.2 Fluoride

The results for fluoride in groundwater, surface water and leachate tank were all reported below the SAC and were generally consistent with the historical data.

6.4.3 Sulphate

Results for sulphate in groundwater generally reported satisfactory results that were in range of the historical data. Higher sulphate results were reported in Rocklow Creek, which may be characteristic of a marine tidal river system.

6.4.4 Total Alkalinity

Surface Water

Results for total alkalinity were consistent with historical data and considered to be satisfactory.

6.4.5 Bicarbonate Alkalinity

Bicarbonate alkalinity in groundwaters were consistent with historical data and considered to be satisfactory for the 2023-2024 monitoring period.

6.5 Metals

6.5.1 Manganese (Total Mn)

Groundwater

Results for manganese in all groundwater, surface water and leachate tanks samples were reported below the 95% TV of 1.9 mg/L. Results were reported between 0.03 mg/L (BH19r Q3) and 0.863 mg/L (BH12r Q2). The results were generally consistent with historical data.

6.5.2 Iron (total Fe)

Total iron was measured in surface water and leachate tank LP1 only. Results for total iron ins surface waters were reported between 0.11mg/L (SWP1 Q3) and 1.48 (SWC_Down Q1). Total iron in leachate tank LP1 was reported between 4.06 mg/L (Q4) and 7.49 mg/L (Q3) The results were generally consistent with historical data.

6.5.3 Iron (Dissolved Fe)

Concentrations of dissolved iron in groundwater were reported results between the LOR of <0.05 mg/L and 44.6 mg/L (BH22 Q1). The results were generally consistent with the historical data.

6.6 Calcium

Results for calcium in groundwater for the 2023-2024 monitoring period reported results between 46 mg/L (BH19r Q3) and 237 mg/L (BH21 Q1).

Results for calcium in Rocklow creek surface water samples were reported between 52 mg/L (SWC_Up Q1) and 286 mg/L (SWC_Down 2 Q1).

Results for calcium in onsite dam SWP1 were reported between 32 mg/L (Q1) and 72 mg/L (Q4). Calcium in leachate tank LP1 was reported between 51 mg/L (Q1) and 96 mg/L (Q2).

6.7 Potassium

Results for potassium in groundwater, surface water and leachate tank LP1 were all reported within range of historical data.

6.8 Organic Analytes

6.8.1 Total Organic Carbon

Total Organic Carbon (TOC) provides a measure of the total concentration of organic material in a water sample. TOC is typically higher in surface water than groundwater. However, high TOC is also characteristic of leachate from landfill. TOC provides a marker for biological activity associated with contaminant degradation and can be used to delineate contaminant plumes. TOC influences geochemical processes by:

- acting as proton donors/acceptors;
- providing pH buffering;
- participating in mineral dissolution/precipitation reactions; and
- providing carbon substrate for microbe-based biodegradation.

Results for TOC in groundwater and surface water samples were generally low and consistent with historical data.

TOC in leachate tank LP1 was reported between 79 mg/L (Q4) and 323 mg/L (Q3) which was generally consistent with historical data.

7 Dust Gauge Results

The below table provides the results of the dust depositions results. A total of four (4) dust collectors were onsite for one (1) month for each quarterly sampling event. Sampling was conducted in general accordance with AS3580.10.1. Dust gauge locations are provided in **Figure 14-1** attached. A summary of the results is provided in **Table 7-1** below.

Table 7-1: Summary of Dust Gauge Results

Quarter	Sample ID	Guideline Criteria (g/m2/month)	Total Insolvable Matter (g/m2/month)	Comment
Quarter 1 2/11/2023 – 1/12/2023	DDG1	4	0.8	Below SAC
	DDG2		0.8	Below SAC
	DDG3		1.4	Below SAC
	DDG4		**8.7**	**Above SAC**
Quarter 2 01/02/2024 -04/03/2024	DDG1		0.5	Below SAC
	DDG2		0.8	Below SAC
	DDG3		1.5	Below SAC
	DDG4		**5.3**	**Above SAC**
Quarter 3 3/05/2024 - 3/06/2024	DDG1		0.8	Below SAC
	DDG2		0.1	Below SAC
	DDG3		0.2	Below SAC
	DDG4		**5.1**	**Above SAC**
Quarter 4 02/08/2024 -03/09/2024	DDG1		0.4	Below SAC
	DDG2		0.5	Below SAC
	DDG3		**5.9**	**Above SAC**
	DDG4		3.8	Below SAC

Results for depositional dust sampling during the 2023-2024 Q1-Q4 monitoring periods generally reported levels of dust below the adopted assessment criteria of 4 g/m^2/month. However, four (4) exceedances were recorded across the annual period in sample locations DDG3 and DDG4 above the SAC of 4 g/m^2/month. The exceedances ranged between 5.1-8.7 g/m^2/month and were considered to be relatively minor. It is recommended that client reviews the potential sources of excess dust in areas proximal to DDG3 and DDG4 locations and continues to monitoring in accordance with EPL 5984.

8 Methane Monitoring Results

8.1 Surface Gas Methane

The surface gas monitoring for the 2023-2024 annual monitoring period DID NOT detect any levels of methane above the EPA license limits of 500 ppm. The results were considered satisfactory. A table of results is provided in **Appendix D**.

8.2 Gas Accumulation Monitoring in Enclosed Structures

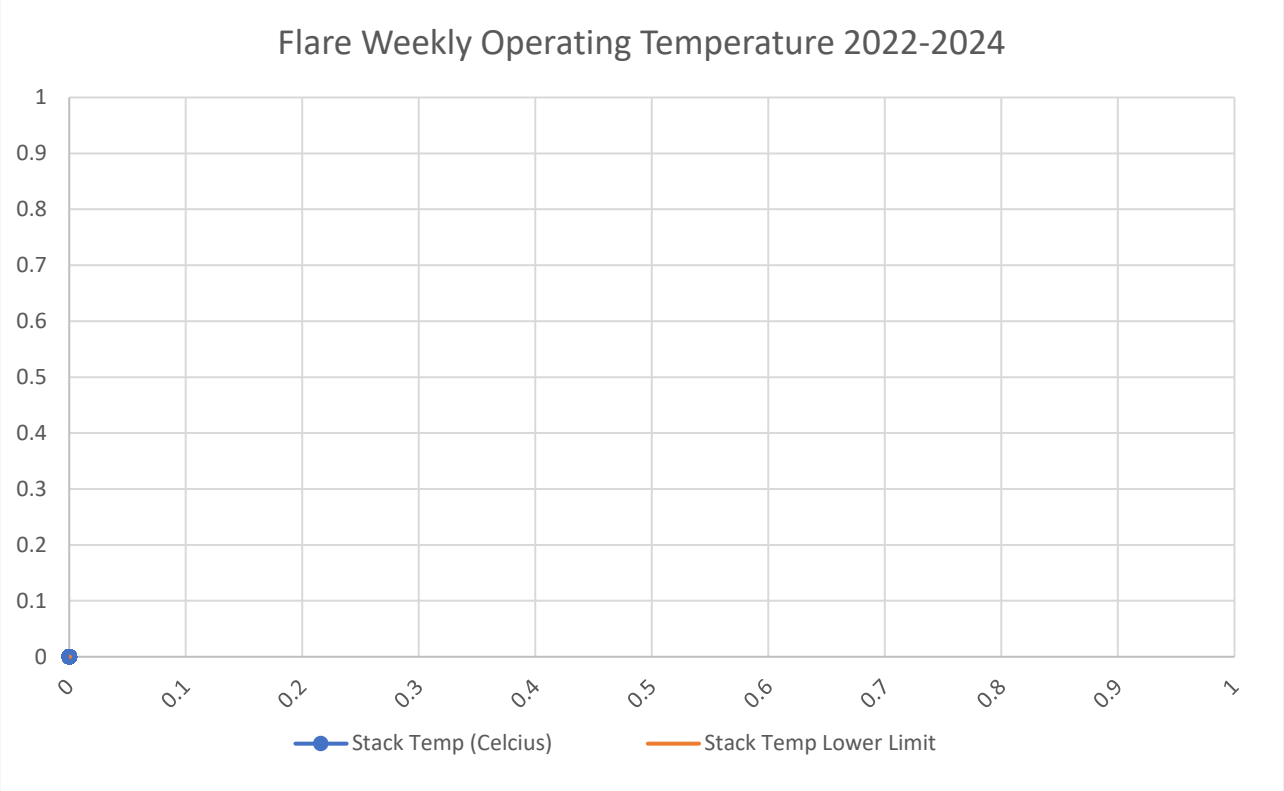
The internal methane testing for enclosed structures within 250m of the landfill during the 2023-2024 annual monitoring period DID NOT detect any levels of methane above the EPA license limits of 1% V/V. The results were considered satisfactory.

9 Flare Operations Results

Weekly average operating temperatures for the flare were supplied by LGI and displayed typical variation associated with a continuous process. Results are summarised in Chart 1 below. LGI Gas Flare reports included as Appendix G.

Weekly average operating temperatures for the 2023-2024 annual monitoring supplied by LGI displayed an average temperature of 567.9 degrees Celsius. A drop in stack temperature below the lower operation limit of 760 degrees as specified within EPL 5989 was detected on 21/12/2023 and continued until 9/08/2024. An increase in temperature above the minimal operational limit within Q4 monitoring period. Further information is documented within the LGI reports in Appendix G.

Chart 1: Weekly Flare Operating Temperatures October 2022 – September 2024



Notes: Data sourced from the LGI reports provided in Appendix G.

10 Quality Assurance/Quality Control Data Evaluation (QAQC)

10.1 Field Sampling QAQC

ENRS understands that the sample program was completed in general accordance with the ALS standard operation procedures (SOP) which references current industry guidelines.

It was understood that the QAQC procedures and indicators for field sampling procedures within the SOP included items summarised in Table 10-1.

Table 10-1: Sampling QAQC Procedures

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Details of sampling team	X	X				☒	☐	☐	Tertiary qualified, LAA, consistent team.

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Reference to sampling plan/method, including any deviations from it – sampling and analysis quality plan	X					☒	☐	☐	Sampling in accordance with the SOP.
Any information that could be required to evaluate measurement uncertainty for subsequent testing (analysis)				X	X	☒	☐	☐	Field sampling records and chain of custody completed in full.
Decontamination procedures carried out between sampling events			X	X	X	☒	☐	☐	Equipment such as decontaminated between samples by washing with phosphate free detergent followed by rinsing with potable water. Re-use of sampling equipment was avoided, where possible. Single use deposable sampling equipment was the preferred method.
Logs for each sample collected, including date, time, location (with GPS coordinates if possible), sampler, duplicate samples, chemical analyses to be performed, site observations and weather/environmental (i.e. surroundings) conditions. Include any diagrams, maps, photos.		X	X			☒	☐	☐	Sampling field sheets were used as required.
Chain of custody fully identifying – for each sample – the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method, departure time from the site and dispatch courier(s) (where applicable)	X	X				☒	☐	☐	COC's completed in full.

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status			Procedures and performance
						Yes	No	N/A	
Field quality assurance/quality control results (e.g. field blank, rinsate blank, trip blank, laboratory prepared trip spike)				X	X	☒	☐	☐	Field QAQC analysed for chemical samples – field duplicate.
Sample splitting techniques – subsampling, containers/preservation (ensure unique ID for subsequent samples provided)			X			☒	☐	☐	Samples obtained in laboratory prepared sample containers appropriate for the analytes.
Statement of duplicate frequency			X	X		☒	☐	☐	Blind field duplicates collected at 1/20 frequency
Background sample results	X	X				☒	☐	☐	Reviewed against previous results from the last 3 years.
Field instrument calibrations (when used)				X	X	☐	☐	☒	Yes field equipment was calibrated prior to use.
Sampling devices and equipment	X	X				☒	☐	☐	Manual sampling with decontamination procedures and disposable equipment.
A copy of signed chain-of-custody forms acknowledging receipt date, time and temperature and identity of samples included in shipments	X	X				☒	☐	☐	COC's completed in full, final records from NATA laboratory attached to CoAs.

10.2 Laboratory QAQC

The QAQC procedures and indicators for laboratory analysis procedures are summarised in Table 10-2.

Table 10-2: Laboratory QAQC procedures

QAQC Indicator	Completenes	Comparability	Representativ	Precision	Accuracy	Status			Procedures and performance
						Yes	No	N/A	
A copy of signed chain-of-custody forms acknowledging receipt date, time and temperature and identity of samples included in shipments	X	X				☒	☐	☐	All samples were logged and transferred under appropriately completed Chain of Custody Forms.
Record of holding times and a comparison with method specifications	X	X				☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Analytical methods used, including any deviations	X	X				☒	☐	☐	Recorded in the CoA.
Laboratory accreditation for analytical methods used, also noting any methods used which are not covered by accreditation	X			X		☒	☐	☐	Recorded in the CoA.
Laboratory performance for the analytical method using inter-laboratory duplicates		X			X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Surrogates and spikes used throughout the full method process, or only in parts. Results are corrected for the recovery	X	X				☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
A list of what spikes and surrogates were run with their recoveries and acceptance criteria (tabulate)		X			X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Practical quantification limits (PQL)	X	X				☒	☐	☐	Recorded in the CoA. PQLs <SAC.
Reference laboratory control sample (LCS) and check results	X					☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Laboratory duplicate results (tabulate)	X				X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Laboratory blank results (tabulate)	X				X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Results are within control chart limits	X					☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.

QAQC Indicator	Completenes	Comparability	Representativ	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Evaluation of all quality assurance/control information listed above against the stated data quality objectives, including a quality assurance/control data evaluation	X	X	X	X	X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.

10.3 QAQC Discussion

A summary of the Data Quality performance and evaluation is summarised in **Table 10-3** below:

Table 10-3: QAQC and Data Evaluation Summary

Objective	Performance	Status
Documentation completeness	• Completion of field records; • Chain of Custody (COC) documentation; • Calibration certificates for equipment; • NATA Laboratory Sample Receipt Notification (SRN); and • NATA laboratory Certificate of Analysis (COA). • Sample Location Plans. • Sample field sheets.	✓
Precision & accuracy for sampling & analysis	• Use only trained and qualified field personnel; • Calibration certificates for field equipment; • Appropriate sampling and field techniques; • Decontamination procedures; • Achieve laboratory QC criteria; and • Achieve QAQC requirements for RPDs and Recovery	✓
Identify Anomalies	• No elevated results not expected by the CSM; • No labelling or sample management errors; • No laboratory analyses or reporting errors	✓
DATA completeness	• Sampling density comparison meets NSW EPA (1995) 'Sampling Design Guidelines' for or all potential contaminants of concern at all areas of environmental concern; and • Systematic and judgemental sampling to provide sufficient data representative of all AECs.	✓
Data comparability	• Use of appropriate techniques for the sampling, storage and transportation of sample media; • Use of NATA certified laboratory using NEPM endorsed procedures; and • Comparison with previous site information, if any.	✓

Objective	Performance	Status
Data representative ness	• Adequate sampling coverage at all points listed in the EPL. • Selection of representative samples from each sampling location; & • Analysis for PCoC. • Achieve laboratory QC criteria. • Achieve QAQC requirements for RPDs and Recovery.	✓

The laboratory was NATA accredited, and the Practical Quantitation Limits (PQL) also referred to as Limits of Reporting (LOR) were within the acceptable levels for the assessment criteria. Laboratory certificates of analysis provided in **Appendix C** indicate that for the samples collected during the scope of works, sampling techniques, transport procedures and laboratory analysis were satisfactory

In summary, the QA/QC indicators all complied with the ALS standards or showed variations that would have no significant effect on the quality of the data or the conclusions of this assessment. Based on the following conclusions it is therefore determined that, for the purposes of this study, the QA/QC results are valid, and ***the quality of the data is acceptable for use in this assessment:***

- The data was representative of site conditions;
- The data was complete with comprehensive records available from all field work undertaken, and all areas of concern sampled and analysed;
- The data was comparable for samples analysed at different times, and consistent with field observations; and
- The data was precise and accurate based on the laboratory achievement of relevant quality control criteria.

11 Annual Environmental Assessment

11.1 Monitoring Point Summary

Based on the results of field measurements and NATA laboratory results conducted by ALS, the following summaries were noted for the Annual 2023 - 2024 monitoring period;

- Groundwater monitoring wells located across the site reported elevated concentrations of key indicators of leachate above the site assessment criteria, specifically ammonia. Groundwater wells were located across the Site including upgradient, adjacent to and downgradient of the landfill cells. The elevated results were generally consistent with the available historical data;
- The leachate tank LP1 reported elevated results of key leachate analytes which was considered to be characteristic of untreated leachate;
- Onsite surface water dam SWP1 generally reported results within the Site Assessment Criteria;
- Offsite surface water of Rocklow Creek generally reported conditions characteristic of a tidal river system. Concentrations of key analytes associated with landfill leachate within the creek were generally reported below adopted the ecological protection trigger values. However, concentrations of ammonia were reported above the ecological stressor value on multiple occasions;
- Dust monitoring reported minor exceedances at the DDG3 and DDG4 locations throughout the annual monitoring period.

- Surface gas monitoring did not detect any methane above the allowable limit across the site surface transects or within onsite buildings;
- Fout (4) overflow events occurred at surface water dam SWP1 during the 2023-2024 annual monitoring period. Events occurred on the 20/12/2023, 06/02/2024, 18/03/2024 and 07/06/2024. Results were generally reported below the assessment criteria. A single exceedance during an for total suspended solids (TSS) was reported for the 7/06/2024 overflow event; and
- Review of the gas flare reports prepared by LGI reported gas flare temperatures below the minimum requirement of 760 degrees Celsius as specified within EPL 5984. A low temperature was measured throughout the Q1, Q2 and Q3 periods. Temperatures increased above the minimum operating temperature during the Q4 period.

11.2 Environmental Management

11.2.1 Landfill Operations

ENRS understand 'solid' waste (general solid waste putrescible and non-putrescible) landfill operations are ongoing at the Site. Landfill practices should be conducted in accordance with the Site's Landfill Environmental Management Plan (LEMP) and the EPA Solid Waste Landfill Guidelines (EPA; 2016).

11.3 Environmental Safeguards

Appropriate management actions are required to continue to prevent and detect potential groundwater and surface water pollution. The nearest sensitive receptors for any uncontrolled Site water and leachate include; areas of adjoining bushland; recreational users of the Minnamurra River estuary environs, down gradient stakeholders; and down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE).

It is recommended that any drainage and detention structures are inspected annually by a suitably qualified environmental professional to assess their structural integrity and identify the need for any maintenance (such as removal of deep rooted vegetation, sediment, and re-lining).

Access tracks to sampling points should be inspected and maintained prior to each quarterly sampling events.

Continue to review surface water and groundwater monitoring results from up and down gradient of the land fill cells and offsite sampling locations within Rocklow Creek.

Ensure the integrity of the landfill cap is maintained. This is to avoid additional surface infiltration during rainfall events and the release of landfill gasses. Continue to monitor surface methane gas in order to assess the capping integrity of the landfill cells.

11.4 Monitoring Program

The Site's EPL's and monitoring regime should be reviewed annually by SCC and the NSW EPA.

Review of the 2023-2024 Annual monitoring results indicated no significant change in environmental conditions at the Site. Key indicators of leachate were reported within the groundwater monitoring locations across the Site. Future sampling events should continue to monitor the key indicators of leachate within ground and surface waters, especially concentration of ammonia and nitrate.

Should monitoring continue to report any significant changes in analyte concentrations the need for additional monitoring locations should be reviewed, including additional groundwater monitoring bores both up and down gradient locations of areas with analytical exceedances.

It is recommended that water quality results from future monitoring rounds continue be forwarded to a suitably qualified environmental professional for review within the laboratory holding time to compare against relevant guidelines and identify any irregularities so that additional testing may be conducted within the sample holding time.

12 Conclusions

Based on the findings obtained during the 2023-2024 annual monitoring program the following conclusions and recommendations are provided:

- Shallow groundwater flow is expected to mimic topography with low hydraulic gradients flowing towards the south and southeast towards Rocklow Creek. Depth to groundwater was generally <5mBGL. The nearest sensitive receptors are likely to include; recreational users of the Minnamurra River estuary environs; down gradient stakeholders; and downgradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems near discharge zones;
- Groundwater throughout the annual monitoring period reported exceedances above the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within groundwater wells across the Site. The analytes were considered to be key indicators of leachate. The exceedances were within range of historical values with no significant changes in concentrations;
- Offsite sample locations within Rocklow Creek generally reported concentrations of analytes below the SAC. However, concentrations of ammonia were reported above the ecological stressor value on multiple occasions;
- Surface gas methane monitoring of the landfill cap reported satisfactory results all within the adopted assessment criteria;
- Methane levels of enclosed structures on or withing 250m of deposited waste or leachate storage were tested and found to be below the acceptable threshold for 1% (volume/volume) in all cases;
- Dust deposition gauges generally recorded satisfactory results below the guidelines provided in AS3580.10.1. Minor exceedances were reported in dust gauges DDG3 and DDG4 through the annual monitoring period. The potential source of the dust should be reviewed by the client. Monitoring should continue in accordance with EPL 5984 requirements;
- Gas Flare temperatures were reported below the required KPI of 760 degrees Celsius throughout the first three (3) quarters. An increase in temperature was reported within the fourth quarter;
- Based on the data reviewed for the 2023-2024 annual monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses were present within groundwater and consistent with the historical data;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional monitoring; and
- This report must be read in conjunction with the attached Statement of Limitations.

13 References

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14 Limitations

This report and the associated services performed by ENRS are in accordance with the scope of services set out in the contract between ENRS and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

ENRS derived the data in this report primarily from visual inspections, and, limited sample collection and analysis made on the dates indicated. In preparing this report, ENRS has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while ENRS believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

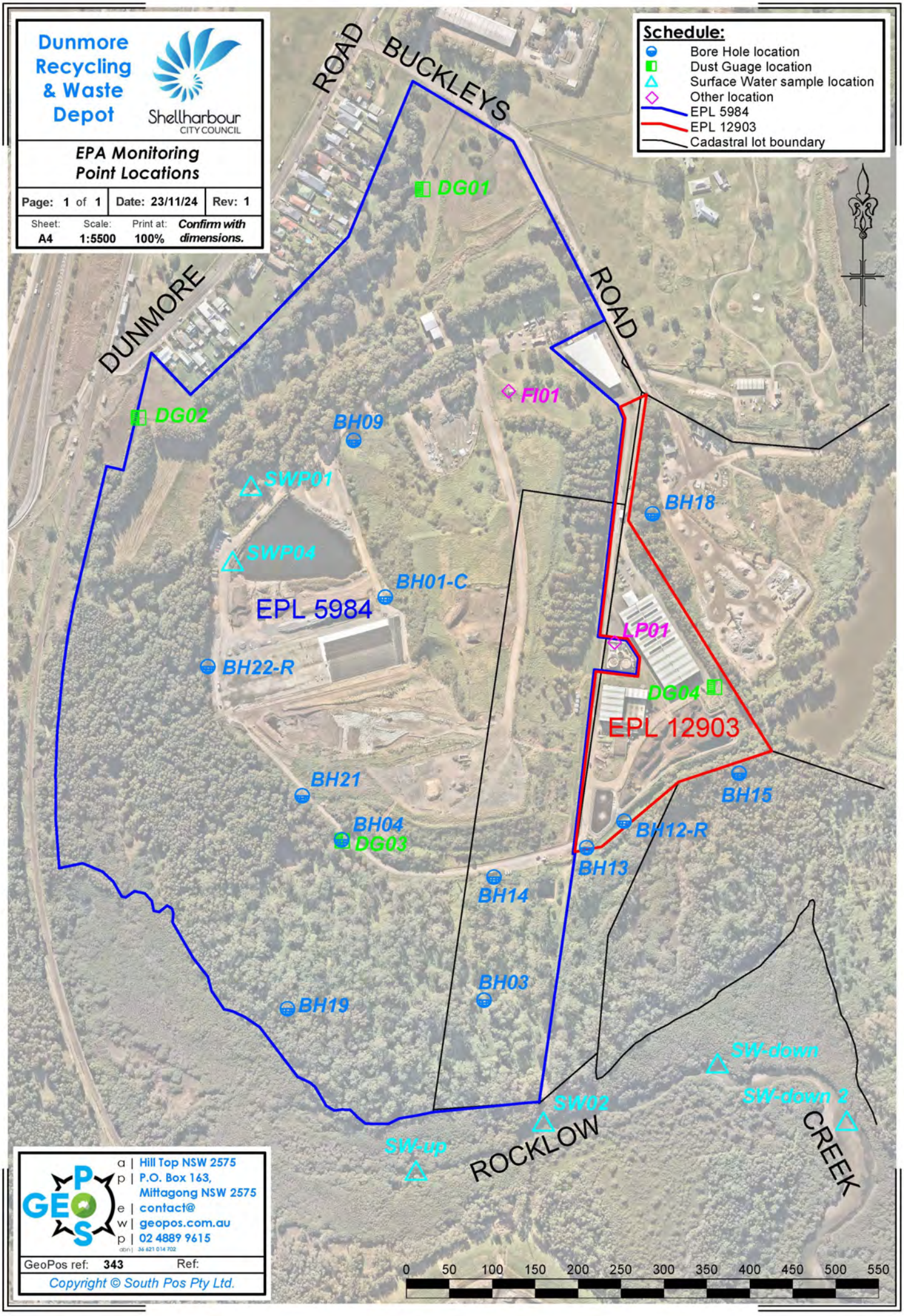
Limitations also apply to analytical methods used in the identification of substances (or parameters). These limitations may be due to non-homogenous material being sampled (i.e. the sample to be analysed may not be representative), low concentrations, the presence of 'masking' agents and the restrictions of the approved analytical technique. As such, non-statistically significant sampling results can only be interpreted as 'indicative' and not used for quantitative assessments.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, ENRS shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between ENRS and the Client. ENRS accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

FIGURES



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Client:	**Shellharbour City Council**	Drawn:	**PL**	Figure:	**3**
Project:	**ENRS0033**	Source:	**SixMaps**	Date:	**16/01/2020**
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW, 2529	Scale:	**NA**	Title:	**Surface Gas Sample transects**
		Status:	**Rev 1**		

TABLES OF RESULTS

TABLE 14-1: Total Concentration Results

Quarterly Water Monitoring Results - December 2023: Dunmore Recycling and Waste Depot

GILs -Trigger Values for Freshwater (Protection of 95% of Species) [A]					-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	-	0.7	-	-	-	-	-	-	-	-	6.5 - 8.5	2200	-	-	-	
GILs -Trigger Values for Marine Water (Protection of 95% of Species) [A]					-	-	-	-	-	-	-	-	-	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Australian Drinking Water Guidelines (2018)[C]				Health	-	-	-	-	-	0.5	-	-	1.5	-	3	50	-	-	-	-	-	-	-	-	6.5 - 8.5	-	-	-	-	
				Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	-	-	-	-	-	-	250	-	-	-	5	6.5 - 8.5	-	-	-	-	
Lab Report No.	Sample No.	Sample type	EPA No,	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Nitrite as N	Nitrate as N	Total Organic Carbon	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	pH	Electrical Conductivity (Non Compensated)	Temperature	Standing Water Level	Total Insoluble Matter	Comments
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	pH	µS/cm	°C	mbgl	mbgl	
				Laboratory PQL	1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	1	1	1	1	0.01	0.1	5	0.1	0.01	1	0.1	0.01	0.1	-
EW2305322001	BH1c	Groundwater	3	Dec 2023	994	125			220	0.11		12.00	0.3	348.00	0.01	< 0.01	153	2,780	2,780	< 20					7.00	7,840	25.0	3.19		-
EW2305322002	BH3	Groundwater	5	Dec 2023	118	146			26	0.09		1.39	< 0.1	9.99	0.24	14.00	11	358	358	120					7.10	1,110	18.0	3.12		-
EW2305322003	BH4	Groundwater	6	Dec 2023	64	125			22	0.12		3.15	< 0.1	2.42	0.01	0.36	11	367	367	103					7.30	894	18.4	4.25		-
EW2305322004	BH9	Groundwater	18	Dec 2023	387	186			83	0.85		0.12	0.4	173.00	< 0.01	< 0.01	100	1,800	1,800	< 20					7.20	3,620	18.3	3.19		-
EW2305322005	BH12r	Groundwater	17	Dec 2023	200	181			28	0.45		10.20	0.2	4.08	0.02	0.60	24	523	523	157					6.90	1,580	20.6	4.30		-
EW2305322006	BH13	Groundwater	10	Dec 2023	335	211			28	0.47		2.19	0.2	8.09	0.01	0.86	40	897	897	55					6.80	2,250	21.3	4.22		-
EW2305322007	BH14	Groundwater	11	Dec 2023	62	139			16	0.18		0.65	0.4	1.84	< 0.01	0.08	17	550	550	24					6.80	1,080	21.0	4.62		-
EW2305322008	BH15	Groundwater	7	Dec 2023	408	112			130	0.24		8.19	0.2	6.35	0.02	< 0.01	34	486	486	300					7.00	2,120	17.4	21.20		-
EW2305322010	BH18	Groundwater	25	Dec 2023	11	62			8	0.29		2.46	0.2	1.58	< 0.01	< 0.01	14	273	273	< 1					6.60	459	19.1	2.19		-
EW2305322009	BH19r	Groundwater	16	Dec 2023	34	89			42	0.06		0.74	0.1	2.42	< 0.01	< 0.01	13	329	329	42					7.50	678	18.2	4.54		-
EW2305322011	BH21	Groundwater	23	Dec 2023	238	237			41	0.12		< 0.05	0.2	0.07	0.78	52.30	27	528	528	227					6.90	2,170	21.0	3.00		-
EW2305322012	BH22	Groundwater	24	Dec 2023	77	156			13	0.34		44.60	0.4	4.68	< 0.01	0.06	33	335	335	345					6.80	1,360	18.3	2.32		-
EW2305324001	SWP1	Surfacewater	1	Dec 2023	67	32	12	59	10	0.36	0.37	0.11	0.3	0.05	< 0.01	0.01	18	162	162	15	3.81		12	4.80	7.30	526	23.8			-
EW2305324003	SWC_up	Surfacewater	20	Dec 2023	1,230	52	77	617	26	0.07	1.09	0.12	0.3	0.20	< 0.01	0.03	11	120	120	162	6.44		10	10.00	7.20	3,980	21.5			-
EW2305324002	SWC_2	Surfacewater	19	Dec 2023	1,370	60	93	749	32	0.08	1.23	0.12	0.3	0.25	< 0.01	0.08	10	120	120	186	5.24		7	10.30	7.20	4,520	21.3			-
EW2305324004	SWC_down	Surfacewater	21	Dec 2023	1,480	66	106	864	37	0.08	1.48	0.09	0.4	0.27	< 0.01	0.09	10	121	121	213	6.60		6	10.30	7.20	5,220	22.0			-
EW2305324005	SWC_down_2	Surfacewater	22	Dec 2023	1,470	64	106	858	36	0.08	1.17	0.09	0.4	0.25	< 0.01	0.07	10	120	120	195	5.81		7	10.50	7.20	5,110	21.8			-
EW2305326001	Leachate Storage Tank LP1	Leachate	2	Dec 2023	1,570	51			355	1.35	5.08		0.3	330	5.76	< 0.20	142	1,770	1,900	< 10	3.40	41.3			8.60	8,410	24.4			-

TABLE 14-2: Total Concentration Results

Quarterly Water Monitoring Results - March 2024 : Dunmore Recycling and Waste Depot

GILs -Trigger Values for Freshwater (Protection of 95% of Species) [A]					-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	-	0.7	-	-	-	-	-	-	-	-	6.5 - 8.5	2200	-	-	
GILs -Trigger Values for Marine Water (Protection of 95% of Species) [A]					-	-	-	-	-	-	-	-	-	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Australian Drinking Water Guidelines (2018)[C]				Health	-	-	-	-	-	0.5	-	-	1.5	-	3	50	-	-	-	-	-	-	-	-	6.5 - 8.5	-	-	-	
				Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	-	-	-	-	-	-	250	-	-	-	5	6.5 - 8.5	-	-	-	
Lab Report No.	Sample No.	Sample type	EPA No,	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Nitrite as N	Nitrate as N	Total Organic Carbon	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	pH	Electrical Conductivity (Non Compensated)	Temperature	Standing Water Level	Comments
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	pH	µS/cm	°C	mbgl	
				Laboratory PQL	1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	1	1	1	1	0.01	0.1	5	0.1	0.01	1	0.1	0.01	-
EW2400913001	BH1c	Groundwater	3	Mar 2024	971	123			211	0.12		12.40	0.3	319.00	< 0.01	< 0.01	178	2,700	2,700	< 1					7.20	7,610	25.0	3.10	-
EW2400913002	BH3	Groundwater	5	Mar 2024	153	159			29	0.15		2.01	< 0.1	17.40	0.08	9.65	19	459	459	164					7.30	1,450	18.7	3.20	-
EW2400913003	BH4	Groundwater	6	Mar 2024	77	148			24	0.16		4.25	0.1	4.20	< 0.01	< 0.01	12	388	388	130					7.40	1,030	18.9	4.50	-
EW2400913004	BH9	Groundwater	18	Mar 2024	436	198			84	0.86		0.18	0.5	133.00	0.02	0.46	73	1,920	1,920	< 1					7.30	3,890	18.7	3.16	-
EW2400913005	BH12r	Groundwater	17	Mar 2024	180	196			28	0.53		10.20	0.2	4.28	< 0.01	0.11	24	548	548	138					6.90	1,620	21.4	4.40	-
EW2400913006	BH13	Groundwater	10	Mar 2024	295	198			25	0.51		3.71	0.2	7.13	< 0.01	2.03	38	829	829	48					6.70	2,110	21.9	4.35	-
EW2400913007	BH14	Groundwater	11	Mar 2024	166	198			21	0.23		0.41	0.4	1.44	0.03	5.28	25	610	610	47					6.70	1,500	21.6	4.82	-
EW2400913008	BH15	Groundwater	7	Mar 2024	204	86			103	0.16		4.34	0.2	9.00	0.02	0.05	33	475	475	181					7.10	1,620	19.7	0.73	-
EW2400913009	BH18	Groundwater	25	Mar 2024	37	95			48	0.07		0.49	0.1	2.36	< 0.01	0.02	11	345	345	46					7.60	714	18.9	4.18	-
EW2400913010	BH19r	Groundwater	16	Mar 2024	11	62			9	0.08		1.24	0.2	0.92	< 0.01	< 0.01	11	242	242	< 1					6.70	426	20.9	2.22	-
EW2400913011	BH21	Groundwater	23	Mar 2024	302	125			16	0.46		1.02	0.3	4.08	< 0.01	0.01	35	769	769	155					7.20	2,280	22.4	3.04	-
EW2400913012	BH22	Groundwater	24	Mar 2024	200	116			22	0.13		16.50	0.5	7.12	< 0.01	< 0.01	28	486	486	218					7.30	1,680	19.5	2.41	-
EW2400977001	SWP1	Surfacewater	1	Mar 2024	112	41	22	122	10	0.48	0.39	< 0.05	0.3	0.07	< 0.01	< 0.01	21	289	289	27	3.53		9	4.60	7.40	871	21.9		-
EW2400977003	SWC_up	Surfacewater	20	Mar 2024	8,720	235	621	5,000	194	0.33	0.29	0.10	0.4	0.23	0.02	0.01	10	168	168	1,260	4.20		< 5	2.50	7.20	25,200	19.4		-
EW2400977002	SWC_2	Surfacewater	19	Mar 2024	10,000	264	715	5,770	223	0.26	0.24	0.07	0.7	0.22	0.02	< 0.01	10	168	168	1,450	3.39		< 5	2.50	7.20	28,800	19.7		-
EW2400977004	SWC_down	Surfacewater	21	Mar 2024	10,300	273	694	5,670	217	0.24	0.26	< 0.05	0.5	0.23	0.01	0.01	9	168	168	1,420	5.16		< 5	2.50	7.20	30,000	20.9		-
EW2400977005	SWC_down_2	Surfacewater	22	Mar 2024	11,200	286	781	6,340	244	0.20	0.17	< 0.10	0.4	0.24	0.01	< 0.01	8	161	161	1,540	4.25		< 5	2.10	7.20	33,000	20.6		-
EW2400975001	Leachate Storage Tank LP1	Leachate	2	Mar 2024	744	96			873	0.67	4.20		0.2	1	0.24	8.53	166	765	830	134	3.32	37.6			8.60	3,520	22.4		-

TABLE 14-3: Total Concentration Results

Quarterly Water Monitoring Results - June 2024 : Dunmore Recycling and Waste Depot

GILs -Trigger Values for Freshwater (Protection of 95% of Species) [A]					-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	-	0.7	-	-	-	-	-	-	-	-	6.5 - 8.5	2200	-	-	
GILs -Trigger Values for Marine Water (Protection of 95% of Species) [A]					-	-	-	-	-	-	-	-	-	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Australian Drinking Water Guidelines (2018)[C]				Health	-	-	-	-	-	0.5	-	-	1.5	-	3	50	-	-	-	-	-	-	-	-	6.5 - 8.5	-	-	-	
				Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	-	-	-	-	-	-	250	-	-	-	5	6.5 - 8.5	-	-	-	
Lab Report No.	Sample No.	Sample type	EPA No,	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Nitrite as N	Nitrate as N	Total Organic Carbon	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	pH	Electrical Conductivity (Non Compensated)	Temperature	Standing Water Level	Comments
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	pH	µS/cm	°C	mbgl	
				Laboratory PQL	1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	1	1	1	1	0.01	0.1	5	0.1	0.01	1	0.1	0.01	-
EW2402552001	BH1c	Groundwater	3	Jun 2024	989	124			206	0.11		12.40	0.4	352.00	0.05	< 0.10	183	2,570	2,570	261					7.00	7,500	25.0	2.75	-
EW2402552002	BH3	Groundwater	5	Jun 2024	115	98			30	0.05		0.20	0.2	6.56	0.02	4.83	14	282	282	69					7.40	759	18.4	2.83	-
EW2402552003	BH4	Groundwater	6	Jun 2024	120	117			23	0.12		2.65	0.1	3.63	< 0.01	0.06	11	350	350	57					7.20	842	19.0	4.15	-
EW2402552004	BH9	Groundwater	18	Jun 2024	528	218			75	0.73		2.95	0.5	96.80	0.01	0.02	69	1,510	1,510	146					6.90	3,790	17.7	2.75	-
EW2402552005	BH12r	Groundwater	17	Jun 2024	230	184			32	0.43		4.57	0.2	2.50	0.05	1.20	30	574	574	84					6.60	1,860	21.3	4.04	-
EW2402552006	BH13	Groundwater	10	Jun 2024	206	182			25	0.44		2.08	0.2	14.00	0.01	5.68	35	652	652	85					6.80	1,900	22.0	3.90	-
EW2402552007	BH14	Groundwater	11	Jun 2024	158	160			22	0.21		0.92	0.4	1.50	0.24	19.30	33	464	464	50					6.80	1,450	21.6	4.22	-
EW2402552008	BH15	Groundwater	7	Jun 2024	147	54			89	0.12		3.81	0.2	7.15	< 0.01	< 0.01	29	347	347	60					6.90	1,090	16.6	0.75	-
EW2402552009	BH18	Groundwater	25	Jun 2024	37	92			42	0.05		0.53	0.2	1.24	< 0.01	0.04	12	326	326	38					7.40	683	18.7	4.33	-
EW2402552010	BH19r	Groundwater	16	Jun 2024	11	46			7	0.03		0.54	0.2	0.54	< 0.01	< 0.01	9	181	181	< 10					6.90	328	20.5	1.99	-
EW2402552011	BH21	Groundwater	23	Jun 2024	299	124			14	0.45		2.57	0.4	4.07	< 0.01	< 0.01	31	729	729	126					7.20	2,230	22.3	2.70	-
EW2402552012	BH22	Groundwater	24	Jun 2024	162	84			7	0.33		21.80	0.3	5.41	< 0.01	< 0.01	38	356	356	52					6.60	1,160	18.9	2.06	-
EW2402546001	SWP1	Surfacewater	1	Jun 2024	183	70	44	204	11	0.04	0.11	< 0.05	0.5	2.10	0.14	0.45	19	316	316	233	4.16		< 5	3.40	7.50	1,120	12.6		-
EW2402546003	SWC_up	Surfacewater	20	Jun 2024	2,430	69	161	1,330	52	0.07	0.88	0.07	0.3	0.12	0.02	0.34	8	108	108	346	8.89		9	11.30	7.40	5,890	13.5		-
EW2402546002	SWC_2	Surfacewater	19	Jun 2024	2,780	76	180	1,500	59	0.07	0.86	0.06	0.3	0.16	0.01	0.41	8	109	109	391	8.81		< 5	10.60	7.50	6,580	13.3		-
EW2402546004	SWC_down	Surfacewater	21	Jun 2024	5,440	136	371	3,140	116	0.06	0.61	< 0.05	0.4	0.10	0.02	0.27	8	110	110	810	8.70		< 5	8.30	7.40	13,100	13.6		-
EW2402546005	SWC_down_2	Surfacewater	22	Jun 2024	6,170	155	442	3,630	134	0.06	0.54	< 0.05	0.5	0.10	0.01	0.25	7	109	109	940	7.78		< 5	7.60	7.40	15,200	13.7		-
EW2402550001	Leachate Storage Tank LP1	Leachate	2	Jun 2024	591	90			842	0.59	7.49		0.2	60	< 0.10	< 0.10	323	973	973	< 10	1.27	12.9			8.20	3,720	14.2		-

TABLE 14-4: Total Concentration Results

Quarterly Water Monitoring Results - September 2024 : Dunmore Recycling and Waste Depot

GILs -Trigger Values for Freshwater (Protection of 95% of Species) [A]					-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	-	0.7	-	-	-	-	-	-	-	-	6.5 - 8.5	2200	-	-	
GILs -Trigger Values for Marine Water (Protection of 95% of Species) [A]					-	-	-	-	-	-	-	-	-	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Australian Drinking Water Guidelines (2018)[C]				Health	-	-	-	-	-	0.5	-	-	1.5	-	3	50	-	-	-	-	-	-	-	-	6.5 - 8.5	-	-	-	
				Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	-	-	-	-	-	-	250	-	-	-	5	6.5 - 8.5	-	-	-	
Lab Report No.	Sample No.	Sample type	EPA No,	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Nitrite as N	Nitrate as N	Total Organic Carbon	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	pH	Electrical Conductivity (Non Compensated)	Temperature	Standing Water Level	Comments
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	pH	µS/cm	°C	mbgl	
				Laboratory PQL	1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	1	1	1	1	0.01	0.1	5	0.1	0.01	1	0.1	0.01	-
EW2404038001	BH1c	Groundwater	3	Sep 2024	787	113			203	0.09		9.22	0.4	28.30	< 0.01	< 0.10	163	2,800	2,800	< 10					7.00	7,090	25.2	3.20	-
EW2404038002	BH3	Groundwater	5	Sep 2024	120	133			40	0.14		2.55	0.2	25.40	0.13	1.21	22	434	434	224					7.40	1,220	17.7	3.18	-
EW2404038003	BH4	Groundwater	6	Sep 2024	26	95			26	0.09		1.81	0.1	2.84	0.01	0.05	8	339	339	110					7.30	690	18.3	4.40	-
EW2404038004	BH9	Groundwater	18	Sep 2024	561	209			64	0.42		4.87	0.5	65.20	< 0.01	< 0.01	47	1,270	1,270	351					7.00	3,650	17.8	3.22	-
EW2404038005	BH12r	Groundwater	17	Sep 2024	290	174			30	0.45		9.49	0.2	5.99	< 0.01	0.28	74	654	654	84					6.80	1,920	20.3	4.35	-
EW2404038006	BH13	Groundwater	10	Sep 2024	280	168			26	0.46		2.03	0.2	16.70	0.03	5.93	37	785	785	107					6.80	2,050	21.9	4.29	-
EW2404038007	BH14	Groundwater	11	Sep 2024	189	168			20	0.25		1.38	0.6	2.03	0.04	6.74	23	594	594	97					6.80	1,580	21.0	4.72	-
EW2404038008	BH15	Groundwater	7	Sep 2024	169	130			98	0.23		5.32	0.2	9.79	0.02	6.72	19	325	325	551					7.00	1,610	14.9	0.69	-
EW2404038009	BH18	Groundwater	25	Sep 2024	23	86			50	0.05		0.71	0.1	1.21	0.01	< 0.01	12	359	359	54					7.40	667	17.8	4.57	-
EW2404038010	BH19r	Groundwater	16	Sep 2024	18	49			12	0.03		0.48	0.2	0.74	< 0.01	< 0.01	12	246	246	< 10					6.80	402	18.5	2.28	-
EW2404038011	BH21	Groundwater	23	Sep 2024	290	116			16	0.48		1.25	0.4	4.43	< 0.01	< 0.01	29	799	799	197					7.20	2,170	21.0	3.16	-
EW2404038012	BH22	Groundwater	24	Sep 2024	195	101			15	0.07		8.85	0.6	3.81	< 0.01	< 0.01	30	492	492	181					7.00	1,450	17.2	2.69	-
EW2404020001	SWP1	Surfacewater	1	Sep 2024	176	72	47	211	9	0.04	0.16	< 0.05	0.6	0.02	< 0.01	0.02	19	370	391	266	12.00		< 5	4.00	8.30	1,340	16.0		-
EW2404020003	SWC_up	Surfacewater	20	Sep 2024	3,160	87	216	1,810	70	0.07	0.29	< 0.05	1.0	0.12	0.01	0.11	6	84	84	457	9.42		< 5	5.30	7.30	8,660	14.8		-
EW2404020002	SWC_2	Surfacewater	19	Sep 2024	3,260	88	214	1,860	71	0.07	0.28	< 0.05	1.0	0.15	0.01	0.11	6	86	86	464	10.40		< 5	4.80	7.50	8,880	14.7		-
EW2404020004	SWC_down	Surfacewater	21	Sep 2024	5,360	143	372	3,100	121	0.07	0.22	< 0.05	0.9	0.80	0.02	0.08	7	127	127	667	8.37		< 5	4.00	7.40	14,800	15.1		-
EW2404020005	SWC_down_2	Surfacewater	22	Sep 2024	6,770	181	475	4,050	156	0.07	0.21	< 0.05	0.9	0.42	0.01	0.08	6	127	127	1,040	8.66		< 5	3.60	7.40	18,300	14.6		-
EW2404022001	Leachate Storage Tank LP1	Leachate	2	Sep 2024	648	91			783	0.43	4.06		0.1	64	< 0.10	< 0.10	79	1,020	1,020	< 10	3.05	30.2			8.40	3,650	15.2		-

TABLE 14-5: Ammonia Results
December 2023 Quarter 1: Dunmore Recycling and Waste Depot

Ammonia Results comapred against the pH Modified Trigger Values - ANZACC (2000) Table 8.3.7				pH		Assessment Criteria		Result	Comment
				pH (lab)	Ecological Stressor Value	pH Modifed Trigger Values - 95% Freshwater	pH Modifed Trigger Values - 95% Marine Water	Ammonai As N	
			Total Concentrations - PQL	0.1	-	-	-	0.01	
Lab Report No.		Sample ID.	Date	pH	mg/L	mg/L	mg/L	mg/L	
2.38	Groundwater	**BH1c**	4/12/2023	7.00	0.20	2.18	3.91	**348.00**	> TV
2.33		**BH3**	4/12/2023	7.10		2.09	3.56	**9.99**	> TV
2.26		**BH4**	4/12/2023	7.30		2.49	5.47	**2.42**	> TV
2.18		**BH9**	4/12/2023	7.20		1.99	3.20	**173.00**	> TV
2.09		**BH12r**	4/12/2023	6.90		2.26	4.24	**4.08**	> TV
1.99		**BH13**	4/12/2023	6.80		2.33	4.55	**8.09**	> TV
1.88		**BH14**	4/12/2023	6.80		2.33	4.55	**1.84**	>TV
1.75		**BH15**	4/12/2023	7.00		2.18	3.91	**6.35**	> TV
1.61		**BH18**	4/12/2023	6.60		2.43	5.07	**1.58**	> TV
1.47		**BH19r**	4/12/2023	7.50		1.61	2.15	**2.42**	> TV
1.18		**BH21**	4/12/2023	6.90		2.26	4.24	**0.07**	< TV
1.03		**BH22**	4/12/2023	6.80		2.33	4.55	**4.68**	> TV
0.9	Rocklow Creek Surface Water	**SWP1**	5/12/2023	7.70		1.18	1.32	**0.09**	< TV
0.78		**SWC_up**	5/12/2023	7.20		1.99	3.20	**0.54**	> TV
0.66		**SWC_2**	5/12/2023	7.30		1.88	2.84	**0.76**	> TV
0.56		**SWC_down**	5/12/2023	7.40		1.75	2.49	**0.51**	> TV
0.48		**SWC_down_2**	5/12/2023	7.40		1.75	2.49	**0.25**	> TV

TABLE 14-6: Ammonia Results
March 2024 Quarter 2: Dunmore Recycling and Waste Depot

Ammonia Results comapred against the pH Modified Trigger Values - ANZACC (2000) Table 8.3.7				pH		Assessment Criteria		Result	Comment
				pH (lab)	Ecological Stressor Value	pH Modified Trigger Values - 95% Freshwater	pH Modified Trigger Values - 95% Marine Water	Ammonai As N	
Total Concentrations - PQL				0.1	-	-	-	0.01	
Lab Report No.		Sample ID.	Date	pH	mg/L	mg/L	mg/L	mg/L	
EW2400913001	Groundwater	**BH1c**	1/03/2024	7.20	0.20	1.99	3.20	**319.00**	> TV
EW2400913002		**BH3**	1/03/2024	7.30		1.88	2.84	**17.40**	> TV
EW2400913003		**BH4**	1/03/2024	7.40		1.75	2.49	**4.20**	> TV
EW2400913004		**BH9**	1/03/2024	7.30		1.88	2.84	**133.00**	> TV
EW2400913005		**BH12r**	1/03/2024	6.90		2.26	4.24	**4.28**	> TV
EW2400913006		**BH13**	1/03/2024	6.70		2.38	4.83	**7.13**	> TV
EW2400913007		**BH14**	1/03/2024	6.70		2.38	4.83	**1.44**	> TV
EW2400913008		**BH15**	1/03/2024	7.10		2.09	3.56	**9.00**	> TV
EW2400913009		**BH18**	1/03/2024	7.60		1.61	2.15	**2.36**	> TV
EW2400913010		**BH19r**	1/03/2024	6.70		2.38	4.83	**0.92**	> TV
EW2400913011		**BH21**	1/03/2024	7.20		1.99	3.20	**4.08**	> TV
EW2400913012		**BH22**	1/03/2024	7.30		1.88	2.84	**7.12**	> TV
EW2400977001	Onsite Dam	**SWP1**	5/03/2024	7.40		1.75	2.49	**0.07**	< TV
EW2400977002	Rocklow Creek Surface Water	**SWC_up**	5/03/2024	7.20		1.99	3.20	**0.23**	> TV
EW2400977003		**SWC_2**	5/03/2024	7.20		1.99	3.20	**0.22**	> TV
EW2400977004		**SWC_down**	5/03/2024	7.20		1.99	3.20	**0.23**	> TV
EW2400977005		**SWC_down_2**	5/03/2024	7.20		1.99	3.20	**0.24**	> TV

TABLE 14-7: Ammonia Results
June 2024 Quarter 3: Dunmore Recycling and Waste Depot

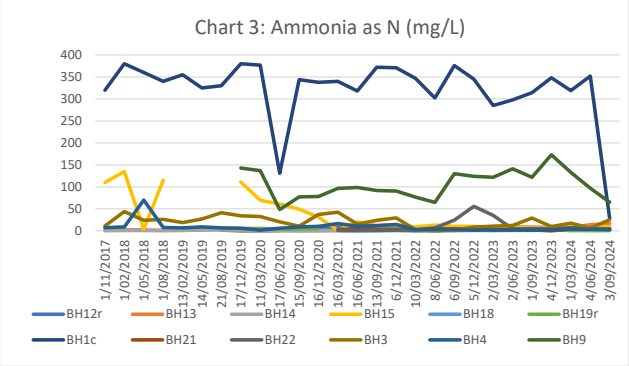
Ammonia Results comapred against the pH Modified Trigger Values - ANZACC (2000) Table 8.3.7				pH		Assessment Criteria		Result	Comment
				pH (lab)	Ecological Stressor Value	pH Modifed Trigger Values - 95% Freshwater	pH Modified Trigger Values - 95% Marine Water	Ammonai As N	
			Total Concentrations - PQL	0.1	-	-	-	0.01	
Lab Report No.		Sample ID.	Date	pH	mg/L	mg/L	mg/L	mg/L	
EW2400913001	Groundwater	BH1c	4/06/2024	7.00	0.20	2.18	3.91	352.00	> TV
EW2400913002		BH3	4/06/2024	7.40		1.75	2.49	6.56	> TV
EW2400913003		BH4	4/06/2024	7.20		1.99	3.20	3.63	> TV
EW2400913004		BH9	4/06/2024	6.90		2.26	4.24	96.80	> TV
EW2400913005		BH12r	4/06/2024	6.60		2.43	5.07	2.50	> TV
EW2400913006		BH13	4/06/2024	6.80		2.33	4.55	14.00	> TV
EW2400913007		BH14	4/06/2024	6.80		2.33	4.55	1.50	> TV
EW2400913008		BH15	4/06/2024	6.90		2.26	4.24	7.15	> TV
EW2400913009		BH18	4/06/2024	7.40		1.75	2.49	1.24	> TV
EW2400913010		BH19r	4/06/2024	6.90		2.26	4.24	0.54	> TV
EW2400913011		BH21	4/06/2024	7.20		1.99	3.20	4.07	> TV
EW2400913012		BH22	4/06/2024	6.60		2.43	5.07	5.41	> TV
EW2400977001	Onsite Dam	SWP1	3/06/2024	7.50		1.61	2.15	2.10	> TV
EW2400977002	Rocklow Creek Surface Water	SWC_up	3/06/2024	7.40		1.75	2.49	0.12	< TV
EW2400977003		SWC_2	3/06/2024	7.50		1.61	2.15	0.16	< TV
EW2400977004		SWC_down	3/06/2024	7.40		1.75	2.49	0.10	< TV
EW2400977005		SWC_down_2	3/06/2024	7.40		1.75	2.49	0.10	< TV

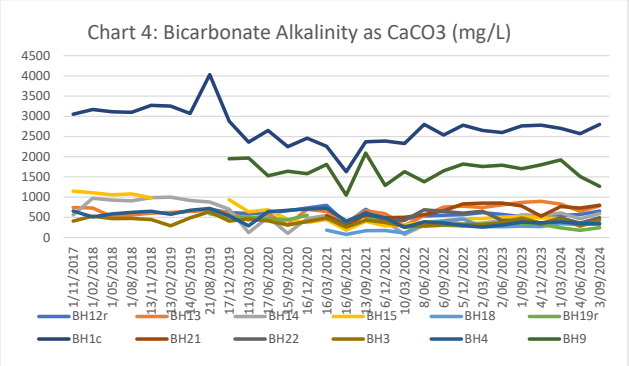
TABLE 14-8: Ammonia Results
September 2024 Quarter 4: Dunmore Recycling and Waste Depot

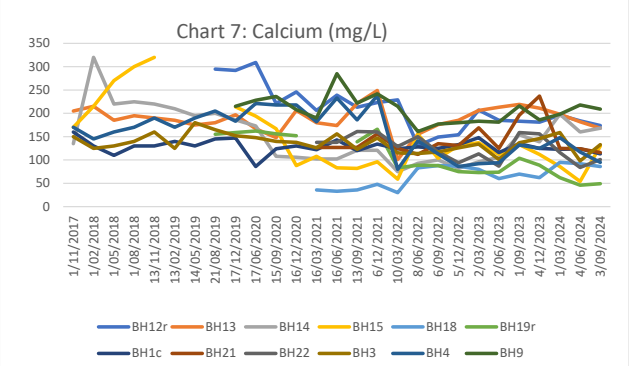
Ammonia Results comapred against the pH Modified Trigger Values - ANZACC (2000) Table 8.3.7				pH		Assessment Criteria		Result	Comment
				pH (lab)	Ecological Stressor Value	pH Modified Trigger Values - 95% Freshwater	pH Modified Trigger Values - 95% Marine Water	Ammonai As N	
Total Concentrations - PQL				0.1	-	-	-	0.01	
Lab Report No.		Sample ID.	Date	pH	mg/L	mg/L	mg/L	mg/L	
EW2400913001	Groundwater	BH1c	4/09/2024	7.00	0.20	2.18	3.91	28.30	> TV
EW2400913002		BH3	4/09/2024	7.40		1.75	2.49	25.40	> TV
EW2400913003		BH4	4/09/2024	7.30		1.88	2.84	2.84	> TV
EW2400913004		BH9	4/09/2024	7.00		2.18	3.91	65.20	> TV
EW2400913005		BH12r	4/09/2024	6.80		2.33	4.55	5.99	> TV
EW2400913006		BH13	4/09/2024	6.80		2.33	4.55	16.70	> TV
EW2400913007		BH14	4/09/2024	6.80		2.33	4.55	2.03	> TV
EW2400913008		BH15	4/09/2024	7.00		2.18	3.91	9.79	> TV
EW2400913009		BH18	4/09/2024	7.40		1.75	2.49	1.21	> TV
EW2400913010		BH19r	4/09/2024	6.80		2.33	4.55	0.74	> TV
EW2400913011		BH21	4/09/2024	7.20		1.99	3.20	4.43	> TV
EW2400913012		BH22	4/09/2024	7.00		2.18	3.91	3.81	> TV
EW2400977001	Onsite Dam	SWP1	4/09/2024	8.30		0.56	0.51	0.02	<TV
EW2400977002	Rocklow Creek Surface Water	SWC_up	4/09/2024	7.30		1.88	2.84	0.12	< TV
EW2400977003		SWC_2	4/09/2024	7.50		1.61	2.15	0.15	< TV
EW2400977004		SWC_down	4/09/2024	7.40		1.75	2.49	0.80	>TV
EW2400977005		SWC_down_2	4/09/2024	7.40		1.75	2.49	0.42	>TV

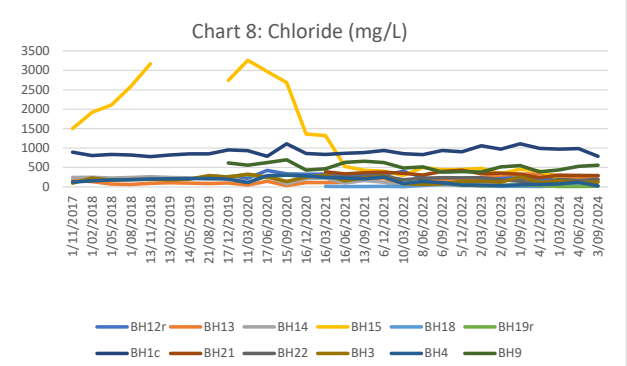
CHARTS

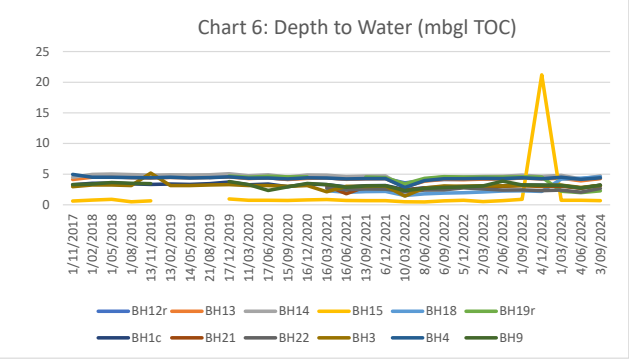
Charts 3-18: Groundwater Charts

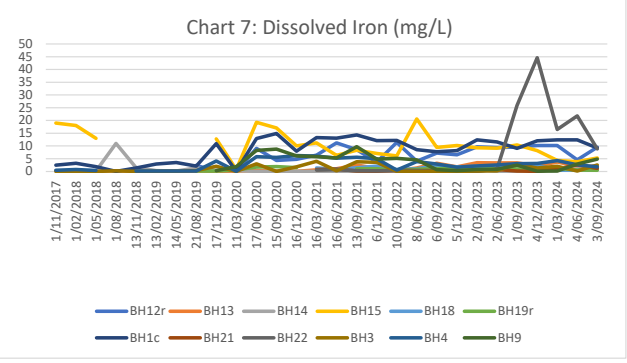


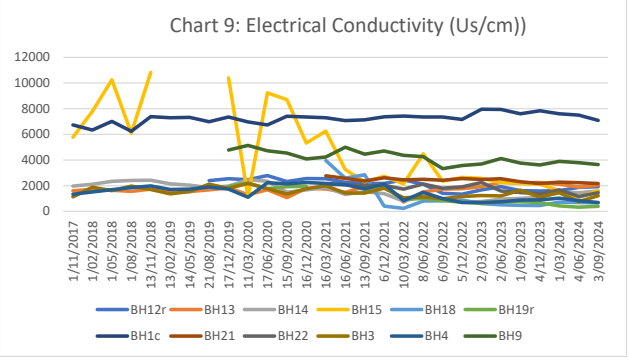


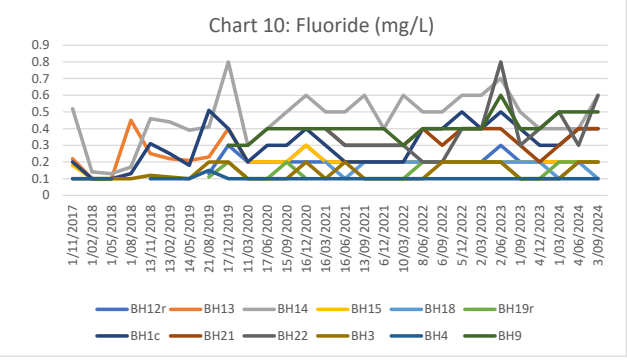












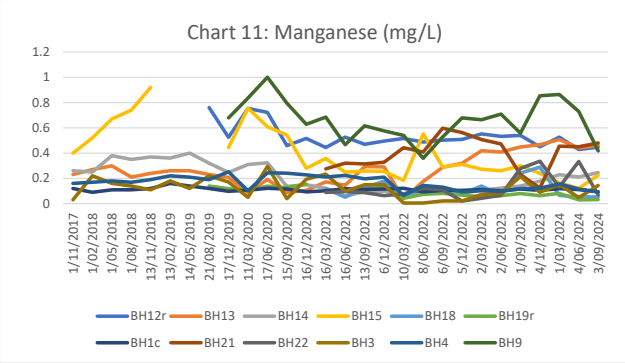


Chart 11: Manganese (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
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1/03/2024
4/06/2024
3/09/2024
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BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

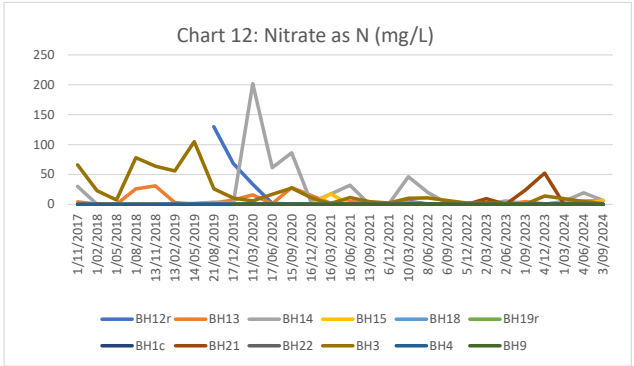


Chart 12: Nitrate as N (mg/L)
250
200
150
100
50
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

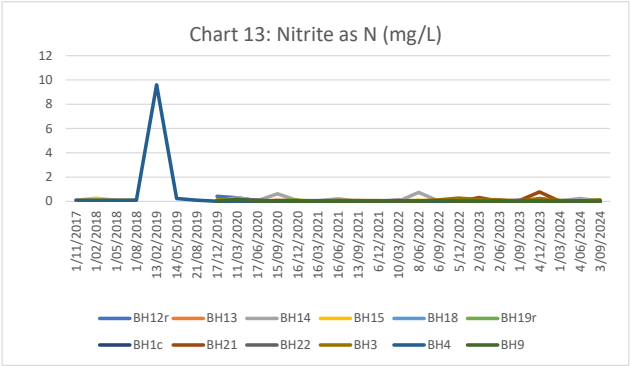


Chart 13: Nitrite as N (mg/L)
12
10
8
6
4
2
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

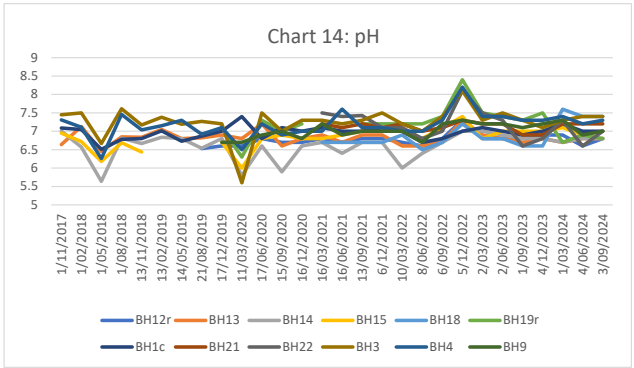


Chart 14: pH
9
8.5
8
7.5
7
6.5
6
5.5
5
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

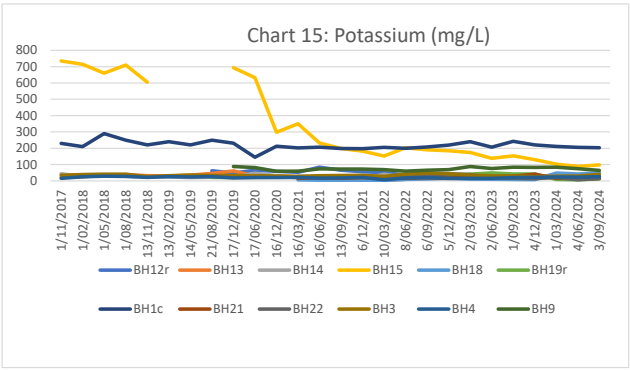


Chart 15: Potassium (mg/L)
800
700
600
500
400
300
200
100
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
17/06/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

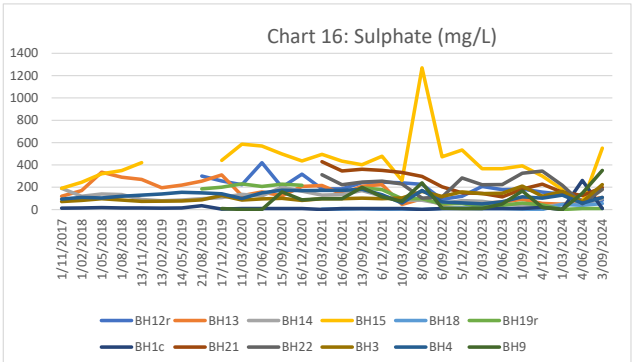


Chart 16: Sulphate (mg/L)
1400
1200
1000
800
600
400
200
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

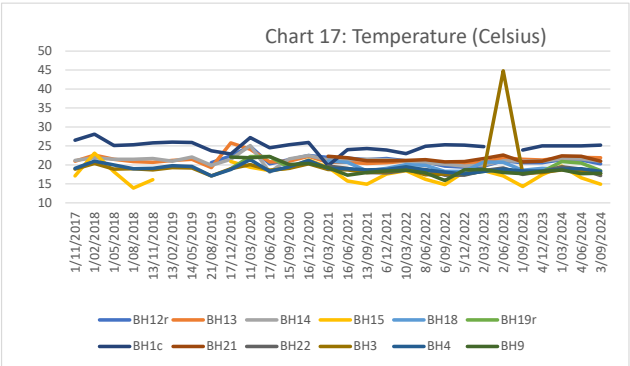


Chart 17: Temperature (Celsius)
50
45
40
35
30
25
20
15
10
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

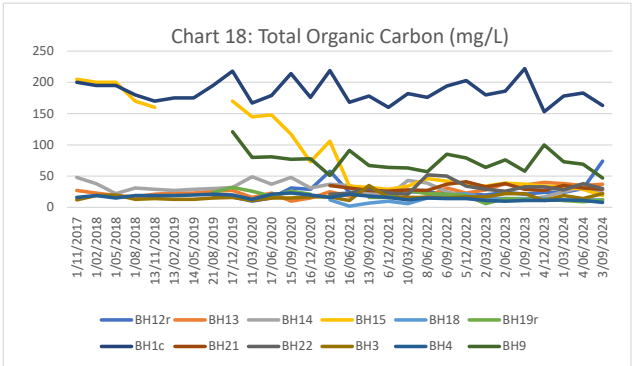
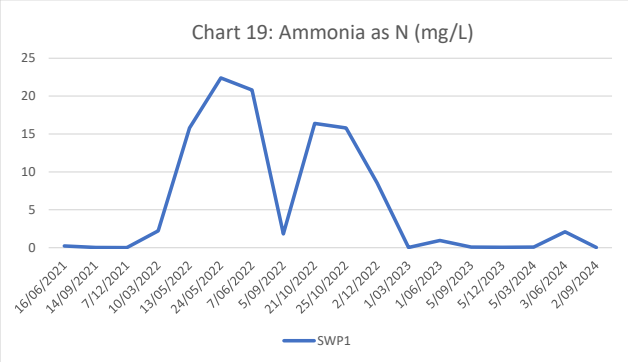
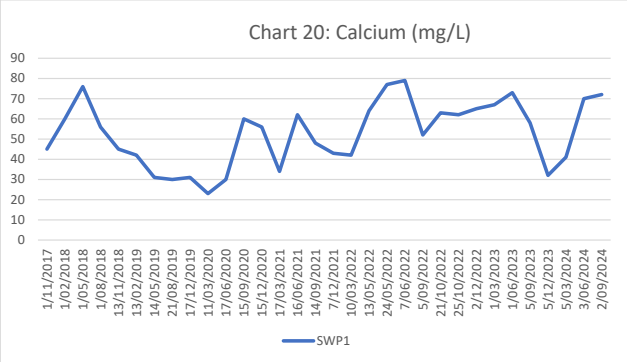
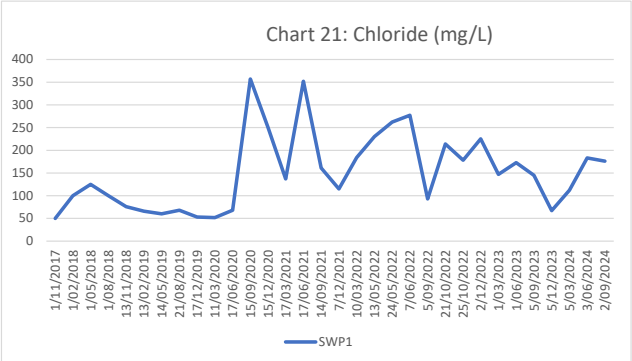


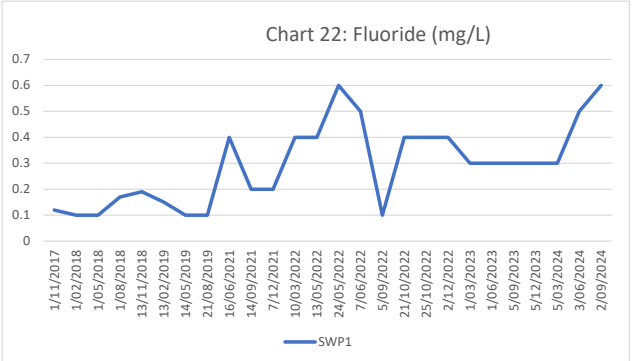
Chart 18: Total Organic Carbon (mg/L)
250
200
150
100
50
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
16/12/2020
16/03/2021
16/06/2021
13/09/2021
6/12/2021
10/03/2022
8/06/2022
6/09/2022
5/12/2022
2/03/2023
2/06/2023
1/09/2023
4/12/2023
1/03/2024
4/06/2024
3/09/2024
BH12r
BH13
BH14
BH15
BH18
BH19r
BH1c
BH21
BH22
BH3
BH4
BH9

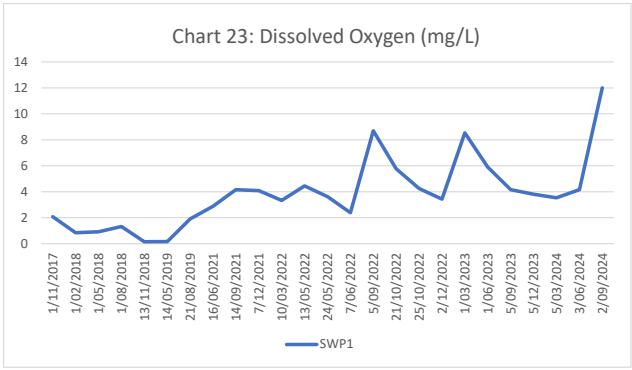
Charts 19-34: Onsite Surface Water Charts

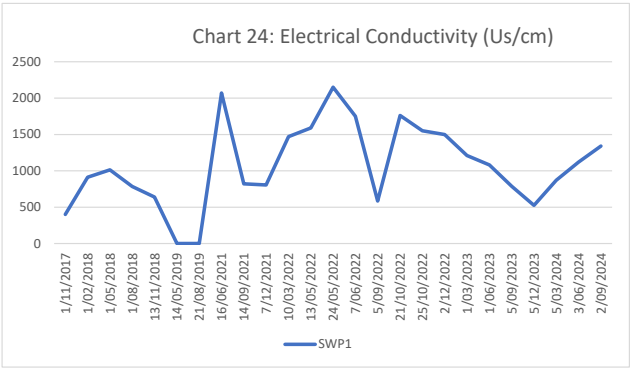


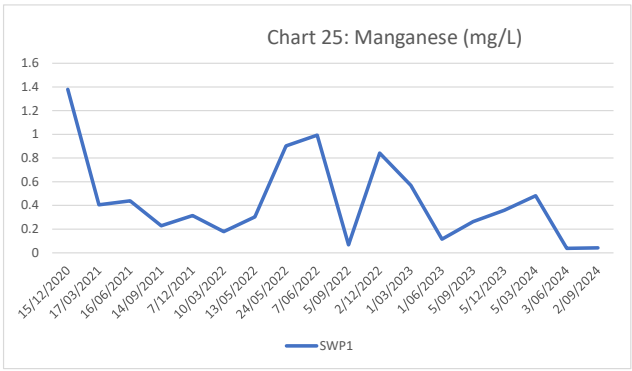


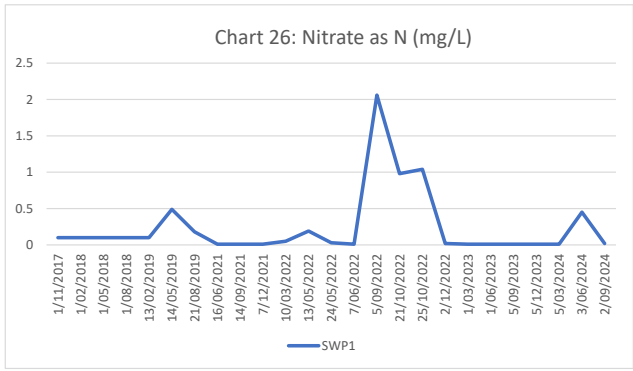












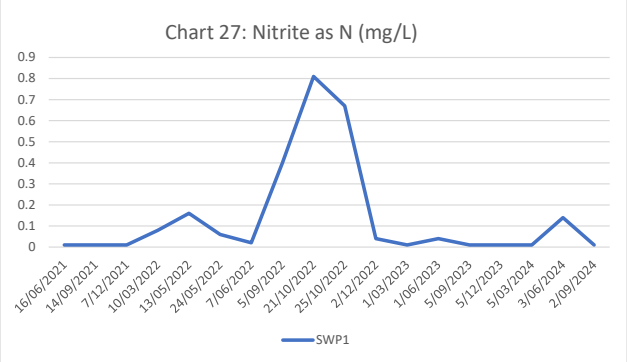


Chart 27: Nitrite as N (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
16/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

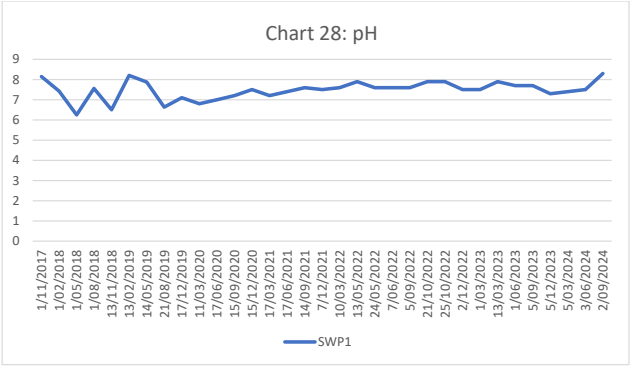


Chart 28: pH
9
8
7
6
5
4
3
2
1
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
17/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
13/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

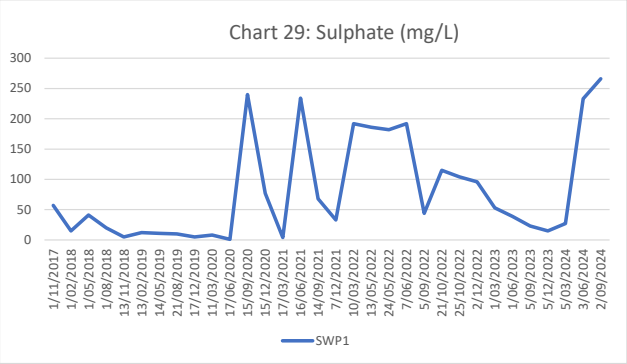


Chart 29: Sulphate (mg/L)
300
250
200
150
100
50
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
16/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

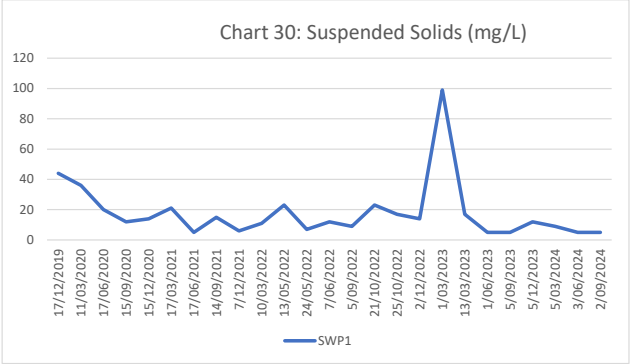


Chart 30: Suspended Solids (mg/L)
120
100
80
60
40
20
0
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
17/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
13/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

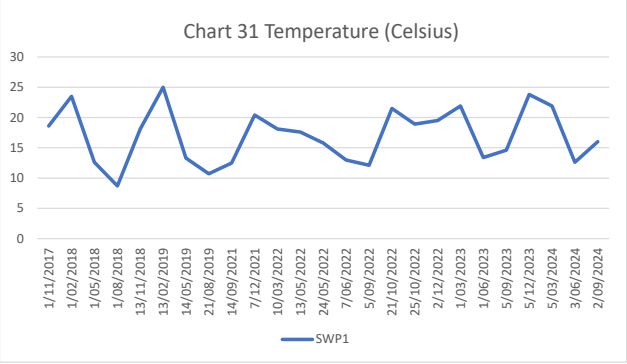


Chart 31 Temperature (Celsius)
30
25
20
15
10
5
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

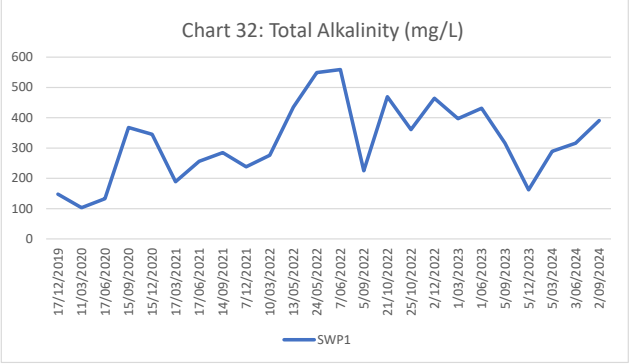


Chart 32: Total Alkalinity (mg/L)
600
500
400
300
200
100
0
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
17/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

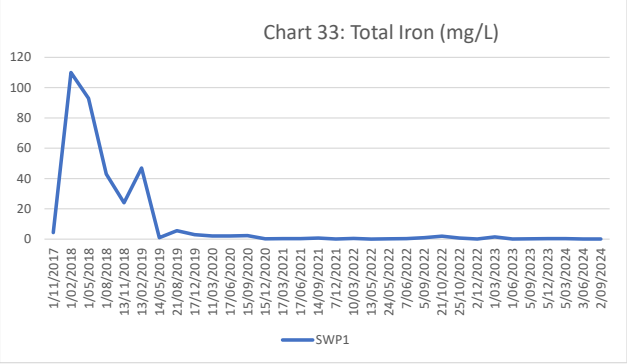


Chart 33: Total Iron (mg/L)
120
100
80
60
40
20
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
17/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

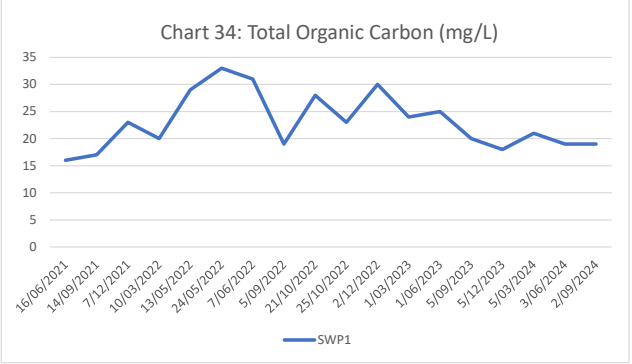
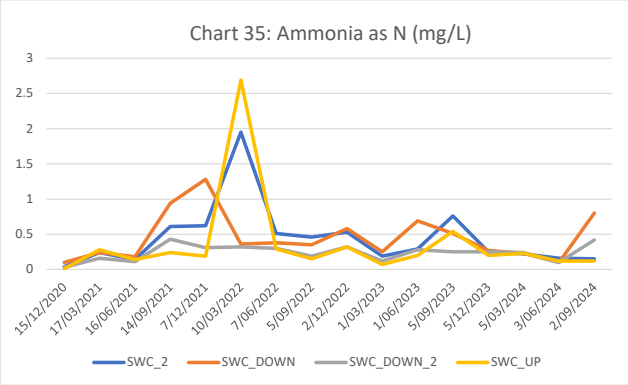
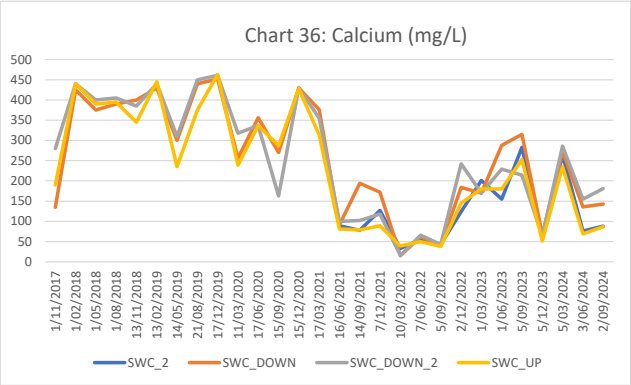
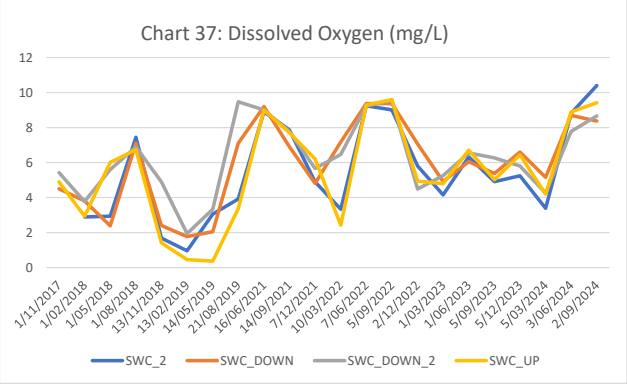


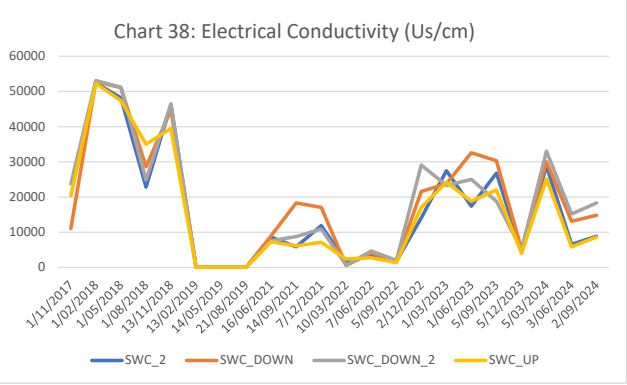
Chart 34: Total Organic Carbon (mg/L)
35
30
25
20
15
10
5
0
16/06/2021
14/09/2021
7/12/2021
10/03/2022
13/05/2022
24/05/2022
7/06/2022
5/09/2022
21/10/2022
25/10/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWP1

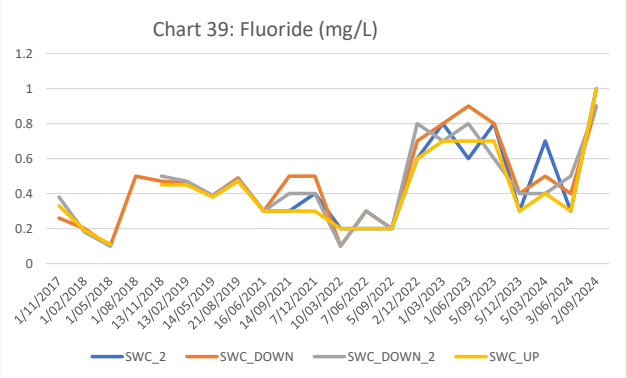
Charts 35-46: Rocklow Creek Surface Water Charts

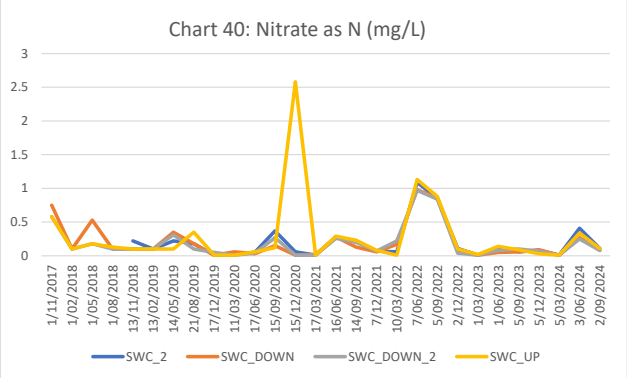


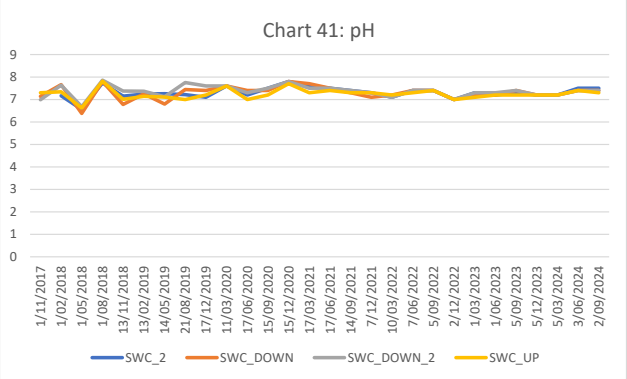


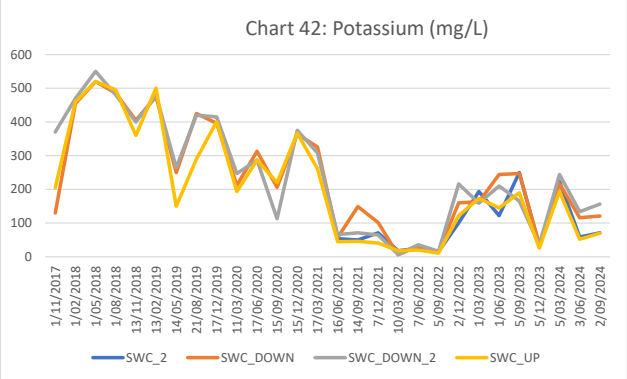












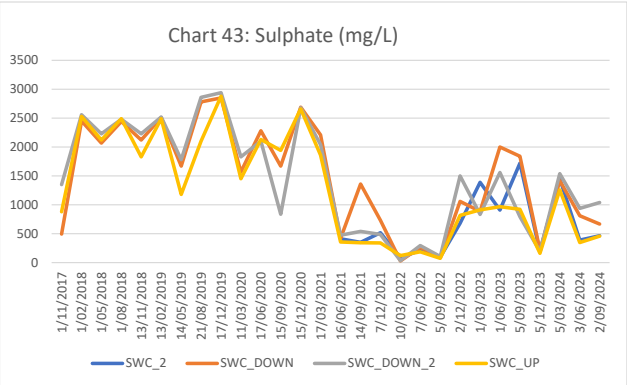


Chart 43: Sulphate (mg/L)
3500
3000
2500
2000
1500
1000
500
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
16/06/2021
14/09/2021
7/12/2021
10/03/2022
7/06/2022
5/09/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWC_2
SWC_DOWN
SWC_DOWN_2
SWC_UP

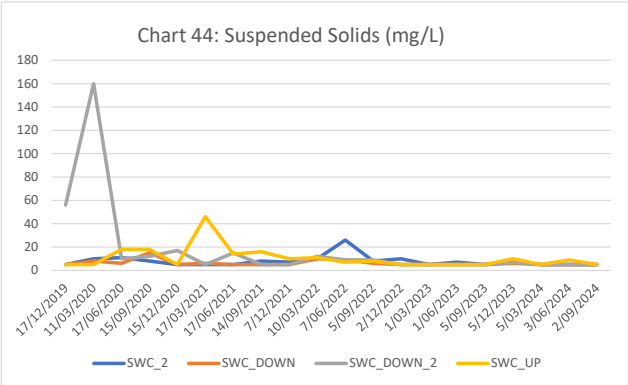


Chart 44: Suspended Solids (mg/L)
180
160
140
120
100
80
60
40
20
0
17/12/2019
11/03/2020
17/06/2020
15/09/2020
15/12/2020
17/03/2021
17/06/2021
14/09/2021
7/12/2021
10/03/2022
7/06/2022
5/09/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWC_2
SWC_DOWN
SWC_DOWN_2
SWC_UP

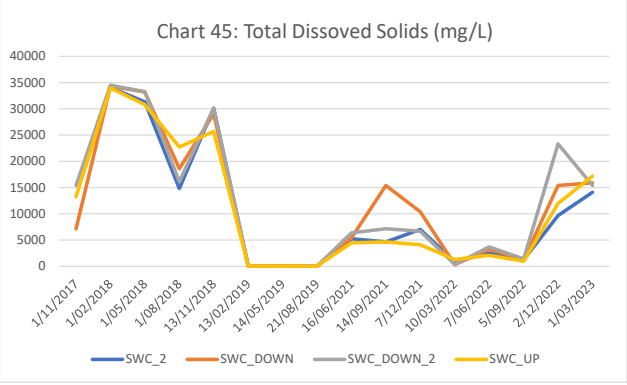


Chart 45: Total Dissoved Solids (mg/L)
40000
35000
30000
25000
20000
15000
10000
5000
0
1/11/2017
1/02/2018
1/05/2018
1/08/2018
13/11/2018
13/02/2019
14/05/2019
21/08/2019
16/06/2021
14/09/2021
7/12/2021
10/03/2022
7/06/2022
5/09/2022
2/12/2022
1/03/2023
SWC_2
SWC_DOWN
SWC_DOWN_2
SWC_UP

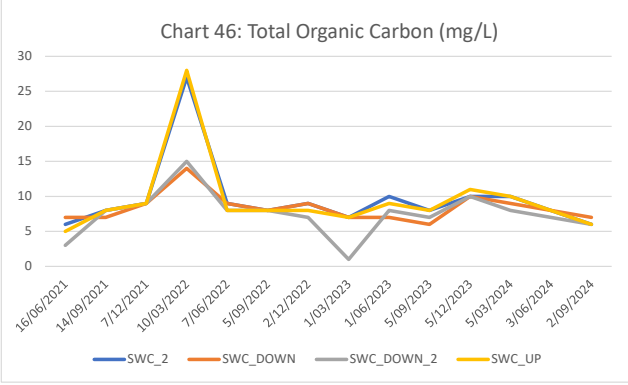
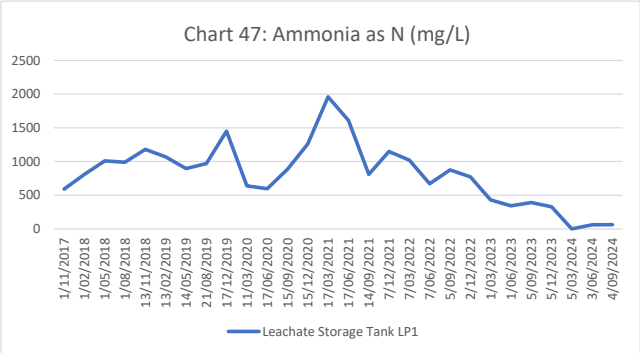
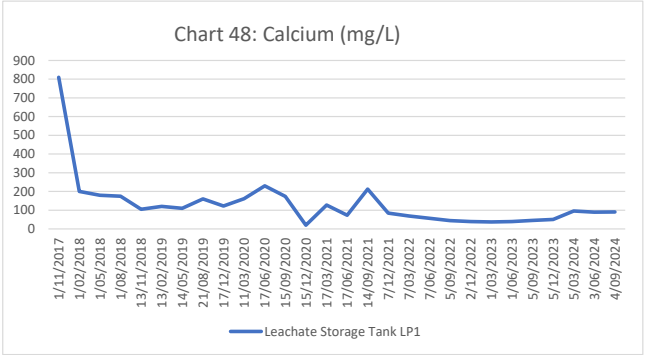
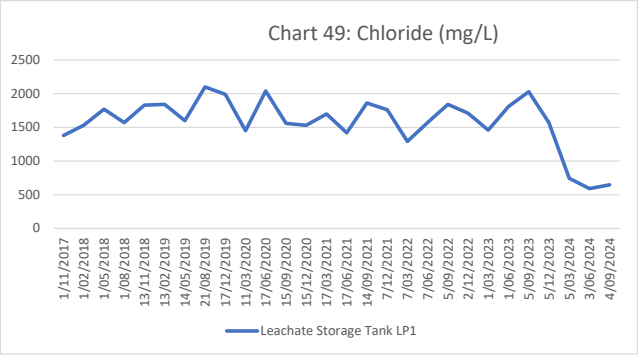


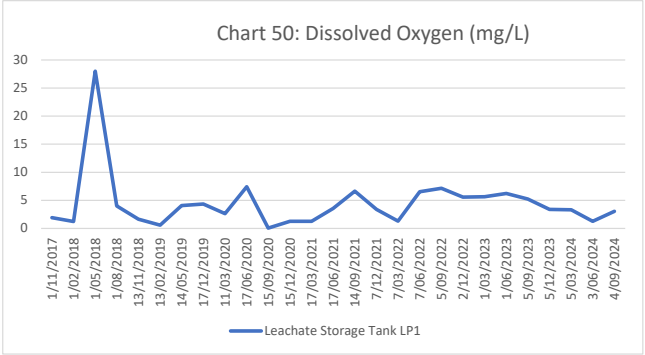
Chart 46: Total Organic Carbon (mg/L)
30
25
20
15
10
5
0
16/06/2021
14/09/2021
7/12/2021
10/03/2022
7/06/2022
5/09/2022
2/12/2022
1/03/2023
1/06/2023
5/09/2023
5/12/2023
5/03/2024
3/06/2024
2/09/2024
SWC_2
SWC_DOWN
SWC_DOWN_2
SWC_UP

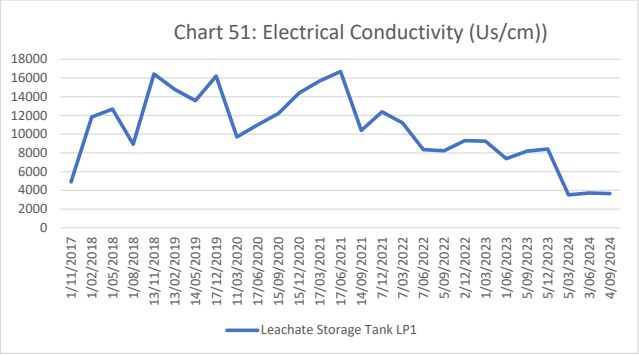
Charts 47-61 Leachate Water Quality Charts

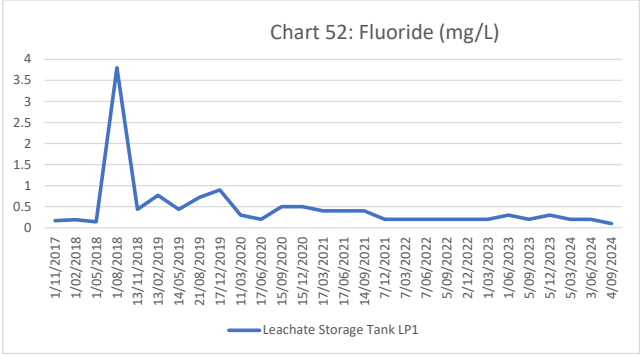


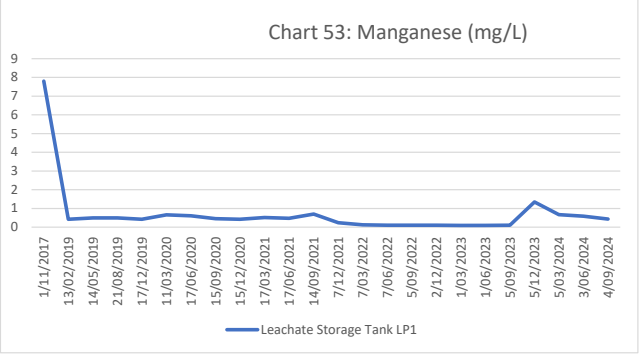


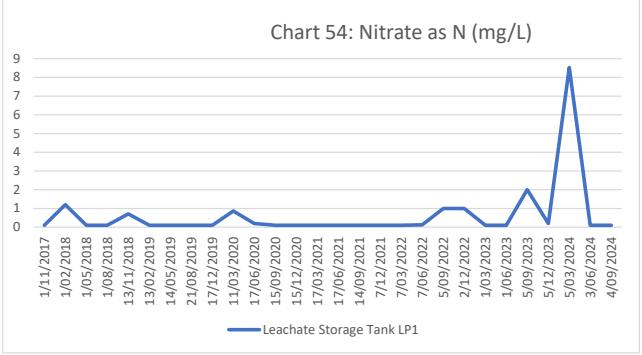












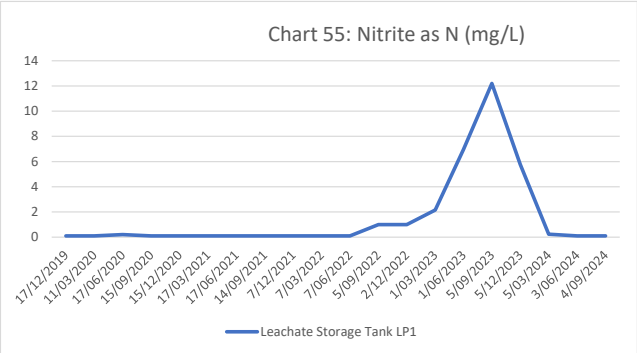


Chart 55: Nitrite as N (mg/L)
Leachate Storage Tank LP1

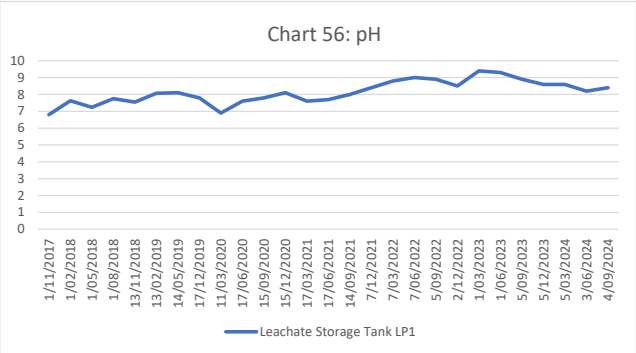


Chart 56: pH
Leachate Storage Tank LP1

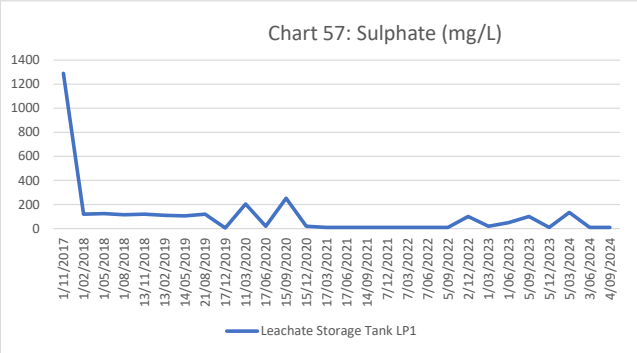


Chart 57: Sulphate (mg/L)
Leachate Storage Tank LP1

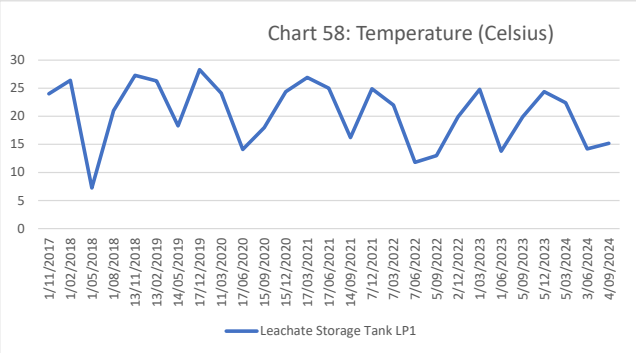


Chart 58: Temperature (Celsius)
Leachate Storage Tank LP1

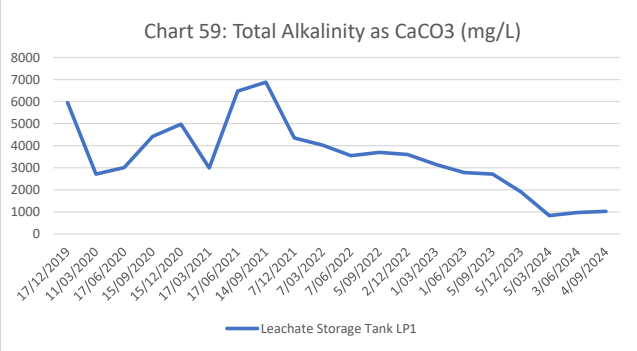


Chart 59: Total Alkalinity as CaCO3 (mg/L)
Leachate Storage Tank LP1

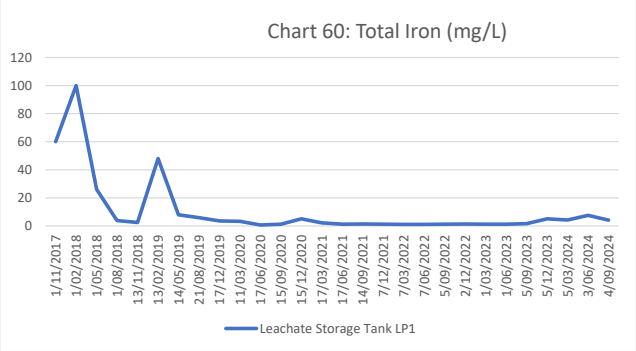


Chart 60: Total Iron (mg/L)
Leachate Storage Tank LP1

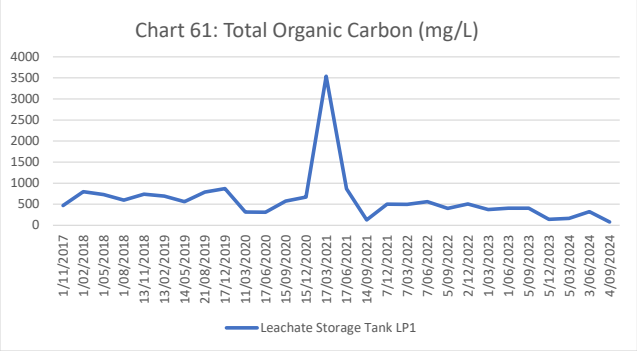
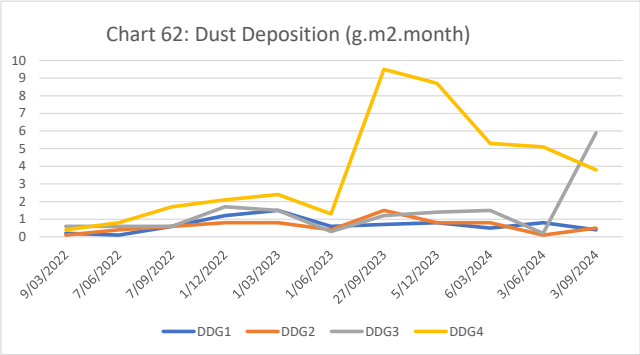


Chart 61: Total Organic Carbon (mg/L)
Leachate Storage Tank LP1

Chart 62 Dust Deposition Chart



APPENDICES

Appendix A:

EPL 5984 Sampling Point Summary (NSW EPA, 10/02/2022. Updated 30/04/2024)

2	Leachate monitoring	Leachate tank labelled LP1 on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
3	Groundwater monitoring	BH1c - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
5	Groundwater monitoring	BH3 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
6	Groundwater monitoring	BH4 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
7	Groundwater monitoring	BH15 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
10	Groundwater monitoring	BH13 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
11	Groundwater monitoring	BH14 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
16	Groundwater monitoring	BH19 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
17	Groundwater monitoring	BH12R - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA

		Ref. no. DOC19/1027702).
18	Groundwater monitoring	BH9 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
19	Surface Water Monitoring	SWC_2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
20	Surface Water Monitoring	SWC_UP - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
21	Surface Water Monitoring	SWC_DOWN - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
22	Surface Water Monitoring	SWC_DOWN2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
23	Groundwater Monitoring	BH21 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).
24	Groundwater monitoring	BH22 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).
25	Groundwater monitoring	BH18 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).

Appendix B:

Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Water Samples

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Adelaide: 2-4 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		
PROJECT:	Dunmore Quarterly Ground Waters EPL	**ALS QUOTE NO.:**	WO/030/19 TENDER
ORDER NUMBER:			
PROJECT MANAGER:	Ryan Stirling		
SAMPLER:		**SAMPLER MOBILE:**	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to :			
Email Invoice to :			

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt	4.5 °C		
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
Robert Dalo	Anele	
DATE/TIME: 4.12.20 14:30	DATE/TIME: 4/12/23	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

Environmental Division
Wollongong
Work Order Reference
EW2305322

Telephone : 02 42253125

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite pr. Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	Dissolved Fe & Mn	NT-4 (NO2, NO3)	Send to Eurofins		
	BH1C	4.12.23 9:55	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH3	12:55	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH4	13:10	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH9	9:25	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH12R	11:32	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH13	11:55	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH14	12:25	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH15	11:10	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH19R	13:30	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH18	8:45	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH21	10:40	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	BH22	10:20	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	Duplicate	8:45	W			✓	✓	✓	✓	✓			Field Tests - pH, EC, Temp & SWL
	Triplicate	8:45	W								✓		
				TOTAL	10								

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2305322**	Page	: 1 of 8
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 04-Dec-2023 15:09
Order number	: 156810	Date Analysis Commenced	: 04-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 13:38
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS		
No. of samples received	: 14		
No. of samples analysed	: 13		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK040: Poor spike recovery for Fluoride due to matrix interferences(confirmed by re-analysis).
- ED041G: LOR raised for Sulfate due to sample matrix
- EK057G: It has been noted that Nitrite is greater than Nox on sample 9, however this difference is within the limits of experimental variation.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Sample collection of Ground Waters by in-house EN67 by high flow and bailer method.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	04-Dec-2023 09:55	04-Dec-2023 12:55	04-Dec-2023 13:10	04-Dec-2023 09:25	04-Dec-2023 11:32
Compound	CAS Number	LOR	Unit		EW2305322-001	EW2305322-002	EW2305322-003	EW2305322-004	EW2305322-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.0	7.1	7.3	7.2	6.9
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7840	1110	894	3620	1580
EA116: Temperature									
Temperature	----	0.5	°C		25.0	18.0	18.4	18.3	20.6
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		2780	358	367	1800	523
Total Alkalinity as CaCO3	----	1	mg/L		2780	358	367	1800	523
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<20	120	103	<20	157
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		994	118	64	387	200
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		125	146	125	186	181
Potassium	7440-09-7	1	mg/L		220	26	22	83	28
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.106	0.090	0.123	0.853	0.450
Iron	7439-89-6	0.05	mg/L		12.0	1.39	3.15	0.12	10.2
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.3	<0.1	<0.1	0.4	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		348	9.99	2.42	173	4.08
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.01	0.24	0.01	<0.01	0.02
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	04-Dec-2023 09:55	04-Dec-2023 12:55	04-Dec-2023 13:10	04-Dec-2023 09:25	04-Dec-2023 11:32
Compound	CAS Number	LOR	Unit		EW2305322-001	EW2305322-002	EW2305322-003	EW2305322-004	EW2305322-005
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**14.0**	**0.36**	<0.01	**0.60**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.01**	**14.2**	**0.37**	<0.01	**0.62**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**153**	**11**	**11**	**100**	**24**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.19**	**3.12**	**4.25**	**3.19**	**4.30**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	04-Dec-2023 11:55	04-Dec-2023 12:25	04-Dec-2023 11:10	04-Dec-2023 13:30	04-Dec-2023 08:45
Compound	CAS Number	LOR	Unit		EW2305322-006	EW2305322-007	EW2305322-008	EW2305322-009	EW2305322-010
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		6.8	6.8	7.0	7.5	6.6
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		2250	1080	2120	678	459
EA116: Temperature									
Temperature	----	0.5	°C		21.3	21.0	17.4	18.2	19.1
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		897	550	486	329	273
Total Alkalinity as CaCO3	----	1	mg/L		897	550	486	329	273
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		55	24	300	42	<1
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		335	62	408	34	11
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		211	139	112	89	62
Potassium	7440-09-7	1	mg/L		28	16	130	42	8
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.467	0.178	0.239	0.063	0.289
Iron	7439-89-6	0.05	mg/L		2.19	0.65	8.19	0.74	2.46
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.2	0.4	0.2	0.1	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		8.09	1.84	6.35	2.42	1.58
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.01	<0.01	0.02	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	04-Dec-2023 11:55	04-Dec-2023 12:25	04-Dec-2023 11:10	04-Dec-2023 13:30	04-Dec-2023 08:45
Compound	CAS Number	LOR	Unit		EW2305322-006	EW2305322-007	EW2305322-008	EW2305322-009	EW2305322-010
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**0.86**	**0.08**	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.87**	**0.08**	**0.02**	<0.01	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**40**	**17**	**34**	**13**	**14**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**4.22**	**4.62**	**21.2**	**4.54**	**2.19**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH21	BH22	Duplicate	----	----
			Sampling date / time	04-Dec-2023 10:40	04-Dec-2023 10:20	04-Dec-2023 08:45	----	----
Compound	CAS Number	LOR	Unit	EW2305322-011	EW2305322-012	EW2305322-013	--------	--------
				Result	Result	Result	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**6.9**	**6.8**	**6.6**	**----**	**----**
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**2170**	**1360**	**461**	**----**	**----**
EA116: Temperature								
Temperature	----	0.5	°C	**21.0**	**18.3**	**19.1**	**----**	**----**
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	**528**	**335**	**267**	**----**	**----**
Total Alkalinity as CaCO3	----	1	mg/L	**528**	**335**	**267**	**----**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**227**	**345**	<1	**----**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**238**	**77**	**11**	**----**	**----**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**237**	**156**	**65**	**----**	**----**
Potassium	7440-09-7	1	mg/L	**41**	**13**	**8**	**----**	**----**
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	**0.123**	**0.336**	**0.300**	**----**	**----**
Iron	7439-89-6	0.05	mg/L	<0.05	**44.6**	**2.59**	**----**	**----**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.2**	**0.4**	**0.2**	**----**	**----**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.07**	**4.68**	**1.58**	**----**	**----**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.78**	<0.01	<0.01	**----**	**----**
EK058G: Nitrate as N by Discrete Analyser								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
				Sampling date / time	04-Dec-2023 10:40	04-Dec-2023 10:20	04-Dec-2023 08:45	----	----
Compound	CAS Number	LOR	Unit		EW2305322-011	EW2305322-012	EW2305322-013	--------	--------
					Result	Result	Result	----	----
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**52.3**	**0.06**	<0.01	**----**	**----**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**53.1**	**0.06**	<0.01	**----**	**----**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**27**	**33**	**14**	**----**	**----**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.00**	**2.32**	**2.19**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
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☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		
PROJECT:	Dunmore Quarterly Surface Waters EPL	ALS QUOTE NO.: WO/030/19 TENDER	
ORDER NUMBER:			
PROJECT MANAGER:	Ryan Stirling		
SAMPLER:	Robert Dalio	SAMPLER MOBILE:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to :			
Email Invoice to :			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt	5.6 °C		
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Robert Dalio	Anete		
DATE/TIME: 5.12.23	DATE/TIME: 5/12/23	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2A (Ionic Balance)	TOC, NT-4, NH3, Total Mn	Dissolved and Total Fe	Turbidity	NH3, NH4 & NO3	TSS, TDS, TOC, Total Mn		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP1	5.12.23 10:45	W			✓	✓	✓	✓					Field Tests - pH, EC, DO & Temp
	SWC_2	9:26	W				✓		✓	✓	✓	✓		Field Tests - pH, EC, DO & Temp
	SWC_UP	8:45	W				✓		✓	✓	✓	✓		Field Tests - pH, EC, DO & Temp
	SWC_DOWN	8:55	W				✓		✓	✓	✓	✓		Field Tests - pH, EC, DO & Temp
	SWC_DOWN_2	9:06	W				✓		✓	✓	✓	✓		Field Tests - pH, EC, DO & Temp
	Duplicate	9:26	W				✓		✓	✓	✓	✓		Field Tests - pH, EC, DO & Temp

Environmental Division
Wollongong
Work Order Reference
EW2305324

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils;
Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
= HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

CERTIFICATE OF ANALYSIS

Work Order	: **EW2305324**	Page	: 1 of 7
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 05-Dec-2023 14:04
Order number	: 156810	Date Analysis Commenced	: 05-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 13:38
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		
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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- 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.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	05-Dec-2023 10:45	05-Dec-2023 09:26	05-Dec-2023 08:45	05-Dec-2023 08:55	05-Dec-2023 09:05
Compound	CAS Number	LOR	Unit		EW2305324-001	EW2305324-002	EW2305324-003	EW2305324-004	EW2305324-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.3	7.2	7.2	7.2	7.2
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		526	4520	3980	5220	5110
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		----	2990	2630	3430	3360
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		12	7	10	6	7
EA045: Turbidity									
Turbidity	----	0.1	NTU		4.8	10.3	10.0	10.3	10.5
EA116: Temperature									
Temperature	----	0.5	°C		23.8	21.3	21.5	22.0	21.8
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		162	120	120	121	120
Total Alkalinity as CaCO3	----	1	mg/L		162	120	120	121	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		15	186	162	213	195
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		67	1370	1230	1480	1470
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		32	60	52	66	64
Magnesium	7439-95-4	1	mg/L		12	93	77	106	106
Sodium	7440-23-5	1	mg/L		59	749	617	864	858
Potassium	7440-09-7	1	mg/L		10	32	26	37	36
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L		0.11	0.12	0.12	0.09	0.09

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	05-Dec-2023 10:45	05-Dec-2023 09:26	05-Dec-2023 08:45	05-Dec-2023 08:55	05-Dec-2023 09:05
Compound	CAS Number	LOR	Unit		EW2305324-001	EW2305324-002	EW2305324-003	EW2305324-004	EW2305324-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.359	0.079	0.074	0.076	0.075
Iron	7439-89-6	0.05	mg/L		0.37	1.23	1.09	1.48	1.17
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.3	0.3	0.3	0.4	0.4
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.05	0.25	0.20	0.27	0.25
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		0.05	0.25	0.20	0.27	0.25
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	0.08	0.03	0.09	0.07
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.01	0.08	0.03	0.09	0.07
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		5.44	44.9	40.5	48.6	47.9
ø Total Cations	----	0.01	meq/L		5.41	44.0	36.4	50.5	50.2
ø Ionic Balance	----	0.01	%		0.30	0.98	5.24	1.96	2.28
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		18	10	11	10	10
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		3.81	5.24	6.44	6.60	5.81

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Duplicate	----	----	----	----
			Sampling date / time	05-Dec-2023 09:26	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2305324-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.2**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**4520**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**2960**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**7**	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**10.2**	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	**21.3**	----	----	----	----
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	**122**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**122**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**189**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**1290**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**57**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**88**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**711**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**30**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	**0.13**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Duplicate	----	----	----	----
				Sampling date / time	05-Dec-2023 09:26	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2305324-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.076**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**1.20**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.4**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.23**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**0.23**	----	----	----	----
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		**0.03**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.03**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**42.8**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**41.8**	----	----	----	----
ø Ionic Balance	----	0.01	%		**1.16**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**10**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**5.23**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd Warabrook NSW 2304 Ph: 02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 3-1 Burma Rd Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):					**FOR LABORATORY USE ONLY (Circle)**	
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		☐ Non Standard or urgent TAT (List due date):					Custody Seal Intact?	Yes / No / N/A
PROJECT:	Dunmore Quarterly Leachate	**ALS QUOTE NO.:**	WO/030/19 TENDER					Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER:				COC:	1 2 3 4 5 6 7			Random Sample Temperature on Receipt:	5.6 °C
PROJECT MANAGER:	Ryan Stirling			OF:	1 2 3 4 5 6 7			Other comment:	

SAMPLER: Robert Dalrio	**SAMPLER MOBILE:**	**RELINQUISHED BY:** Robert Dalrio	**RECEIVED BY:** Anets	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**				
Email Reports to :		**DATE/TIME:** 5.12.23	**DATE/TIME:** 5/12/23	**DATE/TIME:**	**DATE/TIME:**
Email Invoice to :					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

ALS USE ONLY	SAMPLE DETAILS (MATRIX: Solid(S) Water(W))			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	Total Fe & Mn	NT-4 (NO2, NO3)				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Leachate Storage Tank - LP1	5.12.23 12:10	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & DO
				TOTAL	10									

Environmental Division
Wollongong
Work Order Reference
EW2305326

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2305326**	Page	: 1 of 4
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate Tank EPL	Date Samples Received	: 05-Dec-2023 14:09
Order number	: 156810	Date Analysis Commenced	: 05-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 13:39
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		
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*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK059G, EK057G: NOx and Nitrite for sample no.1 confirmed by re-analysis.
- ED041G: LOR raised for Sulfate due to sample matrix
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Leachate Storage Tank LP1	----	----	----	----
			Sampling date / time	05-Dec-2023 12:10	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2305326-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**8.6**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**8410**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**5570**	----	----	----	----
EA116: Temperature								
Temperature	----	0.1	°C	**24.4**	----	----	----	----
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	**134**	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**1770**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**1900**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**1570**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**51**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**355**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	**1.35**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**5.08**	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.3**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**330**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Storage Tank LP1	----	----	----	----
				Sampling date / time	05-Dec-2023 12:10	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2305326-001	--------	--------	--------	--------
					Result	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**5.76**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.20	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.60**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**142**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**3.40**	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation		**41.3**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Melbourne: 24 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Adelaide: 2-4 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
☐ Launceston: 27 Wellington St, Launc Ph: 03 6331 2158 E: launceston@alsen

Perth 4, 5.

Environmental Division
Wollongong
Work Order Reference
EW2400913

Telephone : 02 42253125

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE	
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	
PROJECT:	Dunmore Quarterly Ground Waters EPL	ALS QUOTE NO.:	WO/030/19 TENDER	Free ice / frozen ice bricks present?	
ORDER NUMBER:			COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature	
PROJECT MANAGER:	Ryan Stirling			Other comment:	
SAMPLER:	Robert Dalo	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	DATE/TIME: 1.3.24	DATE/TIME: 1.3.24.	DATE/TIME:
Email Reports to :					
Email Invoice to :					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	Dissolved Fe & Mn	NT-4 (NO2, NO3)	Send to Eurofins			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	BH1C	1.3.24 10:30	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH3	12:50	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH4	13:30	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH9	9:37	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH12R	11:40	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH13	12:00	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH14	12:25	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH15	11:16	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH19R	13:10	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH18	8:55	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH21	10:52	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	BH22	10:27	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	Duplicate	8:55	W			✓	✓	✓	✓	✓				Field Tests - pH, EC, Temp & SWL
	Triplicate	8:55	W								✓			
				TOTAL	10									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2400913**	Page	: 1 of 8
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 01-Mar-2024 15:03
Order number	: 156810	Date Analysis Commenced	: 01-Mar-2024
C-O-C number	: ----	Issue Date	: 18-Mar-2024 10:52
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS CPI 2024		
No. of samples received	: 14		
No. of samples analysed	: 13		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via Bailer & High Flow Method.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sample collection of Ground Waters by in-house EN67 where the “surface layer of the aquifer was sampled”.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	01-Mar-2024 10:03	01-Mar-2024 12:50	01-Mar-2024 13:30	01-Mar-2024 09:37	01-Mar-2024 11:40
Compound	CAS Number	LOR	Unit		EW2400913-001	EW2400913-002	EW2400913-003	EW2400913-004	EW2400913-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.2	7.3	7.4	7.3	6.9
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7610	1450	1030	3890	1620
EA116: Temperature									
Temperature	----	0.5	°C		25.0	18.7	18.9	18.7	21.4
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		2700	459	388	1920	548
Total Alkalinity as CaCO3	----	1	mg/L		2700	459	388	1920	548
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	164	130	<1	138
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		971	153	77	436	180
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		123	159	148	198	196
Potassium	7440-09-7	1	mg/L		211	29	24	84	28
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.118	0.151	0.156	0.863	0.527
Iron	7439-89-6	0.05	mg/L		12.4	2.01	4.25	0.18	10.2
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.3	<0.1	0.1	0.5	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		319	17.4	4.20	133	4.28
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.08	<0.01	0.02	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	01-Mar-2024 10:03	01-Mar-2024 12:50	01-Mar-2024 13:30	01-Mar-2024 09:37	01-Mar-2024 11:40
Compound	CAS Number	LOR	Unit		EW2400913-001	EW2400913-002	EW2400913-003	EW2400913-004	EW2400913-005
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**9.65**	<0.01	**0.46**	**0.11**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**9.73**	<0.01	**0.48**	**0.11**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**178**	**19**	**12**	**73**	**24**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.10**	**3.20**	**4.50**	**3.16**	**4.40**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	01-Mar-2024 12:00	01-Mar-2024 12:25	01-Mar-2024 11:16	01-Mar-2024 13:10	01-Mar-2024 08:55
Compound	CAS Number	LOR	Unit		EW2400913-006	EW2400913-007	EW2400913-008	EW2400913-009	EW2400913-010
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		6.7	6.7	7.1	7.6	6.7
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		2110	1500	1620	714	426
EA116: Temperature									
Temperature	----	0.5	°C		21.9	21.6	19.7	18.9	20.9
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		829	610	475	345	242
Total Alkalinity as CaCO3	----	1	mg/L		829	610	475	345	242
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		48	47	181	46	<1
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		295	166	204	37	11
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		198	198	86	95	62
Potassium	7440-09-7	1	mg/L		25	21	103	48	9
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.507	0.229	0.164	0.065	0.081
Iron	7439-89-6	0.05	mg/L		3.71	0.41	4.34	0.49	1.24
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.2	0.4	0.2	0.1	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		7.13	1.44	9.00	2.36	0.92
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.03	0.02	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	01-Mar-2024 12:00	01-Mar-2024 12:25	01-Mar-2024 11:16	01-Mar-2024 13:10	01-Mar-2024 08:55
Compound	CAS Number	LOR	Unit		EW2400913-006	EW2400913-007	EW2400913-008	EW2400913-009	EW2400913-010
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**2.03**	**5.28**	**0.05**	**0.02**	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**2.03**	**5.31**	**0.07**	**0.02**	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**38**	**25**	**33**	**11**	**11**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**4.35**	**4.82**	**0.73**	**4.18**	**2.22**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH21	BH22	Duplicate	----	----
			Sampling date / time	01-Mar-2024 10:52	01-Mar-2024 10:27	01-Mar-2024 08:55	----	----
Compound	CAS Number	LOR	Unit	EW2400913-011	EW2400913-012	EW2400913-013	--------	--------
				Result	Result	Result	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.2**	**7.3**	**6.7**	**----**	**----**
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**2280**	**1680**	**427**	**----**	**----**
EA116: Temperature								
Temperature	----	0.5	°C	**22.4**	**19.5**	**20.9**	**----**	**----**
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	**769**	**486**	**241**	**----**	**----**
Total Alkalinity as CaCO3	----	1	mg/L	**769**	**486**	**241**	**----**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**155**	**218**	<1	**----**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**302**	**200**	**10**	**----**	**----**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**125**	**116**	**62**	**----**	**----**
Potassium	7440-09-7	1	mg/L	**16**	**22**	**9**	**----**	**----**
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	**0.455**	**0.132**	**0.080**	**----**	**----**
Iron	7439-89-6	0.05	mg/L	**1.02**	**16.5**	**1.23**	**----**	**----**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.3**	**0.5**	**0.2**	**----**	**----**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**4.08**	**7.12**	**0.89**	**----**	**----**
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								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
				Sampling date / time	01-Mar-2024 10:52	01-Mar-2024 10:27	01-Mar-2024 08:55	----	----
Compound	CAS Number	LOR	Unit		EW2400913-011	EW2400913-012	EW2400913-013	--------	--------
					Result	Result	Result	----	----
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**0.01**	<0.01	<0.01	**----**	**----**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.01**	<0.01	<0.01	**----**	**----**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**35**	**28**	**12**	**----**	**----**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.04**	**2.41**	**2.22**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) ED093F: Dissolved Major Cations
(WATER) EP005: Total Organic Carbon (TOC)

CERTIFICATE OF ANALYSIS

Work Order	: **EW2400974**	Page	: 1 of 4
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate	Date Samples Received	: 05-Mar-2024 15:09
Order number	: 156810	Date Analysis Commenced	: 05-Mar-2024
C-O-C number	: ----	Issue Date	: 12-Mar-2024 14:07
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE CPI 2024		
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*
Aneta Prosaroski	Environmental Services Representative	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK057G: LOR raised for NOx on sample no.1 due to sample matrix.
- EK057G: LOR raised for Nitrite due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Sump	----	----	----	----
				Sampling date / time	05-Mar-2024 14:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2400974-001	--------	--------	--------	--------
					Result	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit		**7.5**	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		**8250**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**4060**	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C		**22.2**	----	----	----	----
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		**3330**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**3330**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**1010**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**135**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**353**	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.708**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**15.9**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.6**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**490**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Sump	----	----	----	----
				Sampling date / time	05-Mar-2024 14:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2400974-001	--------	--------	--------	--------
					Result	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser - Continued									
Nitrite as N	14797-65-0	0.01	mg/L		<0.10	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.10	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.10	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**257**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**7.51**	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation		**86.5**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CERTIFICATE OF ANALYSIS

Work Order	: **EW2400977**	Page	: 1 of 7
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 05-Mar-2024 15:12
Order number	: 156810	Date Analysis Commenced	: 05-Mar-2024
C-O-C number	: ----	Issue Date	: 12-Mar-2024 15:36
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER CPI 2024		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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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*
Aneta Prosaroski	Environmental Services Representative	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- 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.
- EG020: LORs have been raised for some samples due to matrix interference (High sample salinity)
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	05-Mar-2024 12:45	05-Mar-2024 10:00	05-Mar-2024 10:20	05-Mar-2024 10:40	05-Mar-2024 10:50
Compound	CAS Number	LOR	Unit		EW2400977-001	EW2400977-002	EW2400977-003	EW2400977-004	EW2400977-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.4	7.2	7.2	7.2	7.2
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		871	28800	25200	30000	33000
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		----	27400	23300	28400	30700
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		9	<5	<5	<5	<5
EA045: Turbidity									
Turbidity	----	0.1	NTU		4.6	2.5	2.5	2.5	2.1
EA116: Temperature									
Temperature	----	0.5	°C		21.9	19.7	19.4	20.9	20.6
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		289	168	168	168	161
Total Alkalinity as CaCO3	----	1	mg/L		289	168	168	168	161
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		27	1450	1260	1420	1540
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		112	10000	8720	10300	11200
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		41	264	235	273	286
Magnesium	7439-95-4	1	mg/L		22	715	621	694	781
Sodium	7440-23-5	1	mg/L		122	5770	5000	5670	6340
Potassium	7440-09-7	1	mg/L		10	223	194	217	244
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L		<0.05	0.07	0.10	<0.05	<0.10

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	05-Mar-2024 12:45	05-Mar-2024 10:00	05-Mar-2024 10:20	05-Mar-2024 10:40	05-Mar-2024 10:50
Compound	CAS Number	LOR	Unit		EW2400977-001	EW2400977-002	EW2400977-003	EW2400977-004	EW2400977-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.482	0.260	0.329	0.241	0.199
Iron	7439-89-6	0.05	mg/L		0.39	0.24	0.29	0.26	0.17
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.3	0.7	0.4	0.5	0.4
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.07	0.22	0.23	0.23	0.24
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		0.07	0.22	0.23	0.23	0.24
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.02	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	0.01	0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	0.02	0.03	0.02	0.01
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		9.50	316	276	323	351
ø Total Cations	----	0.01	meq/L		9.42	329	285	323	360
ø Ionic Balance	----	0.01	%		0.40	2.03	1.73	0.08	1.31
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		21	10	10	9	8
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		3.53	3.39	4.20	5.16	4.25

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Duplicate	----	----	----	----
			Sampling date / time	05-Mar-2024 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2400977-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.2**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**28800**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**27300**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**2.4**	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	**19.7**	----	----	----	----
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	**165**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**165**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**1280**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**10400**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**270**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**689**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**5660**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**215**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	**0.06**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Duplicate	----	----	----	----
				Sampling date / time	05-Mar-2024 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2400977-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.234**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.27**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.4**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.24**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**0.24**	----	----	----	----
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		**0.02**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**323**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**322**	----	----	----	----
ø Ionic Balance	----	0.01	%		**0.22**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**9**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**3.39**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY

Mandatory Fields

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Quarterly Ground Waters EPL**			SITE:	**Dunmore**
***INVOICE** TO: *(client default if nil)*	Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM	
*EMAIL **REPORTS** TO: *(default to PM if blank)*	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

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CoC #: *(if applicable)*

BIOSECURITY

*** STORAGE REQUIREMENTS** *Please check box.* →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Ammonia NT-04 (NO2 & NO3)	TOC	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	Dissolved Fe & Mn	Field Tests pH, EC, Temp & SWL	Send to Eurofins							Lab QC *(additional bottles req.)* Dup	Lab QC MS	Additional Information *(Comment on hazards - e.g., asbestos, known high contamination)*
	BH1C		4.6.24 10:10	4	W	X	X	X	X	X								☐	☐	
	BH3		14:00	4	W	X	X	X	X	X								☐	☐	
	BH4		13:20	4	W	X	X	X	X	X								☐	☐	
	BH9		9:23	4	W	X	X	X	X	X								☐	☐	
	BH12R		12:05	4	W	X	X	X	X	X								☐	☐	
	BH13		12:25	4	W	X	X	X	X	X								☐	☐	
	BH14		12:55	4	W	X	X	X	X	X								☐	☐	
	BH15		11:57	4	W	X	X	X	X	X								☐	☐	
	BH19R		13:40	4	W	X	X	X	X	X								☐	☐	
	BH18		8:25	4	W	X	X	X	X	X										
	BH21		11:10	4	W	X	X	X	X	X										
	BH22		10:38	4	W	X	X	X	X	X										
	Duplicate		8:25	4	W	X	X	X	X	X										
	Triplicate		8:25	4	W						X							☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted — Ice Bricks: Frozen / Thawed — None
Sample Temp at Receipt: 7.9°c 6.8°c 7.1 °c
Security Seal Intact *(circle)*: Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #:
Packaging: *(Circle)* Hard Esky / Foam Esky / Box/Bag/Other
Count: # 2 # #

Relinquished by: Robert DeLio Signature: Date/Time: 4.6.24 15:15
Relinquished by: Signature: Date/Time:

Received by: Michael Santos Signature: Date/Time: 4.6.24. 15:10
Received by: Signature: Date/Time:

Environmental Division
Wollongong
Work Order Reference
EW2402552

Telephone : 02 42253125

CERTIFICATE OF ANALYSIS

Work Order	: **EW2402552**	Page	: 1 of 8
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 04-Jun-2024 15:10
Order number	: 156810	Date Analysis Commenced	: 04-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 17:03
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS CPI 2024		
No. of samples received	: 14		
No. of samples analysed	: 13		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- ED041G: LOR raised for Sulfate on sample nos. 10 and 13 due to sample matrix.
- EK059G: LOR raised for NOx on sample no.1 due to sample matrix.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling High Flow and Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Sample collection of Ground Waters by in-house EN67 where the “surface layer of the aquifer was sampled”.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	04-Jun-2024 10:10	04-Jun-2024 14:00	04-Jun-2024 13:20	04-Jun-2024 09:23	04-Jun-2024 12:05
Compound	CAS Number	LOR	Unit		EW2402552-001	EW2402552-002	EW2402552-003	EW2402552-004	EW2402552-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.0	7.4	7.2	6.9	6.6
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7500	759	842	3790	1860
EA116: Temperature									
Temperature	----	0.5	°C		25.0	18.4	19.0	17.7	21.3
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		2570	282	350	1510	574
Total Alkalinity as CaCO3	----	1	mg/L		2570	282	350	1510	574
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		261	69	57	146	84
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		989	115	120	528	230
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		124	98	117	218	184
Potassium	7440-09-7	1	mg/L		206	30	23	75	32
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.112	0.049	0.116	0.730	0.428
Iron	7439-89-6	0.05	mg/L		12.4	0.20	2.65	2.95	4.57
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.4	0.2	0.1	0.5	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		352	6.56	3.63	96.8	2.50
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.05	0.02	<0.01	0.01	0.05
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	04-Jun-2024 10:10	04-Jun-2024 14:00	04-Jun-2024 13:20	04-Jun-2024 09:23	04-Jun-2024 12:05
Compound	CAS Number	LOR	Unit		EW2402552-001	EW2402552-002	EW2402552-003	EW2402552-004	EW2402552-005
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.10	**4.83**	**0.06**	**0.02**	**1.20**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.10	**4.85**	**0.06**	**0.03**	**1.25**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**183**	**14**	**11**	**69**	**30**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**2.75**	**2.83**	**4.15**	**2.75**	**4.04**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	04-Jun-2024 12:25	04-Jun-2024 12:55	04-Jun-2024 11:38	04-Jun-2024 13:40	04-Jun-2024 08:25
Compound	CAS Number	LOR	Unit		EW2402552-006	EW2402552-007	EW2402552-008	EW2402552-009	EW2402552-010
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		6.8	6.8	6.9	7.4	6.9
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		1900	1450	1090	683	328
EA116: Temperature									
Temperature	----	0.5	°C		22.0	21.6	16.6	18.7	20.5
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		652	464	347	326	181
Total Alkalinity as CaCO3	----	1	mg/L		652	464	347	326	181
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		85	50	60	38	<10
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		206	158	147	37	11
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		182	160	54	92	46
Potassium	7440-09-7	1	mg/L		25	22	89	42	7
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.440	0.211	0.121	0.054	0.030
Iron	7439-89-6	0.05	mg/L		2.08	0.92	3.81	0.53	0.54
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.2	0.4	0.2	0.2	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		14.0	1.50	7.15	1.24	0.54
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.01	0.24	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	04-Jun-2024 12:25	04-Jun-2024 12:55	04-Jun-2024 11:38	04-Jun-2024 13:40	04-Jun-2024 08:25
Compound	CAS Number	LOR	Unit		EW2402552-006	EW2402552-007	EW2402552-008	EW2402552-009	EW2402552-010
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**5.68**	**19.3**	<0.01	**0.04**	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**5.69**	**19.5**	<0.01	**0.04**	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**35**	**33**	**29**	**12**	**9**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.90**	**4.22**	**0.75**	**4.33**	**1.99**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
				Sampling date / time	04-Jun-2024 11:10	04-Jun-2024 10:38	04-Jun-2024 08:25	----	----
Compound	CAS Number	LOR	Unit		EW2402552-011	EW2402552-012	EW2402552-013	--------	--------
					Result	Result	Result	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.2	6.6	6.9	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		2230	1160	328	----	----
EA116: Temperature									
Temperature	----	0.5	°C		22.3	18.9	20.5	----	----
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		729	356	180	----	----
Total Alkalinity as CaCO3	----	1	mg/L		729	356	180	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		126	52	<10	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		299	162	14	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		124	84	46	----	----
Potassium	7440-09-7	1	mg/L		14	7	7	----	----
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.450	0.334	0.029	----	----
Iron	7439-89-6	0.05	mg/L		2.57	21.8	0.54	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.4	0.3	0.3	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		4.07	5.41	0.54	----	----
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									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
				Sampling date / time	04-Jun-2024 11:10	04-Jun-2024 10:38	04-Jun-2024 08:25	----	----
Compound	CAS Number	LOR	Unit		EW2402552-011	EW2402552-012	EW2402552-013	--------	--------
					Result	Result	Result	----	----
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.01	**----**	**----**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.01	**----**	**----**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**31**	**38**	**9**	**----**	**----**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**2.70**	**2.06**	**1.99**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Quarterly Surface Waters EPL**			SITE:	**Dunmore**
***INVOICE TO:** *(client default if nil)*	Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM	
*EMAIL **REPORTS TO:** *(default to PM if blank)*	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

BIOSECURITY

Country of Origin: *(if not Australia)*

Environmental Division Wollongong
Work Order Reference
EW2402546

Telephone : 02 42253125

*** STORAGE REQUIREMENTS** *Please check box.* →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	TSS	NT-1, NT-2A (Ionic Balance)	TOC, NT-4, NH3, Total Mn	Dissolved and Total Fe	Turbidity	NH3, NH4 & NO3	TSS, TDS, TOC, Total Mn	Field Test pH, EC, DO & Temp					Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
	SWP1		3.6.24 10:10	4		X	X	X	X				X					☐	☐	
	SWC_2		11:45				X		X	X	X	X	X					☐	☐	
	SWC_UP		11:30				X		X	X	X	X	X					☐	☐	
	SWC_DOWN		10:40				X		X	X	X	X	X					☐	☐	
	SWC_DOWN_2		10:55				X		X	X	X	X	X					☐	☐	
	Duplicate		10:15				X		X	X	X	X	X					☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted — Ice Bricks: (Frozen) / Thawed — None
Sample Temp at Receipt: 4.2°C 4.8°C 4.8°C
Security Seal Intact *(circle)*: Yes / No / N/A(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ALS
Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other
Count # 1 # #

Relinquished by: Robert Dahl
Signature:
Date/Time: 3.6.24
Relinquished by:
Signature:
Date/Time:

Received by: Anita
Signature
Date/Time: 3/6/24
Received by:
Signature
Date/Time:

CERTIFICATE OF ANALYSIS

Work Order	: **EW2402546**	Page	: 1 of 7
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 03-Jun-2024 14:39
Order number	: 156810	Date Analysis Commenced	: 03-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 17:43
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER CPI 2024		
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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Sydney.**
- 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.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
			Sampling date / time	03-Jun-2024 10:10	03-Jun-2024 11:45	03-Jun-2024 11:30	03-Jun-2024 10:40	03-Jun-2024 10:55
Compound	CAS Number	LOR	Unit	EW2402546-001	EW2402546-002	EW2402546-003	EW2402546-004	EW2402546-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.5	7.5	7.4	7.4	7.4
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1120	6580	5890	13100	15200
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	4990	4300	10200	11900
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	9	<5	<5
EA045: Turbidity								
Turbidity	----	0.1	NTU	3.4	10.6	11.3	8.3	7.6
EA116: Temperature								
Temperature	----	0.5	°C	12.6	13.3	13.5	13.6	13.7
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	316	109	108	110	109
Total Alkalinity as CaCO3	----	1	mg/L	316	109	108	110	109
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	233	391	346	810	940
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	183	2780	2430	5440	6170
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	70	76	69	136	155
Magnesium	7439-95-4	1	mg/L	44	180	161	371	442
Sodium	7440-23-5	1	mg/L	204	1500	1330	3140	3630
Potassium	7440-09-7	1	mg/L	11	59	52	116	134
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	0.06	0.07	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	03-Jun-2024 10:10	03-Jun-2024 11:45	03-Jun-2024 11:30	03-Jun-2024 10:40	03-Jun-2024 10:55
Compound	CAS Number	LOR	Unit		EW2402546-001	EW2402546-002	EW2402546-003	EW2402546-004	EW2402546-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.038	0.072	0.072	0.059	0.057
Iron	7439-89-6	0.05	mg/L		0.11	0.86	0.88	0.61	0.54
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.5	0.3	0.3	0.4	0.5
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		2.10	0.16	0.12	0.10	0.10
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		2.08	0.16	0.12	0.10	0.10
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.14	0.01	0.02	0.02	0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.45	0.41	0.34	0.27	0.25
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.59	0.42	0.36	0.29	0.26
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		16.3	88.7	77.9	172	196
ø Total Cations	----	0.01	meq/L		16.3	85.4	75.9	177	205
ø Ionic Balance	----	0.01	%		0.18	1.94	1.32	1.24	2.40
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		19	8	8	8	7
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		4.16	8.81	8.89	8.70	7.78

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Duplicate	----	----	----	----
			Sampling date / time	03-Jun-2024 10:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2402546-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.5**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**1130**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**990**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**3.3**	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	**12.5**	----	----	----	----
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	**314**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**314**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**231**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**176**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**70**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**45**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**208**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**11**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Duplicate	----	----	----	----
				Sampling date / time	03-Jun-2024 10:15	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2402546-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.038**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.12**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.5**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**1.87**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**1.86**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.14**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.45**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.59**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**16.0**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**16.5**	----	----	----	----
ø Ionic Balance	----	0.01	%		**1.46**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**18**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**4.10**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	SHECIT	*PROJECT MANAGER:	Ryan Stirling	SAMPLER:	SAMPLED BY ALS
*CLIENT:	Shellharbour City Council	*PM MOBILE:		SAMPLER MOBILE:	02 4225 3125
OFFICE: *(Invoiced Office)*	Shellharbour	ALS QUOTE # *(Client PL if blank)*	WO/030/19 TENDER	PURCHASE ORDER NO.:	156810
PROJECT NO./PROJECT:	Dunmore Quarterly Ground Waters EPL			SITE:	Dunmore
*INVOICE TO: *(client default if nil)*	Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM	
*EMAIL REPORTS TO: *(default to PM if blank)*	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

BIOSECURITY

Country of Origin: *(if not Australia)*

Environmental Division
Wollongong
Work Order Reference
EW2404038

Telephone : 02 42253125

*** STORAGE REQUIREMENTS** *Please check box.* →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Ammonia NT-04 (NO2 & NO3)	TOC	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	Dissolved Fe & Mn	Field Tests pH, EC, Temp & SWL	Send to Eurofins	(additional bottles req.) Dup	MS	(Comment on hazards - e.g., asbestos, known high contamination)
	BH1C		2.9.24 9:25	4	W	X	X	X	X	X		☐	☐	
	BH3		11:35	4	W	X	X	X	X	X		☐	☐	
	BH4		12:45	4	W	X	X	X	X	X		☐	☐	
	BH9		9:10	4	W	X	X	X	X	X		☐	☐	
	BH12R		11:20	4	W	X	X	X	X	X		☐	☐	
	BH13		11:40	4	W	X	X	X	X	X		☐	☐	
	BH14		12:20	4	W	X	X	X	X	X		☐	☐	
	BH15		10:55	4	W	X	X	X	X	X		☐	☐	
	BH19R		13:10	4	W	X	X	X	X	X		☐	☐	
	BH18		8:20	4	W	X	X	X	X	X				
	BH21		9:55	4	W	X	X	X	X	X				
	BH22		10:17	4	W	X	X	X	X	X				
	Duplicate		8:20	4	W	X	X	X	X	X				
	Triplicate		8:20	4	W						X	☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; None
Sample Temp at Receipt: 4.2 °C 4.8 °C 5.1 °C
Security Seal Intact *(circle)*: Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ALS
Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other
Count: # 2 # # #

Relinquished by:	Robert Dalton	Signature:	Date/Time: 2/9/24 9	Received by:	Signature
Relinquished by:		Signature:	Date/Time:	Received by:	Signature

Date/Time: 3/9/24

CERTIFICATE OF ANALYSIS

Work Order	: **EW2404038**	Page	: 1 of 8
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 03-Sep-2024 15:56
Order number	: 166321	Date Analysis Commenced	: 03-Sep-2024
C-O-C number	: ----	Issue Date	: 12-Sep-2024 18:13
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS CPI 2024		
No. of samples received	: 14		
No. of samples analysed	: 13		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- EK059: LOR raised for NOx for sample 1 due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow and Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sample collection of Ground Waters by in-house EN67 where the “surface layer of the aquifer was sampled”.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	03-Sep-2024 09:35	03-Sep-2024 11:55	03-Sep-2024 12:45	03-Sep-2024 09:10	03-Sep-2024 11:20
Compound	CAS Number	LOR	Unit		EW2404038-001	EW2404038-002	EW2404038-003	EW2404038-004	EW2404038-005
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.0	7.4	7.3	7.0	6.8
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7090	1220	690	3650	1920
EA116: Temperature									
Temperature	----	0.5	°C		25.2	17.7	18.3	17.8	20.3
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		2800	434	339	1270	654
Total Alkalinity as CaCO3	----	1	mg/L		2800	434	339	1270	654
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<10	224	110	351	84
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		787	120	26	561	290
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		113	133	95	209	174
Potassium	7440-09-7	1	mg/L		203	40	26	64	30
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.093	0.144	0.093	0.418	0.447
Iron	7439-89-6	0.05	mg/L		9.22	2.55	1.81	4.87	9.49
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.4	0.2	0.1	0.5	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		28.3	25.4	2.84	65.2	5.99
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.13	0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1C	BH3	BH4	BH9	BH12R
				Sampling date / time	03-Sep-2024 09:35	03-Sep-2024 11:55	03-Sep-2024 12:45	03-Sep-2024 09:10	03-Sep-2024 11:20
Compound	CAS Number	LOR	Unit		EW2404038-001	EW2404038-002	EW2404038-003	EW2404038-004	EW2404038-005
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.10	**1.21**	**0.05**	<0.01	**0.28**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.10	**1.34**	**0.06**	<0.01	**0.28**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**163**	**22**	**8**	**47**	**74**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.20**	**3.18**	**4.40**	**3.22**	**4.35**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	03-Sep-2024 11:40	03-Sep-2024 12:20	03-Sep-2024 10:55	03-Sep-2024 13:10	03-Sep-2024 08:20
					EW2404038-006	EW2404038-007	EW2404038-008	EW2404038-009	EW2404038-010
					Result	Result	Result	Result	Result
EA005FD: Field pH									
pH	----	0.1	pH Unit		6.8	6.8	7.0	7.4	6.8
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		2050	1580	1610	667	402
EA116: Temperature									
Temperature	----	0.5	°C		21.9	21.0	14.9	17.8	18.5
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		785	594	325	359	246
Total Alkalinity as CaCO3	----	1	mg/L		785	594	325	359	246
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		107	97	551	54	<10
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		280	189	169	23	18
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		168	168	130	86	49
Potassium	7440-09-7	1	mg/L		26	20	98	50	12
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.460	0.246	0.225	0.053	0.032
Iron	7439-89-6	0.05	mg/L		2.03	1.38	5.32	0.71	0.48
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.2	0.6	0.2	0.1	0.2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		16.7	2.03	9.79	1.21	0.74
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.03	0.04	0.02	0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH13	BH14	BH15	BH19R	BH18
				Sampling date / time	03-Sep-2024 11:40	03-Sep-2024 12:20	03-Sep-2024 10:55	03-Sep-2024 13:10	03-Sep-2024 08:20
Compound	CAS Number	LOR	Unit		EW2404038-006	EW2404038-007	EW2404038-008	EW2404038-009	EW2404038-010
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		**5.93**	**6.74**	**6.72**	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**5.96**	**6.78**	**6.74**	**0.01**	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**37**	**23**	**19**	**12**	**12**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**4.29**	**4.72**	**0.69**	**4.57**	**2.28**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	BH21	BH22	Duplicate	----	----
			Sampling date / time	03-Sep-2024 09:55	03-Sep-2024 10:17	03-Sep-2024 08:20	----	----
Compound	CAS Number	LOR	Unit	EW2404038-011	EW2404038-012	EW2404038-013	--------	--------
				Result	Result	Result	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.2**	**7.0**	**6.8**	**----**	**----**
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**2170**	**1450**	**402**	**----**	**----**
EA116: Temperature								
Temperature	----	0.5	°C	**21.0**	**17.2**	**18.5**	**----**	**----**
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	**799**	**492**	**244**	**----**	**----**
Total Alkalinity as CaCO3	----	1	mg/L	**799**	**492**	**244**	**----**	**----**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**197**	**181**	<10	**----**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**290**	**195**	**18**	**----**	**----**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**116**	**101**	**50**	**----**	**----**
Potassium	7440-09-7	1	mg/L	**16**	**15**	**12**	**----**	**----**
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	**0.480**	**0.069**	**0.032**	**----**	**----**
Iron	7439-89-6	0.05	mg/L	**1.25**	**8.85**	**0.50**	**----**	**----**
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.4**	**0.6**	**0.2**	**----**	**----**
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**4.43**	**3.81**	**0.76**	**----**	**----**
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								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH21	BH22	Duplicate	----	----
				Sampling date / time	03-Sep-2024 09:55	03-Sep-2024 10:17	03-Sep-2024 08:20	----	----
Compound	CAS Number	LOR	Unit		EW2404038-011	EW2404038-012	EW2404038-013	--------	--------
					Result	Result	Result	----	----
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.01	**----**	**----**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.01	**----**	**----**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**29**	**30**	**12**	**----**	**----**
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		**3.16**	**2.69**	**2.28**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Quarterly Surface Waters EPL**			SITE:	**Dunmore**
***INVOICE** TO: *(client default if nil)*	Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM	
*EMAIL **REPORTS** TO: *(default to PM if blank)*	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

BIOSECURITY

Country of Origin: *(if not Australia)*

Environmental Division
Wollongong
Work Order Reference
EW2404020

Telephone : 02 42253125

*** STORAGE REQUIREMENTS**
Please check box. →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND**
Please check box. →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	TSS	NT-1, NT-2A (Ionic Balance)	TOC, NT-4, NH3, Total Mn	Dissolved and Total Fe	Turbidity	NH3, NH4 & NO3	TSS, TDS, TOC, Total Mn	Field Test pH, EC, DO & Temp	Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	SWP1		29/4 14:50	4		X	X	X	X				X	☐	☐	
2	SWC_2		14:30				X		X	X	X	X	X	☐	☐	
3	SWC_UP		13:45				X		X	X	X	X	X	☐	☐	
4	SWC_DOWN		13:55				X		X	X	X	X	X	☐	☐	
5	SWC_DOWN_2		14:10				X		X	X	X	X	X	☐	☐	
6	Duplicate		14:30				X		X	X	X	X	X	☐	☐	
														☐	☐	
														☐	☐	
														☐	☐	
														☐	☐	
														☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted — Ice Bricks: Frozen / Thawed — None
Sample Temp at Receipt: 4.2 °C 4.8 °C 5.1 °C
Security Seal Intact (circle): Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ALS
Packaging: (Circle) Hard Esky — Foam Esky — Box/Bag/Other
Count # 1 # #

Relinquished by: Robert Dako — Signature: — Date/Time: 2.9.24
Relinquished by: — Signature: — Date/Time:

Received by: Aneta — Signature — Date/Time: 3/9/24
Received by: — Signature — Date/Time:

CERTIFICATE OF ANALYSIS

Work Order	: **EW2404020**	Page	: 1 of 7
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 03-Sep-2024 15:55
Order number	: 166321	Date Analysis Commenced	: 03-Sep-2024
C-O-C number	: ----	Issue Date	: 12-Sep-2024 18:13
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER CPI 2024		
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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- 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.
- TDS by method EA-015 various samples may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
			Sampling date / time	02-Sep-2024 14:50	02-Sep-2024 14:30	02-Sep-2024 13:45	02-Sep-2024 13:55	02-Sep-2024 14:10
Compound	CAS Number	LOR	Unit	EW2404020-001	EW2404020-002	EW2404020-003	EW2404020-004	EW2404020-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	**8.3**	**7.5**	**7.3**	**7.4**	**7.4**
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**1340**	**8880**	**8660**	**14800**	**18300**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**----**	**6740**	**6570**	**11400**	**14700**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	<5	<5
EA045: Turbidity								
Turbidity	----	0.1	NTU	**4.0**	**4.8**	**5.3**	**4.0**	**3.6**
EA116: Temperature								
Temperature	----	0.5	°C	**16.0**	**14.7**	**14.8**	**15.1**	**14.6**
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	**21**	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**370**	**86**	**84**	**127**	**127**
Total Alkalinity as CaCO3	----	1	mg/L	**391**	**86**	**84**	**127**	**127**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**266**	**464**	**457**	**667**	**1040**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**176**	**3260**	**3160**	**5360**	**6770**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**72**	**88**	**87**	**143**	**181**
Magnesium	7439-95-4	1	mg/L	**47**	**214**	**216**	**372**	**475**
Sodium	7440-23-5	1	mg/L	**211**	**1860**	**1810**	**3100**	**4050**
Potassium	7440-09-7	1	mg/L	**9**	**71**	**70**	**121**	**156**
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
				Sampling date / time	02-Sep-2024 14:50	02-Sep-2024 14:30	02-Sep-2024 13:45	02-Sep-2024 13:55	02-Sep-2024 14:10
Compound	CAS Number	LOR	Unit		EW2404020-001	EW2404020-002	EW2404020-003	EW2404020-004	EW2404020-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		0.042	0.065	0.066	0.065	0.066
Iron	7439-89-6	0.05	mg/L		0.16	0.28	0.29	0.22	0.21
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.6	1.0	1.0	0.9	0.9
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.02	0.15	0.12	0.80	0.42
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		0.02	0.15	0.12	0.79	0.42
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.01	0.01	0.02	0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.02	0.11	0.11	0.08	0.08
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.02	0.12	0.12	0.10	0.09
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		18.3	103	100	168	215
ø Total Cations	----	0.01	meq/L		16.9	105	103	176	228
ø Ionic Balance	----	0.01	%		4.11	0.66	1.14	2.35	2.96
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		19	6	6	7	6
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		12.0	10.4	9.42	8.37	8.66

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Duplicate	----	----	----	----
			Sampling date / time	02-Sep-2024 14:30	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2404020-006	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.5**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**8880**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**6680**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**4.7**	----	----	----	----
EA116: Temperature								
Temperature	----	0.5	°C	**14.7**	----	----	----	----
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	**86**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**86**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**498**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**3350**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**88**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**214**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**1820**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**71**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Duplicate	----	----	----	----
				Sampling date / time	02-Sep-2024 14:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2404020-006	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.064**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.28**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**1.0**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.16**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**0.16**	----	----	----	----
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		**0.11**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.11**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**106**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**103**	----	----	----	----
ø Ionic Balance	----	0.01	%		**1.72**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**5**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**10.4**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY

Mandatory Fields

CLIENT CODE:	SHECIT	*PROJECT MANAGER:	Ryan Stirling	SAMPLER:	SAMPLED BY ALS
*CLIENT:	Shellharbour City Council	*PM MOBILE:		SAMPLER MOBILE:	02 4225 3125
OFFICE: (Invoiced Office)	Shellharbour	ALS QUOTE # (Client PL if blank)	WO/030/19 TENDER	PURCHASE ORDER NO.:	156810
PROJECT NO./PROJECT:	Dunmore Quarterly Leachate EPL			SITE:	Dunmore
*INVOICE TO: (client default if nil)	Financial@shellharbour.nsw.gov.au				☐ CC Invoice to PM
*EMAIL REPORTS TO: (default to PM if blank)	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

Page ___of___

CoC #: (if applicable)

BIOSECURITY

Country of Origin: (if not Australia)

*** STORAGE REQUIREMENTS** (Please check box. →)
☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Standard Storage time from receipt of samples: Waters - 3 weeks, Soils - 2 months
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** (Please check box. → Not all tests can be expedited, contact Client Services for more information)
☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Comments:

ALS Use Only / Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	NT-04 (NO2, NO3)	Total Fe & Mn	Field Test pH, EC, DO & Temp	Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
	Leachate Storage Tank - LP1		4/9/24 925	4	W	X	X	X	X	X	X	☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted — Ice Bricks: (Frozen) / Thawed — None
Sample Temp at Receipt: -4.3 °C, 4.6 °C, 4.4 °C
Security Seal Intact (circle): Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ALS
Packaging: (Circle) Hard Esky, Foam Esky, Box/Bag/Other
Count: # 1 # #

Relinquished by: Robert DaLio — Signature: — Date/Time: 4.9.24
Relinquished by: — Signature: — Date/Time:
Received by: Aneta — Signature — Date/Time: 4/9/24
Received by: — Signature — Date/Time:

Environmental Division Wollongong
Work Order Reference
EW2404022

Telephone : 02 42253125

ENFM (204/17)

CERTIFICATE OF ANALYSIS

Work Order	: **EW2404022**	Page	: 1 of 4
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate Tank EPL	Date Samples Received	: 04-Sep-2024 14:43
Order number	: 166321	Date Analysis Commenced	: 04-Sep-2024
C-O-C number	: ----	Issue Date	: 13-Sep-2024 14:35
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE CPI 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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- General Comments
- Analytical Results

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

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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: LOR raised for Nitrite due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK059G: LOR raised for NOx due to sample matrix.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	Leachate Storage Tank LP1	----	----	----	----
			Sampling date / time	04-Sep-2024 09:25	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2404022-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**8.4**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**3650**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**3150**	----	----	----	----
EA116: Temperature								
Temperature	----	0.1	°C	**15.2**	----	----	----	----
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	**1020**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**1020**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**648**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**91**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**783**	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	**0.434**	----	----	----	----
Iron	7439-89-6	0.05	mg/L	**4.06**	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.1**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**64.4**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Leachate Storage Tank LP1	----	----	----	----
				Sampling date / time	04-Sep-2024 09:25	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2404022-001	--------	--------	--------	--------
					Result	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.10	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.10	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.10	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**79**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**3.05**	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation		**30.2**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) ED093F: Dissolved Major Cations
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

Appendix C:
Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Dust Samples

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney**: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle**: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane**: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville**: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne**: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide**: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth**: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7555 E: samples.perth@alsenviro.com
☐ **Launceston**: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT **(List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE:	Dunmore		
PROJECT:	Dunmore Dust	**ALS QUOTE NO.:** WO/030/19 TENDER	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:			
PROJECT MANAGER:	Ryan Stirling		
SAMPLER:	Robert Dalo	**SAMPLER MOBILE:**	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to :			
Email Invoice to :			

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: N/A °C
Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Robert Dalo	M. Sambs		
DATE/TIME: 1-12-23	DATE/TIME: 1-12-23 13:30	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	DDG1	1-12-23 11:22	AIR			✓								
	DDG2	11:10	AIR			✓								
	DDG3	9:55	AIR			✓								
	DDG4	8:45	AIR			✓								
				TOTAL	10									

Environmental Division
Wollongong
Work Order Reference
EW2305319

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2305319**	Page	: 1 of 3
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 01-Dec-2023 13:30
Order number	: 156810	Date Analysis Commenced	: 05-Dec-2023
C-O-C number	: ----	Issue Date	: 07-Dec-2023 21:24
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		
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*
Thomas Regan	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- Dust conducted by ALS Newcastle, NATA accreditation no. 825, site no 1656.
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- The dust gauges for all samples were full when received by the laboratory. They may have overflowed in the field. Results for these gauges are thus reported on an 'as received' basis.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)

			Sample ID	**DDG1 02/11/2023 - 01/12/2023**	**DDG2 02/11/2023 - 01/12/2023**	**DDG3 02/11/2023 - 01/12/2023**	**DDG4 02/11/2023 - 01/12/2023**	**----**
			Sampling date / time	01-Dec-2023 11:22	01-Dec-2023 11:10	01-Dec-2023 09:55	01-Dec-2023 08:45	----
Compound	*CAS Number*	*LOR*	*Unit*	**EW2305319-001**	**EW2305319-002**	**EW2305319-003**	**EW2305319-004**	**--------**
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.4**	**0.4**	**1.0**	**5.9**	**----**
Ash Content (mg)	----	2	mg	**7**	**7**	**17**	**101**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.4**	**0.4**	**0.4**	**2.8**	**----**
Combustible Matter (mg)	----	2	mg	**6**	**6**	**7**	**47**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**0.8**	**0.8**	**1.4**	**8.7**	**----**
Total Insoluble Matter (mg)	----	2	mg	**13**	**13**	**24**	**148**	**----**

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney**: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ **Newcastle**: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
☐ **Brisbane**: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ **Townsville**: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne**: 2-4 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide**: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
☐ **Perth**: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston**: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT **(List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE:	Dunmore		
PROJECT:	Dunmore Dust	**ALS QUOTE NO.:** WO/030/19 TENDER	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:			
PROJECT MANAGER:	Ryan Stirling		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comments:			

SAMPLER: Michael Santos	**SAMPLER MOBILE:** 0403 590899	**RELINQUISHED BY:** Michael Santos DATE/TIME: 04.03.24 11:15	**RECEIVED BY:** Ameta DATE/TIME: 4/3/24 11:30
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	**RELINQUISHED BY:** DATE/TIME:	**RECEIVED BY:** DATE/TIME:
Email Reports to :			
Email Invoice to :			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	A04 (Ash, CM, TIS)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	DDG1	04.03.24 9:09	AIR			✓								
2	DDG2	9:30	AIR			✓								
3	DDG3	8:57	AIR			✓								
4	DDG4	8:45	AIR			✓								
				TOTAL	10									

Environmental Division
Wollongong
Work Order Reference
EW2400973

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2400973**	Page	: 1 of 3
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 04-Mar-2024 12:22
Order number	: 156810	Date Analysis Commenced	: 06-Mar-2024
C-O-C number	: ----	Issue Date	: 13-Mar-2024 15:52
Sampler	: Michael Santos		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		
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*
Thomas Regan	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Newcastle.**
- Dust analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in deposition units e.g., g/m².mth where the sampling procedure is not NATA accredited. ALS Mudgee laboratory is NATA accredited for dust sampling, therefore ALS Mudgee reported deposition units are accredited.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Depositon Gauges.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)

			Sample ID	DDG1 01/02/2024 - 04/03/2024	DDG2 01/02/2024 - 04/03/2024	DDG3 01/02/2024 - 04/03/2024	DDG4 01/02/2024 - 04/03/2024	----
			Sampling date / time	04-Mar-2024 09:09	04-Mar-2024 09:30	04-Mar-2024 08:57	04-Mar-2024 08:45	----
Compound	CAS Number	LOR	Unit	EW2400973-001	EW2400973-002	EW2400973-003	EW2400973-004	--------
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.4**	**0.5**	**1.0**	**3.2**	**----**
Ash Content (mg)	----	2	mg	**7**	**10**	**23**	**62**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.1**	**0.3**	**0.5**	**2.1**	**----**
Combustible Matter (mg)	----	2	mg	**3**	**7**	**11**	**40**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**0.5**	**0.8**	**1.5**	**5.3**	**----**
Total Insoluble Matter (mg)	----	2	mg	**10**	**17**	**34**	**102**	**----**

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Dust**			SITE:	**Dunmore**
***INVOICE TO:** *(client default if nil)*	Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM	
***EMAIL REPORTS TO:** *(default to PM if blank)*	Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au				

BIOSECURITY

Country of Origin: *(if not Australia)*

*** STORAGE REQUIREMENTS**
Please check box →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND**
Please check box →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division
Wollongong
Work Order Reference
EW2402542

Telephone : 02 42253125

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	A04 (Ash, CM TIS)	Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	DDG1		3.6.24 9:21	1	D	X	☐	☐	
2	DDG2		9:15	1	D	X	☐	☐	
3	DDG3		9:39	1	D	X	☐	☐	
4	DDG4		13:15	1	D	X	☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; (None)
Sample Temp at Receipt: N/A °C °C
Security Seal Intact *(circle)*: Yes / No / (NA(None))
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ACS-
Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other
Count # # # 1

Relinquished by: Robert Dahw Signature: Date/Time: 3.6.24
Received by: Aneta Signature Date/Time: 3/6/24
Relinquished by: Signature: Date/Time:
Received by: Signature Date/Time:

CERTIFICATE OF ANALYSIS

Work Order	: **EW2402542**	Page	: 1 of 3
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 03-Jun-2024 14:54
Order number	: 156810	Date Analysis Commenced	: 11-Jun-2024
C-O-C number	: ----	Issue Date	: 13-Jun-2024 16:38
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		
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*
Thomas Regan	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- **Analytical work for this work order will be conducted at ALS Newcastle.**
- Dust analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in deposition units e.g., g/m².mth where the sampling procedure is not NATA accredited. ALS Mudgee laboratory is NATA accredited for dust sampling, therefore ALS Mudgee reported deposition units are accredited.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Deposition Gauges.
- The dust gauges for samples 001-003 were full when received by the laboratory. They may have overflowed in the field. Results for these gauges are thus reported on an 'as received' basis. No algaecide correction has been applied to EA139 Soluble Matter or EA142 Total Solids results (where applicable).
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)			Sample ID	DDG1 03/05/2024 - 03/06/2024	DDG2 03/05/2024 - 03/06/2024	DDG3 03/05/2024 - 03/06/2024	DDG4 03/05/2024 - 03/06/2024	----
			Sampling date / time	03-Jun-2024 09:21	03-Jun-2024 09:15	03-Jun-2024 09:39	03-Jun-2024 13:15	----
Compound	CAS Number	LOR	Unit	EW2402542-001	EW2402542-002	EW2402542-003	EW2402542-004	--------
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.7**	**0.1**	**0.1**	**3.3**	**----**
Ash Content (mg)	----	2	mg	**13**	**2**	**3**	**62**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.1**	<0.1	**0.1**	**1.8**	**----**
Combustible Matter (mg)	----	2	mg	**2**	<2	**2**	**34**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**0.8**	**0.1**	**0.2**	**5.1**	**----**
Total Insoluble Matter (mg)	----	2	mg	**15**	**3**	**5**	**96**	**----**

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Dust**			SITE:	**Dunmore**

***INVOICE** TO: *(client default if nil)* Financial@shellharbour.nsw.gov.au ☐ CC Invoice to PM

BIOSECURITY

Country of Origin: *(if not Australia)*

*EMAIL **REPORTS** TO: *(default to PM if blank)* Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au

*** STORAGE REQUIREMENTS** *Please check box.* →

Standard Storage time from receipt of samples:

Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage

Specify Disposal Date:

Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →

(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**

(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division Wollongong
Work Order Reference
EW2404041

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	A04 (Ash, CM TIS)	Lab QC (additional bottles req.) Dup	Lab QC MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
	DDG1		03.09.24 13:31	1	D	X	☐	☐	
	DDG2		13:23	1	D	X	☐	☐	
	DDG3		11:50	1	D	X	☐	☐	
	DDG4		1100	1	D	X	☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	
							☐	☐	

Receipt Detail (Lab Use ONLY)

Chilling Method: Ice: Frozen / Melted Ice Bricks: Frozen / Thawed. (None)

Sample Temp at Receipt ___ °C N/A °C

Security Seal Intact *(circle)* Yes / No / (NA(None))

Carrier Details ☐ Courier/Post ☐ Client

Con Note # ALS-

Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other

Count # # #

Relinquished by:	Michael Santos	Signature:	Date/Time: 3.9.24 15:10	Received by: Aneta	Signature: Date/Time: 3.9.24.
Relinquished by:		Signature:	Date/Time:	Received by:	Signature: Date/Time:

CERTIFICATE OF ANALYSIS

Work Order	: **EW2404041**	Page	: 1 of 3
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 03-Sep-2024 15:29
Order number	: 166321	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 12-Sep-2024 15:30
Sampler	: Michael Santos		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		
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*
Thomas Regan	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

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

- Dust conducted by ALS Newcastle, NATA Accreditation No. 825, Site No. 1656.
- Dust analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in deposition units e.g., g/m².mth where the sampling procedure is not NATA accredited.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Deposition Gauges.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)

			Sample ID	DDG1 02/08/2024 - 03/09/2024	DDG2 02/08/2024 - 03/09/2024	DDG3 02/08/2024 - 03/09/2024	DDG4 02/08/2024 - 03/09/2024	----
			Sampling date / time	03-Sep-2024 00:00	03-Sep-2024 00:00	03-Sep-2024 00:00	03-Sep-2024 00:00	----
Compound	CAS Number	LOR	Unit	EW2404041-001	EW2404041-002	EW2404041-003	EW2404041-004	--------
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.3**	**0.4**	**4.8**	**2.8**	**----**
Ash Content (mg)	----	2	mg	**6**	**9**	**110**	**54**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.1**	**0.1**	**1.1**	**1.0**	**----**
Combustible Matter (mg)	----	2	mg	<2	<2	**24**	**20**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**0.4**	**0.5**	**5.9**	**3.8**	**----**
Total Insoluble Matter (mg)	----	2	mg	**7**	**10**	**134**	**74**	**----**

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry / Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

Appendix D:
Surface Gas (Methane) Field Sheets

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 9784 8555 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-4 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** ☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT:	Dunmore Quarterly Methane Testing	**ALS QUOTE NO.:** WO/030/19 TENDER	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER:		**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER:	Ryan Stirling	OF: 1 2 3 4 5 6 7	Other comments:

SAMPLER:	**SAMPLER MOBILE:**	**RELINQUISHED BY:** Michael	**RECEIVED BY:** Aneta	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	DATE/TIME: 13/12/23	DATE/TIME: 13/12/23	DATE/TIME:
Email Reports to :				**RECEIVED BY:**
Email Invoice to :				DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Surface Methane Testing								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Methane	13/12/23	W			✓								
				TOTAL	10									

Environmental Division
Wollongong
Work Order Reference
EW2305636

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Landfill Emissions Report

Client: Shellharbour City Council
Site: Dunmore
Date: 13/12/2023
Sampler(s) Robert DaLio, Michael Santos

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A					**No Safe Access**
B	1	6168 226	302 435	2.3	
B	2	6168 253	302 437	2.3	
B	3	6168 274	302 437	2.3	
B	4	6168 296	302 439	2.4	
C	1	6168 434	302 375	2.4	
C	2	6168 380	302 390	2.7	
C	3	6168 322	302 406	2.4	
C	4	6167 265	302 416	2.5	
C	5	6167 222	302 421	2.4	
C	6	6168 133	302 417	2.3	
C	7	6168 072	302 408	2.3	
C	8	6168 046	302 405	2.3	
D	1	6168 138	302 396	2.4	
D	2	6168 147	302 394	2.3	
D	3	6168 153	302 392	2.4	
D	4	6168 163	302 389	2.4	
D	5	6168 169	302 390	7.8	
D	6	6168 178	302 391	3.6	
D	7	6168 188	302 389	2.6	
D	8	6168 198	302 385	2.7	
D	7	6168 223	302 383	2.7	
E	1	6168	302		**Overgrown**
E	2	6168	302		**Overgrown**
E	3	6168 138	302 376	2.3	
E	4	6168 146	302 376	2.3	
E	5	6168 154	302 376	2.3	
E	6	6168 158	302 373	2.2	
E	7	6168 165	302 372	2.3	
E	8	6168 176	302 367	2.3	
E	7	6168 188	302 362	2.3	
E	8	6168 194	302 377	2.2	
F	1	6168 113	302 356	2.4	
F	2	6168 121	302 358	2.3	
F	3	6168 133	302 352	2.2	
F	4	6168 143	302 348	2.3	
F	5	6168 153	302 337	2.3	
F	6	6168 168	302 332	2.3	
G	1	6168 407	302 256	2.6	
G	2	6168 420	302 291	2.4	
G	3	6168 441	302 322	2.4	
G	4	6168 462	302 358	2.4	
H	1	6168 433	302 261	2.9	
H	2	6168 394	302 220	2.9	
H	3	6168 352	302 182	2.9	
H	4	6168 327	302 155	2.8	
H	5	6168 274	302 101	2.8	
H	6	6168 237	302 076	2.8	
H	7	6168 186	301 074	2.7	
H	8	6168 123	301 063	2.6	
H	9	6168 071	302 66	2.4	
H	10	6168 030	302 104	4.8	
H	11	6167 000	302 136	7.1	

H	12	6167 946	302 185	9.5	
H	13	6167 913	302 218	7.2	
H	14	6167 877	302 259	4.4	
H	15	6167 869	302 309	2.7	
H	16	6167 873	302 356	5.0	
H	17	6167 880	302 391	3.7	
H	18	6167 887	302 424	6.8	
H	19	6167 897	302 462	23.3	
H	20	6167 904	302 483	2.6	
H	21	6167 159	302 536	3.3	
H	22	6167 082	302 630	3.4	
H	23	6167 113	302 630	3.4	
H	24	6168 150	302 607	3.4	
H	25	6168 174	302 590	3.4	
H	26	6168 201	302 573	3.4	
H	27	6168 236	302 546	3.4	
H	28	6168 291	302 538	3.4	
H	29	6168 324	302 543	3.3	
H	30	6168 352	302 550	3.4	
H	31	6168 440	302 547	3.4	
H	32	6168 492	302 397	3.1	
H	33	6168 492	302 367	3.0	
H	34	6168 490	302 330	3.0	
H	35	6168 473	302 294	2.9	
I	1	6168 179	302 244	2.4	
I	2	6168 170	302 208	2.4	
I	3	6168 152	302 157	2.4	
I	4	6168 146	302 88	2.4	
J	1	6168 338	302 180	2.5	
J	2	6168 317	302 198	2.5	
J	3	6168 293	302 217	2.5	
J	4	6167 252	302 234	2.5	
J	5	6167 214	302 246	2.5	
K	1	6168 525	302 385	2.4	
K	2	6168 539	302 425	2.1	
K	3	6168 561	302 461	2.0	
K	4	6168 592	302 412	2.0	
K	5	6168 568	302 368	1.9	
L	1	6168 746	302 330	2.9	
L	2	6168 702	302 301	2.7	
L	3	6168 663	302 261	2.5	
L	4	6168 631	302 243	2.2	
L	5	6168 592	302 221	2.0	
L	6	6168 568	302 197	1.8	
Compressor Shed	1			8.7	
Office	1			3.1	
Community Recycling Centre	1			3.0	
OLD Weighbridge	1			3.6	
OLD Weighbridge Toilet	1			9.3	
Revolve Shop	1			2.4	
Building Truckwash	1			2.5	
New Weighbridge	1			3.4	
Methane Blank (Pre testing)				2.5	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				2.5	Taken at entrance to Dunmore site before main gate

Comments:

Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016
Gas concentrations are reported as raw values without correction for background concentration.

Mandatory Fields	**CHAIN OF CUSTODY**			Page ___ of ___
CLIENT CODE: SHECIT	*PROJECT MANAGER: Ryan Stirling	SAMPLER: SAMPLED BY ALS		
*CLIENT: Shellharbour City Council	*PM MOBILE:	SAMPLER MOBILE: 02 4225 3125		CoC #: (if applicable)
OFFICE: (Invoiced Office) Shellharbour	ALS QUOTE # (Client PL if blank) WO/030/19 TENDER	PURCHASE ORDER NO.: 156810		
PROJECT NO./PROJECT: Dunmore Quarterly Surface Methane Testing		SITE: Dunmore		
*INVOICE TO: (client default if nil) Financial@shellharbour.nsw.gov.au		☐ CC Invoice to PM		BIOSECURITY
*EMAIL REPORTS TO: (default to PM if blank) Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au		*ANALYSIS REQUIRED (NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.		Country of Origin: (if not Australia)

*** STORAGE REQUIREMENTS** Please check box. → Standard Storage time from receipt of samples: Waters - 3 weeks, Soils - 2 months
☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** Please check box. → (Not all tests can be expedited, contact Client Services for more information)
☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

Environmental Division
Wollongong
Work Order Reference
EW2401405
Telephone : 02 42253125

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Surface Mthane												Lab QC Dup	Lab QC MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	Mathane		21/3/24.			X												☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	

Receipt Detail (Lab Use ONLY)	Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; (None)	Sample Temp at Receipt: N/A °C °C	Security Seal Intact (circle): Yes / No / (NA(None))	Carrier Details: ☐ Courier/Post ☐ Client; Con Note #: ALS	Packaging: (Circle) Hard Esky, Foam Esky, Box/Bag/Other; Count # # # N/A

Relinquished by:	Signature:	Date/Time:	Received by:	Signature	Date/Time:
Michael	MS	21/3/24	Aneta	[signature]	21/3/24

ENFM (204/17)

Approved Date: 13/02/2024

ALS Landfill Emissions Report

Client:	Shellharbour City Council	Date:	21/03/2024
Site:	Dunmore	Sampler(s)	Robert DaLio, Michael Santos

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A					**No Safe Access**
B	1	6168 218	302 433	3.2	
B	2	6168 250	302 437	3.5	
B	3	6168 269	302 438	3.2	
B	4	6168 290	302 438	3.4	
C	1	6168 436	302 375	3.5	
C	2	6168 392	302 382	3.5	
C	3	6168 320	302 405	6.3	
C	4	6167 256	302 414	3.5	
C	5	6167 200	302 420	4.6	
C	6	6168 145	302 423	3.5	
C	7	6168 073	302 405	3.4	
C	8	6168 065	302 400	3.5	
D	1	6168 155	302 398	3.5	
D	2	6168 162	302 400	3.6	
D	3	6168 176	302 400	3.2	
D	4	6168 154	302 390	3.2	
D	5	6168 164	302 388	3.1	
D	6	6168 169	302 389	3.2	
D	7	6168 180	302 389	3.3	
D	8	6168 189	302 382	3.4	
D	7	6168 200	302 380	3.3	
E	1	6168	302		**Overgrown**
E	2	6168	302		**Overgrown**
E	3	6168 139	302 376	3.5	
E	4	6168 144	302 372	4.9	
E	5	6168 150	302 372	3.9	
E	6	6168 158	302 373	3.5	
E	7	6168 166	302 373	3.4	
E	8	6168 157	302 366	3.4	
F	1	6168 142	302 304	3.5	
F	2	6168 148	302 348	3.6	
F	3	6168 150	302 330	3.9	
F	4	6168 153	302 337	4.8	
F	5	6168 160	302 332	3.7	
F	6	6168 167	302 332	3.9	
G	1	6168 403	302 251	4.1	
G	2	6168 408	302 266	4.2	
G	3	6168 422	302 285	4.5	
G	4	6168 462	302 354	4.1	
H	1	6168 348	302 558	3.4	
H	2	6168 321	302 245	3.5	
H	3	6168 289	302 540	3.6	
H	4	6168 250	302 536	3.6	
H	5	6168 222	302 556	3.6	
H	6	6168 185	302 573	3.7	
H	7	6168 144	301 595	4.3	
H	8	6168 123	301 610	5.0	
H	9	6168 099	302 631	5.2	
H	10	6168 070	302 607	3.2	
H	11	6167 077	302 580	13.2	
H	12	6167 120	302 554	3.3	
H	13	6167 162	302 530	3.2	
H	14	6167 049	302 89	3.3	
H	15	6167 005	302 132	3.2	
H	16	6167 972	302 159	3.4	
H	17	6167 944	302 175	3.3	
H	18	6167 918	302 207	3.4	
H	19	6167 874	302 250	3.3	
H	20	6167 870	302 312	3.3	
H	21	6167 879	302 380	3.3	
H	22	6167 890	302 420	3.7	
H	23	6167 950	302 490	3.7	
H	24	6168 013	302 499	3.9	
H	25	6168 090	302 510	3.7	
H	26	6168 151	302 518	3.8	
H	27	6168 198	302 520	4.3	
H	28	6168 250	302 520	5.0	
H	29	6168 280	302 530	4.2	
H	30	6168 339	302 533	3.6	
H	31	6168 446	302 507	3.8	
H	32	6168 490	302 300	3.7	
H	33	6168 482	302 300	3.5	
H	34	6168 468	302 302	3.8	
H	35	6168 475	302 295	3.5	

I	1	6168 180	302 240	8.3	
I	2	6168 172	302 210	7.6	
I	3	6168 160	302 155	4.0	
I	4	6168 149	302 89	3.2	
J	1	6168 322	302 212	5.7	
J	2	6168 292	302 217	4.6	
J	3	6168 255	302 228	5.8	
J	4	6167 236	302 238	5.3	
J	5	6167 212	302 240	5.9	
K	1	6168 525	302 389	3.5	
K	2	6168 543	302 456	3.3	
K	3	6168 579	302 460	3.3	
K	4	6168 591	302 411	3.5	
K	5	6168 565	302 374	3.4	
L	1	6168 758	302 340	3.5	
L	2	6168 721	302 310	3.6	
L	3	6168 701	302 300	3.6	
L	4	6168 682	302 285	3.5	
L	5	6168 662	302 265	3.5	
L	6	6168 590	302 239	3.5	
Compressor Shed	1			3.6	
Office	1			3.8	
Community Recycling Centre	1			5.0	
OLD Weighbridge	1			4.7	
OLD Weighbridge Toilet	1			4.0	
Revolve Shop	1			3.5	
Building Truckwash	1			3.7	
New Weighbridge	1			3.7	
Methane Blank (Pre testing)				3.4	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				3.6	Taken at entrance to Dunmore site before main gate

Comments:

Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016
Gas concentrations are reported as raw values without correction for background concentration.

Mandatory Fields		CHAIN OF CUSTODY			Page ___of___
CLIENT CODE: SHECIT	*PROJECT MANAGER: Ryan Stirling		SAMPLER: SAMPLED BY ALS		
*CLIENT: Shellharbour City Council	*PM MOBILE:		SAMPLER MOBILE: 02 4225 3125		CoC #: (if applicable)
OFFICE: (Invoiced Office) Shellharbour	ALS QUOTE # (Client PL if blank) WO/030/19 TENDER		PURCHASE ORDER NO.: 156810		
PROJECT NO./PROJECT: Dunmore Quarterly Surface Methane Testing			SITE: Dunmore		
*INVOICE TO: (client default if nil) Financial@shellharbour.nsw.gov.au			☐ CC Invoice to PM		BIOSECURITY
*EMAIL REPORTS TO: (default to PM if blank) Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au					Country of Origin: (if not Australia)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division
Wollongong
Work Order Reference
EW2403130
Telephone : 02 42253125

*** STORAGE REQUIREMENTS**
Please check box.
→
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND**
Please check box.
→
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

Comments:

ALS Use Only / Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Surface Mthane											Lab QC (additional bottles req.) Dup	MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
	Mathane		19/6/24			X											☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	

Receipt Detail (Lab Use ONLY)	Chilling Method:	Ice: Frozen / Melted	Ice Bricks: Frozen / Thawed	None	Sample Temp at Receipt	°C	°C	°C	Security Seal Intact (circle)	Yes / No / NA(None)	Carrier Details	☐ Courier/Post	☐ Client	Con Note #	Packaging: (Circle)	Hard Esky	Foam Esky	Box/Bag/Other	Count # # #

Relinquished by:	Signature:	Date/ Time:	Received by:	Signature	Date/ Time:
Michael	MS	19/6/24	Aneta	[signature]	19/6/24.
Relinquished by:	Signature:	Date/ Time:	Received by:	Signature	Date/ Time:

ALS Landfill Emissions Report

Client:	Shellharbour City Council	Date:	19/06/2024
Site:	Dunmore	Sampler(s)	Robert DaLio, Michael Santos

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A					**No Safe Access**
B	1	6168 225	302 436	5.0	
B	2	6168 245	302 438	3.5	
B	3	6168 273	302 439	2.6	
B	4	6168 296	302 439	2.7	
C	1	6168 434	302 375	2.8	
C	2	6168 362	302 394	2.8	
C	3	6168 318	302 406	2.8	
C	4	6167 265	302 418	2.8	
C	5	6167 196	302 425	2.8	
C	6	6168 106	302 413	2.7	
C	7	6168 048	302 406	2.7	
D	1	6168 148	302 398	3.5	
D	2	6168 160	302 400	3.6	
D	3	6168 170	302 400	3.2	
D	4	6168 177	302 390	3.2	
D	5	6168 186	302 388	3.1	
E	1	6168 228	302 333	4.5	
E	2	6168 221	302 335	6.1	
E	3	6168 212	302 336	6.3	
E	4	6168 206	302 342	12.1	
E	5	6168 194	302 351	4.2	
E	6	6168 181	302 357	5.3	
E	7	6168 161	302 369	6.1	
E	8	6168 145	302 384	3.4	
F	1	6168 146	302 349	10.8	
F	2	6168 157	302 343	10.1	
F	3	6168 166	302 339	8.2	
F	4	6168 174	302 337	5.7	
F	5	6168 181	302 331	6.2	
F	6	6168 194	302 327	4.6	
G	1	6168 408	302 248	2.6	
G	2	6168 426	302 292	2.5	
G	3	6168 449	302 326	2.6	
G	4	6168 469	302 357	2.6	
H	1	6168 487	302 329	2.5	
H	2	6168 444	302 370	2.6	
H	3	6168 412	302 329	2.6	
H	4	6168 374	302 203	2.6	
H	5	6168 331	302 157	2.5	
H	6	6168 301	302 127	2.4	
H	7	6168 266	301 096	2.5	
H	8	6168 189	301 079	2.6	
H	9	6168 141	302 068	2.5	
H	10	6168 071	302 062	2.5	
H	11	6168 013	302 121	4.8	
H	12	6167 972	302 162	2.8	
H	13	6167 949	302 181	2.7	
H	14	6167 893	302 243	2.8	
H	15	6167 871	302 312	2.8	
H	16	6167 879	302 369	2.7	
H	17	6167 894	302 444	2.8	
H	18	6167 190	302 529	2.8	
H	19	6167 140	302 548	2.7	
H	20	6167 107	302 568	2.7	
H	21	6167 076	302 584	3.0	
H	22	6167 085	302 625	2.6	
H	23	6167 113	302 625	3.1	
H	24	6168 148	302 605	3.4	
H	25	6168 187	302 585	3.6	
H	26	6168 226	302 557	3.9	
H	27	6168 289	302 542	3.0	

H	28	6168 327	302 454	2.8	
H	29	6168 357	302 543	2.7	
I	1	6168 147	302 072	8.3	
I	2	6168 150	302 098	7.6	
I	3	6168 153	302 142	4.0	
I	4	6168 181	302 242	3.2	
J	1	6168 349	302 194	2.5	
J	2	6168 317	302 209	2.6	
J	3	6168 276	302 227	2.5	
J	4	6167 236	302 241	2.5	
J	5	6167 194	302 255	2.5	
K	1	6168 529	302 393	2.6	
K	2	6168 542	302 428	2.5	
K	3	6168 559	302 460	2.5	
K	4	6168 595	302 432	2.6	
K	5	6168 571	302 370	2.6	
L	1	6168 757	302 339	2.5	
L	2	6168 735	302 327	2.5	
L	3	6168 704	302 307	2.5	
L	4	6168 679	302 284	2.5	
L	5	6168 664	302 268	2.5	
L	6	6168 642	302 241	2.5	
Compressor Shed	1			2.6	
Office	1			3.3	
Community Recycling Centre	1			3.7	
OLD Weighbridge	1			2.7	
OLD Weighbridge Toilet	1			2.7	
Revolve Shop	1			3.1	
Building Truckwash	1			2.6	
New Weighbridge	1			3.4	
Methane Blank (Pre testing)				2.7	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				2.5	Taken at entrance to Dunmore site before main gate

Comments:

Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016
Gas concentrations are reported as raw values without correction for background concentration.

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	~~TS6810~~
PROJECT NO./PROJECT:	**Dunmore Quarterly Surface Methane Testing**			SITE:	**Dunmore**

***INVOICE** TO: *(client default if nil)* Financial@shellharbour.nsw.gov.au ☐ CC Invoice to PM

***EMAIL REPORTS** TO: *(default to PM if blank)* Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au

BIOSECURITY

Country of Origin: *(if not Australia)*

*** STORAGE REQUIREMENTS** *Please check box.* →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →
(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division
Wollongong
Work Order Reference
EW2404346

Telephone : 02 42253125

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(**S**) Water(**W**) Sediments (**SD**), Dust (**D**), Product (**P**), Biota (**B**), Biosolid (**BS**)	Surface Mthane												Lab QC *(additional bottles req.)* Dup	Lab QC MS	Additional Information *(Comment on hazards - e.g., asbestos, known high contamination)*
	Mathane		19/9/24			X												☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	
																		☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted Ice Bricks: Frozen / Thawed None
Sample Temp at Receipt: °C N °C A °C
Security Seal Intact *(circle)*: Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #: ALS

Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other
Count # # # NA

Relinquished by:	Michael	Signature:	MS	Date/ Time:	19/9/24
Relinquished by:		Signature:		Date/ Time:	
Received by:	Aneta	Signature		Date/ Time:	19/9/24
Received by:		Signature		Date/ Time:	

ALS Landfill Emissions Report

Client: Shellharbour City Council
Site: Dunmore
Date: 19/09/2024
Sampler(s) Robert DaLio, Michael Santos

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A					**No Safe Access**
B	1	6168 219	302 433	6.1	
B	2	6168 244	302 439	0.0	Methane Cage
B	3	6168 266	302 442	0.1	
B	4	6168 288	302 442	0.1	
B	5	6168 306	302 442	0.0	
C	1	6168 436	302 377	0.0	
C	2	6168 402	302 385	0.0	
C	3	6168 358	302 397	0.0	
C	4	6167 315	302 410	0.0	
C	5	6167 270	302 417	0.0	
C	6	6168 226	302 422	0.0	
C	7	6168 176	302 422	0.0	
C	8	6167 136	302 415	6.1	
C	9	6168 100	302 410	0.1	
C	10	6168 063	302 407	1.7	
D	1	6168 139	302 388	0.9	
D	2	6168 149	302 386	0.0	
D	3	6168 163	302 382	0.0	
D	4	6168 178	302 379	0.0	
D	5	6168 196	302 373	0.0	
D	6	6168 215	302 376	0.0	
D	7	6168 224	302 376	0.1	Methane Cage
D	8	6168 233	302 378	0.0	
D	9	6168 249	302 381	0.0	
E	1	6168 146	302 374	0.0	
E	2	6168 165	302 365	0.0	
E	3	6168 180	302 358	0.0	
E	4	6168 222	302 350	0.0	
E	5	6168 223	302 344	0.0	
E	6	6168 229	302 338	0.0	
F	1	6168 160	302 340	0.3	
F	2	6168 148	302 342	0.0	
F	3	6168 157	302 338	0.0	
F	4	6168 167	302 333	0.0	
F	5	6168 183	302 330	0.0	
F	6	6168 200	302 328	0.0	
F	6	6168 227	302 325	0.0	
G	1	6168 409	302 257	0.0	
G	2	6168 419	302 288	0.0	
G	3	6168 435	302 315	0.0	
G	4	6168 451	302 342	0.0	
H	1	6168 449	302 540	0.0	
H	2	6168 398	302 560	0.0	
H	3	6168 340	302 550	0.0	
H	4	6168 289	302 543	0.0	
H	5	6168 216	302 567	0.0	
H	6	6168 172	302 594	0.0	
H	7	6168 140	301 614	0.0	
H	8	6168 113	301 632	0.0	
H	9	6168 083	302 626	0.0	
H	10	6168 081	302 578	2.0	
H	11	6168 127	302 547	0.8	
H	12	6168 154	302 529	1.0	
H	13	6168 440	302 506	0.0	
H	14	6168 456	302 483	0.0	
H	15	6168 477	302 461	0.0	
H	16	6168 495	302 442	0.0	
H	17	6168 486	302 356	0.0	
H	18	6168 448	302 279	0.0	
H	19	6168 390	302 217	0.0	
H	20	6168 338	302 165	0.0	
H	21	6168 279	302 109	0.0	
H	22	6168 206	302 076	0.0	
H	23	6168 146	302 070	0.0	
H	24	6168 051	302 079	0.0	
H	25	6167 989	302 148	2.5	
H	26	6167 945	302 188	7.5	
H	27	6167 907	302 227	7.8	
H	28	6167 872	302 275	7.0	
H	29	6167 869	302 327	0.0	
H	30	6167 881	302 396	0.0	

H	31	6167 894	302 450	8.4	
H	32	6167 901	302 485	0.0	
I	1	6168 148	302 089	0.0	
I	2	6168 154	302 120	0.0	
I	3	6168 164	302 161	0.0	
I	4	6168 174	302 225	0.0	
J	1	6168 197	302 251	0.0	
J	2	6168 222	302 243	0.0	
J	3	6168 261	302 230	0.0	
J	4	6167 294	302 217	0.0	
J	5	6167 328	302 194	0.1	
K	1	6168 526	302 394	0.0	
K	2	6168 239	302 431	0.0	
K	3	6168 558	302 463	0.0	
K	4	6168 590	302 431	1.2	
K	5	6168 577	302 382	0.0	
K	6	6168 555	302 373	0.0	
L	1	6168 750	302 341	0.0	
L	2	6168 717	302 309	0.0	
L	3	6168 676	302 279	0.0	
L	4	6168 652	302 253	0.0	
L	5	6168 606	302 232	0.0	
L	6	6168 572	302 204	0.0	
Compressor Shed	1			0.0	New building Shipping Container
Office	1			1.0	
Community Recycling Centre	1			0.0	
OLD Weighbridge	1			0.8	
OLD Weighbridge Toilet	1			0.1	
Revolve Shop	1			0.0	
Building Truckwash	1			0.1	
New Weighbridge	1			0.0	
Methane Blank (Pre testing)				0.0	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				0.0	Taken at entrance to Dunmore site before main gate

Comments:

Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016
Gas concentrations are reported as raw values without correction for background concentration.

Appendix E:
Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Overflow Events

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle:** 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E:townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard **TAT (List due date):** ☐ Non Standard or urgent TAT **(List due date):**
OFFICE:			
PROJECT:	Dunmore Landfill Overflows	**ALS QUOTE NO.:** WO/030/19 TENDER	
ORDER NUMBER:			
PROJECT MANAGER:	Ryan Stirling		
SAMPLER:	Robert Dalis	**SAMPLER MOBILE:**	
COC emailed to ALS? (YES / NO)		**EDD FORMAT (or default):**	
Email Reports to :			
Email Invoice to :			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:	6.2 °C		
Other comment:			

RELINQUISHED BY:	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
Robert Dalis	Anela		
DATE/TIME: 6.2.24 14:35	DATE/TIME: 6/2/24	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **CC reports to:**

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	TSS	pH							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP1	6.2.24 14:35	W			✓	✓							
				TOTAL	10									

Environmental Division
Wollongong
Work Order Reference
EW2400576

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2400576**	Page	: 1 of 2
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Overflows	Date Samples Received	: 06-Feb-2024 15:26
Order number	: 156810	Date Analysis Commenced	: 06-Feb-2024
C-O-C number	: ----	Issue Date	: 15-Feb-2024 14:08
Sampler	: Client		
Site	: ----		
Quote number	: WO/030/19 TENDER OVERFLOW DISCHARGE		
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*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**SWP1 Point 1**	----	----	----	----
			Sampling date / time	06-Feb-2024 14:35	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EW2400576-001**	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.7**	**----**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**----**	**----**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

CERTIFICATE OF ANALYSIS

Work Order	: **EW2401299**	Page	: 1 of 5
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Surface Water SWP01 Overflow	Date Samples Received	: 18-Mar-2024 17:00
Order number	: ----	Date Analysis Commenced	: 18-Mar-2024
C-O-C number	: ----	Issue Date	: 27-Mar-2024 09:34
Sampler	: Michael Santos		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER CPI 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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- 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.
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SWP1 Point 1	----	----	----	----
			Sampling date / time	18-Mar-2024 07:30	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2401299-001	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.6**	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**753**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**458**	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	**8.2**	----	----	----	----
EA116: Temperature								
Temperature	----	0.1	°C	**25.2**	----	----	----	----
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	**232**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**232**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**21**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**87**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**37**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**17**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**94**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**8**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	----	----	----	----
				Sampling date / time	18-Mar-2024 07:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2401299-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.175**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.36**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.2**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.06**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**0.06**	----	----	----	----
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		**0.02**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**7.53**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**7.54**	----	----	----	----
ø Ionic Balance	----	0.01	%		**0.08**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**17**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**6.10**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E: samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		
PROJECT:	Dunmore Quarterly Surface Waters SWP01 Overflow full Testing	ALS QUOTE NO.: WO/030/19 TENDER	
ORDER NUMBER:			
PROJECT MANAGER:	Joel Culton		
SAMPLER:	Michael Santos	SAMPLER MOBILE: 0403590899	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to :			
Email Invoice to :			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:	5.2		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
M. Santos	Aneta		
DATE/TIME: 20.12.23 16:20	DATE/TIME: 20-12-23	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TSS	NT+, NT-2A (Ionic Balance)	TOC, NT-4, NH3, Total Mn	Dissolved and Total Fe	20/12/23				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP1	20.12.23 14:35	W			✓	✓	✓	✓					Field Tests - pH, EC, DO & Temp
				TOTAL	10									

Not Discharging

Environmental Division
Wollongong
Work Order Reference
EW2305715

Telephone : 02 42253125

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved P
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = S
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: **EW2305715**	Page	: 1 of 2
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Ryan Stirling	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Overflows	Date Samples Received	: 20-Dec-2023 15:11
Order number	: 156810	Date Analysis Commenced	: 20-Dec-2023
C-O-C number	: ----	Issue Date	: 29-Dec-2023 16:58
Sampler	: Michael Santos		
Site	: ----		
Quote number	: WO/030/19 TENDER OVERFLOW DISCHARGE		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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Signatories

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Signatories	*Position*	*Accreditation Category*
Aneta Prosaroski	Environmental Services Representative	Laboratory - Wollongong, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**SWP1 Point 1**	----	----	----	----
			Sampling date / time	20-Dec-2023 14:35	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EW2305715-001**	--------	--------	--------	--------
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**7.5**	**----**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**6**	**----**	**----**	**----**	**----**

Inter-Laboratory Testing

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

(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

CHAIN OF CUSTODY

Mandatory Fields

Page ___of___

CoC #: *(if applicable)*

CLIENT CODE:	**SHECIT**	***PROJECT MANAGER:**	**Ryan Stirling**	SAMPLER:	**SAMPLED BY ALS**
***CLIENT:**	**Shellharbour City Council**	***PM MOBILE:**		SAMPLER MOBILE:	**02 4225 3125**
OFFICE: *(Invoiced Office)*	**Shellharbour**	ALS QUOTE # *(Client PL if blank)*	**WO/030/19 TENDER**	PURCHASE ORDER NO.:	**156810**
PROJECT NO./PROJECT:	**Dunmore Landfill Overflow Full Testing**			SITE:	**Dunmore**

***INVOICE** TO: *(client default if nil)* Financial@shellharbour.nsw.gov.au ☐ CC Invoice to PM

BIOSECURITY

Country of Origin: *(if not Australia)*

*EMAIL **REPORTS** TO: *(default to PM if blank)* Ryan.stirlingshellharbour.nsw.gov.au, Glenn.holdenshellharbour.nsw.gov.au, Mitchell.copasshellharbour.nsw.gov.au, lab@enrs.com.au

*** STORAGE REQUIREMENTS** *Please check box.* →

Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☐ Standard Storage
☐ Extended Storage

Specify Disposal Date:

Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →

(Not all tests can be expedited, contact Client Services for more information)

☐ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**

(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division Wollongong
Work Order Reference
EW2402690

Telephone : 02 42253125

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	TSS	NT-1, NT-2A (Ionic Balance)	TOC, NT-4, NH3, Total Mn	Dissolved and Total Fe	Field Test pH, EC, DO & Temp							Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
	SWP1		7.6.24 9:10	1	W	X	X	X	X	X							☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	
																	☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted Ice Bricks: Frozen / Thawed None
Sample Temp at Receipt: 11.3 °C 12.3 °C 10.1 °C
Security Seal Intact *(circle)*: Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #
Packaging: *(Circle)* Hard Esky Foam Esky Box/Bag/Other
Count # # #

Relinquished by: Robert Dahle Signature: R. Dahle Date/Time: 7.6.24.
Received by: Michael Santos Signature: Date/Time: 7-6-24 14:40

Relinquished by: Signature: Date/Time:
Received by: Signature: Date/Time:

CERTIFICATE OF ANALYSIS

Work Order	: **EW2402690**	Page	: 1 of 5
Client	: **SHELLHARBOUR CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: ----	Telephone	: +61 2 4225 3125
Project	: Dunmore Surface Water SWP01 Overflow	Date Samples Received	: 07-Jun-2024 14:45
Order number	: 156810	Date Analysis Commenced	: 07-Jun-2024
C-O-C number	: ----	Issue Date	: 19-Jun-2024 13:14
Sampler	: Robert DaLio		
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER CPI 2024		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW

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~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- 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.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- 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.
- 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.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	----	----	----	----
				Sampling date / time	07-Jun-2024 09:10	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2402690-001	--------	--------	--------	--------
					Result	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit		7.7	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		806	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		622	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		61	----	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		110	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C		8.2	----	----	----	----
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		240	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		240	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		154	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		96	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		49	----	----	----	----
Magnesium	7439-95-4	1	mg/L		27	----	----	----	----
Sodium	7440-23-5	1	mg/L		132	----	----	----	----
Potassium	7440-09-7	1	mg/L		7	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SWP1 Point 1	----	----	----	----
				Sampling date / time	07-Jun-2024 09:10	----	----	----	----
Compound	CAS Number	LOR	Unit		EW2402690-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L		**0.195**	----	----	----	----
Iron	7439-89-6	0.05	mg/L		**4.33**	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		**0.3**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**3.06**	----	----	----	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		**3.04**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.13**	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**1.02**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**1.15**	----	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**10.7**	----	----	----	----
ø Total Cations	----	0.01	meq/L		**10.6**	----	----	----	----
ø Ionic Balance	----	0.01	%		**0.57**	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**14**	----	----	----	----
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L		**13.9**	----	----	----	----

Inter-Laboratory Testing

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

(WATER) EA045: Turbidity
(WATER) EP005: Total Organic Carbon (TOC)
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EG020T: Total Metals by ICP-MS
(WATER) EK057G: Nitrite as N by Discrete Analyser
(WATER) EK058G: Nitrate as N by Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C
(WATER) EK055G-NH4: Ammonium as N by DA
(WATER) EK055G: Ammonia as N by Discrete Analyser
(WATER) EN055: Ionic Balance
(WATER) ED045G: Chloride by Discrete Analyser
(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA
(WATER) EK040P: Fluoride by PC Titrator
(WATER) ED037P: Alkalinity by PC Titrator
(WATER) ED093F: Dissolved Major Cations
(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

Appendix F:
Calibration Certificates

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Calibration certificate number **16712 H-10352**

Instrument **Laser One** **Serial Number** **16712**

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from 0-1000ppm CH4

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0	0	0	0.00	0.00	0.00	0.00
1000	3.07	3	3	3	3.00	0.07	0.01	0.01
1000	9.93	10	10	10	10.00	0.07	0.01	0.01
1000	104.0	102	102	102	102.00	2.00	0.20	0.20
1000	1011	1010	1010	1010	1010.00	1.00	0.10	0.10

Uncertainty	0.20	%
Max % error	0.20	% FS

Gas verification from 0-100% vol CH4

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
100.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00
100.00	15.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00
100.00	50.00	49.90	49.90	49.90	49.90	0.10	0.10	0.10
100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00

Uncertainty	0.10	%
Max % error	0.10	% FS

Gas verification from 0-100% CH4 LEL (0-4.4% VOL)

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00

Uncertainty	0.00	%
Max % error	0.00	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temp.	22.7	C
Pressure	971	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
N2	110241	03/11/2025	N2
3 ppm	303552	29/01/2028	CH4
10 ppm	265827	16/02/2026	CH4
100ppm	S1081135P	27/07/2028	CH4
1000 ppm	S1198731S	14/06/2028	CH4
1.0% Vol	S1198415S	10/04/2024	CH4
2.2% vol	1273046T	30/02/2028	CH4
5.0% vol	244842	08/08/2025	CH4
15% vol	268737	08/08/2025	CH4
50% vol	267652	09/05/2025	CH4
100% vol	1262313	09/08/2027	CH4

Calibration results: Pass

Next scheduled calibration: 19/10/2024

Calibration date: 19/10/2023

Issued by: Keeley Knight

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Calibration certificate number 41298 H-09833

Instrument Laser One **Serial Number** 41298

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from 0-1000ppm CH4

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0	0	0	0.00	0.00	0.00	0.00
1000	2.91	3	3	3	3.00	0.09	0.01	0.01
1000	10.3	10.3	10.3	10.3	10.30	0.00	0.00	0.00
1000	101.0	101	101	101	101.00	0.00	0.00	0.00
1000	1011	1010	1010	1010	1010.00	1.00	0.10	0.10

Uncertainty	0.10	%
Max % error	0.10	% FS

Gas verification from 0-100% vol CH4

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
100.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00
100.00	15.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00
100.00	50.00	49.90	49.90	49.90	49.90	0.10	0.10	0.10
100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00

Uncertainty	0.10	%
Max % error	0.10	% FS

Gas verification from 0-100% CH4 LEL (0-4.4% VOL)

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00

Uncertainty	0.00	%
Max % error	0.00	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temp.	22.6	C
Pressure	998	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
N2	110241	03/11/2025	N2
3 ppm	292675	17/08/2027	CH4
10 ppm	119779SG	11/04/2024	CH4
100ppm	S1035778	08/03/2028	CH4
1000 ppm	S1500109Y	02/03/2028	CH4
1.0% Vol	S1198415S	10/04/2024	CH4
2.2% vol	S1204209S	27/02/2028	CH4
5.0% vol	244842	08/08/2025	CH4
15% vol	268737	08/08/2025	CH4
50% vol	267652	09/05/2025	CH4
100% vol	1262313	09/08/2027	CH4

Calibration results: Pass

Next scheduled calibration: 03/07/2024

Calibration date: 03/07/2023

Issued by: Keeley Knight

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Calibration certificate number 19254 H-07052

Instrument Laser One **Serial Number** 19254

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from 0-1000ppm CH4

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0	0	0	0.00	0.00	0.00	0.00
1000	3	3.1	3.1	3.1	3.10	0.10	0.01	0.01
1000	10.3	10.3	10.3	10.3	10.30	0.00	0.00	0.00
1000	102.0	101	101	101	101.00	1.00	0.10	0.10
1000	1001	1000	1000	1000	1000.00	1.00	0.10	0.10

Uncertainty	0.10	%
Max % error	0.10	% FS

Gas verification from 0-100% vol CH4

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
100.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00
100.00	15.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00
100.00	50.00	49.90	49.90	49.90	49.90	0.10	0.10	0.10
100.00	100.00	99.90	99.90	99.90	99.90	0.10	0.10	0.10

Uncertainty	0.10	%
Max % error	0.10	% FS

Gas verification from 0-100% CH4 LEL (0-4.4% VOL)

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.00	0.00	2.00	2.00	1.33	2.00	2.00	2.00
100.00	50.00	0.00	0.00	0.00	0.00	50.00	50.00	50.00

Uncertainty	50.00	%
Max % error	50.00	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temp.	19.9	C
Pressure	1009	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
N2	S1261680T	16/05/2024	N2
3 ppm	131394SG	21/11/2025	CH4
10 ppm	119779SG	11/04/2024	CH4
100 ppm	S1385429W	18/01/2026	CH4
1000 ppm	1490137	23/08/2026	CH4
1.0% Vol	S1198415S	10/04/2024	CH4
2.2% vol	S1672767FF	18/07/2026	CH4
5.0% vol	217147	03/12/2024	CH4
15% vol	269223	07/11/2023	CH4
50% vol	189051SG	23/02/2024	CH4
100% vol	S1182097S	15/11/2025	CH4

Calibration results: Pass

Next scheduled calibration: 28/02/2025

Calibration date: 28/02/2022

Issued by: Laura McBride

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Inc.

Calibration certificate number **24RA-60425**

Instrument **Laser One** **Serial Number** **16233**

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from **0-1000ppm CH4**

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0	0	0	0.00	0.00	0.00	0.00
1000	3.02	3.2	3.2	3.2	3.20	0.18	0.02	0.02
1000	11	11.2	11.2	11.2	11.20	0.20	0.02	0.02
1000	102.0	105	105	105	105.00	3.00	0.30	0.30
1000	1006	1000	1000	1000	1000.00	6.00	0.60	0.60

Uncertainty	0.60	%
Max % error	0.60	% FS

Gas verification from **0-100% vol CH4**

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.18	2.10	2.10	2.10	2.10	0.08	0.08	0.08
100.00	5.00	4.80	4.80	4.80	4.80	0.20	0.20	0.20
100.00	15.10	15.00	15.00	15.00	15.00	0.10	0.10	0.10
100.00	50.00	49.80	49.80	49.80	49.80	0.20	0.20	0.20
100.00	100.00	99.50	99.50	99.50	99.50	0.50	0.50	0.50

Uncertainty	0.50	%
Max % error	0.50	% FS

Gas verification from **0-100% CH4 LEL (0-4.4% VOL)**

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Inc.

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.18	2.00	2.00	2.00	2.00	0.18	0.18	0.18
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00

Uncertainty	0.18	%
Max % error	0.18	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Inc.

Environmental conditions during calibration

Temp.	23.3	C
Pressure	982.4	mBar

Gas bottles used for calibration

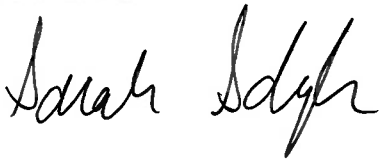
Gas	Cylinder number	Expiry date	Gas
Synthetic Air	303802	3/12/2029	Synthetic Air
3 ppm	CC76924	6/7/2032	CH4
10 ppm	CC303924	11/30/2031	CH4
100ppm	DT0021612	6/6/2029	CH4
1000 ppm	CC64714	9/27/2028	CH4
1.0% Vol	DT0008070	5/24/2029	CH4
2.2% vol	CC81557	9/29/2028	CH4
5.0% vol	TT44360	9/11/2028	CH4
15% vol	481840	6/12/2029	CH4
50% vol	CC708175	1/22/2029	CH4
100% vol	HP-T-105403	8/22/2028	CH4

Calibration results: Pass

Next scheduled calibration: 8/6/2025

Calibration date: 8/6/2024

Issued by: Sarah Schafer



Appendix G:
Gas Flare Reports

FOCUS YOUR ENERGY

PEOPLE ENGINEERING A CLEAN ENERGY, ZERO CARBON FUTURE.

WWW.LGI.COM.AU

PROJECT PROFILE: DUNMORE, NSW

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement.

Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
26.5 million m3	252 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.2 million seedlings planted for 10 years (t CO2e)	5,870 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas management system, including the monitoring and reporting services provided.

P: +61 7 3711 2225 **E:** enquiries@lgi.com.au **in:** linkedin.com/company/lgi-ltd | 57 Harvey Street N, Eagle Farm QLD 4009

Saving the planet one landfill, one megawatt, one solar panel, one battery at a time

*Results achieved to 1 December 2023

Site:	Dunmore	**Report issue date:**	13/12/2023
Report month:	November 2023	**Prepared by:**	Grace Tap
Prepared for:	Shellharbour City Council	**Checked by:**	Brendan Fraser

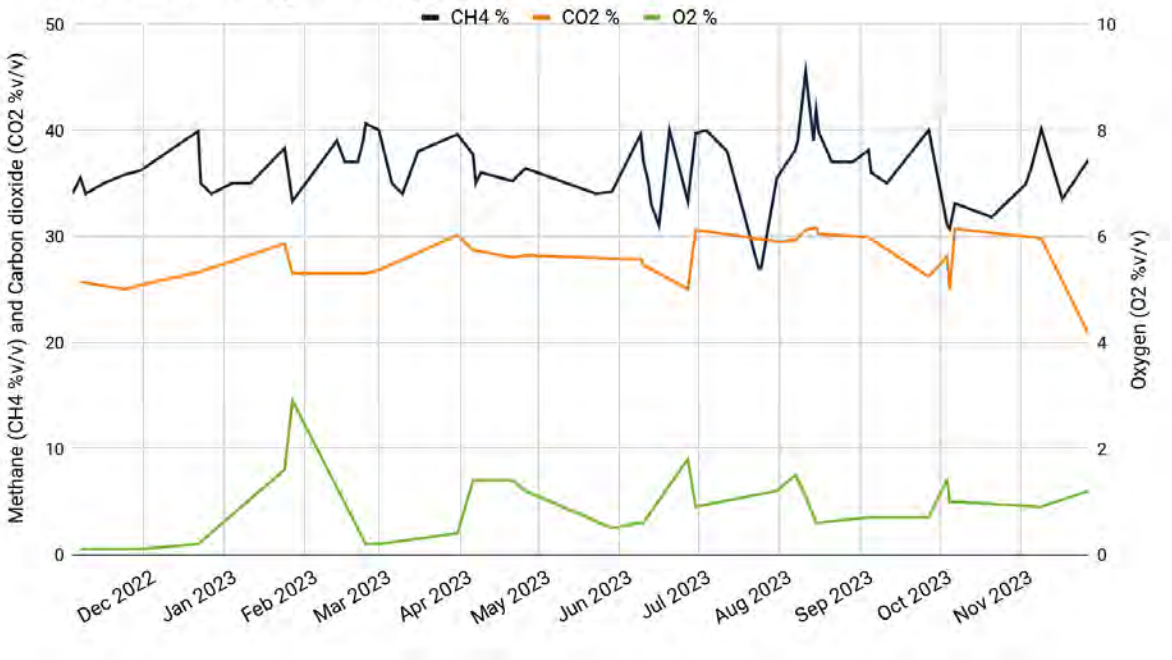
Comments on changes to existing system:	• **January 2016** - LGI disconnected the 4 lateral wells and 8 vertical wells. • **April 2016** - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells. • **June 2016** - LGI disconnected the extended gas capture system to assist Council. • **September 2016** - LGI disconnected the extended gas capture system to assist Council. • **November 2016** - LGI commissioned the connection to leachate sump 6 as of 23-11-2016. • **May 2017** - LGI installed an additional 10 vertical wells to the existing LFG system • **November 2019** - LGI on site to move mainline up batter, and reconnected infrastructure that had been previously disconnected, including 4 wells on the dimple and a 160mm leachate riser. • **April 2020 -** LGI installed a flowline to sump 6 after earlier disconnection. • **February 2021** - LGI installed 13 new vertical wells, including a new submain • **March 2022** - LGI replaced the flare gas analyser panel with a Draeger model analyser for greater accuracy and reliability • **August 2022** - LGI repaired the 225mm mainline and and adjacent submain to allow for intermediate capping to continue across the top of cell 3 • **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line. • **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 94.79 % Down Time: 37.50 h 16.08h - Planned Outage 21.42h - Forced Outage External Field tuned: - 03/11/2023 - 09/11/2023 - 27/11/2023
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

Flare Operational Data:

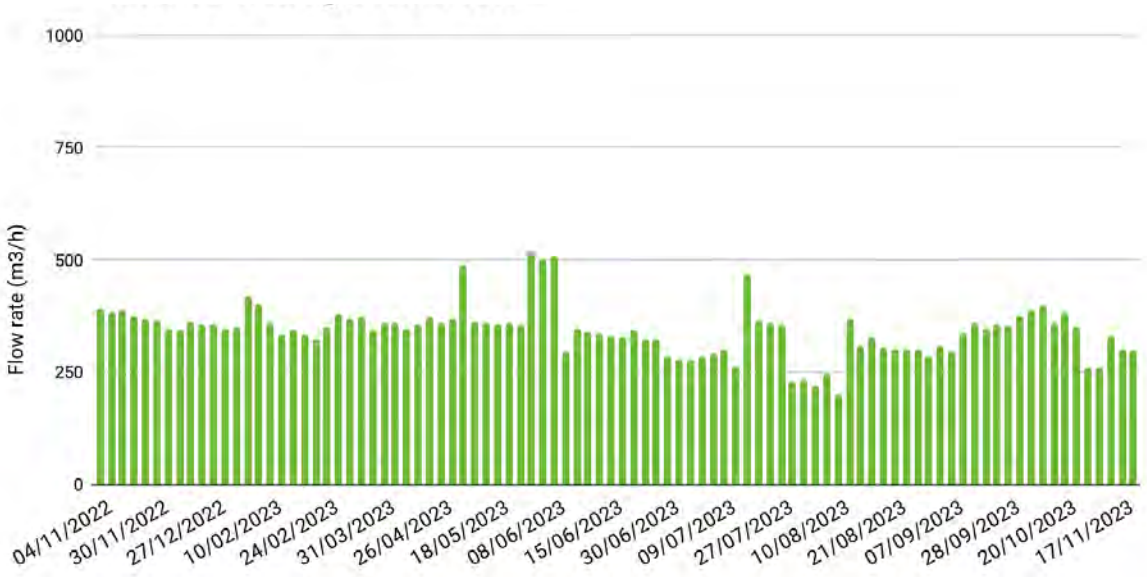
Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m3)
09/11/2023	40.1	29.8	0.9	257	686	26,345,690
17/11/2023	33.5	-	-	300	754	26,401,136
27/11/2023	37.2	20.8	1.2	297	774	26,471,625
Average	36.9	25.3	1.05	285	738	-

Dunmore- Methane, Carbon Dioxide & Oxygen

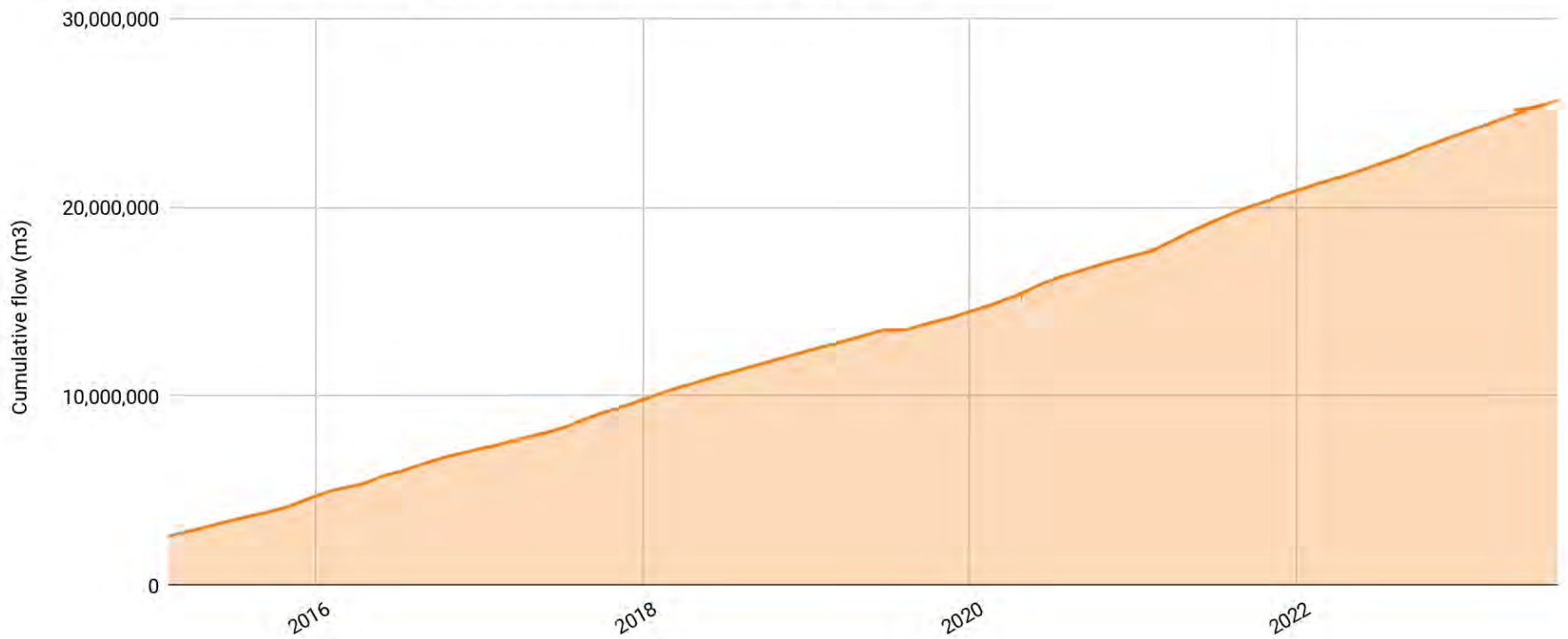
Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.



Dunmore - Flow Rate



Dunmore - Cumulative Flow



26,492,740 m3 of combusted landfill gas from the beginning of the project up to 1 December 2023 represents:

- 251,617 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,193,624 seedlings planted for 10 years
- 5,870 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

Please note:

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PROJECT PROFILE: DUNMORE, NSW

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement.

Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
26.7 million m3	253 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.2 million seedlings planted for 10 years (t CO2e)	5,738 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas management system, including the monitoring and reporting services provided.

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Saving the planet one landfill, one megawatt, one solar panel, one battery at a time

*Results achieved to 1 January 2024

Site:	Dunmore	**Report issue date:**	15/01/2024
Report month:	December 2023	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Brendan Fraser

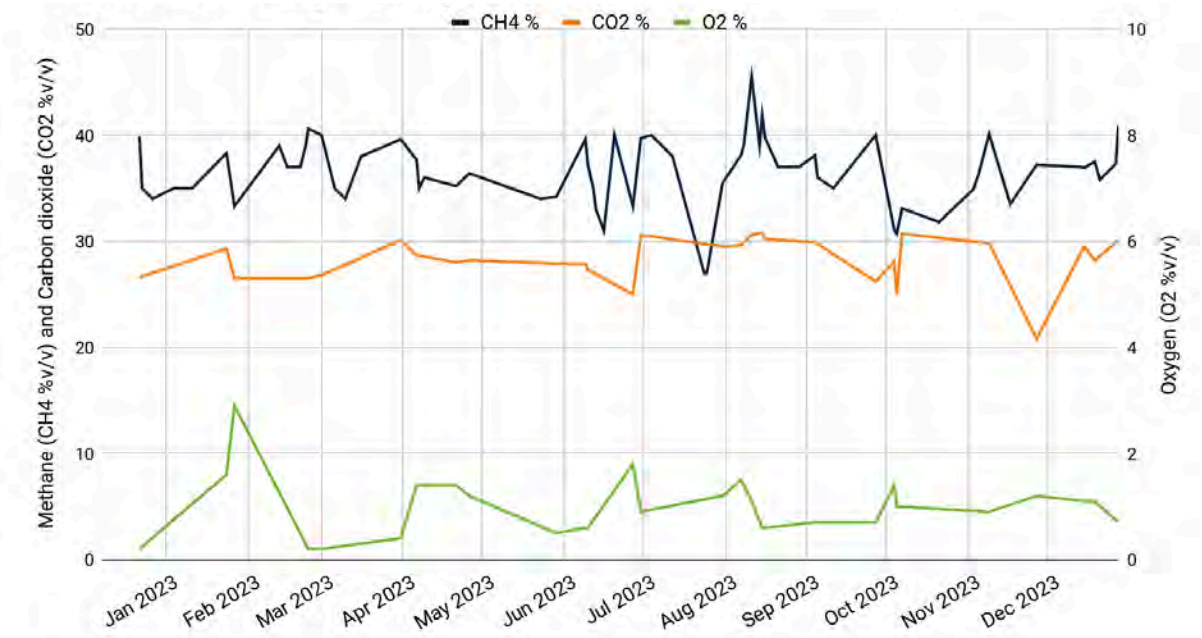
Comments on changes to existing system:	• **January 2016** - LGI disconnected the 4 lateral wells and 8 vertical wells. • **April 2016** - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells. • **June 2016** - LGI disconnected the extended gas capture system to assist Council. • **September 2016** - LGI disconnected the extended gas capture system to assist Council. • **November 2016** - LGI commissioned the connection to leachate sump 6 as of 23-11-2016. • **May 2017** - LGI installed an additional 10 vertical wells to the existing LFG system • **November 2019** - LGI on site to move mainline up batter, and reconnected infrastructure that had been previously disconnected, including 4 wells on the dimple and a 160mm leachate riser. • **April 2020 -** LGI installed a flowline to sump 6 after earlier disconnection. • **February 2021** - LGI installed 13 new vertical wells, including a new submain • **March 2022** - LGI replaced the flare gas analyser panel with a Draeger model analyser for greater accuracy and reliability • **August 2022** - LGI repaired the 225mm mainline and and adjacent submain to allow for intermediate capping to continue across the top of cell 3 • **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line. • **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliabilty and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 92.59 % Down Time: 55.17 h 0.83h - Planned Outage 54.33h - Forced Outage Internal Field tuned: - 28/12/2023
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning. Potential for re-drilling old wells.

Flare Operational Data:

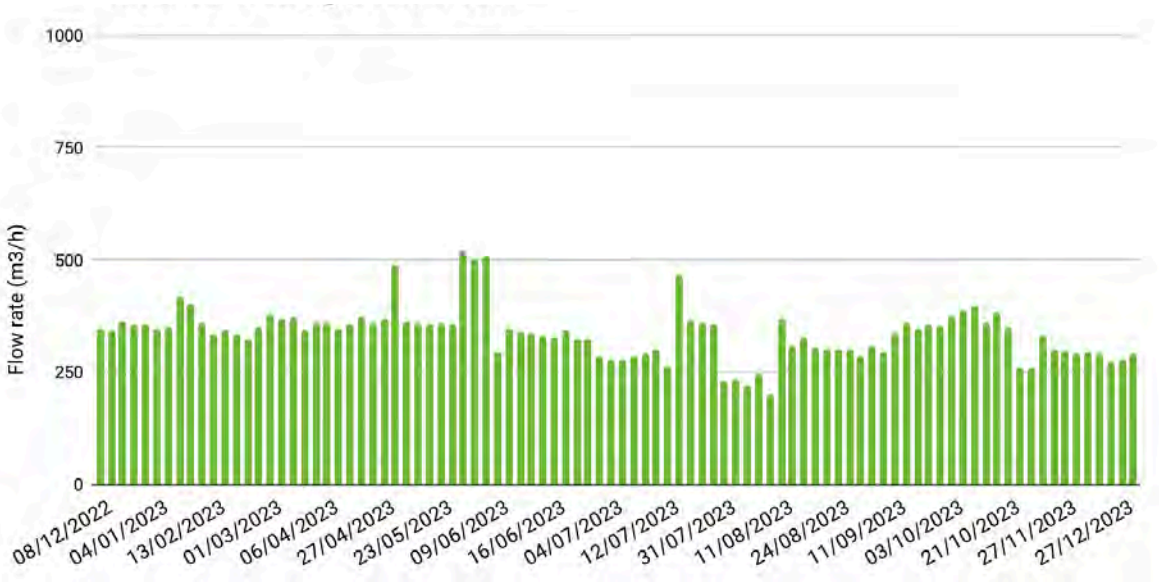
Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m3)
15/12/2023	36.9	29.5	1.1	294	749	26,577,789
19/12/2023	37.5	28.2	1.1	292	452	26,605,676
21/12/2023	35.8	-	-	272	440	26,619,312
28/12/2023	40.9	30.1	0.7	292	484	26,665,802
Average	37.8	29.3	0.96666666	288	531	-

Dunmore- Methane, Carbon Dioxide & Oxygen

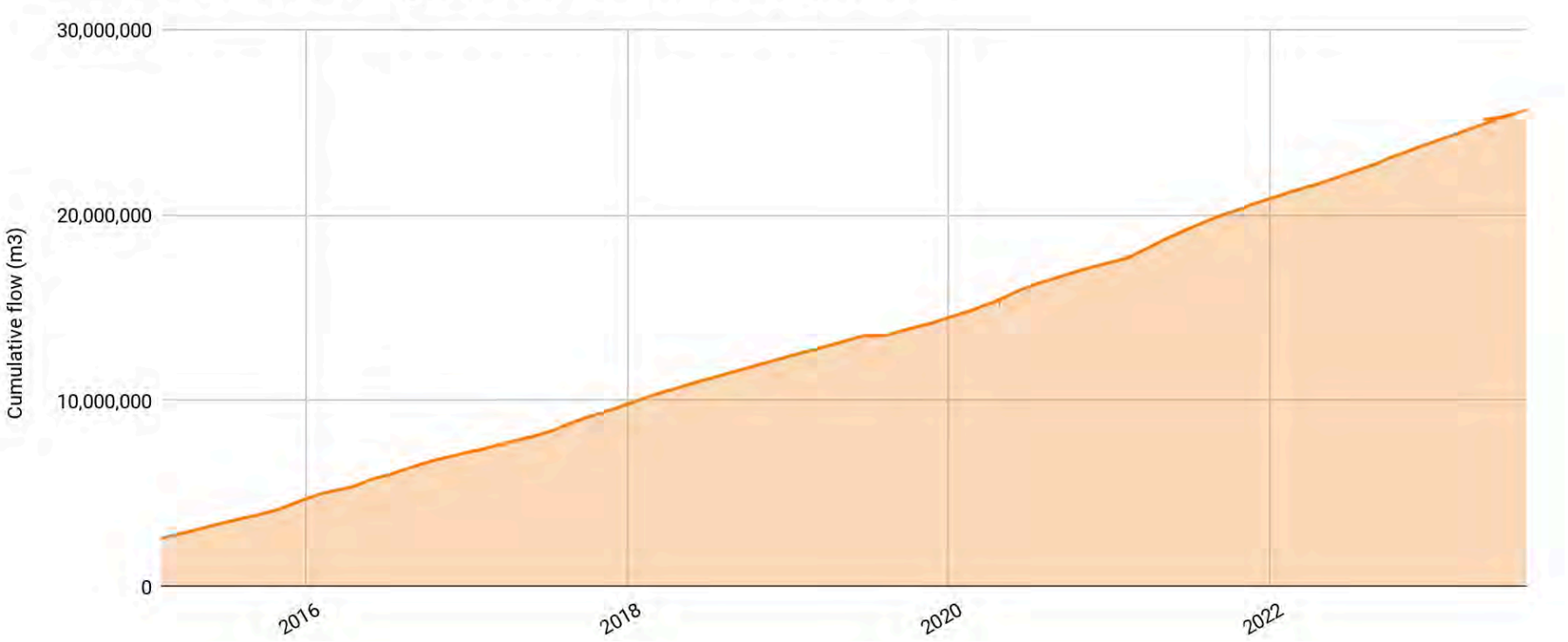
Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.



Dunmore - Flow Rate



Dunmore - Cumulative Flow



26,690,608 m3 of combusted landfill gas from the beginning of the project up to 1 January 2024 represents:

- 253,497 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,224,945 seedlings planted for 10 years
- 5,738 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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PROJECT PROFILE: DUNMORE, NSW

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Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
26.9 million m3	255 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.3 million seedlings planted for 10 years (t CO2e)	5,628 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
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*Results achieved to 1 February 2024

Site:	Dunmore	**Report issue date:**	29/02/2024
Report month:	January 2024	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Brendan Fraser

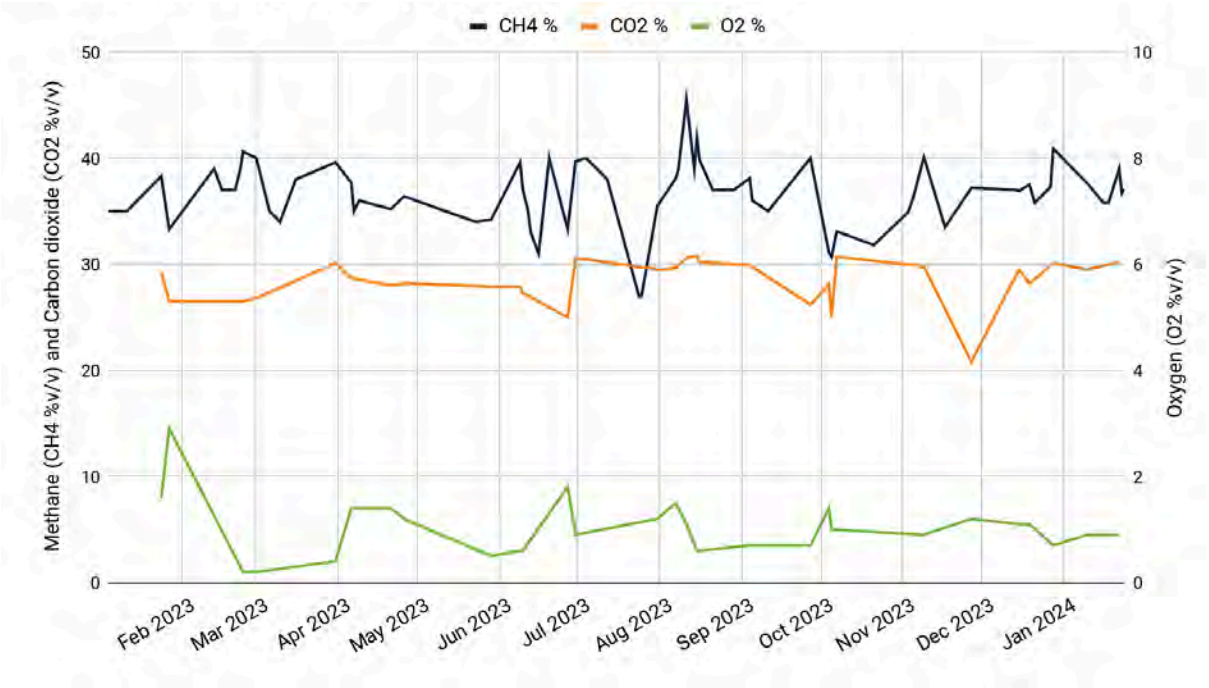
Comments on changes to existing system:	• **January 2016** - LGI disconnected the 4 lateral wells and 8 vertical wells. • **April 2016** - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells. • **June 2016** - LGI disconnected the extended gas capture system to assist the Council. • **September 2016** - LGI disconnected the extended gas capture system to assist the Council. • **November 2016** - LGI commissioned the connection to leachate sump 6 as of 23-11-2016. • **May 2017** - LGI installed an additional 10 vertical wells to the existing LFG system • **November 2019** - LGI on site to move mainline up battery, and reconnected infrastructure that had been previously disconnected, including 4 wells on the dimple and a 160mm leachate riser. • **April 2020 -** LGI installed a flowline to sump 6 after earlier disconnection. • **February 2021** - LGI installed 13 new vertical wells, including a new submain • **March 2022** - LGI replaced the flare gas analyser panel with a Draeger model analyser for greater accuracy and reliability • **August 2022** - LGI repaired the 225mm mainline and and adjacent submain to allow for intermediate capping to continue across the top of cell 3 • **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line. • **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 100.00 % Down Time: 0.00 h Field tuned: - 18/01/2024 - 22/01/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

Flare Operational Data:

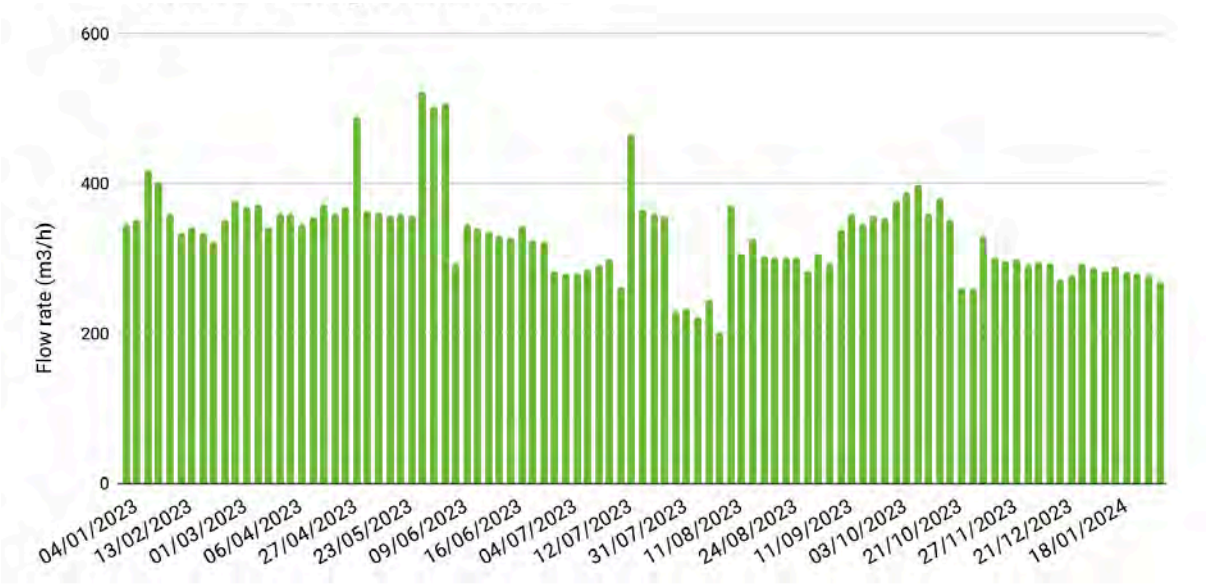
Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m3)
10/01/2024	37.6	29.5	0.9	287	462	26,755,289
16/01/2024	35.8	-	-	284	453	26,795,576
18/01/2024	35.8	-	-	289	459	26,809,196
22/01/2024	39	30.2	0.9	281	459	26,836,367
Average	37.1	29.9	0.9	285	458	-

Dunmore- Methane, Carbon Dioxide & Oxygen

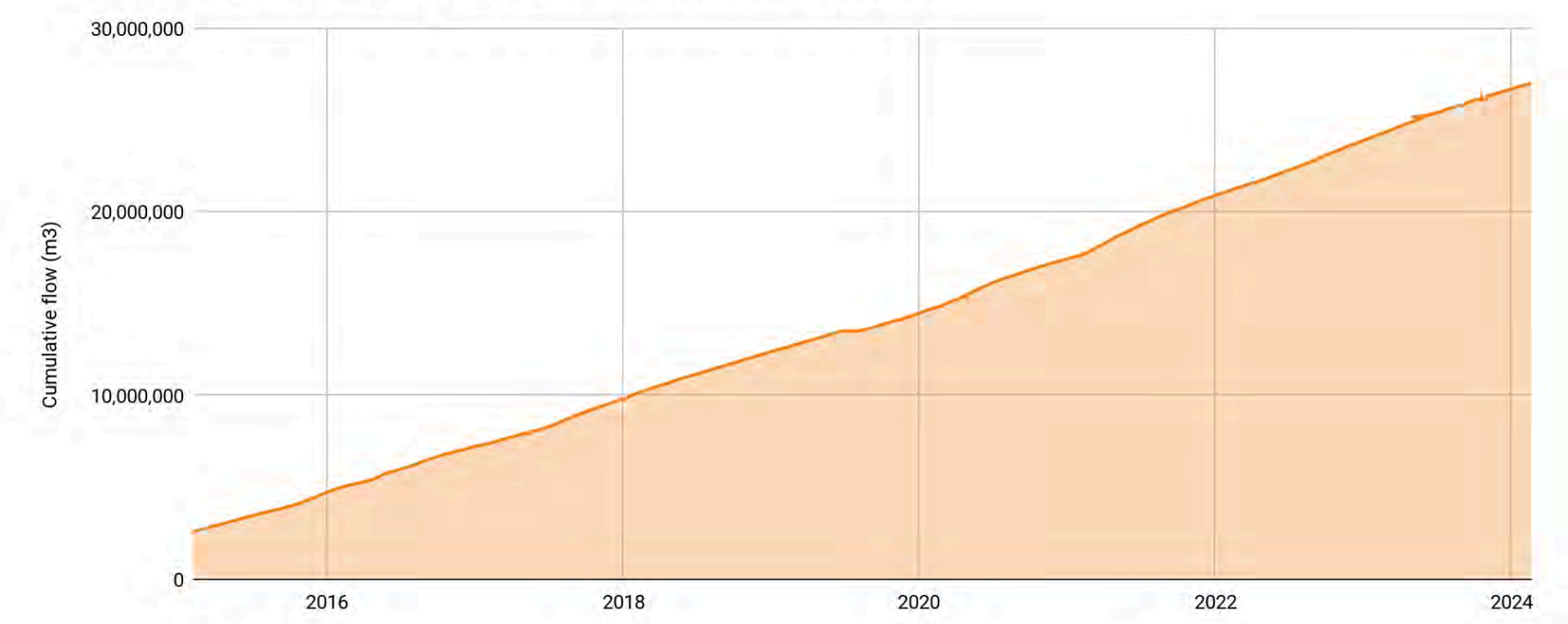
Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.



Dunmore - Flow Rate



Dunmore - Cumulative Flow



26,900,446 m3 of combusted landfill gas from the beginning of the project up to 1 February 2024 represents:

- 255,490 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,258,161 seedlings planted for 10 years
- 5,628 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
27.1 million m3	257 thousand tonnes CO2e	92 thousand Australian Carbon Credit Units (ACCUs)	4.3 million seedlings planted for 10 years	5,555 for the last 12 months of carbon abatement

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
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Saving the planet one landfill, one megawatt, one solar panel, one battery at a time

*Results achieved to 1 March 2024

Site:	Dunmore	**Report issue date:**	15/03/2024
Report month:	February 2024	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Brendan Fraser

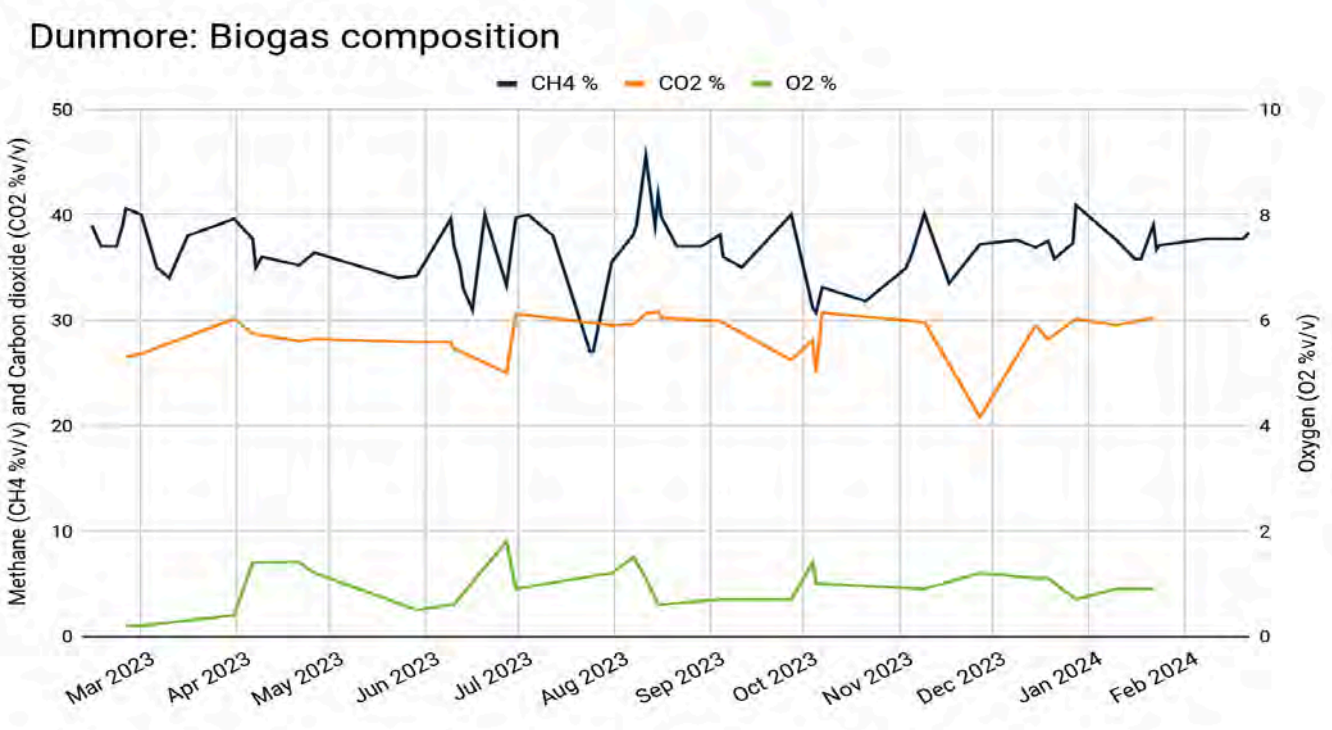
Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 99.90 % Down Time: 0.67 h 0.67h - Forced Outage External
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

Flare Operational Data:

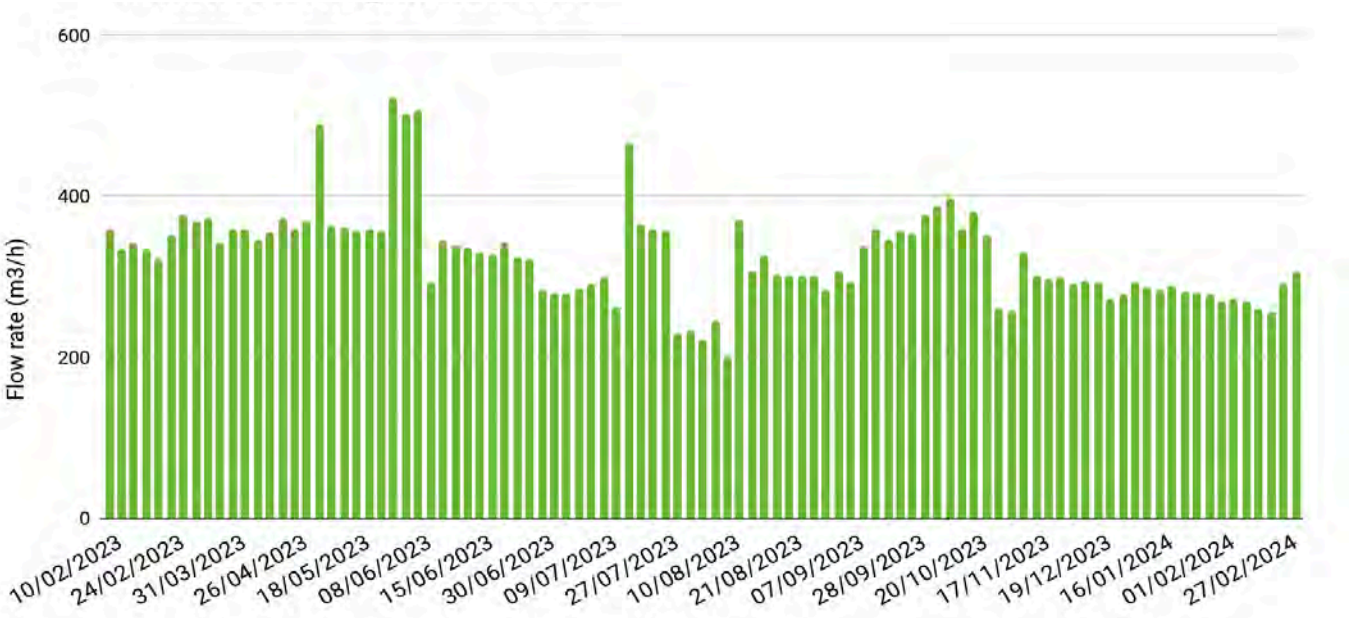
Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m3)
08/02/2024	37.7	-	-	271	448	26,948,083
20/02/2024	37.7	-	-	270	447	27,025,085
22/02/2024	38.3	-	-	260	440	27,037,652
27/02/2024	39.9	30.6	0.4	290	484	27,068,892
Average	38.4	30.6	0.4	273	455	-

Dunmore- Methane, Carbon Dioxide & Oxygen

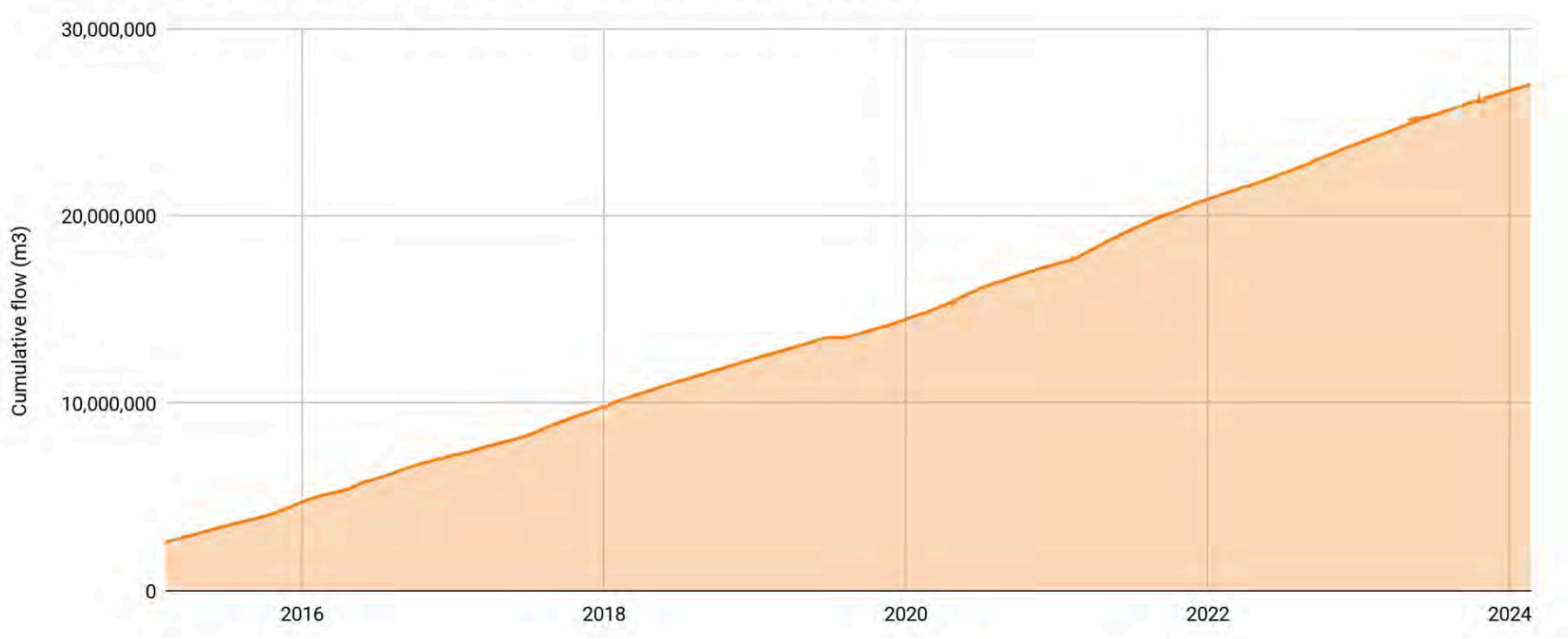
Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.



Dunmore - Flow Rate



Dunmore - Cumulative Flow



27,086,656 m3 of combusted landfill gas from the beginning of the project up to 1 March 2024 represents:

- 257,258 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,287,637 seedlings planted for 10 years
- 5,555 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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Archived commentary:

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Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
27.5 million m3	261 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.4 million seedlings planted for 10 years (t CO2e)	5,285 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

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*Results achieved to 1 May 2024

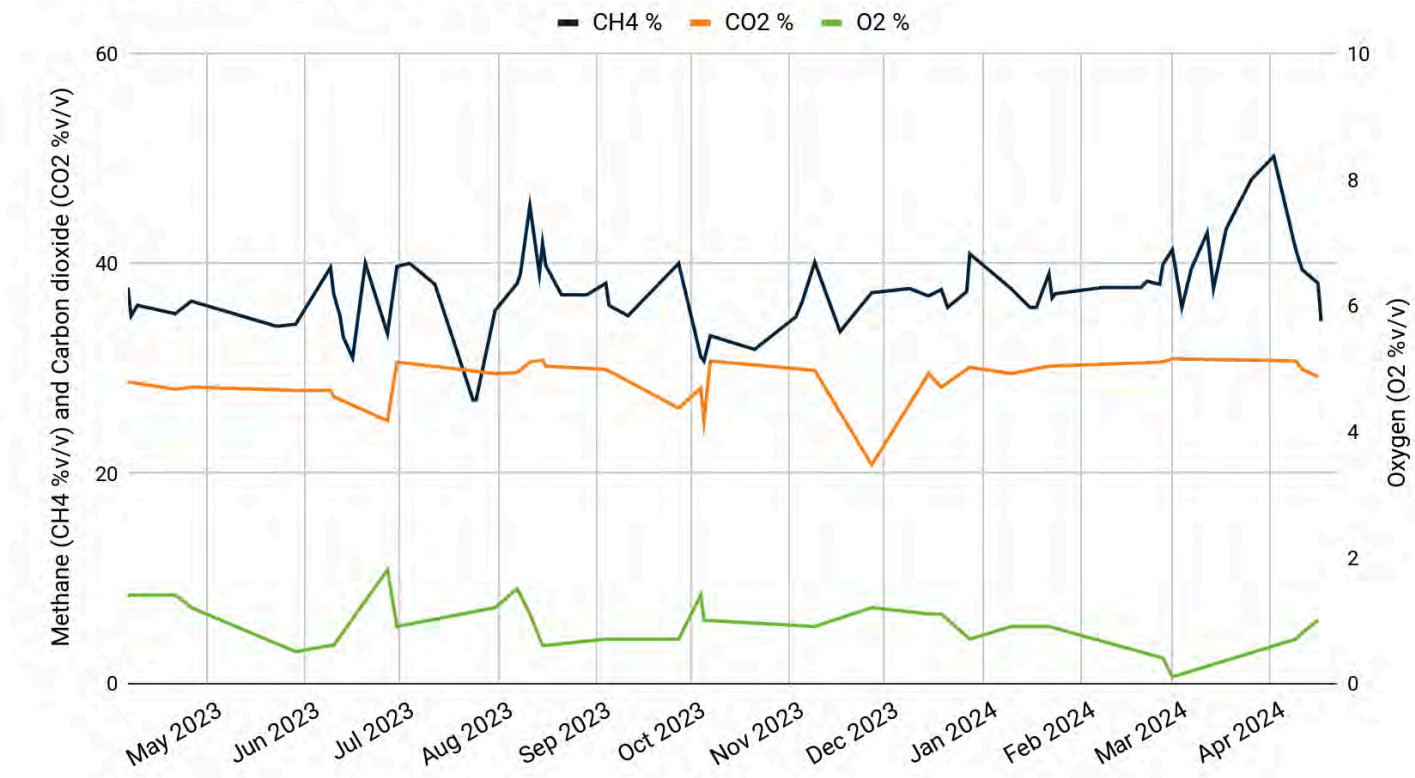
Site:	Dunmore	**Report issue date:**	21/05/2024
Report month:	April 2024	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 98.51 % Down Time: 10.75 h 10.75h - Forced Outage Internal Field tuned: - 29/04/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

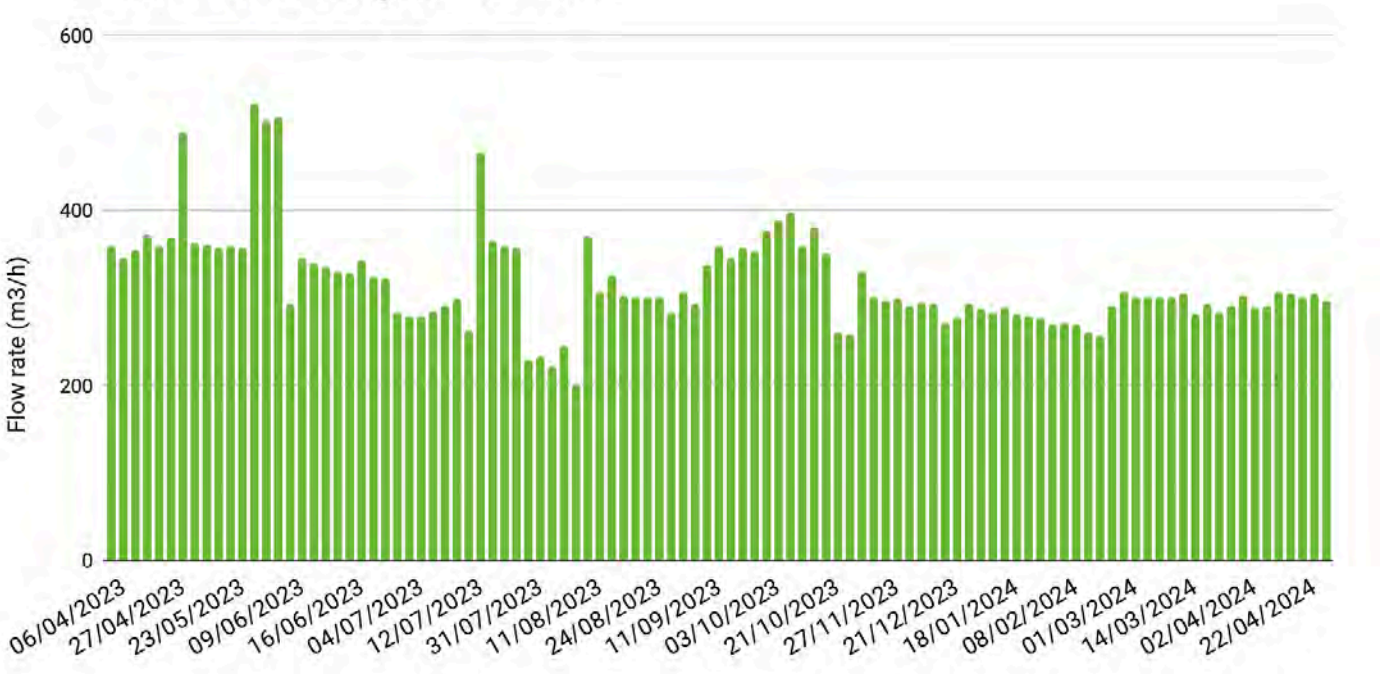
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m^3)
02/04/2024	50.2	-	-	302	507	27,276,513
09/04/2024	41.3	30.7	0.7	288	458	27,324,829
11/04/2024	39.4	29.9	0.8	290	450	27,338,790
16/04/2024	38.1	29.2	1	307	578	27,374,684
Average	42.25	29.93	0.83	297	498	-

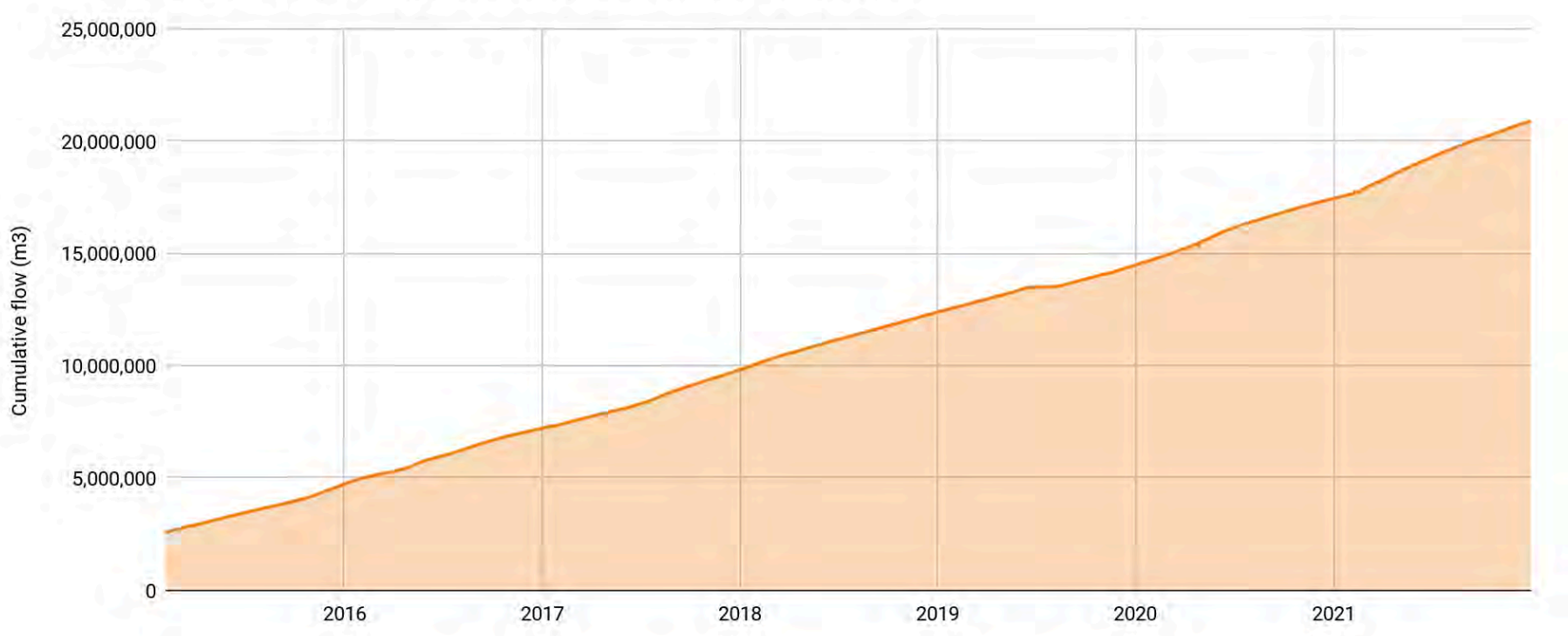
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



27,480,639 m3 of combusted landfill gas from the beginning of the project up to 1 May 2024 represents:

- 261,000 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,350,002 seedlings planted for 10 years
- 5,285 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

Please note:

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Archived commentary:

Comments on changes to existing system:	• **January 2016** - LGI disconnected the 4 lateral wells and 8 vertical wells. • **April 2016** - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells. • **June 2016** - LGI disconnected the extended gas capture system to assist Council. • **September 2016** - LGI disconnected the extended gas capture system to assist Council. • **November 2016** - LGI commissioned the connection to leachate sump 6 as of 23-11-2016. • **May 2017** - LGI installed an additional 10 vertical wells to the existing LFG system • **November 2019** - LGI on site to move mainline up batter, and reconnected infrastructure that had been previously disconnected, including 4 wells on the dimple and a 160mm leachate riser. • **April 2020 -** LGI installed a flowline to sump 6 after earlier disconnection. • **February 2021** - LGI installed 13 new vertical wells, including a new submain • **March 2022** - LGI replaced the flare gas analyser panel with a Draeger model analyser for greater accuracy and reliability • **August 2022** - LGI repaired the 225mm mainline and and adjacent submain to allow for intermediate capping to continue across the top of cell 3 • **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line.

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PROJECT PROFILE: DUNMORE, NSW

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Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
27.7 million m3	263 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.4 million seedlings planted for 10 years (t CO2e)	5,155 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI made 1000 m³/hr ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas management system, including the monitoring and reporting services provided.

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*Results achieved to 1 June 2024

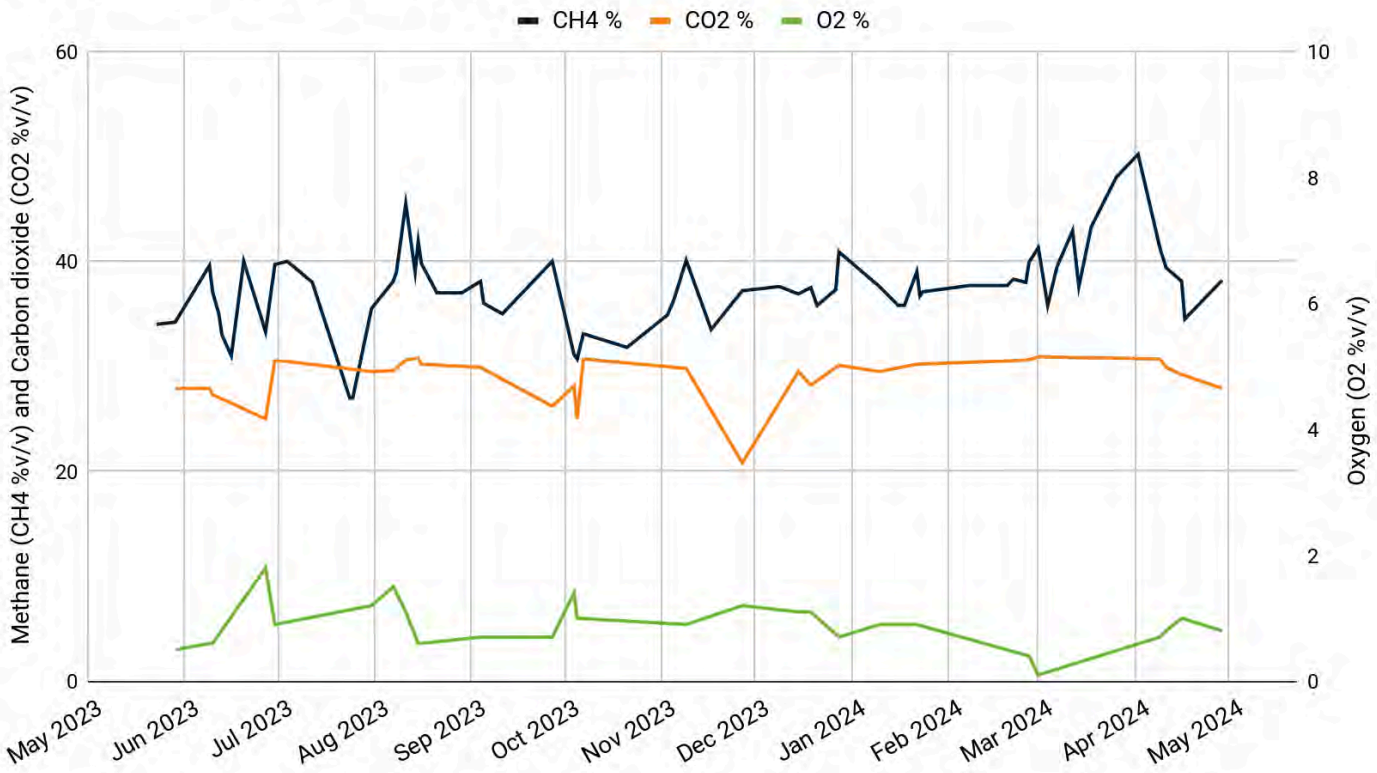
Site:	Dunmore	**Report issue date:**	14/06/2024
Report month:	May 2024	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliabilty and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 99.81 % Down Time: 1.42 h 1.42h - Planned Outage Field tuned: - 31/05/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

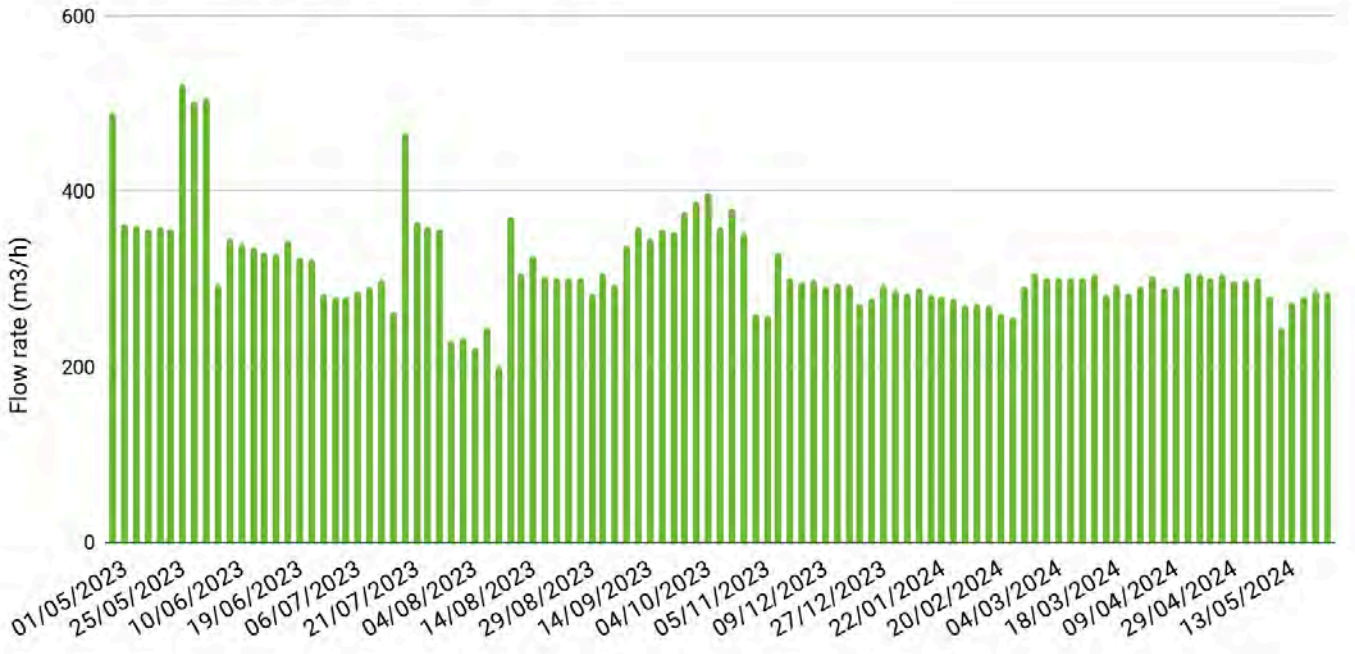
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m^3)
03/05/2024	-	-	-	299.14	537	27,497,311
07/05/2024	-	-	-	301	209	27,525,925
16/05/2024	-	-	-	273	535	27,582,754
31/05/2024	42.2	30.4	0.7	285	560	27,685,920
Average	42.20	30.40	0.70	290	460	-

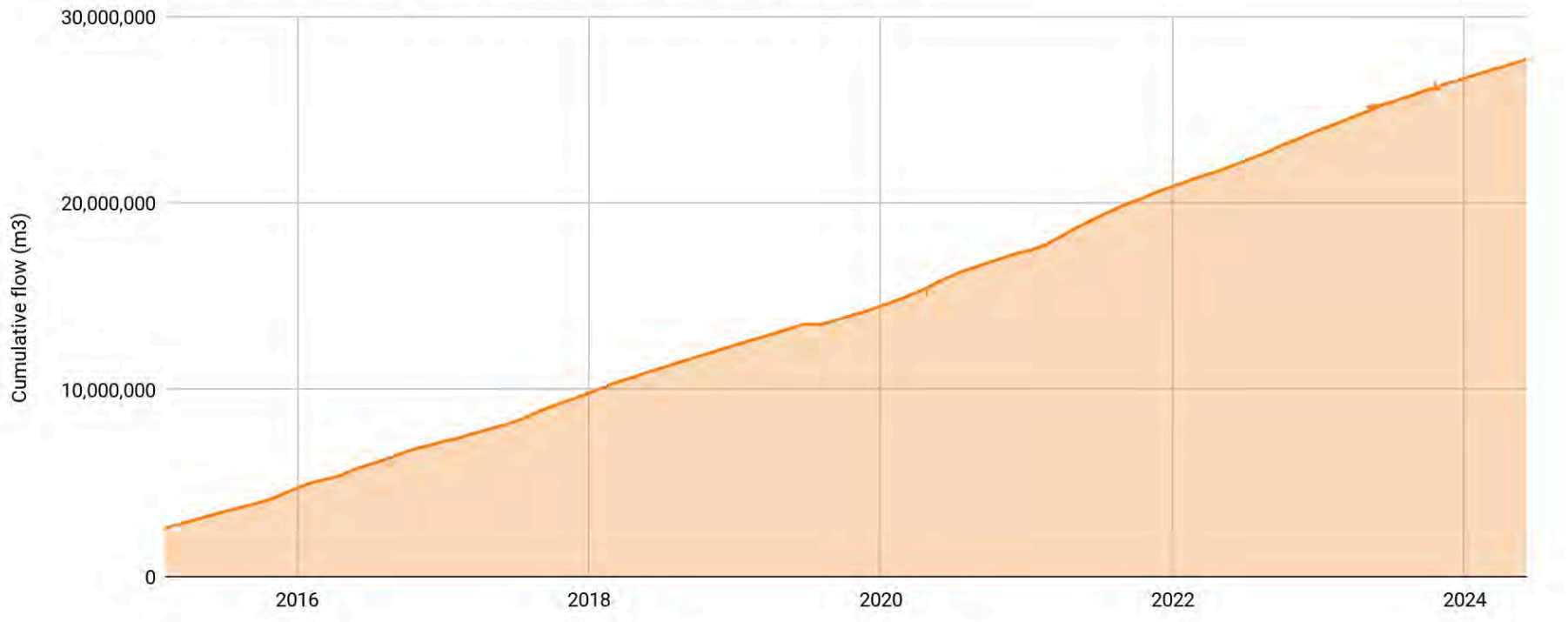
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



27,689,259 m3 of combusted landfill gas from the beginning of the project up to 1 June 2024 represents:

- 262,982 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,383,025 seedlings planted for 10 years
- 5,155 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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PROJECT PROFILE: DUNMORE, NSW

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Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
27.9 million m3	265 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.4 million seedlings planted for 10 years (t CO2e)	5,118 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI made 1000 m³/hr ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
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*Results achieved to 1 July 2024

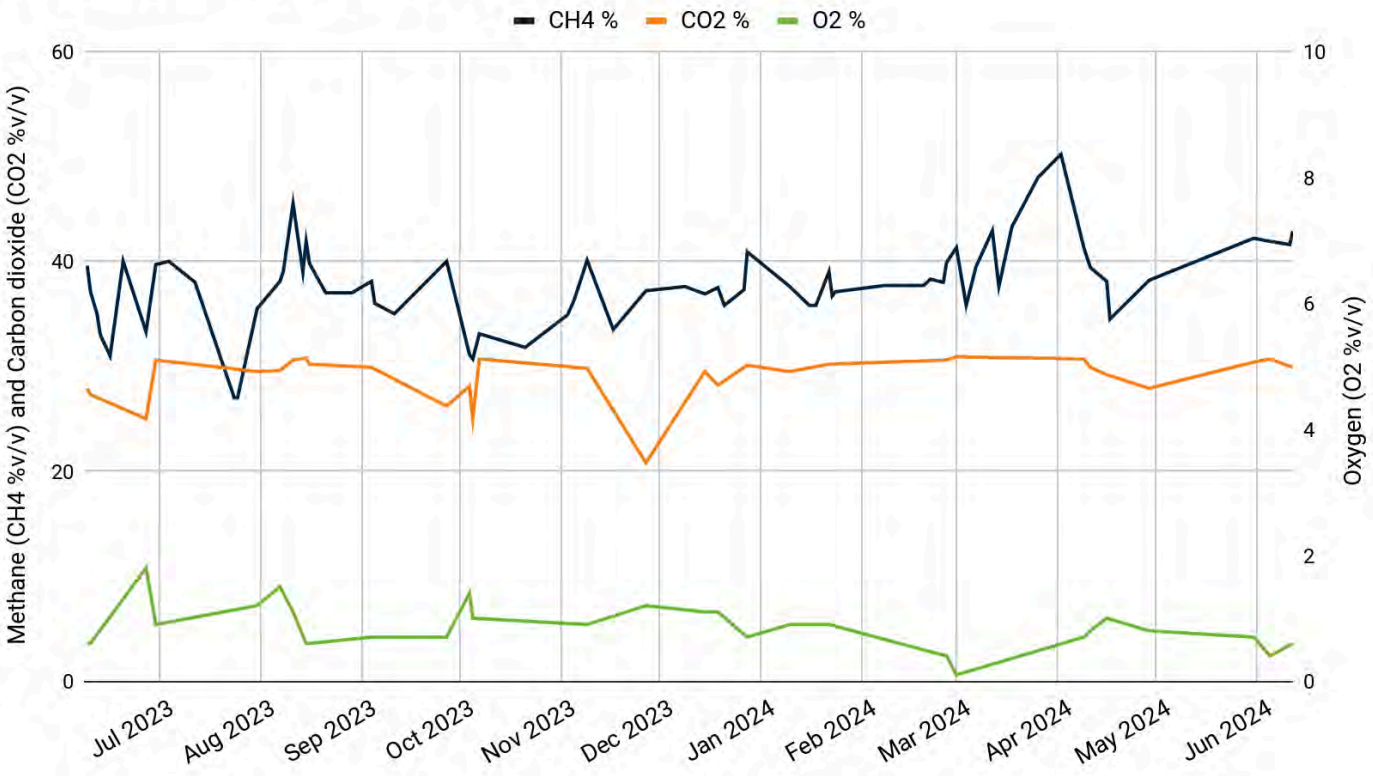
Site:	Dunmore	**Report issue date:**	23/07/2024
Report month:	June 2024	**Prepared by:**	Nusrat Habib
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 99.70 % Down Time: 2.17 h 2.17h - Planned Outage
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

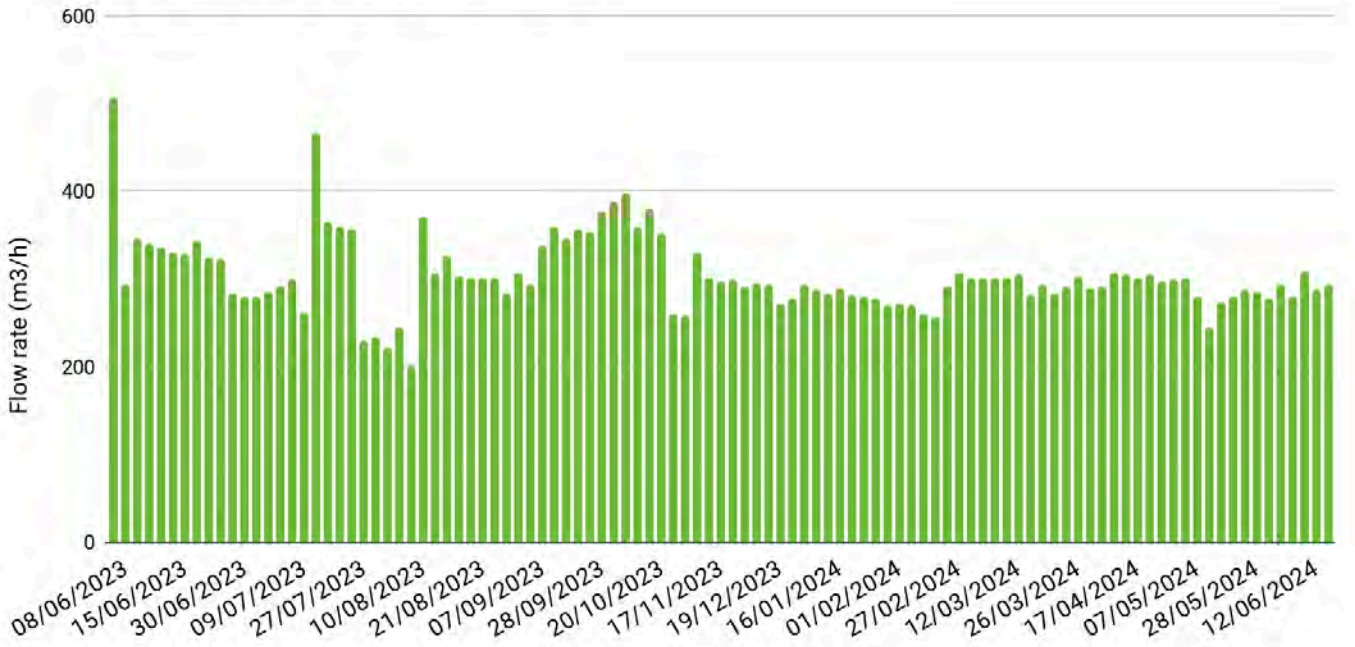
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m^3)
05/06/2024	41.9	30.7	0.4	292	546	27,718,675
12/06/2024	42.9	29.9	0.6	309	580	27,765,593
25/06/2024	39.6	-	-	287	534	27,855,001
28/06/2024	39.8	28.6	1	293	542	27,876,987
Average	41.05	29.73	0.67	295	551	-

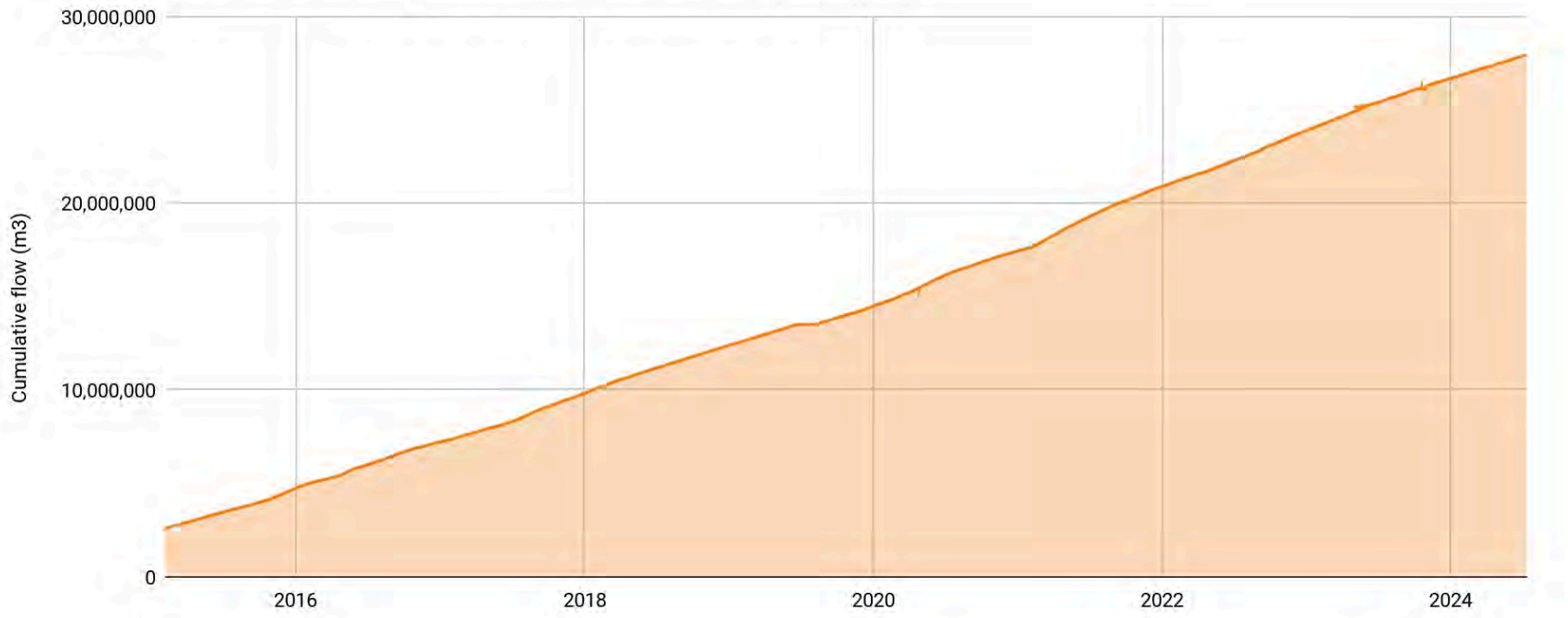
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



27,894,757 m3 of combusted landfill gas from the beginning of the project up to 1 July 2024 represents:

- 264,933 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,415,554 seedlings planted for 10 years
- 5,118 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
28.1 million m3	267 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.4 million seedlings planted for 10 years (t CO2e)	5,054 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

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*Results achieved to 1 August 2024

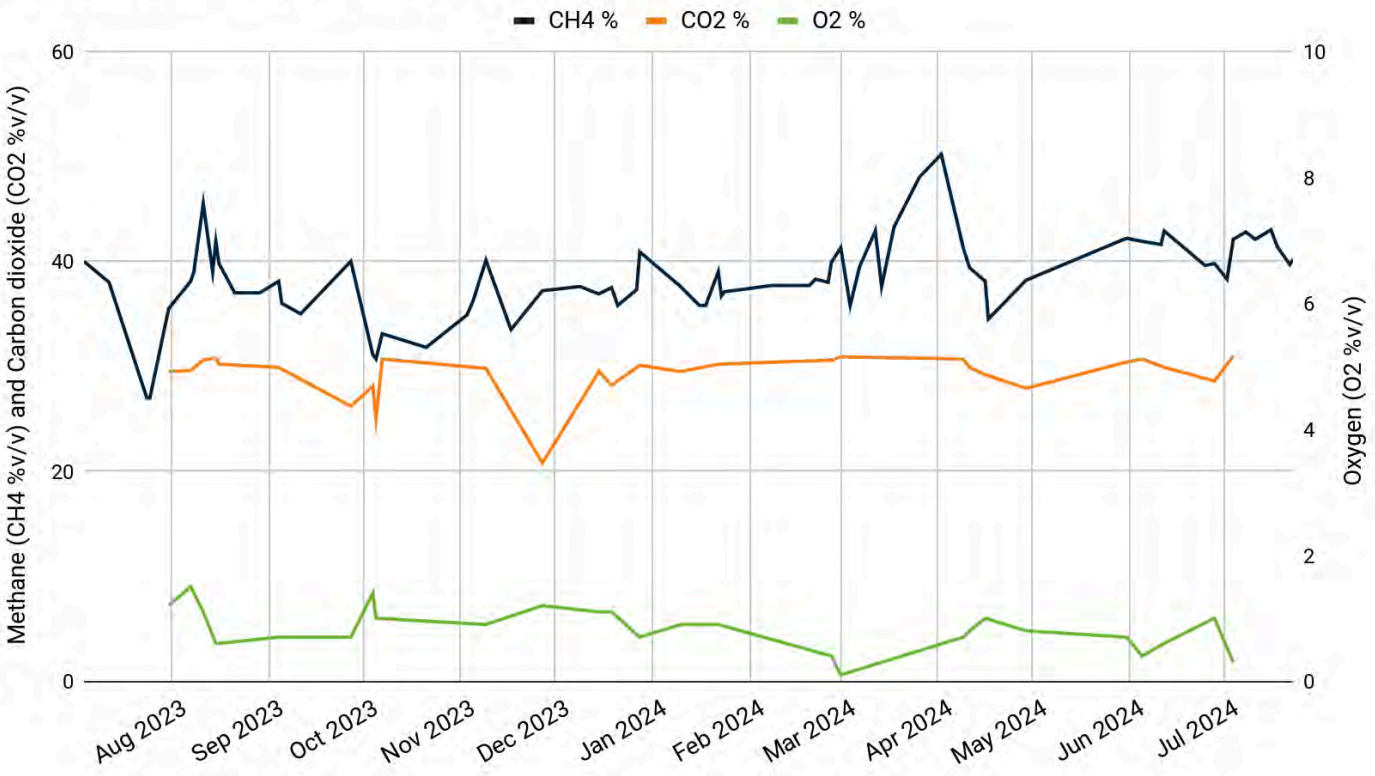
Site:	Dunmore	**Report issue date:**	15/08/2024
Report month:	July 2024	**Prepared by:**	Grace Burtenshaw
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line. • **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliabilty and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 99.79 % Down Time: 1.58 h 1.58h - Planned Outage Field tuned: - 04/07/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

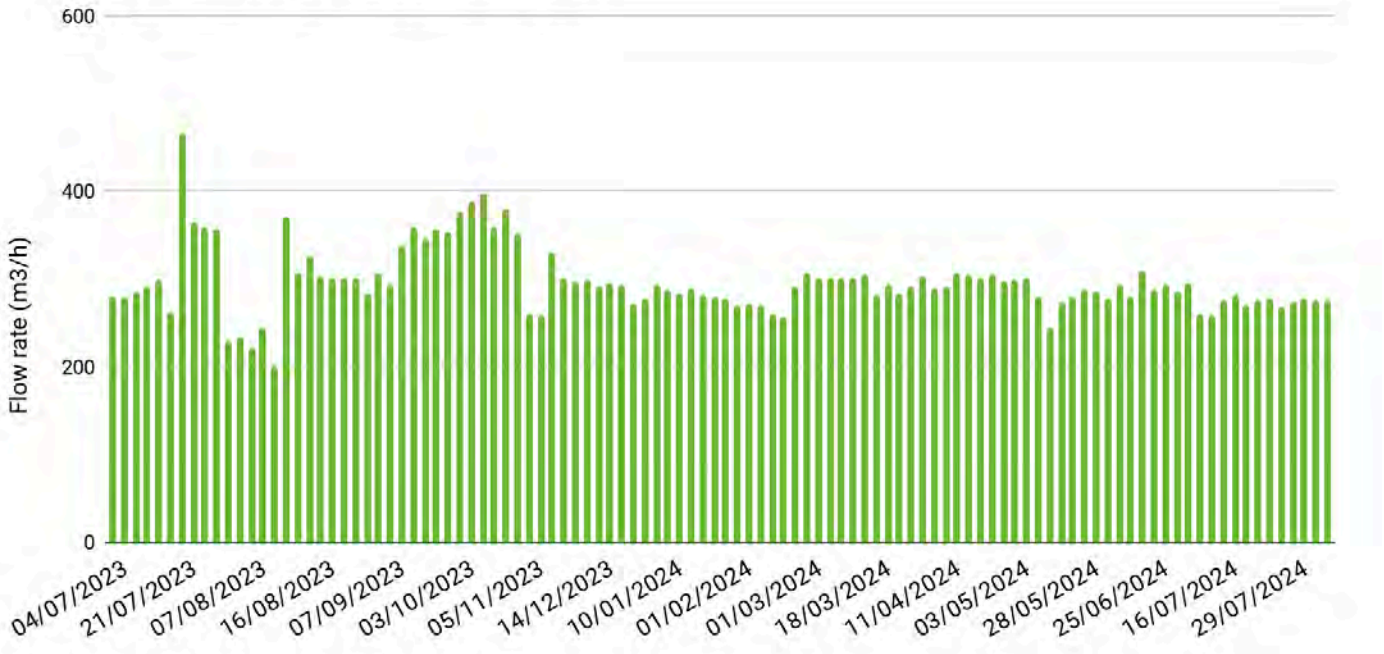
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m^3)
04/07/2024	42.1	31	0.3	295	555	27,917,600
16/07/2024	43	-	-	276	577	27,993,997
25/07/2024	40.4	-	-	278	693	28,051,983
31/07/2024	38.2	-	-	275	716	28,104,624
Average	40.93	31.00	0.30	281	635	-

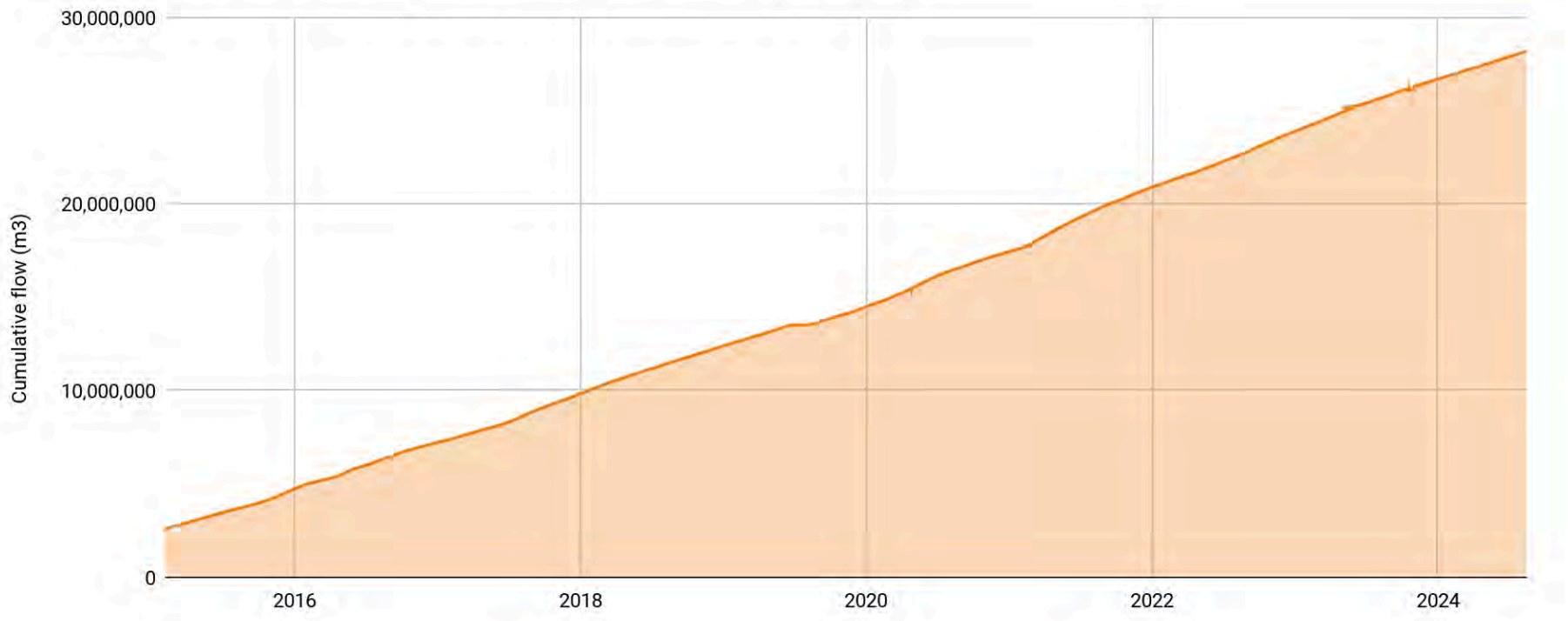
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



28,097,024 m3 of combusted landfill gas from the beginning of the project up to 1 August 2024 represents:

- 266,854 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,447,572 seedlings planted for 10 years
- 5,054 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

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28.3 million m3	269 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.5 million seedlings planted for 10 years (t CO2e)	5,044 for the last 12 months of carbon abatement (t CO2e)

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*Results achieved to 1 September 2024

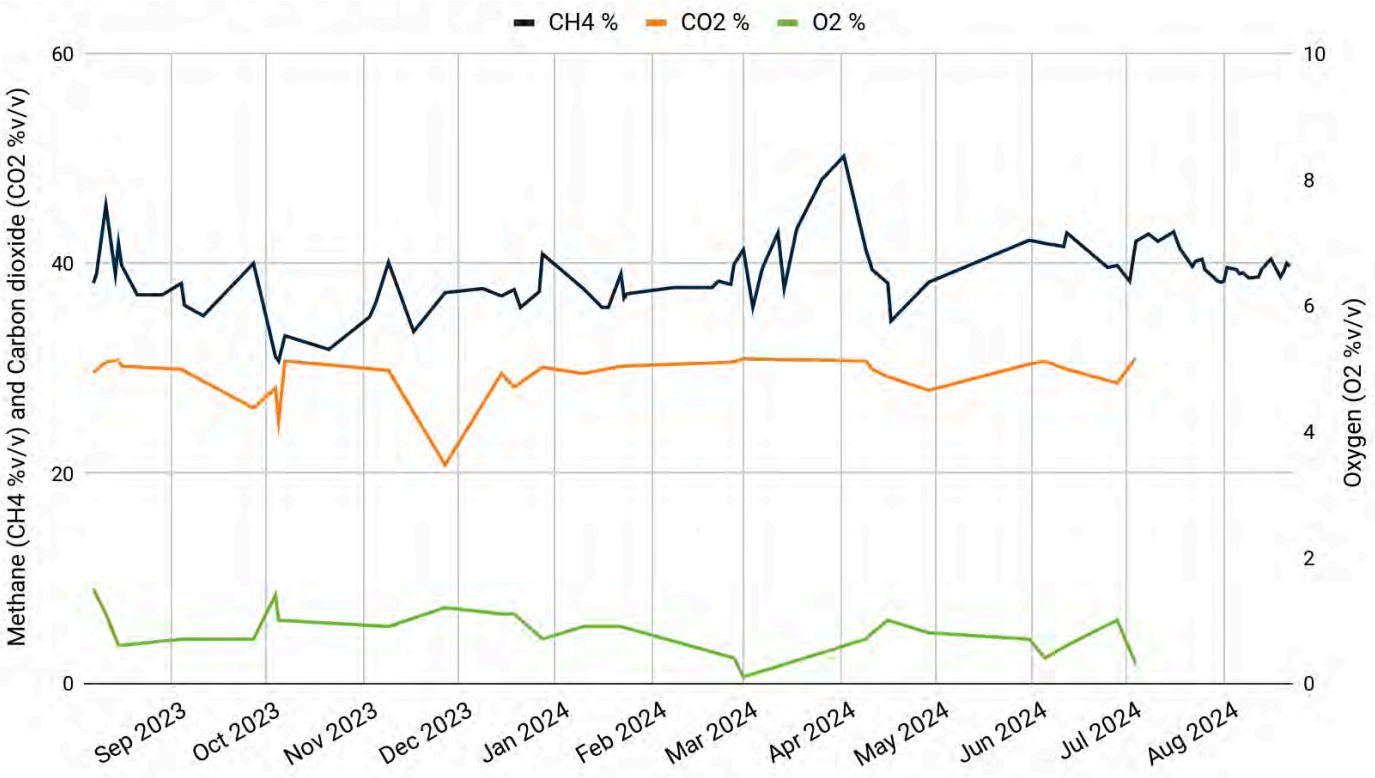
Site:	Dunmore	**Report issue date:**	13/09/2024
Report month:	August 2024	**Prepared by:**	Grace Burtenshaw
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations.
Comments on operation / maintenance:	Availability - 100.00 % Down Time: 0.00 h Field tuned: - 12/08/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

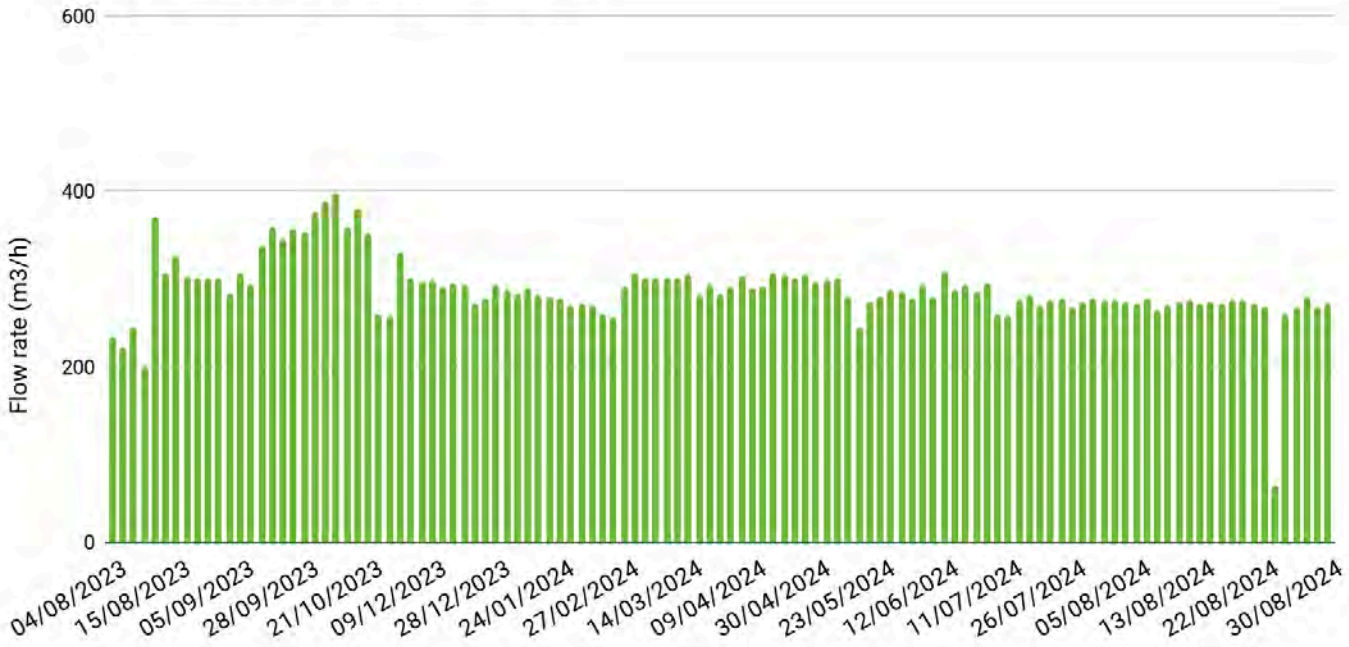
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m³)
02/08/2024	39.6	-	-	273	767	28,107,289
09/08/2024	38.6	-	-	274	789	28,152,615
16/08/2024	40.4	-	-	271	806	28,197,597
27/08/2024	39.7	-	-	267	777	28,268,861
Average	39.58	-	-	271	785	-

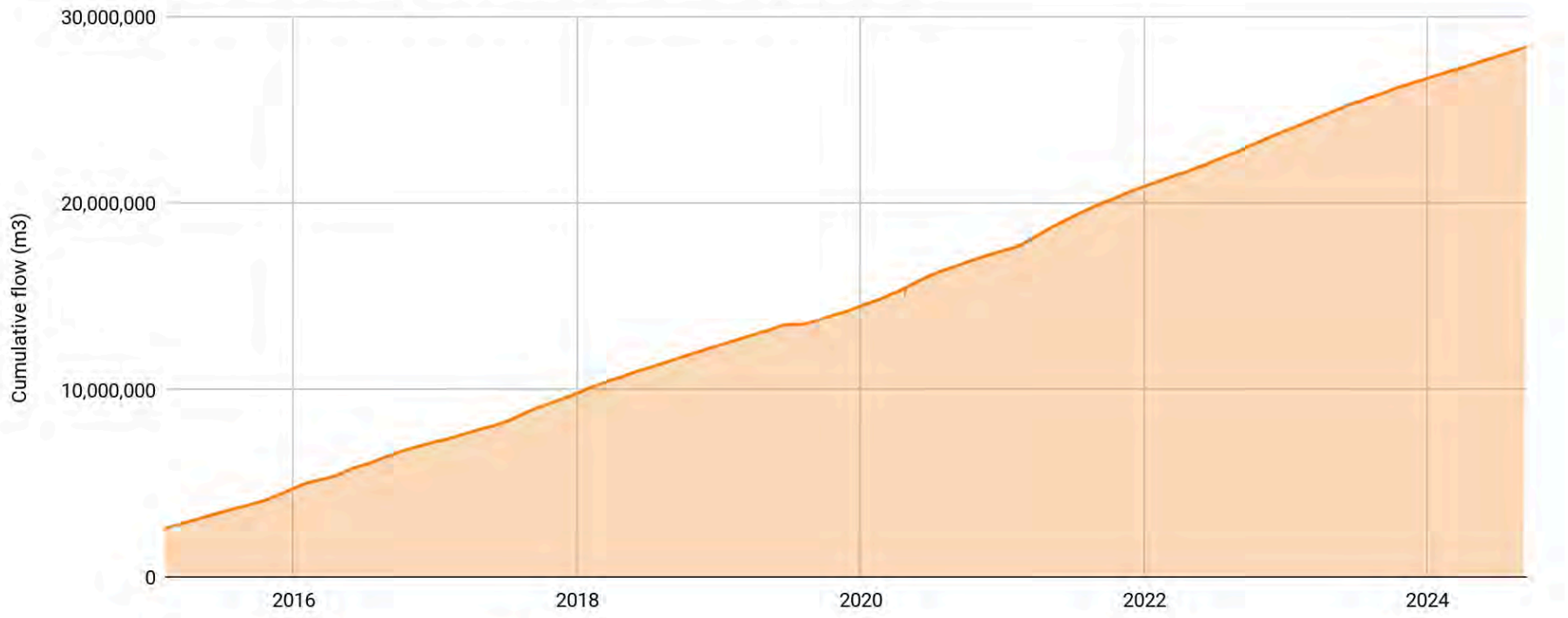
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



28,299,499 m3 of combusted landfill gas from the beginning of the project up to 1 September 2024 represents:

- 268,777 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,479,622 seedlings planted for 10 years
- 5,044 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

Please note:

This report has been prepared by LGI Limited (LGI) with all reasonable skill, care and diligence, and taking account of the human power and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from LGI. LGI disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Where LGI has been accorded gas rights under the terms and conditions of the agreement with the client, the data contained in this report represents confidential commercial information and should not be copied or disseminated in any form to a third party without prior consent from LGI.

Archived commentary:

Comments on changes to existing system:	• **January 2016** - LGI disconnected the 4 lateral wells and 8 vertical wells. • **April 2016** - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells. • **June 2016** - LGI disconnected the extended gas capture system to assist the Council. • **September 2016** - LGI disconnected the extended gas capture system to assist the Council. • **November 2016** - LGI commissioned the connection to leachate sump 6 as of 23-11-2016. • **May 2017** - LGI installed an additional 10 vertical wells to the existing LFG system • **November 2019** - LGI on site to move mainline up batter, and reconnected infrastructure that had been previously disconnected, including 4 wells on the dimple and a 160mm leachate riser. • **April 2020 -** LGI installed a flowline to sump 6 after earlier disconnection. • **February 2021** - LGI installed 13 new vertical wells, including a new submain • **March 2022** - LGI replaced the flare gas analyser panel with a Draeger model analyser for greater accuracy and reliability • **August 2022** - LGI repaired the 225mm mainline and and adjacent submain to allow for intermediate capping to continue across the top of cell 3 • **December 2022** - LGI installed a pneumatic bore pump in a j-trap, allowing for greater reliability of condensate management in the main gas line.

FOCUS YOUR ENERGY

PEOPLE ENGINEERING A CLEAN ENERGY, ZERO CARBON FUTURE.

WWW.LGI.COM.AU

PROJECT PROFILE: DUNMORE, NSW

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement.

Results Achieved since the Project Commenced*

BIOGAS CAPTURED	CARBON ABATEMENT	ACCUs CREATED	SEEDLINGS PLANTED	CARS OFF THE ROAD
28.5 million m3	271 thousand tonnes (t CO2e - environmental benefit)	92 thousand Australian Carbon Credit Units (ACCUs)	4.5 million seedlings planted for 10 years (t CO2e)	4,948 for the last 12 months of carbon abatement (t CO2e)

BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI made 1000 m³/hr ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas management system, including the monitoring and reporting services provided.

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Saving the planet one landfill, one megawatt, one solar panel, one battery at a time

*Results achieved to 1 October 2024

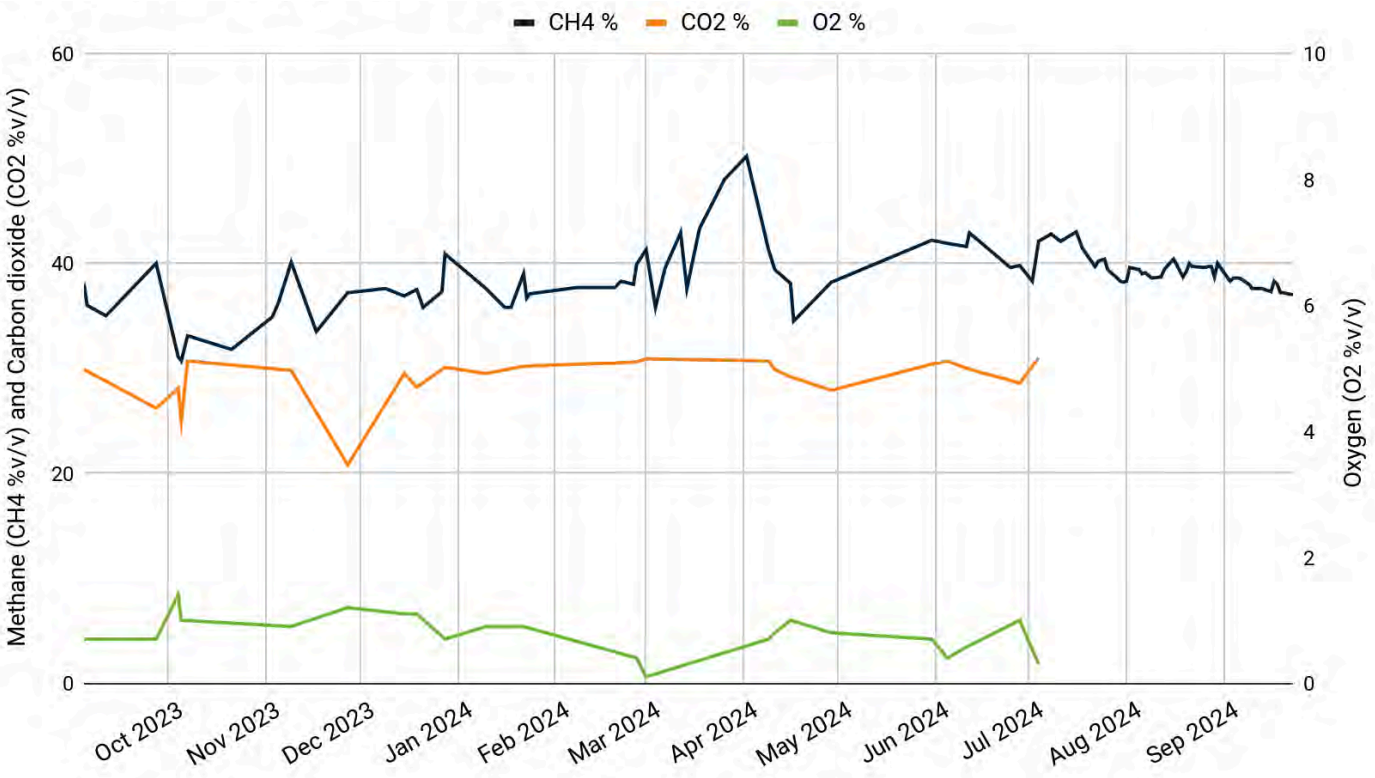
Site:	Dunmore	**Report issue date:**	14/10/2024
Report month:	September 2024	**Prepared by:**	Grace Burtenshaw
Prepared for:	Shellharbour City Council	**Checked by:**	Tom O'Connor

Comments on changes to existing system:	• **May 2023** - LGI installed a series of 3 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. • **June 2023** - LGI installed a series of 2 pneumatic bore pumps at various wells with evacuated leachate being returned into sump 5. **- October 2023** - LGI replaced the flare with a brand new flare of identical capacity. The new flare has improved control systems, reliability and performance, and will be compliant with current Type B Gas and Hazardous Area Zoning regulations. **- October 2024 -** LGI Repaired a submain that was damaged in day to day operations. LGI conducting repair works on the flare (asset team for further information).
Comments on operation / maintenance:	Availability - 96.30 % Down Time: 26.67 h 26.67h - Forced Outage External Field tuned: - 13/09/2024
Recommendations:	LGI recommends continued regular communication with Council regarding leachate management, site performance and future planning.

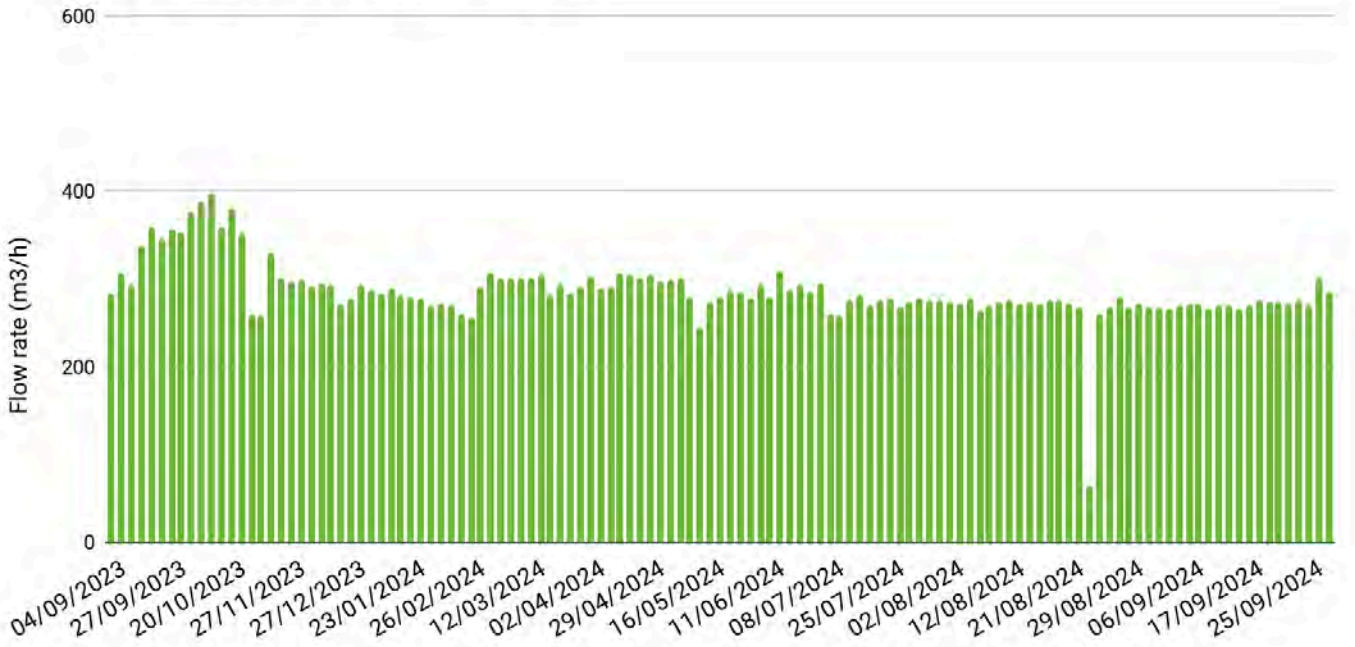
Flare Operational Data:

Date	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	FLOW (m3/h)	STACK TEMP (°C)	CUMULATIVE FLOW (m^3)
02/09/2024	38.7	-	-	268	782	28,308,010
09/09/2024	38	-	-	271	783	28,353,918
16/09/2024	37.3	-	-	266	740	28,399,232
27/09/2024	38	-	-	301	674	28,463,907
Average	38.00	-	-	277	745	-

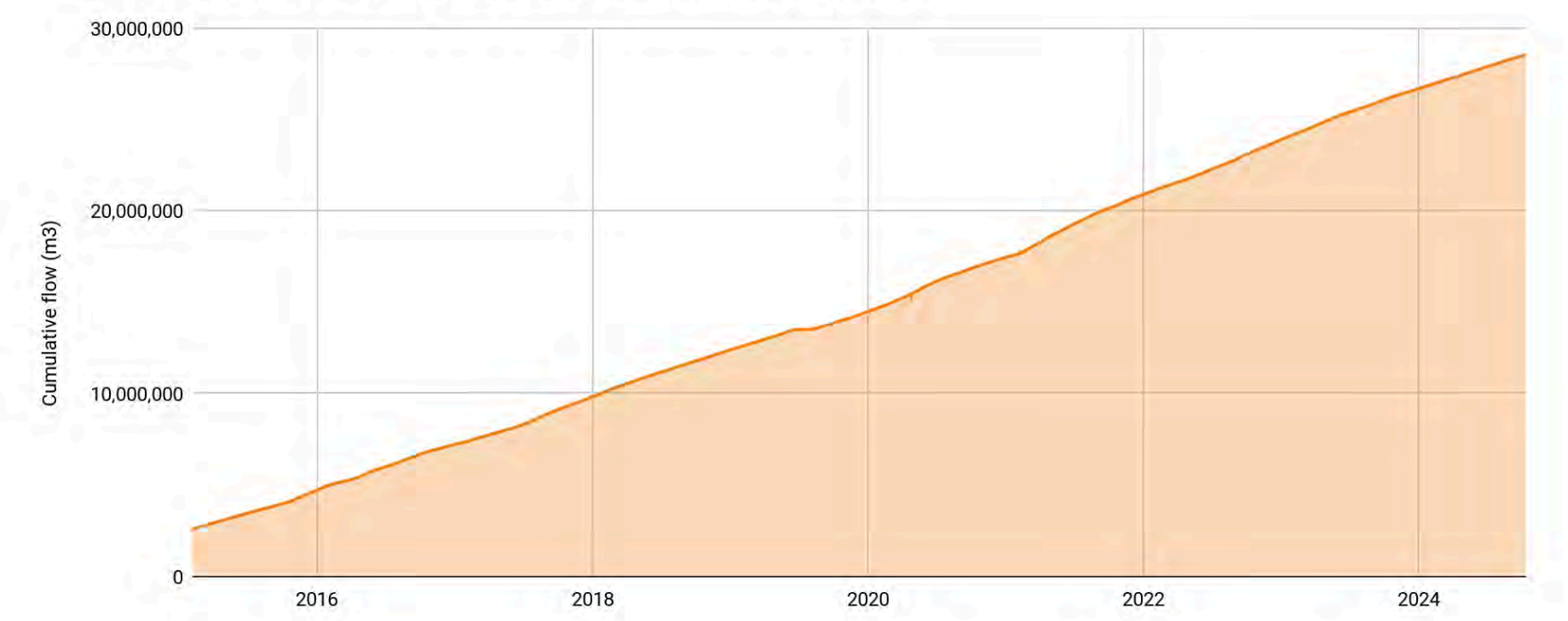
Dunmore- Methane, Carbon Dioxide & Oxygen



Dunmore - Flow Rate



Dunmore - Cumulative Flow



28,490,464 m3 of combusted landfill gas from the beginning of the project up to 1 October 2024 represents:

- 270,591 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,509,851 seedlings planted for 10 years
- 4,948 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

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