

ANNUAL ENVIRONMENTAL MONITORING REPORT (AEMR) OCTOBER 2020

DUNMORE RECYCLING & WASTE DEPOT 44 BUCKLEYS ROAD, DUNMORE, NSW, 2529

ENVIRONMENT PROTECTION LICENCE (EPL) 5984

Prepared For:Shellharbour City CouncilProject Number:ENRS0033Date:October 2020



ENVIRONMENT & NATURAL RESOURCE SOLUTIONS108 Jerry Bailey Road, Shoalhaven Heads, NSWT02 4448 5490ABN68 600 154 596WWW.ENRS.COM.AU



COMMERCIAL IN CONFIDENCE

This document has been prepared consistent with accepted scientific practice, supported by available data and resource conditions, as determined by limited data acquisition during the assessment period, evident at the site at the time. The designated recipients of this report accept all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using the results of the interpretation, the data, and any information or conclusions drawn from it, whether or not caused by any negligent act or omission. To the maximum permitted by law, *ENRS Pty Ltd* excludes all liability to any person or identity, arising directly or indirectly from using the information or material contained herein.

INTELLECTUAL PROPERTY LAWS PROTECT THIS DOCUMENT

Copyright in the material provided in this document is owned by *ENRS Pty Ltd,* and third parties may only use the information in the ways described in this legal notice:

- Temporary copies may be generated, necessary to review the data.
- A single copy may be copied for research or personal use.
- The documents may not be changed, nor any part removed including copyright notice.
- Request in writing is required for any variation to the above.
- An acknowledgement to the source of any data published from this document is mandatory.

ACKNOWLEDGEMENTS

The project was conducted through close liaison with Shellharbour City Council (SCC) and ALS Environmental.

Author and Document Control

Written/Submitted by:	Reviewed / Approved by:
Beeston	Flat
Taite Beeston (BSc.) Geologist & Environmental Consultant	Rohan Last (BSc. MSc) Hydrogeologist & Environmental Scientist

Record of Distribution

Copies	Report No. & Title	Status	Date	Prepared for:
1 x PDF	2020010_ENRS0033r1e1_SCC Dunmore AEMR	Rev.1	20 th Nov.2020	ALS c/- Shellharbour City Council (SCC)
1 x PDF	202010_ENRS0033r1e2_SCC Dunmore AEMR	Rev.2	30 th Nov.2020	ALS c/- Shellharbour City Council (SCC)



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 2019-2020 monitoring period, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984 and No.12903.

The Site was established in 1945 and has been managed by Shellharbour Council (SC) 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.

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 are provided in **Appendix A** (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

The objectives of this AEMR are 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 an Annual Environmental Monitoring Report.

The scope of work for this AEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the 2019-2020 monitoring period in regard to the following tasks:

- Review previous reports and document the hydrogeological setting;
- Tabulate results of all monitoring data for both water and dust samples, collected and provided by ALS as required by the EPLs for the respective reporting period.



- > Analysis and interpretation of all monitoring data (water, dust and landfill surface gas);
- Review all quarterly environmental monitoring reports from the 2020 reporting period and available data from 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.

Based on the findings obtained during the 2019-2020 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. 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 monitoring period reported exceedances of the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within multiple groundwater bores including; BH-1c, BH-3, BH-4, BH-9, BH-12r, BH-13, BH-14, BH-15, BH-19r. This is considered to be consistent with historical values;
- Onsite surface water samples (SWP-1, SW-2, SWP-4 and SWP-5) over the monitoring period reported a single minor exceedance for pH above the ANZECC (2000) trigger values for 95% marine/freshwater;
- Downgradient Rocklow Creek surface water samples (SWC-Up, SWC-2, SWC-down and SWC-down 2) were generally reported within the adopted Site Assessment Criteria. Within the 2019-2020 monitoring period a single exceedance for ammonium was reported above the ANZECC (2000) guidelines in SWC-2. Subsequent sampling events reports satisfactory results in all Rocklow Creek sample locations;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Dust deposition gauges recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- No non-compliances with the EPL were reported during the 2019-2020 annual monitoring period;
- Based on this review of the 2019-2020 annual monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses are considered to be relatively consistent with the range of historical results;
- 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.



TABLE OF CONTENTS

EXECU	TIVE SUMMARY	II
1.0	INTRODUCTION	1
1.1	Project Background	1
1.1.1	Site History	1
1.1.2	EPL Requirements	1
1.2	Objectives	1
1.3	Scope of Work	2
2.0	SITE DESCRIPTION	2
2.1	Location	2
2.2	Surrounding Landuse	3
2.2.1	Sensitive Receptors	4
2.3	Topography & Drainage	4
2.4	Soil Landscape	4
2.5	Geology	4
2.6	Hydrogeology	5
2.6.1	Existing Bores	5
2.6.2	Flow Regime	5
2.7	Surface Water	5
3.0	ASSESSMENT CRITERIA	6
3.1	Contaminants of Potential Concern	6
3.2	Water Quality Guidelines	6
3.2.1	ANZECC Guidelines	6
3.2.2	National Environmental Protection Measure (NEPM)	7
3.3	Dust Deposition Assessment Criteria	7
3.4	Surface Methane GAS Assessment Criteria	7
4.0	SAMPLING METHODOLOGY	8
4.1	Water Sampling	8
4.1.1	Location of Water Monitoring Points	8
4.1.2	Depth to Water	8
4.1.3	Sample Collection	8
4.1.4	1 5	8
4.1.5	5	
4.2	Dust Deposition sampling	
4.3	Surface Methane Gas Monitoring	9
4.4	Laboratory Analysis	10
5.0	QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)	10



5.1	Data Quality Objectives	10	
5.2	QA/QC Procedures11		
5.3	EPL Non-Compliance11		
6.0	WATER QUALITY RESULTS	11	
6.1	Overflow Results	11	
6.2	Field Testing	11	
6.3	Physical Indicators	12	
6.3.1	Salinity (EC & TDS)	12	
6.3.2	Dissolved Oxygen	12	
6.3.3	рН		
6.3.4	Total Suspended Solids (TSS)	13	
6.4	Inorganic Analytes	13	
6.4.1	Nutrients	13	
6.4.2	Metals & Metalloids	14	
6.5	Organic Analytes	15	
6.5.1	Total Organic Carbon	15	
7.0	DUST GAUGE RESULTS	15	
8.0	SURFACE METHANE GAS RESULTS	16	
9.0	ANNUAL ENVIRONMENTAL ASSESSMENT	16	
9.1	Monitoring Point Summary		
9.2	Environmental Management	17	
9.2.1	Landfill Operations	17	
9.3	Environmental Safeguards	17	
9.4	Monitoring Program	17	
10.0	CONCLUSIONS	18	
11.0	LIMITATIONS	19	



LIST OF TABLES, FIGURES & APPENDICES

TABLES

- Table 1: Site Identification
- Table 2: Surrounding Land use
- Table 3: Groundwater Assessment Criteria
- Table 4: Adopted Guideline Criteria
- Table 5: Data Quality Objectives
- Table 6: Summary of Dust Gauge Results
- Table 7: Water Quality Results Comparison of Quarterly Monitoring Results Against Site Assessment Criteria December 2019
- Table 8: Water Quality Results Comparison of Quarterly Monitoring Results Against SiteAssessment Criteria March 2020
- Table 9: Water Quality Results Comparison of Quarterly Monitoring Results Against SiteAssessment Criteria June 2020
- Table 10: Water Quality Results Comparison of Quarterly Monitoring Results Against SiteAssessment Criteria September 2020

FIGURES

- Figure 1: Site Location Map
- Figure 2: Sampling Points & Site Plan
- Figure 3: Surface Methane Gas Sample Transects
- Figure 4: Regional Geology
- Figure 5: Registered Bores

CHARTS

Chart 1 to Chart 20 – Groundwater Water Quality Results 2017-2020

- Chart 21 to Chart 40 Onsite Surface Water Quality Results 2017-2020
- Chart 41 to Chart 62 Rocklow Creek Surface Water Quality Results 2017-2020
- Chart 63 to Chart 83 Leachate Water Quality Results 2017-2020

APPENDICES

Appendix A EPL 5984 Sampling Point Summary (NSW EPA, 04/03/2020)

- Appendix B Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) Water Samples
- Appendix C Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) Dust Samples
- Appendix D Surface Gas (Methane) Field Sheets
- Appendix E Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) Overflow Event
- Appendix F Calibration Certificates



1.0 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 2019-2020 monitoring period, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984 and No.12903.

1.1 PROJECT BACKGROUND

1.1.1 Site History

The Site was established in 1945 and has been managed by Shellharbour Council (SC) 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.

1.1.2 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.
- 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 are provided in **Appendix A** (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

1.2 OBJECTIVES

The objectives of this AEMR are 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 an Annual Environmental Monitoring Report.

1.3 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 2019-2020 monitoring period in regard to the following tasks:

- > Review previous reports and document the hydrogeological setting;
- Tabulate results of all monitoring data for both water and dust samples, collected and provided by ALS as required by the EPLs for the respective reporting period.
- > Analysis and interpretation of all monitoring data (water, dust and landfill surface gas);
- Review all quarterly environmental monitoring reports from the 2020 reporting period and available data from 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.

2.0 SITE DESCRIPTION

2.1 LOCATION

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 1** below. Details of the Site boundary and sampling points are provided in the Site Plan (see **Figure 2**). The key features required to identify the Site are summarised in **Table 1**.

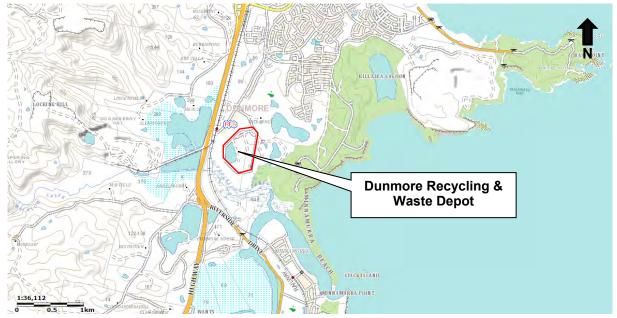
Aspect	Description	
Site	Dunmore Recycling and Waste Depot	
Street Address 44 Buckleys Road, Dunmore, NSW 2529		

Table 1: Site Identification



Aspect	Description
Site Area	72.36 hectares
Title Identifier	Lot 21 DP 653009, Lot 1 DP 419907
Zoning	RU1 Primary Production
Local Government Area	Shellharbour City Council

Figure 1: Site Location Map



Source: SIX Maps (https://maps.six.nsw.gov.au/) (cited 16/01/2020)

2.2 SURROUNDING LANDUSE

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

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.

Table 2: Surrounding Land use



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;
- Down gradient stakeholders; and
- Down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE) near discharge zones.

2.3 TOPOGRAPHY & DRAINAGE

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

The previous annual monitoring report (Environmental Earth Sciences 2018) reported the soil profile at the Site as organic, black, massive sandy loam topsoil overlying loose bleached light grey sand with iron staining in the subsoil.

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 (ASS).

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. 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 are 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.



3.0 ASSESSMENT CRITERIA

3.1 CONTAMINANTS OF POTENTIAL CONCERN

This section of the report provides a summary of the Contaminants of Potential Concern (CoPC) associated with the Site. CoPC's are identified in the Sites EPL/s which document the CoPC and water quality indicators required to be monitored. Analytical requirements for all water sampling are provided in Appendix A.

3.2 WATER QUALITY GUIDELINES

Nationally developed guidelines are provided in the National Water Quality Management Strategy (NWQMS): Guidelines for Groundwater Protection in Australia (ARMCANZ & ANZECC 1995). For the purpose of this assessment, the relevant criteria selected to protect environmental values are summarised in **Table 3** below:

Environmental Value	Relevant Guideline
Ecosystems / Health Screening Levels	ANZG (2018) (Australian and New Zealand Guidelines for Fresh and Marine Water Quality).
	National Environment Protection Measure (NEPM) (2013).
Drinking Water	Australian Drinking Water Guidelines (ADWG) (2018)

Table 3: Groundwater Assessment Criteria

3.2.1 ANZECC Guidelines

The relevant criteria for this water quality assessment are the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG;2018). The ANZG (2018) provide Default Guideline Values (DGVs) for four (4) levels of protection categorised by the percentage of species possibly affected, being 80%, 90%, 95% or 99% of species. Values for a level of protection for 95% of species in a marine environment have been adopted and are displayed in **Table 4**. Where DVGs are not available reference is made against the ANZECC (2000) Trigger Values (TVs). 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**.

Parameter	Groundwater Guideline	Surface water Guideline
Ammonia	0.9 mg/L	0.9 mg/L
Nitrate	10.6 mg/L	10.6 mg/L
рН	6.5-8.0 pH units	6.5-8.0 pH units
Soluble Iron	0.3 mg/L	0.3 mg/L
Manganese	1.9 mg/L	1.9 mg/L

Table 4: Adopted Guideline Criteria



Parameter	Groundwater Guideline	Surface water Guideline
Electrical Conductivity	125-2200 µS/cm	125-2200 µS/cm

3.2.2 National Environmental Protection Measure (NEPM)

The NSW EPA has endorsed the use of the Groundwater Investigation Levels (GILs) given in the 2013 ASC NEPM 'Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater'. The latest NEPM provide a framework for risk-based assessment of groundwater contamination.

Groundwater Health Screening Levels (HSLs) are provided for four (4) land use categories for vapour intrusion (Table 1A[4]) associated with Total Recoverable Hydrocarbons TRH (F1 & F2) and BTEX compounds.

NEPM	Description of Land use Categories
HIL A	Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
HIL B	Residential B with minimal opportunities for soil access; includes buildings with fully and permanently paved yard space such as high-rise buildings and apartments.
HIL C	Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.
HIL D	Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.
GILs	Groundwater Investigation Levels (GILs) should be applied based on the receiving environment and groundwater resources. GILs are provided in NEPM Table 1C for; Fresh Waters; Marine Waters; and Drinking Water;
EILs	 Ecological Investigation Levels (EILs) for common contaminants in the top two (2) metres of soil based on three (3) generic land use settings: Areas of ecological significance; Urban residential areas and public open space; and
	Commercial and industrial land uses.

3.3 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.

3.4 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.



4.0 SAMPLING METHODOLOGY

Field sampling was conducted by *ALS Environmental* (Wollongong) as commissioned by *SCC* in June 2020. 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.

4.1 WATER SAMPLING

4.1.1 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; eight (8) surface waters, located onsite and off-site; nine (9) groundwater monitoring wells surrounding the landfill operations; and two (2) leachate points. Sampling locations are illustrated in **Figure 2** attached.

4.1.2 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 identified in monitoring Wells.*

4.1.3 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 is conducted in accordance with *ALS* sampling protocols.

4.1.4 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 or low flow parameter stabilisation methods applied with field sheets provided to document pumping volumes and field parameters. Samples were collected using clear disposal bailers. and were sealed in laboratory-prepared sampling containers appropriate for the analysis. All samples were stored on ice immediately after their collection and transported to the laboratory under Chain of Custody (CoC) documentation.

Surface water and leachate samples were collected using as 'grab samples' from the midpoint of the structure and at mid-depth.



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.

4.1.5 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).

4.2 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. The 2019-2020 monitoring period was the first year of the four (4) dust monitoring points.

Dust collection gauges were set up for a one (1) month period between the dates; Q1 11/12/19-16/01/20; Q2 11/02/2020-10/03/2020; Q3 15/05/2020-17/06/2020; and Q4 14/08/2020-15/09/2020. A total of four (4) dust monitoring locations were considered adequate to assess site conditions.

4.3 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. Whenever possible the concentration of methane gas was also recorded in any buildings located within a distance of 250 m of the deposited waste. Any depressions or surface fissures away from the sampling grid were also investigated.

4.4 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.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

5.1 DATA QUALITY OBJECTIVES

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 by Australian Standard: AS 4482.1-2005 and referenced by the National Environment Protection (Assessment of Site Contamination) Measure (NEPC;2013). The DQO's for the investigation were to obtain representative data to allow assessment of:

- groundwater quality;
- The risks posed to human health and the environment, including potential future users of the Site; and
- > The requirements for any further investigative works.

The assessment was conducted to a standard consistent with generally accepted and current professional consulting practice for such an investigation. The evaluation criteria adopted for the investigation are summarised in **Table 5**.

DQO	Evaluation Criteria
Documentation completeness	Completion of field records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratories.
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 areas of environmental concern at the Site, and selection of representative samples.

Table 5: Data Quality Objectives



DQO

Evaluation Criteria

Precision and accuracy for sampling and analysis

Use properly trained and qualified field personnel and achieve field and laboratory QA/ QC criteria.

5.2 QA/QC PROCEDURES

Data provided for the purpose of this report by SC was prepared by *ALS*. *ALS* is NATA accredited for the laboratory testing. The QA/QC indicators as provided to ENRS either all complied with the required standards, or showed variations that would have no significant effect on the quality of the data or the conclusions of this environmental assessment. Therefore, the data is considered acceptable for use in this assessment.

It should be noted that whilst the EPL does not require field duplicates, ENRS recommend sampling include rinsate samples and field duplicates at the standard rate of 1 in 10, or field QA/QC is conducted in accordance with *ALS* procedures.

5.3 EPL NON-COMPLIANCE

Monitoring requirements are defined by the EPL. ENRS understand the 2019-2020 annual monitoring results identified no non-compliance with the terms of the EPL.

6.0 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 7 - Table 10** with comparison against the relevant Site Assessment Criteria (SAC). The laboratory certificates of analysis are provided in Appendix B.

6.1 OVERFLOW RESULTS

One (1) overflow event was recorded over the 2020 reporting period on the **10th August /2020**. Climate data taken from Albion Park (Shellharbour Airport) (068241) weather station recorded a total rainfall of 171.3mm over three days leading up the event (8,9,10/08/2020). Overflow was subsequently sampled by *ALS* at two locations and analysed for total suspended solids and pH. Laboratory certificates of analysis are provided in Appendix E. Results for total suspended solids (TSS) were reported below the lower limit of detection of <0.5 mg/L. pH recorded relatively natural results of 7.2 pH units at both sampling points. The results were considered satisfactory.

6.2 FIELD TESTING

Field testing is conducted by ALS during sampling to record physical water parameters. A water quality meter is used to measure the following parameters in the field:



- Electrical Conductivity (Salinity);
- > pH (Acidity); and
- > Dissolved Oxygen (surface waters only).

6.3 PHYSICAL INDICATORS

6.3.1 Salinity (EC & TDS)

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

Groundwater

Salinity in groundwater is typically higher than surface water due to mineral dissolution. Groundwater salinity at the Site was generally reported above the freshwater SAC of 2,200 μ S/cm. Elevated results were reported in seven (7) of nine (9) groundwater bores during the 2019 - 2020 monitoring period, ranging between; **2,210 \muS/cm** (BH-19r, 11/03/2020) and **10,400 \muS/cm** (BH-15, 17/12/2019). Results are consistent with the previous 2020 quarterly monitoring events.

Leachate

Salinity in leachate is expected to vary significantly with leachate concentration and stormwater dilution. Leachate salinity for the 2019-2020 monitoring period ranged from **9,700 \muS/cm** (LP1, 11/03/2020) and **16,600 \muS/cm** (Sump, 17/12/2019) which are above the TV.

6.3.2 Dissolved Oxygen

Levels of Dissolved Oxygen (DO) were measured in the field during sampling. 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 sulfide and Ammonia.

The ANZECC (2000) 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.

Dissolved Oxygen for the 2019-2020 monitoring period were recorded for Leachate only and ranged from **0.13 mg/L** (Sump, 17/06/2020) and **7.43 mg/L** (LP1, 17/06/2020).

6.3.3 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).

Surface Water

Surface water for the 2019-2020 monitoring period reported pH values of between **pH 6.30** (SWP-1, 11/03/2020) and **pH 9.0** (SWP-4, 11/03/2020).

Groundwater

Groundwater pH was reported between **pH 5.6** (BH-3, 11/03/2020) and **pH 7.5** (BH-3, 17/06/2020). All groundwater results were reported within the ANZECC recommended range of pH 6.5-8.0. The results are largely within the historical range of values.

6.3.4 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 reported for surface water only. Concentrations for the 2019-2020 monitoring period were reported between <**5 mg/L** (SWC-up & SWC-2 17/12/2019, SWC-up 11/03/2020) and **160 mg/L** (SWC-down 2, 13/03/2020).

6.4 INORGANIC ANALYTES

6.4.1 Nutrients

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.

Ammonia

For the 2019-2020 monitoring period, ammonia was measured within groundwater monitoring bores between **0.04 mg/L** (BH14, 11/03/2020) and **380 mg/L** (BH-1c, 17/12/2019).

Ammonia was measured within groundwater monitoring bores between **0.42 mg/L** (BH-14) and **131 mg/L** (BH-1c). Throughout the monitoring period, all groundwater wells reported at least one (1) exceedance of the adopted trigger value of 0.91 mg/L. This is consistent with historical values.

Ammonia in leachate was reported between **59.60 mg/L** (LP1, 17/06/2020) and **1450 mg/L** (LP1, 17/12/2019). High ammonia concentrations are expected in untreated leachate.



Ammonium

Ammonium was measured at Rocklow Creek surface water monitoring locations. Throughout the 2019-2020 monitoring period ammonium was reported between **0.03 mg/L** (SWC-down 2, 17/12/2019) and **1.68 mg/L** (SWC-2, 17/06/2020). The SWC-2 result reported from the Q3 sampling event was the only exceedance of the adopted trigger value of 0.91 mg/L throughout the monitoring period.

Nitrate

Results for Nitrate in groundwater were reported between **<.01 mg/L** in multiple bores and **202 mg/L** (BH-14, 11/03/2020). A total of four (4) groundwater wells reported exceedances above the TV of 0.7mg/L throughout the 2019-2020 monitoring period, including BH-3, BH-12r, BH-13 and BH-14.

Nitrate in Rocklow Creek surface water and leachate samples were all reported below the TV of 0.7mg/L. The results are considered satisfactory.

6.4.2 Metals & Metalloids

Magnesium (Total Mg)

Magnesium was analysed in selected surface water samples. Concentrations of magnesium in surface water during the 2019-2020 monitoring period were reported between **8 mg/L** (SWP-1, 11/03/2020) and **1,420 mg/L** (SWC-down 2, 17/12/2020).

Manganese (Total Mn)

Manganese was analysed in groundwater and leachate sampling points. Concentrations of Manganese in groundwater for the 2019-2020 monitoring period were reported between **0.04 mg/L** (BH-3, 15/09/2020) and **1 mg/L** (BH-9, 17/06/2020). Leachate concentrations were reported between **0.41 mg/L** (Sump, 17/12/2019) and **0.672 mg/L** (Sump, 17/06/2020). These values are below the adopted TV (1.9 mg/L 95% of Species - freshwater) and are considered acceptable. Concentrations of Manganese should continue to be reviewed during subsequent monitoring events.

Iron (Total Fe)

Iron was measured in selected surface water samples including leachate onsite dams, leachate and . Concentrations of total iron within onsite surface water were reported between **0.07 mg/L** (SWP-2, 17/12/2019) and **3.3 mg/L** (SWP-1, 17/12/2019). Concentrations of total iron within Rocklow creek sampling locations were reported between the laboratory lower limit of detection of <**0.1-0.5 mg/L** and **10.5 mg/L** (SWC-down 2, 11/03/2020). Concentration of iron with leachate samples was reported between **0.69 mg/L** (Tank LP1, 17/06/2020) and **3.52 mg/L** (Tank LP1, 17/17/2019).

Iron (Dissolved Fe)

Dissolved iron was measured within selected groundwater and surface water sampling points. Groundwater results were reported between the laboratory lower limit of detection of <0.05 mg/L and 19.3 mg/L (BH15, 17/06/2020). Onsite surface water reported concentrations of dissolved iron the laboratory lower limit of detection and 1.31 mg/L (SWP-1, 17/06/2020).



Samples collected from Rocklow Creek generally reports results below the lower limit of reporting with a maximum detection of 0.11 mg/L (SWC-up, 15/09/2020).

6.5 ORGANIC ANALYTES

6.5.1 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.

TOC was reported during the 2019-2020 monitoring period at the following concentrations:

- Groundwater; between **11 mg/L** (BH-3; 11/03/2020) and **218 mg/L** (BH-1c; 17/12/2019);
- Surface Water; between 29 mg/L (SWP-4; 11/03/2020) and 46 mg/L (SWP-4; 17/12/2020)
- > Leachate; 238 mg/L (Sump; 17/06/2020) and 900 mg/L (Sump; 17/12/2019).

7.0 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 sampling round, in general accordance with AS3580.10.1. A total of four (4) quarterly (Q) rounds were conducted over the 2019-2020 monitoring period; Q1 11/12/19-16/01/20; Q2 11/02/2020-10/03/2020; Q3 15/05/2020-17/06/2020; and Q4 14/08/2020-15/09/2020. A summary of results is provided in **Table 6** below.

Sample ID	Guideline Criteria		Total Insolu (g/m²/n		
U	(g/m²/month)	Q1	Q2	Q3	Q4
DDG1		7.4	1.2	0.6	0.2
DDG2	4	4.7	0.7	0.4	0.2
DDG3		7.7	1.8	0.8	1.1

Table 6: Summary of Dust Gauge Results



Sample ID	Criteria		Total Insolı (g/m²/n		
U	(g/m²/month)	Q1	Q2	Q3	Q4
DDG4		4.4	1.9	2.4	2.7

Results for depositional dust during the 2019-2020 annual monitoring period generally reported levels of dust below the adopted assessment criteria of **4** g/m²/month. Exceedances were recorded in all sample locations within the Q1 sampling period. Specification by the laboratory of the Q1 dust contents identified large quantities of Ash. The Q1 sampling period occurred during high levels of smoke within the regional area. Given that no ash generation activities occur as part of Site operations, the results are considered satisfactory. Dust gauge locations are provided in **Figure 2** attached. It is recommended that monitoring is continued in accordance with EPL 5984.

8.0 SURFACE METHANE GAS RESULTS

The surface gas monitoring from the 2019-2020 monitoring period *DID NOT* detect any levels of methane above the EPA license limits of 500 ppm. The results are considered satisfactory. A table of results is provided in Appendix D.

9.0 ANNUAL ENVIRONMENTAL ASSESSMENT

9.1 MONITORING POINT SUMMARY

Field measurements and NATA laboratory results for dust and methane results from the annual 2019-2020 monitoring period reported satisfactory results. Water results including leachate, groundwater, onsite and offsite surface water reported concentrations of analytes within the range historical values. Water results from the last three (3) years have been tabulated and presented **Charts 1-83** attached.

Groundwater and surface water within the Site boundary generally reported multiple high levels of analytes considered to be characteristic of landfill and leachate. Offsite sample locations within Rocklow Creek generally reported satisfactory results. A single exceedance for ammonium was recorded in Rocklow Creek upstream sample SWC-2 on the 17th June 2020. Subsequent sampling on the 15th September 2020 reported satisfactory results for ammonium in SW-2. Results are considered to be consistent with historical monitoring events.

All dust gauges reported satisfactory results over the 2019-2020 monitoring period. Exceedances for dust during a single round of monitoring between 11/12/19-16/01/20 identified high ash loadings. Subsequent rounds reported satisfactory results.

Results of surface methane gas monitoring recorded satisfactory results. The landfill surface cap was therefore considered intact and effective during the monitoring period.



9.2 ENVIRONMENTAL MANAGEMENT

9.2.1 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).

9.3 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 prior to each quaterly sampling events.

Continue to review annual surface and groundwater monitoring results from up and down gradient of the land fill cells and offsite sampling locations within Rocklow Creek. Continue to monitor surface methane gas in order to assess the cappping integrity of the landfill cells.

9.4 MONITORING PROGRAM

The water, dust and surface methane monitoring program is required to demonstrate that Site activities are not generating any off-site pollution. The Site's EPL's and monitoring regime should be reviewed annually.

Review of the 2019-2020 monitoring results indicate no significant change in environmental conditions at the Site over the past three (3) years. Future sampling events should continue to monitor the key indicators of leachate within surface and ground 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 holding time.



10.0 CONCLUSIONS

Based on the findings obtained during the 2019-2020 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. 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 monitoring period reported exceedances of the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within multiple groundwater bores including; BH-1c, BH-3, BH-4, BH-9, BH-12r, BH-13, BH-14, BH-15, BH-19r. This is considered to be consistent with historical values;
- Onsite surface water samples (SWP-1, SW-2, SWP-4 and SWP-5) over the monitoring period reported a single minor exceedance for pH above the ANZECC (2000) trigger values for 95% marine/freshwater;
- Downgradient Rocklow Creek surface water samples (SWC-Up, SWC-2, SWC-down and SWC-down 2) were generally reported within the adopted Site Assessment Criteria. Within the 2019-2020 monitoring period a single exceedance for ammonium was reported above the ANZECC (2000) guidelines in SWC-2. Subsequent sampling events reports satisfactory results in all Rocklow Creek sample locations;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Dust deposition gauges recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- No non-compliances with the EPL were reported during the 2019-2020 annual monitoring period;
- Based on this review of the 2019-2020 annual monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses are considered to be relatively consistent with the range of historical results;
- 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.



11.0 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 the site.

ENRS derived the data in this report primarily from visual inspections, examination of available records, interviews with individuals with information about the site, and if requested, 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 the 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.



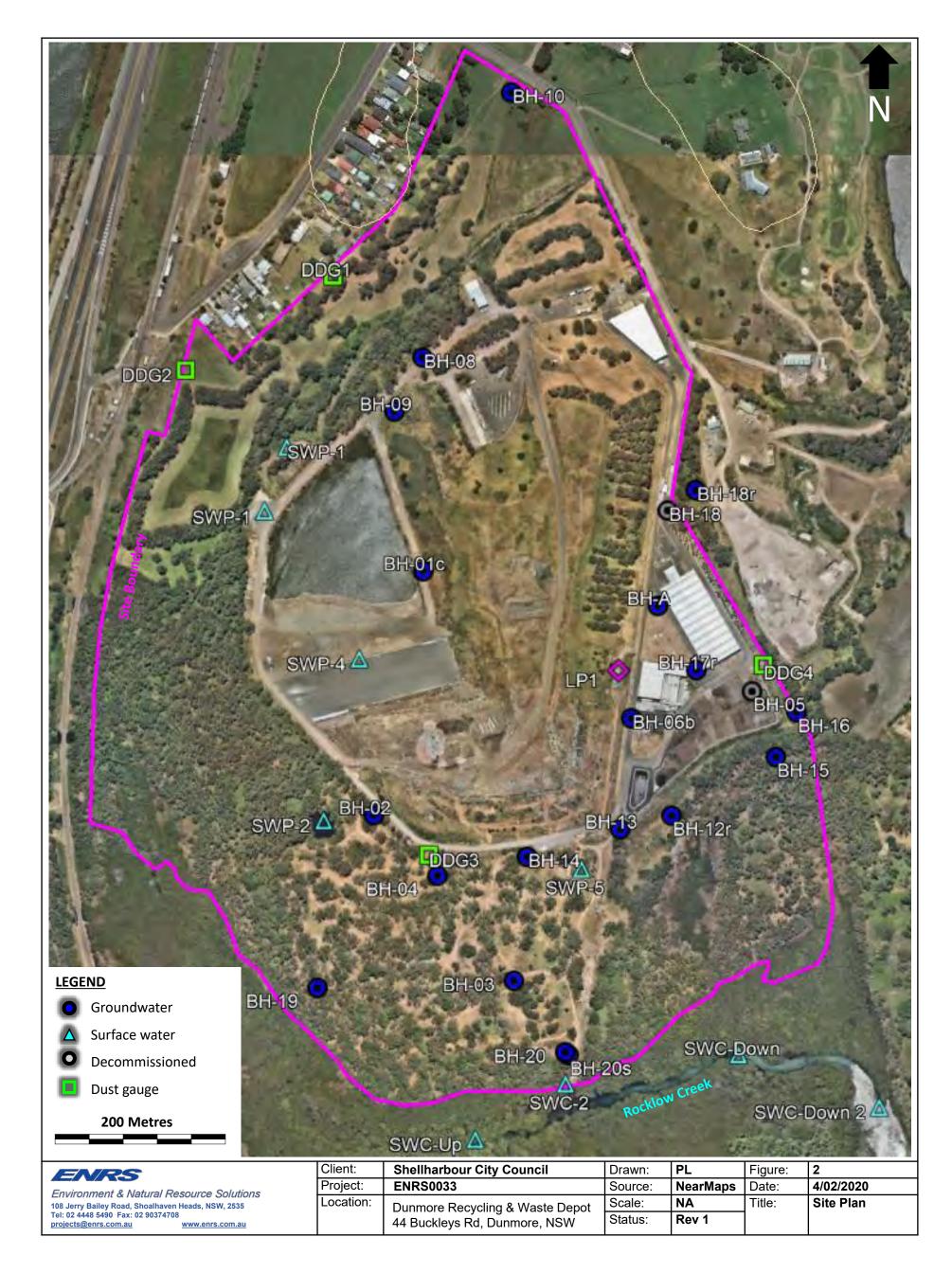
12.0 REFERENCES

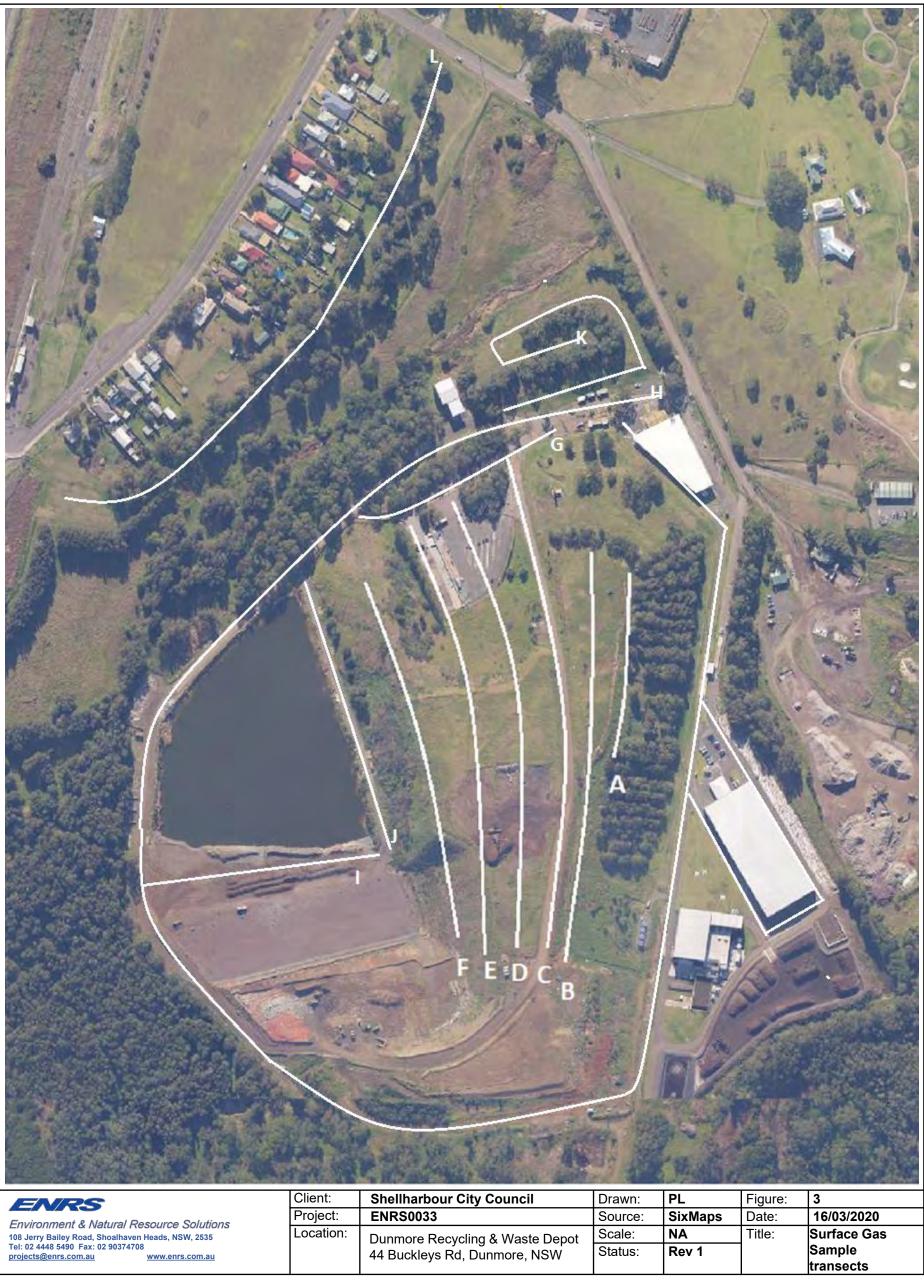
ANZECC (1996). Guidelines for the Laboratory Analysis of Contaminated Materials.

- ANZECC (2000) Australian Water Quality Guidelines for Fresh and Marine Waters. Australian and New Zealand Environment & Conservation Council. ISBN 09578245 0 5 (set).
- ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.
- Australian Government (2011) National Health & Medical Research Council. National Resource Management Ministerial Council. National Water Quality Strategy. Australian Drinking Water Guidelines.
- Australian Standard AS 3580.10.1. Methods for sampling and analysis of ambient air; method 10.1- Determination of particulate matter Deposited matter Gravimetric method
- Environmental Earth Sciences (2018) Annual Report 2018- Environmental Monitoring at the Dunmore Recycling and Waste Depot, Dunmore, New South Wales
- NEPC (2013). National Environment Protection (Assessment of Site Contamination) Measure.
- Netherlands (1994) Environmental Quality Objectives in the Netherlands. Ministry of Housing, Spatial Planning and the Environment, Netherlands Government. ISBN 90-6092-783-4.
- NSW Department of Environment and Climate Change (2009a). Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997
- NSW Department of Environment and Conservation (1997). Guidelines for the Assessment and Management of Groundwater Contamination
- NSW EPA (1995) Sampling Design Guidelines. ISBN 0-7310-3756-1.
- NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Sites.
- NSW Department of Environment and Conservation (1997). Guidelines for the Assessment and Management of Groundwater Contamination.
- NSW EPA (1996) Environmental Guidelines: Solid Waste Landfills. ISBN 0 7310 3774 X
- NSW EPA (2016) Environmental Guidelines: Solid Waste Landfills (2nd Edition). ISBN 978 1 76039 350 2
- NSW EPA (Mar. 2020) Environmental Protection Licence (EPL) 5984
- NSW EPA (Dec. 2017) Environmental Protection Licence (EPL) 12903
- NSW Government (1997). Protection of the Environment Operations Act.
- NSW Government (2005). Protection of the Environment (Waste) Regulation.
- NSW Landcom (2008). Managing Urban Stormwater: Soils and Construction, Volume 2B Waste Landfills.

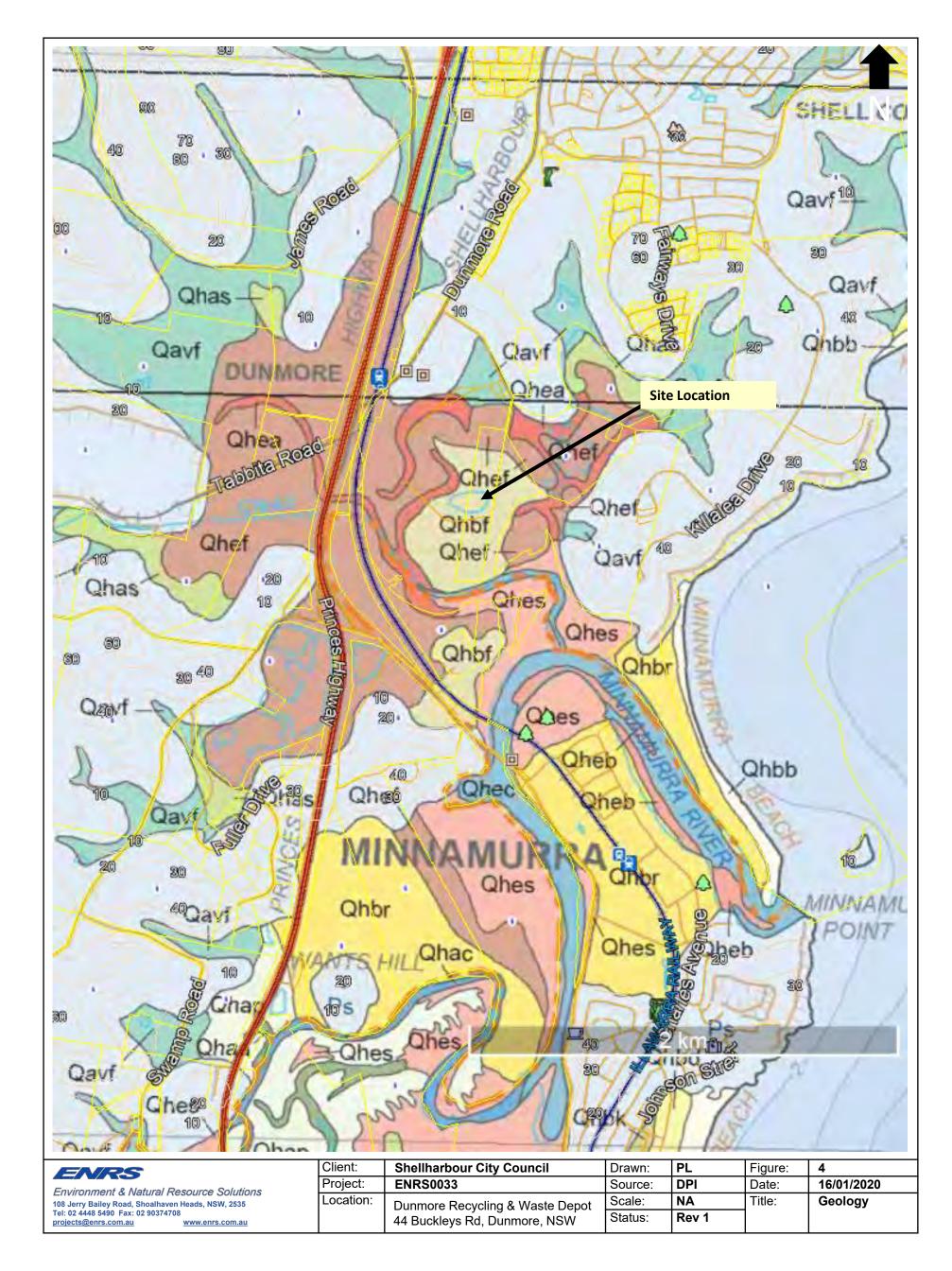


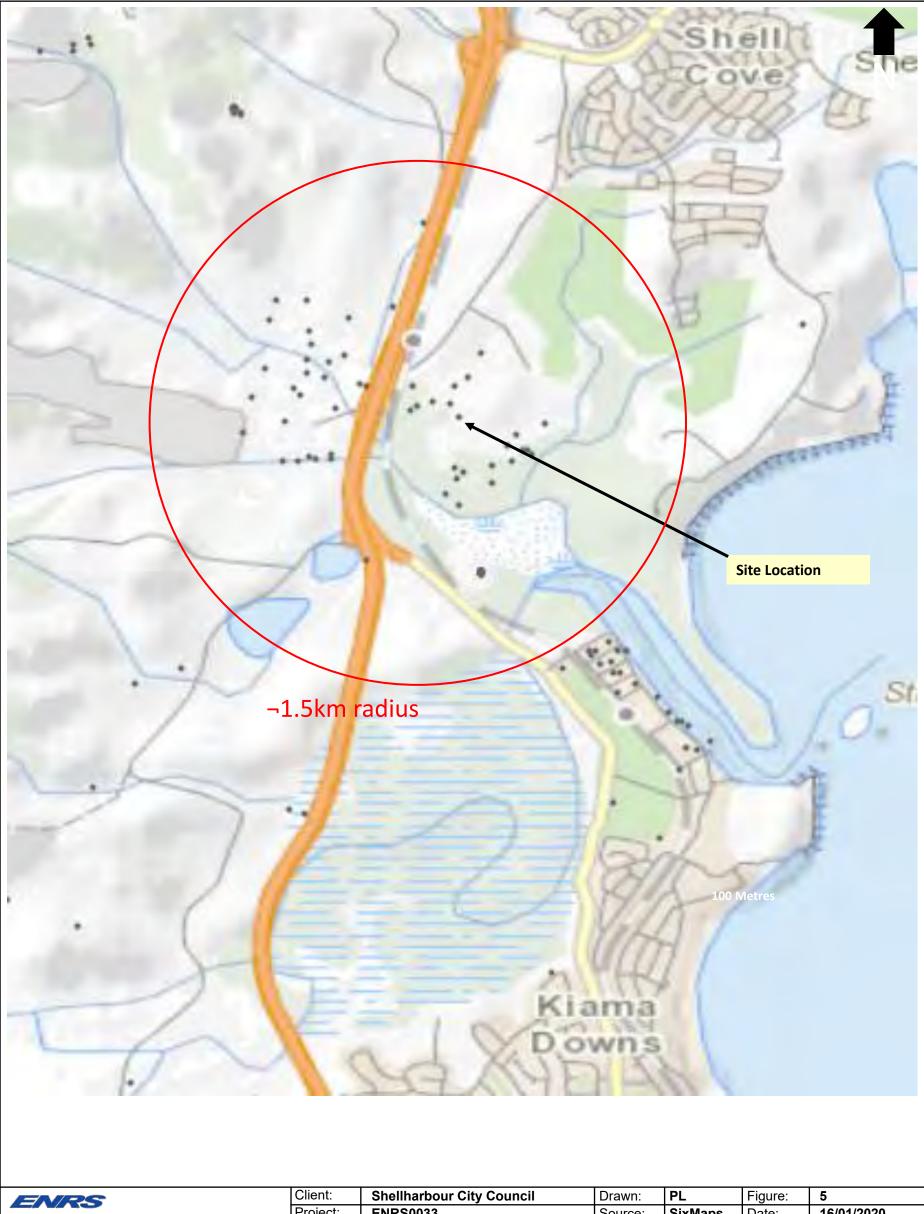
FIGURES





Environment & Natural Resource Solutions	Project:	ENRS0033	Source:	SixMaps	Date:
108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535	Location:	Dunmore Recycling & Waste Depot	Scale:	NA	Title:
Tel: 02 4448 5490 Fax: 02 90374708 projects@enrs.com.au www.enrs.com.au		44 Buckleys Rd, Dunmore, NSW	Status:	Rev 1	





ENRS	Cheffic.	Shellharbour City Council	Drawn:	PL	Figure:	5
Environment & Natural Resource Solutions	Project:	ENRS0033	Source:	SixMaps	Date:	16/01/2020
108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535	Location:	Dunmore Recycling & Waste Depot	Scale:	NA	Title:	Registered
Tel: 02 4448 5490 Fax: 02 90374708 projects@enrs.com.au www.enrs.com.au		44 Buckleys Rd, Dunmore, NSW	Status:	Rev 1		Bores



TABLES

										Quart	erly V	Vater I							entra 19: Di				i Ig and	Wast	te Dep	oot									
	rigger Values for Freshv of Species) ^A	water (Protection	-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	•	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	2200	-	Ţ	
	rigger Values for Marine tion of 95% of Species)		-	-	-	-	-	-	-	-	•	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-		
	lian Drinking Water	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-		
Guideli	ines (2018) ^c	Aesthetic	250		-	180	-	0.1	0.3	0.3	-	0.5	0.5		-	-	-	-	-	-	-	-	250		-	-	5	-	-		6.5 - 8.0	-			
	Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	На	Electrivcal Conductivity	Temperature	Depth to Water (mbgl TOC)	Comments
		Units Laboratory PQL	mg/L	mg/L 1	mg/L	mg/L	mg/L 1	mg/L 0.001	mg/L 0.05	mg/L 0.05	mg/L 0.1	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 1	mg/L 2	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 0.01	% 0.1	mg/L 5	NTU 0.1	meq/L 0.01	meq/L 0.01	meq/L 0.01	рН 0.01	μS/cm 1	°C 0.1	mbgl	
	BH-1c	17/12/2019	951	147	-	-	231	0.098	-	10.90	0.4	380.0	-	<0.01	<0.01	<0.01	218	-	<1	<1	2880	2880	<5	-	-	-	-	-			7	7360	22.9	3.72	
	BH-3	17/12/2019	254	152			33	0.171	-	2.04	0.2	34.3		0.11	10.60	10.70	16	-	<1	<1	408	408	126							-	7.2	1800	19	3.3	-
5	BH-4	17/12/2019	200	183	-	-	18	0.252	-	4.08	0.1	6.1	-	<0.01	0.01	0.01	20	-	<1	<1	540	540	141	-	-	-	-	-	-	-	7.1	1730	18.8	4.56	
/ater	BH-9	17/12/2019	620	215	-	-	88	0.679	-	0.35	0.3	143.0	-	<0.01	0.22	0.22	121	-	<1	<1	1950	1950	<10	-	-	-	-	-	-	-	6.7	4780	22.1	3.8	-
wpu	BH-12r	17/12/2019	260	292	-	-	48	0.525	-	0.06	0.3	0.2	-	0.42	68.40	68.80	17	-	<1	<1	617	617	256	-	-	-	-	-	-	-	6.6	2550	22.4	4.59	-
Grou	BH-13	17/12/2019	104	197	-	-	61	0.208	-	0.13	0.4	1.2	-	0.08	7.28	7.36	27	-	<1	<1	612	612	311	-	-	-	-	-	-	-	6.9	1840	25.8	4.57	-
0	BH-14	17/12/2019	243	186	-	-	21	0.247		0.50	0.8	2.9	-	0.02	1.60	1.62	32	-	<1	<1	704	704	108		-	-	-	-	-	-	6.8	1970	21.5	5.07	-
	BH-15	17/12/2019	2740	214	-	-	694	0.444	-	12.80	0.4	111.0		0.03	0.29	0.32	170	-	<1	<1	938	938	440		-	-	-	-	-	-	6.7	10400	20.9	0.95	-
	BH-19r	17/12/2019	270	159	-	-	21	0.118	-	0.17	0.2	5.4	-	0.09	0.05	0.14	32	-	<1	<1	501	501	201	-	-	-	-	-	-	-	7.1	1940	19	4.69	-
	SWP-1	17/12/2019	53	31	12	48	7	-	3.03	0.72	-	-	-	-	-	-	-	-	<1	<1	148	148	<5	-	-	44	26	4	5	4	7.1	-	-	-	-
Surface Water	SWP-2	17/12/2019	399	95	56	341	30	-	0.07	<0.05	-	-	-	-	-	-	-	-	<1	<1	536	536	207	-	-	9	4	26	25	3	7.8	-	-	-	-
Sur	SWP-4	17/12/2019	447	53	68	380	20	-	0.20	<0.05	-	-	-	-	-	-	46	3	<1	34	350	383	316	-	-	30	9	27	25	3	8.7	-	-	-	-
	SWP-5	17/12/2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
~	SWC-up	17/12/2019	18300	463	1340	11000	401	-	<0.50	0.10	-	•	0.50	<0.01	<0.01	<0.01	-	-	<1	<1	207	207	2880	-	-	<5	1	580	622	3	7.2	-	-	-	-
klov eek	SWC-2	17/12/2019	-	-	-	-	-	-	<0.50	<0.10	-	•	0.48	<0.01	<0.01	<0.01	-	-	<1	<1	202	202	-		-	<5	-	-	-	-	7.1	-	-	-	-
Cre	SWC-down	17/12/2019	18100	452	1330	11000	396	-	<0.50	<0.10	-	-	0.28	<0.01	<0.01	<0.01	-	-	<1	<1	202	202	2850	-	-	5	1	574	621	4	7.4	-	-	-	-
	SWC-down 2	17/12/2019	18400	461	1420	11800	415	-	1.48	<0.10	-	-	0.03	<0.01	0.05	0.05	-	-	<1	<1	186	186	2940	-	-	56	18	584	664	6	7.6	-	-	-	-
chate	Leachate Sump	17/12/2019	2050	105	-	-	502	0.412	3.22	-	0.8	1400	-	0.68	0.01	0.69	900	-	<1	<1	6000	6000	<5	2	24	-	-	-	-	-	7.8	16600	32.1	-	-
Lea	Leachate Tank LP1	17/12/2019	1990	122	-	-	560	0.425	3.52	-	0.9	1450	-	<0.10	<0.10	<0.10	870	-	<1	<1	5950	5950	<5	4	57	-	-	-	-	-	7.8	16200	28.3	-	-

TABLE 7: Total Concentration Results

^A Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2001) for guidance on applying these levels to different ecosystem conditions. Also the sames as the NEPM (2013) ELLs. ⁶ ARXEG 2018 - pit Upper and Lower Limit for NSW Lowland River (Table 3.32). ⁶ Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2016).



Clls-Trigger Values for Freshwater (Protection of SS's of Species) ^A																																			
			-	-	-	-	-	1.9	-	-	-			-	0.7	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	2200			
	igger Values for Marin ion of 95% of Species)		-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Australi	an Drinking Water	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	- 0	-		
Guidelir	nes (2018) ^c	Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	250	-	-	-	5	-	-	-	6.5 - 8.0	.	-		
	Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	Н	Electrivcal Conduct/vity	Temperature	Depth to Water (mbgl TOC)	Comments
		Units Laboratory PQL	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 0.001	mg/L 0.05	mg/L 0.05	mg/L 0.1	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 1	mg/L 2	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L 0.01	% 0.1	mg/L 5	NTU 0.1	meq/L 0.01	meq/L 0.01	meq/L 0.01	pH 0.01	μS/cm 1	°C 0.1	mbgl -	-
	BH-1c	11/03/2020	934	-	-	-	-	0.107	-	0.11	0.2	377.0	-	0.08	0.26	0.34	167	-	<1	<1	2360	2360	<10	-	-	-	-	-	-	-	7.4	6970	27.2	3.26	-
	BH-3	11/03/2020	328	-	-	-	-	0.050	-	0.05	0.1	32.5	-	0.05	5.77	5.82	11	-	<1	<1	460	460	86	-	-	-	-	-	-	-	5.6	2180	20.1	3.15	-
res	BH-4	11/03/2020	112	-	-	-	-	0.102	-	0.10	<0.1	1.8	-	0.02	0.64	0.66	13	-	<1	<1	294	294	99	-	-	-	-	-	-	-	6.5	1100	21.4	4.35	-
r Bor	BH-9	11/03/2020	560	-	-	-	-	0.835	-	1.91	0.3	137.0	-	0.17	0.06	0.23	80	-	<1	<1	1970	1970	<1	-	-	-	-	-	-	-	6.7	5140	21.9	3.3	-
vater	BH-12r	11/03/2020	226	-	-	-	-	0.753	-	< 0.05	0.2	0.1	-	0.30	33.70	34.00	10	-	<1	<1	597	597	223	-	-	-	-	-	-	-	6.6	2470	24.9	4.37	-
mpur	BH-13	11/03/2020	48	-	-	-	-	0.087	-	0.09	0.2	0.2	-	0.06	16.00	16.10	16	-	<1	<1	434	434	125	-	-	-	-	-	-	-	6.8	1300	24.1	4.29	-
Grot	BH-14	11/03/2020	115	-	-	-	-	0.310	-	0.31	0.3	0.04	-	0.30	202.00	202.00	49	-	<1	<1	125	125	136	-	-	-	-	-	-	-	5.8	2460	25.1	4.74	-
	BH-15	11/03/2020	3260	-	-	-	-	0.754	-	0.75	0.2	69.6	-	0.03	0.09	0.12	145	-	<1	<1	639	639	586	-	-	-	-	-	-	-	6	1160	19.4	0.75	-
Γ	BH-19r	11/03/2020	315		-	-		0.110	-	0.63	0.1	5.5	-	0.16	0.41	0.57	26	-	<1	<1	517	517	230	-	-	-	-	-	-	-	6.3	2210	22.2	4.5	-
Water	SWP-1	11/03/2020	52	23	8	31	12	-	2.05	0.90	-	-	-	-	-	-	-	-	<1	<1	103	103	8	-	-	36	9	4	3	3	6.8	-	-	-	-
Ň	SWP-2	11/03/2020	315	72	40	230	24	-	0.10	<0.05	-	-	-	-	-	-	-	-	<1	14	407	421	181	-	-	6	3	21	18	9	7.6	-	-	-	-
Surface	SWP-4	11/03/2020	422	32	55	329	18	-	0.08	<0.05	-	-	-	-	-	-	29	4	<1	49	272	321	300	-	-	25	13	25	21	8	9	-	-	-	Sand Mine Dam
Sur	SWP-5	11/03/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	SWC-up	11/03/2020	9520	239	631	5280	194	-	0.48	0.07	-	-	0.04	<0.01	0.01	0.01	-	-	<1	<1	128	128	1450	-	-	<5	5	301	298	0	7.6	-	23	-	-
Creek	SWC-2	11/03/2020	-	-	-	-	-	-	0.70	0.05	-	-	0.06	<0.01	0.02	0.02	-	-	<1	<1	146	146	-	-	-	10		-	-	-	7.6	-	20	-	-
č, Ro	SWC-down	11/03/2020	10400	256	697	5760	212	-	0.39	0.06	-	-	0.06	<0.01	0.06	0.06	-	-	<1	<1	123	123	1570	-	-	8	5	328	326	0	7.6	-	22	-	-
	SWC-down 2	11/03/2020	11900	318	832	6950	247	-	10.50	<0.10	-	-	0.08	<0.01	0.01	0.01	-	-	<1	<1	122	122	1830	-	-	160	52	376	393	2	7.6	-	22	-	-
chate	Leachate Sump	11/03/2020	1480	21	-	-	36	0.616	2.74		0.4	1000	-	<0.10	0.12	0.12	352	-	<1	<1	3720	3720	204	0.17	1.9	-	-	-	-	-	7.2	12300	29	-	-
Leax	Leachate Tank LP1	11/03/2020	1450	161	- 1	-	221	0.657	3.26	- 1	0.3	638	-	<0.10	0.86	0.86	315	-	<1	<1	2710	2710	205	3	32	-	-	-	-	-	6.9	9700	24.1	-	-

A Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the sames as the NEPM (2013) EILs. ⁶ ANZ 62018 - pH Upper and Lower Limit for NSW Lowland Rivers (Table 3.22). ⁶ Investigation levels are taken from the health Values of the Australian Drinking Water Guidelines (NHMRC 2018).



									E	PL Qu	arterl										Resu Recy		and V	Vaste	Depo	t									
	rigger Values for Fresh tion of 95% of Species)		-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	-	-	-	-	-	85 - 110	-	6 - 50	-	-	-	6.5 - 8.0	2200	-		
	rigger Values for Marin tion of 95% of Species)		-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	90 - 110	-	0.5 - 10	-	-	-	•	-	•		
Austral	an Drinking Water	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	- (-		
	nes (2018) ^c	Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	250	-	-		5	-	-	-	6.5 - 8.0	- 1	-		
	Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	На	Electrivcal Conductivity	Temperature	Depth to Water (mbgl TOC)	Comments
		Units Laboratory PQL	mg/L	mg/L 1	mg/L	mg/L	mg/L	mg/L 0.001	mg/L 0.05	mg/L 0.05	mg/L 0.1	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 0.01	mg/L 1	mg/L 2	mg/L 1	mg/L 1	mg/L 1	mg/L 1	mg/L	mg/L 0.01	% 0.1	mg/L 5	NTU 0.1	meq/L 0.01	meq/L 0.01	meq/L 0.01	. pH 0.01	µS/cm	°C 0.1	mbgl -	-
	BH-1c	17/06/2020	790	86	-	-	145	0.122	-	12.90	0.3	131.0	-	<0.10	<0.10	<0.10	179	-	<1	<1	2650	2650	<10	-	-	-	-	-	-	-	6.8	6740	24.5	3.38	-
Ī	BH-3	17/06/2020	259	148	-	-	32	0.294	-	2.98	0.1	20.4	-	0.02	16.90	16.90	15	-	<1	<1	414	414	95	-	-	-	-	-	-	-	7.5	1780	18.6	3.15	-
Bores	BH-4	17/06/2020	293	221	-	-	20	0.244	-	5.84	<0.1	6.11	-	<0.01	<0.01	<0.01	21	-	<1	<1	640	640	149	-	-	-	-	-	-	-	7.2	2230	18.3	4.37	-
	BH-9	17/06/2020	627	228	-	-	82	1.000	-	8.24	0.4	48.6	-	0.01	<0.01	0.01	81	-	<1	<1	1530	1530	<1	-	-	-	-	-	-	-	6.9	4720	22.2	2.35	-
dwater	BH-12r	17/06/2020	425	309	-	-	66	0.722	-	9.06	0.2	0.92	-	0.05	1.76	1.81	15	-	<1	<1	605	605	420	-	-	-	-	-	-	-	6.8	2790	20.3	4.42	-
\pur	BH-13	17/06/2020	146	167	-	-	30	0.192	-	0.45	0.2	1.13	-	0.02	0.97	0.99	23	-	<1	<1	588	588	159	-	-	-	-	-	-	-	7.2	1690	20.8	4.4	-
Groun	BH-14	17/06/2020	275	173	-	-	47	0.323	-	<0.05	0.4	0.42	-	0.05	61.40	61.40	37	-	<1	<1	504	504	122	-	-	-	-	-	-	-	6.6	2350	18.1	4.89	-
	BH-15	17/06/2020	2970	194	-	-	632	0.609	-	19.30	0.2	60.8	-	<0.10	<0.10	<0.10	148	-	<1	<1	690	690	570	-	-	-	-	-	-	-	6.8	9240	18.5	0.74	-
[BH-19r	17/06/2020	236	162	-	-	22	0.138	-	1.73	0.1	4.23	-	0.01	0.07	0.08	18	-	<1	<1	475	475	207	-	-	-	-	-	-	-	7.3	1760	22.2	4.64	
Water	SWP-1	17/06/2020	68	30	12	38	19	-	2.13	1.31	-	-	-	-	-	-	-	-			133	133	<1	-	-	20	3	5	5	1	7	-	-	-	-
Ň	SWP-2	17/06/2020	351	87	45	267	24	-	0.08	<0.05		-	-	-	-	-	-	-	<1	14	430	430	180	-	-	7	2	22	20	5	7.9	-	-	-	-
Surface	SWP-4	17/06/2020	441	58	64	365	18	-	0.17	<0.05	-	-	-	-	-	-	26	2	<1	49	402	402	260	-	-	14	5	26	25	3	8.1	· ·	-	-	Sand Mine Dam
Sur	SWP-5	17/06/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
_	SWC-up	17/06/2020	14100	337	998	8190	287	-	0.19	<0.10	-	-	0.34	<0.01	0.06	0.06	-	-	-	-	167	167	2130	-	-	18	2	445	462	2	7	-	-	-	-
Creek	SWC-2	17/06/2020	-	-	-	-	-	-	0.24	<0.10	-	-	1.68	<0.01	0.05	0.05	-	-	-	-	170	170	-	-	-	11	-	-	-	-	7.2	-	-	-	-
õgõ	SWC-down	17/06/2020	14900	356	1060	8890	313	-	<0.10	<0.10	-	-	0.72	<0.01	0.03	0.03	-	-	-	-	162	162	2280	-	-	6	2	471	500	3	7.4	-	-	-	-
	SWC-down 2	17/06/2020	14200	337	978	8180	287	-	0.13	<0.10	-	-	0.28	<0.01	0.04	0.04	-	-	-	-	169	169	2100	-	-	10	1	448	460	1	7.3	-	-	-	-
chate	Leachate Sump	17/06/2020	1640	7	-	-	12	0.672	1.96	-	0.4	611	-	<0.20	<1.00	<1.00	238	-	<1	<1	3620	3620	104	0.35	3.5	-	-	-	-	-	7.7	12000	15.3	-	-
yea.	Leachate Tank LP1	17/06/2020	2040	230	l - T	I -	190	0.605	0.69		0.2	60		<0.20	<0.20	<0.20	309	-	<1	<1	3010	3010	<20	7	73		-	-	-	-	7.6	11000	14.1	-	

A Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the sames as the NEPM (2013) EILs. ⁶ ANZG 2018 - pH Upper and Lower Limit for NSW Lowland Rivers (Table 3.22). ⁶ Investigation levels are taken from the health Values of the Australian Drinking Water Guidelines (NHMRC 2018).

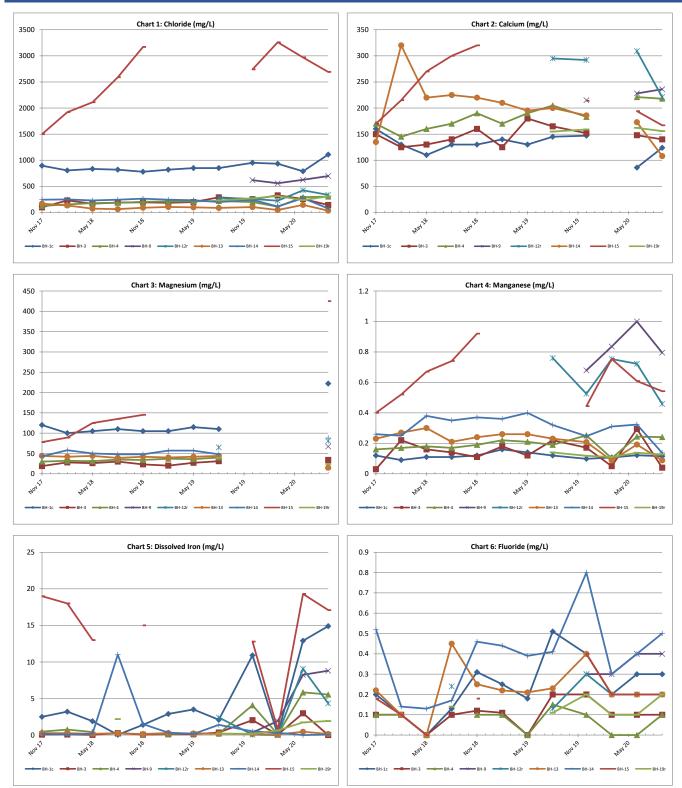
										EPL \	Nater										Resi Recycl		nd Wa	iste D	epot										
	rigger Values for Freshw of Species) ^A	ater (Protection	-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	-	-	-	-	-	85 - 110	-	6 - 50	-	-	-	6.5 - 8.0	2200	-]	
	rigger Values for Marine ion of 95% of Species) ^A	Water	-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	4	-	-	-	-	-	-	-	90 - 110	-	0.5 - 10	-	-	-	-	-	-		
	an Drinking Water nes (2018) ^C	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-	4	
Guideilli	ies (2010)	Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	250	-	-	-	5	-	-	-	6.5 - 8.0	-	-		
	Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	lonic Balance	Æ	Electrivcal Conductivity	Temperature	Depth to Water (mbgl TOC)	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		mg/L	mg/L	mg/L	%	mg/L	NTU	meq/L	meq/L			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	0.01	0.01	1	2	1 <1	1	1	1	1	0.01	0.1	5	0.1	0.01	0.01	0.01		1	0.1		-
-	BH-1c BH-3	15/09/2020	1110 143	124 140	222 34	-	-	0.115	-	14.90 <0.05	0.3 0.1	344.0 10.5	-	<0.01	<0.01	<0.01 27.50	214 15	-	<1	<1	2250 310	2250 310	<10	-	-	-	-	-	-	-	7.1	7410 1350	25.3 19.1	2.96 3.01	-
se	BH-4	15/09/2020	304	218	34 19	-	-	0.040	-	<0.05 5.54	0.1	9.04	-	0.06	<0.01	0.03	23		<1	<1	674	674	100	-	-	-	-	-		-	6.9	2150	19.1	4.21	-
Bg	BH-4 BH-9	15/09/2020	698	236	67			0.795	-	8.80	0.4	77.3		0.03	<0.01	0.03	23 77		<1	<1	1640	1640	159		-			-	-		7	4550	20.1	2.92	
Groundwater	BH-12r	15/09/2020	337	221	81			0.459	-	4.34	0.4	4.11		<0.03	0.75	0.75	31		<1	<1	664	664	200	-	-	-	-	-	-	-	6.7	2320	21.4	4.15	-
- Abr	BH-13	15/09/2020	35	148	15	-	-	0.088	-	0.16	0.2	0.27	-	0.09		28.20	10	-	<1	<1	310	310	122	-	-	-	-	-	-	-	6.6	1070	21	4.12	-
Brou	BH-14	15/09/2020	76	108	88	-	-	0.137	-	0.05	0.5	0.03	-	0.63	86.30	86.90	48	-	<1	<1	104	104	201	-	-	-	-	-	-	-	5.9	1490	21.6	4.52	-
Ŭ	BH-15	15/09/2020	2690	167	425	-	-	0.542	-	17.10	0.2	49.5	-	<0.01	<0.01	< 0.01	117	-	<1	<1	452	452	499	-	-	-	-	-	-	-	6.9	8700	19.2	0.72	-
	BH-19r	15/09/2020	311	156	24	-	-	0.127	-	1.92	0.2	4.38	-	0.04	0.05	0.09	26	-	<1	<1	436	436	228	-	-	-	-	-	-	-	7	1920	19.3	4.55	-
	SWP-1	15/09/2020	357	60	49	282	16	-	2.30	0.40	-	-	-	-	-	-	-	-	<1	<1	368	368	240	-	-	12	1.2	22.4	19.7	6.45	7.2	-	-	-	-
ace	SWP-2	15/09/2020	438	143	57	317	29	-	0.52	0.20	-	-	-	-	-	-	-	-	<1	<1	634	634	280	-	-	10	27	31	26	8	7.7	-	-	-	-
Surface Water	SWP-4	15/09/2020	441	54	55	320	15	-	0.18	<0.05	-	-	-	-	-	-	39	<2	<1	6	339	345	275	-	-	8	2	25	22	8	8	-	-	-	Sand Mine Dam
	SWP-5	15/09/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	SWC-up	15/09/2020	12700	287	726	6160	220	-	0.40	0.11	-	-	0.60	0.01	0.12	0.13	-	-	<1	<1	175	175	1940	-	-	18	3	402	348	7	7.2	-	-	-	-
Rocklow Creek	SWC-2	15/09/2020	-	-	-	-	-	-	0.49	0.10	-	-	0.77	0.01	0.37	0.38	-	-	<1	<1	131	131	-	-	-	8	-	-	-	-	7.5	-	-	-	-
õ õ	SWC-down	15/09/2020	11200	270	674	5690	206	-	0.33	0.07	-	-	0.57	<0.01	0.15	0.15	-	-	<1	<1	161	161	1670	-	-	15	3	354	322	5	7.4	-	-	-	-
	SWC-down 2	15/09/2020	6410	163	366	3080	113	-	0.35	0.08	-	-	0.38	0.01	0.27	0.28	-	-	<1	<1	146	146	838	-	-	12	4	201	175	7	7.5	-	-	-	-
chate	Leachate Sump	15/09/2020	1430	178	-	-	258	0.424	1.59	-	0.5	734	-	<0.10	<0.10	<0.10	557	-	<1	<1	3640	3640	250	0.13	1.4	-	-	-	-	-	7.7	11200	18	-	-
Lea	Leachate Tank LP1	15/09/2020	1560	174	-	-	279	0.457	1.29	-	0.5	887	-	<0.10	<0.10	<0.10	577	-	<1	<1	4420	4420	252	0.06	0.6	-	-	-	-	-	7.8	12200	18	-	-

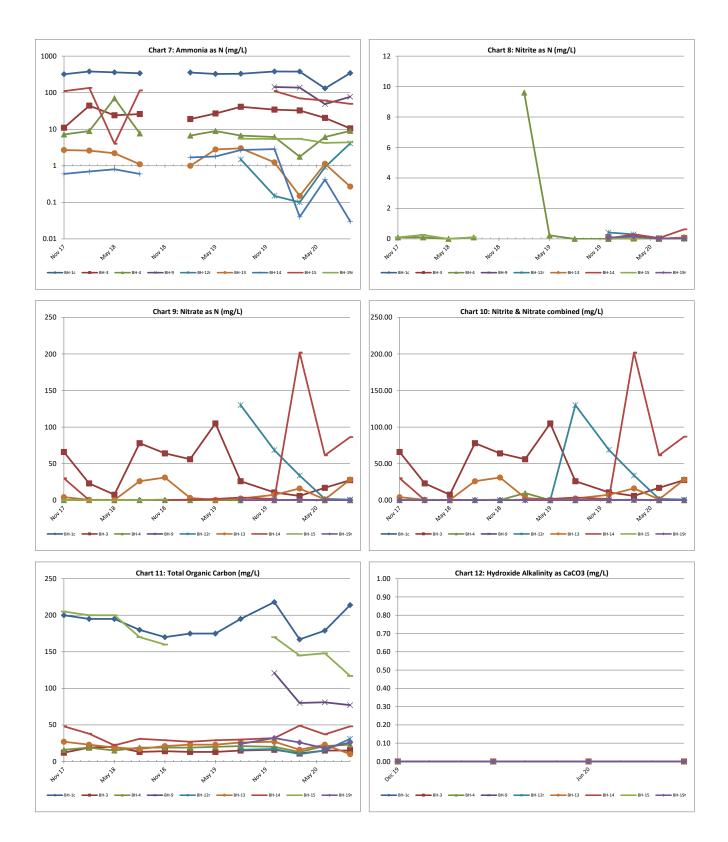
^b Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the sames as the NEPM (2013) ELs.
⁶ ANZ 02018 - pH Upper and Lower Limit for KSW Lowland Rivers (Table 3.22).
¹⁶ Investigation levels as tables moth the health values of the Latriking Driving Water Guidelines (NHMRC 2016).

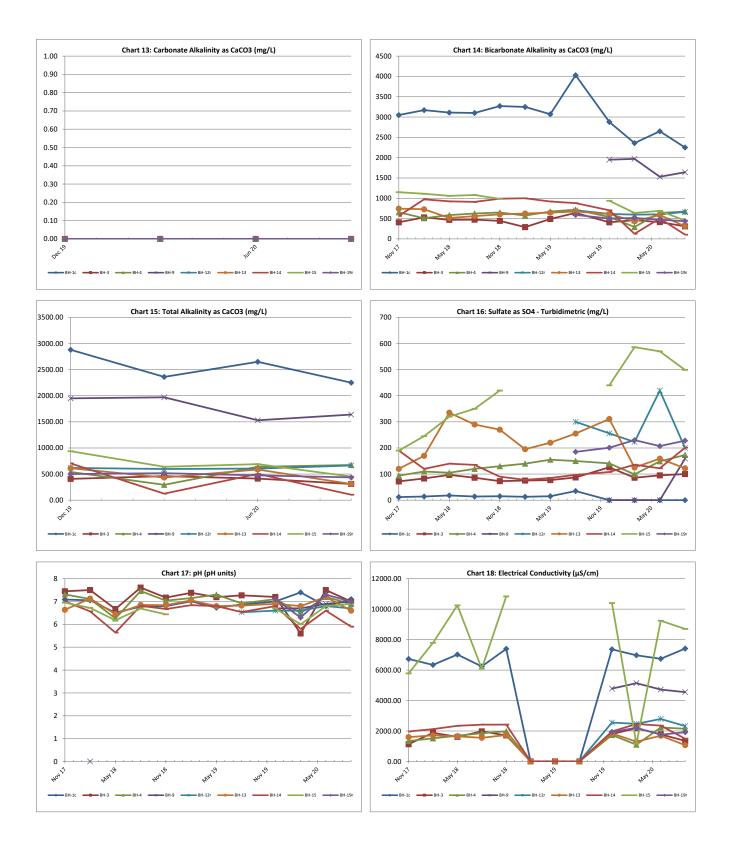


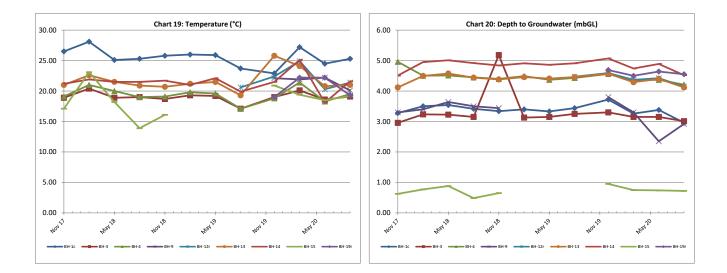
CHARTS

Charts 1-20: Groundwater Results

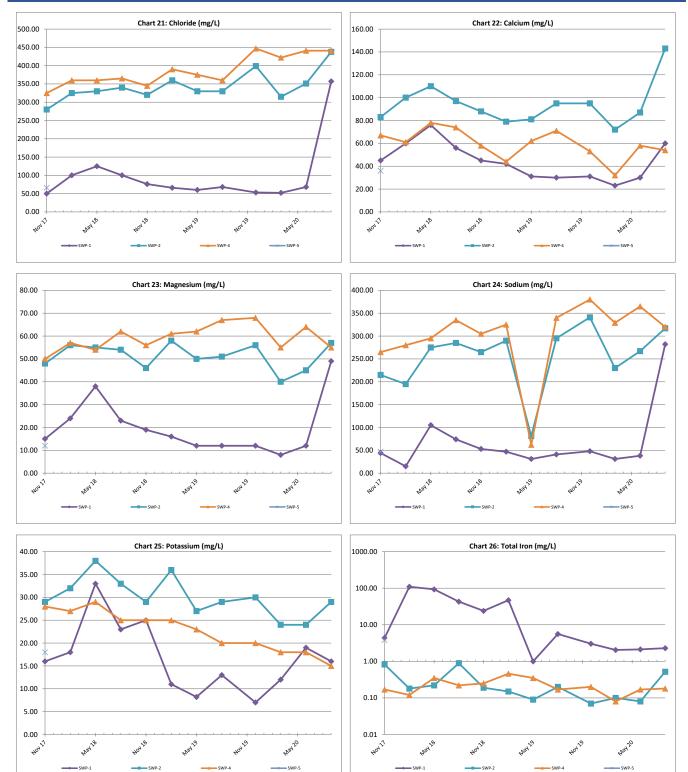


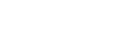


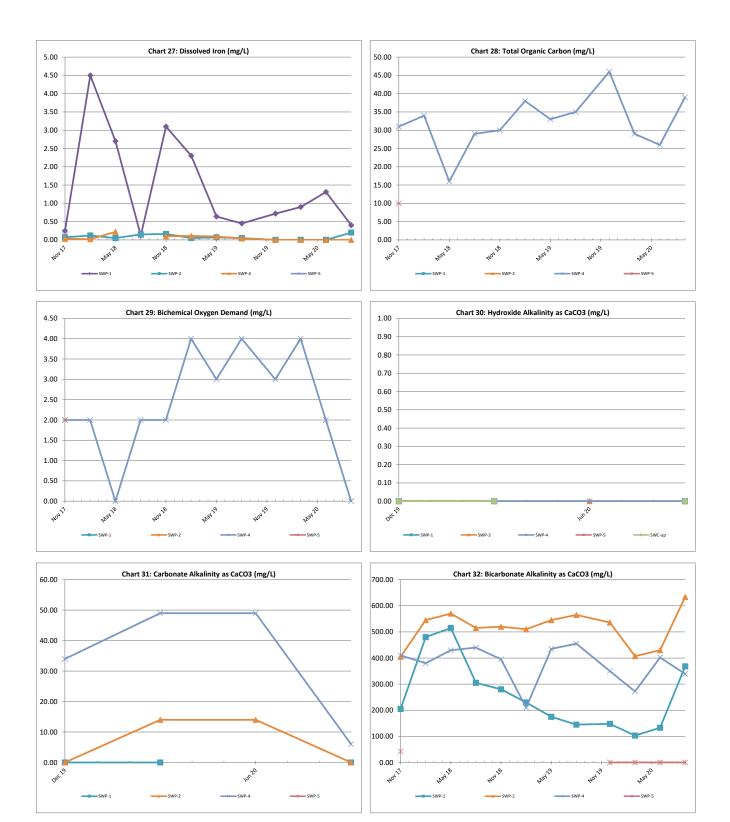


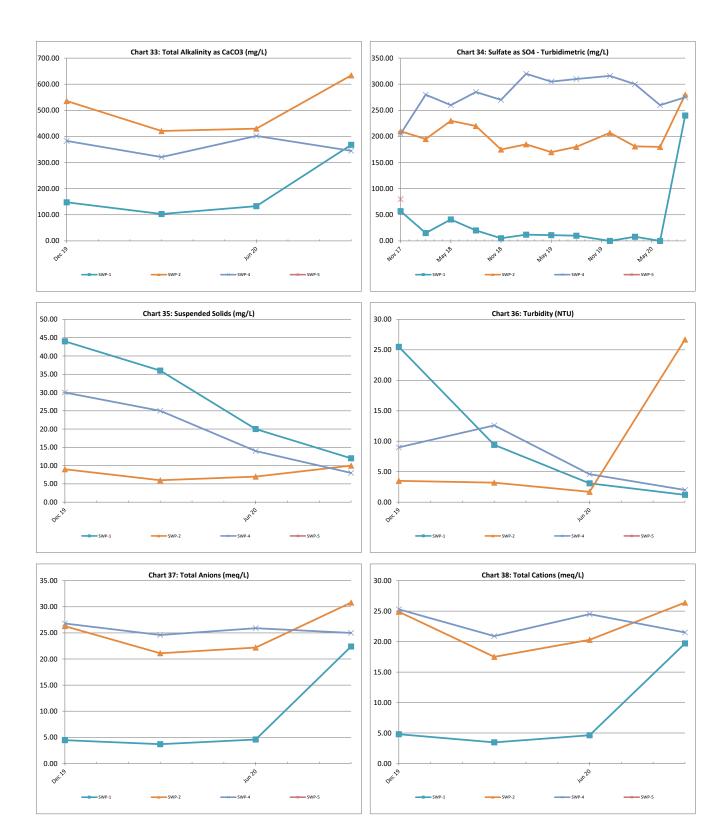


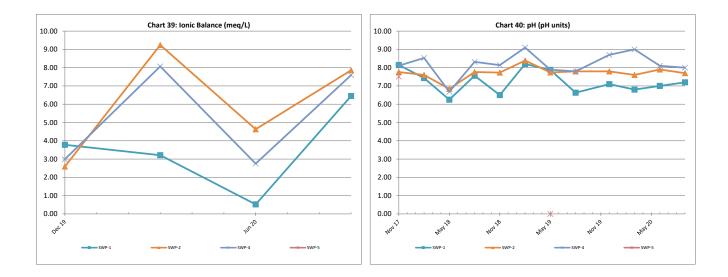
Charts 21-40: Onsite Surface Water Results











Charts 41-62: Rocklow Creek Results

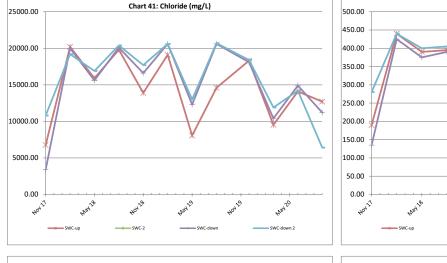
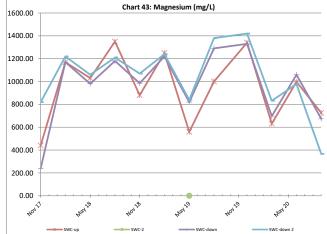
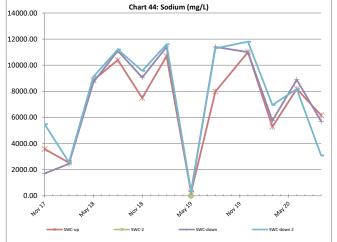
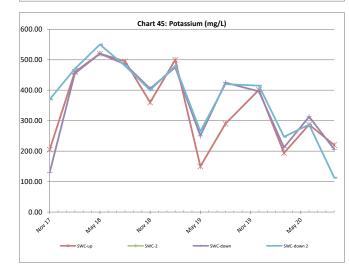


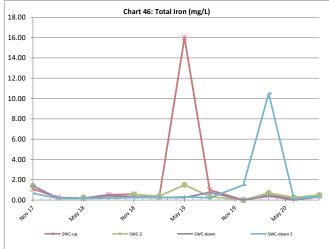


Chart 42: Calcium (mg/L)

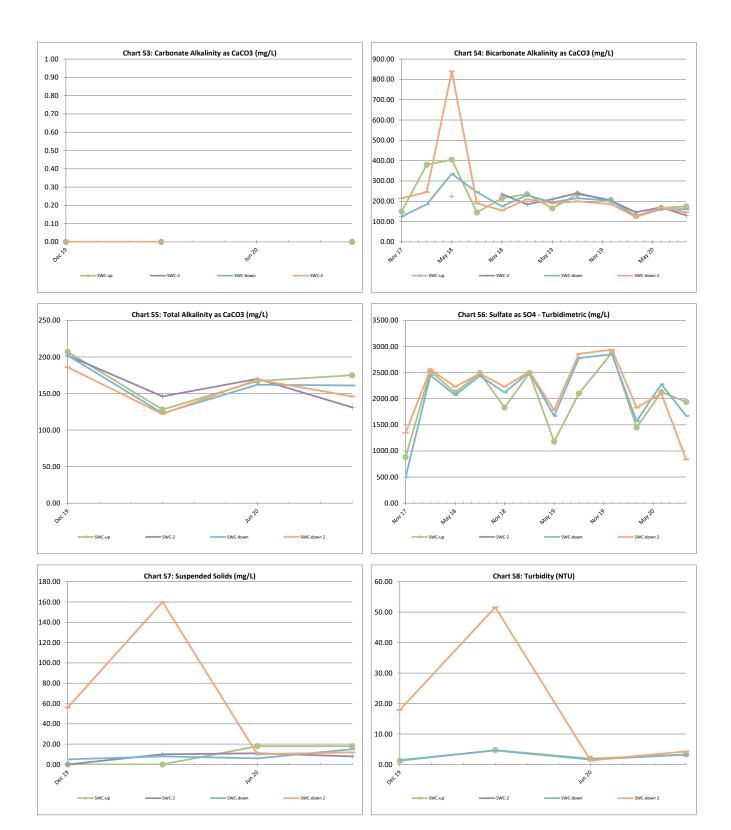






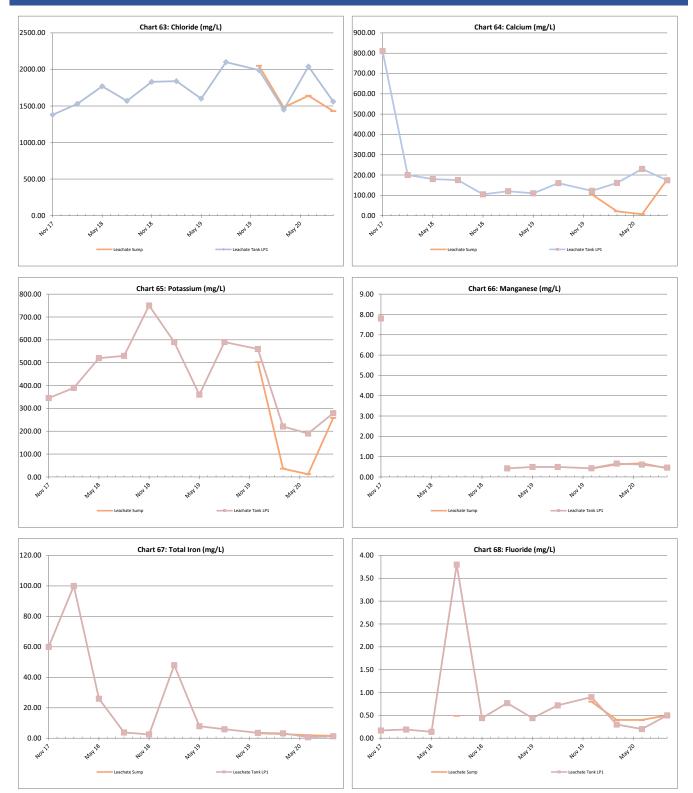




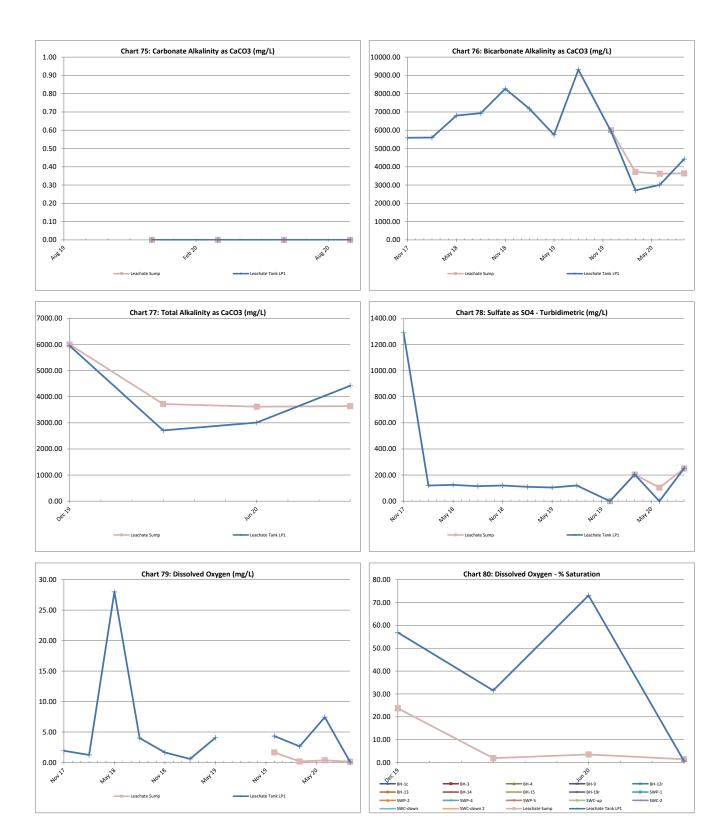


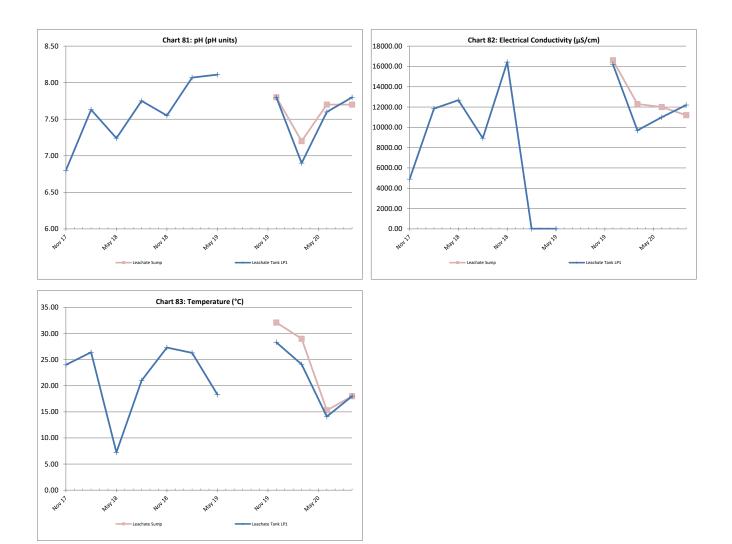


Charts 63-83: Leachate Results











APPENDICES



Appendix A

E	EPL 5984 Sampling I	Point Summary	(NSW EPA, 04/03/2020)
1		Overflow drain	Catch drain collecting overflows from Sediment Dams 1 & 2 and labelled SWP1 on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
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).



Appendix B

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

ALS)	ALS Laboratory: please tick → Shellharbour City Council		D Newcastle: 5 Rosegum Ph:02 4968 9433 Eisample:	s.newcastle@	AKNSW 2304 C Townsville: alsenviro.com Ph:07 4796 0600) E: townsville.en	dard TAT (List	a.com P	h: 08 8359 0890		ooraka SA 509 alsenviro.com		C Launcest Ph: 03 6331	2158 E: 1	Enviro	nmental Division
OFFICE:	41 Burelli St WOLLONGONG NSI	W 2500		(Standard T	AT may be longer for some tests		Standard or urg		ist due date)				1.0.0	idy Seal	Wollor Work	Order Reference
PROJECT:	Dunmore Quarterly Surface Wate				race Organics) DTE NO.: WO/030/19 TEN		otanciald of dig		st due dute,		ENCE NUMB	ER (Circle)	- Cana	ice/hoz	F١	V1905497
ORDER NUMBER:									COC:	1 2	34	56	1150.05	om San		Ngong Order Reference W1905497
PROJECT MANAGER:	: Joel Culton			1					OF:	1 2	34	56	7 Office	comme		
SAMPLER:			SAMPLER N	IOBILE:		RELING	JISHED BY:		RECI	EIVED BY:		· · ·	RELINQU	SHED		
COC emailed to ALS?	(YES / NO)		EDD FORMA	T (or defa	ult):		INN		- <i>L</i>	haot	e,					
Email Reports to :	· · · · · · · · · · · · · · · · · · ·									tvet			DATE/TIM	E:		
Email Invoice to :						17,	12,19		17	.12	17				Felephone	: 02 42253125
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPO	SAL:	CC reports to:													
ALS USE ONLY	SAMP MATRIX:	PLE DET			CONTAINER IN	IFORMATIO	N				-			sted to attract s d filtered bottle re		Additional Information
LAB ID	SAMPLE ID		DATE / TIME	MATRIX	TYPE & PRESERV, (refer to codes be		TOTAL BOTTLES	TSS	NT-1, NT-2 (lonic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP1	17.1	2.19 11:30	w	502ml P, WE/BAR,	N×2	5	1	1		1	1				Field Tests - pH
	SWP2		1 9:15	w		1		1	1		1	1				Field Tests - pH
	SWP4 - Sand Mine Dam		11:16	w	VS.			1	1	1	1	1				Field Tests - pH
	SWP5		11:00	w	VS			1	1	1	1	✓		Oper	1	Field Tests - pH
	SWC_UP		10:06	w	SP			√	1		1	1	1			Field Tests - pH & Temp
	SWC_2		10.04	, w	SP			*			1		1	1		Field Tests - pH & Temp
	SWC_DOWN		10:25	w	SP			1	1		1	1	1			Field Tests - pH & Temp
	SWC_DOWN_2	J	10:20	w	₿ SP	V		4	1		1	1	1			Field Tests - pH & Temp
		protestar men el completar				тот	AL 10									

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	: EW1905497	Page	: 1 of 6
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541
Telephone	·	Telephone	Australia NSW Australia : +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water	Date Samples Received	17-Dec-2019 16:30
Order number	: TBA	Date Analysis Commenced	: 17-Dec-2019
C-O-C number	:	Issue Date	: 06-Jan-2020 11:18
Sampler	: Aneta Prosaroski, Glenn Davies		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 8		Accredited for compliance with
No. of samples analysed	: 8		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- EG020: Some samples were diluted and rerun due to matrix interference and LOR's have been raised accordingly. (High Total Dissolved Solids)
- ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling Completed as per 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1	SWP2	SWP4 - Sand Mine Dam	SWP5	SWC_UP
	Clier	nt samplir	ng date / time	17-Dec-2019 11:30	17-Dec-2019 09:15	17-Dec-2019 11:16	17-Dec-2019 11:00	17-Dec-2019 10:16
Compound	CAS Number	LOR	Unit	EW1905497-001	EW1905497-002	EW1905497-003	EW1905497-004	EW1905497-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	7.1	7.8	8.7		7.2
EA025: Total Suspended Solids dried	at 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	44	9	30		<5
EA045: Turbidity								
Turbidity		0.1	NTU	25.5	3.5	9.0		1.2
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1		<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	34		<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	148	536	350		207
Total Alkalinity as CaCO3		1	mg/L	148	536	383		207
ED041G: Sulfate (Turbidimetric) as SC	04 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	207	316		2880
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	53	399	447		18300
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	31	95	53		463
Magnesium	7439-95-4	1	mg/L	12	56	68		1340
Sodium	7440-23-5	1	mg/L	48	341	380		11000
Potassium	7440-09-7	1	mg/L	7	30	20		401
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	0.72	<0.05	<0.05		0.10
EG020T: Total Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	3.03	0.07	0.20		<0.50
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9 N	0.01	mg/L					0.50
EK057G: Nitrite as N by Discrete Ana	lvser							
Nitrite as N	14797-65-0	0.01	mg/L					<0.01
EK058G: Nitrate as N by Discrete Ana								
Nitrate as N	14797-55-8	0.01	mg/L					<0.01
EK059G: Nitrite plus Nitrate as N (NO								
Nitrite + Nitrate as N		0.01	mg/L					<0.01
EN055: Ionic Balance			J					
Ø Total Anions		0.01	meg/L	4.45	26.3	26.8		580
		0.01					I	



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1	SWP2	SWP4 - Sand Mine Dam	SWP5	SWC_UP
	Cli	ent sampli	ng date / time	17-Dec-2019 11:30	17-Dec-2019 09:15	17-Dec-2019 11:16	17-Dec-2019 11:00	17-Dec-2019 10:16
Compound	CAS Number	LOR	Unit	EW1905497-001	EW1905497-002	EW1905497-003	EW1905497-004	EW1905497-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Cations		0.01	meq/L	4.80	24.9	25.3		622
ø Ionic Balance		0.01	%	3.78	2.59	2.99		3.48
EN67 PK: Field Tests								
Field Observations		0.01					dry	
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon		1	mg/L			46		
EP030: Biochemical Oxygen Demand (BOI) (C							
Biochemical Oxygen Demand		2	mg/L			3		



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWC_2	SWC_DOWN	SWC_DOWN 2	
	Clie	ent sampli	ng date / time	17-Dec-2019 10:06	17-Dec-2019 10:25	17-Dec-2019 10:20	
Compound	CAS Number	LOR	Unit	EW1905497-006	EW1905497-007	EW1905497-008	
				Result	Result	Result	
EA005FD: Field pH							
рН		0.1	pH Unit	7.1	7.4	7.6	
EA025: Total Suspended Solids dried	at 104 ± 2°C						
Suspended Solids (SS)		5	mg/L	<5	5	56	
EA045: Turbidity							
Turbidity		0.1	NTU		1.4	17.9	
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	202	202	186	
Total Alkalinity as CaCO3		1	mg/L	202	202	186	
ED041G: Sulfate (Turbidimetric) as SO	04 2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		2850	2940	
ED045G: Chloride by Discrete Analyse	er						
Chloride	16887-00-6	1	mg/L		18100	18400	
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L		452	461	
Magnesium	7439-95-4	1	mg/L		1330	1420	
Sodium	7440-23-5	1	mg/L		11000	11800	
Potassium	7440-09-7	1	mg/L		396	415	
EG020F: Dissolved Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	<0.10	<0.10	<0.10	
EG020T: Total Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	1.48	
EK055G-NH4: Ammonium as N by DA							
Ammonium as N	14798-03-9_N	0.01	mg/L	0.48	0.28	0.03	
EK057G: Nitrite as N by Discrete Anal							 1
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Ana							
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.05	
EK059G: Nitrite plus Nitrate as N (NO							
Nitrite + Nitrate as N		0.01	mg/L	<0.01	<0.01	0.05	
EN055: Ionic Balance							1
Ø Total Anions		0.01	meq/L		574	584	
		0.01	meq/L		5/4	507	



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWC_2	SWC_DOWN	SWC_DOWN 2	
	Cl	ient samplii	ng date / time	17-Dec-2019 10:06	17-Dec-2019 10:25	17-Dec-2019 10:20	
Compound	CAS Number	LOR	Unit	EW1905497-006	EW1905497-007	EW1905497-008	
				Result	Result	Result	
EN055: Ionic Balance - Continued							
Ø Total Cations		0.01	meq/L		621	664	
Ø Ionic Balance		0.01	%		3.91	6.39	

CHAIN OF CUSTODY ALS Laboratory: please tick ->

 Bydney: 277 Wocopark Rd. Snathfield NSW 2176
 Brisbane 32 Shand St, Stafford OLD 4053
 Ph.02 5784 3555 Eisamples bythey@alsenviro.com
 Ph.07 3243 7222 E samples bricbarie@alsenviro.com El Newcastle: 5 Rosegum Rd, Warsbrock NSW 2304
 El Townsville: 1415 Desma Cl, Bohla QLD 4818
 Ph.02 4962 9433 Examples newcastle@atserviro.com
 Ph.02 4962 9433 Examples newcastle@atserviro.com

FI Melbourne, 2-4 Westall Rd. Springpale VIC 3171 Ph/03 8549 9600 E: samples melbourne@aisenviro.com Adelaide: 2-1 Burma Rd, Pooraka SA 5095
 Ph. 08 8259 0890 Eladelaide@alsenviro.com

CLPorth: 10 Hod Way, Malaya WA 3390 Ph: 08 9209 7655 E: samples.ps:th@alsenvirp.com CI Launceston: 27 Wellington St. Launceston TAS 7250 Ph 03 6331 2158 E. launceston@alsenviro.com

CLIENT:	Shellharbour City Council		ND REQUIREMENTS : D Standard TAT (List	due date):							FOR LABORATORY USE	the provide state of the second
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT e.g., Ultra Trace	may be longer for some tests D Non Standard or un	gent TAT (List due dat	e):						Clustocy SeaLinted?	Yes No State
PROJECT:	Dunmore Quarterly Leachate	ALS QUOTE	NO.: WO/030/19 TENDER		ço	C SEQU	IENCE	NUMBI	ER (C	Circle)	Free (ce//frozen ice bricks pre receipt?	etifupar Yes No NVA
ORDER NUMBE	R:			co	C: 1	2	3	4	5	6	7 Rendom Sample Temperature	on Receiption
PROJECT MAN	AGER: Joel Culton			o	ः 1	2	3	4	5	6	7 Other comment	
SAMPLER:	<u>.</u>	SAMPLER MOBILE:	RELINQUISHED BY:	RE	CEIVE	D BY:					RELINQUISHED BY:	RECEIVED BY:
COC emailed to	ALS? (YES / NO)	EDD FORMAT (or default)	Glenn		A	ne	H	e,				
Email Reports to	o :		DATE/TIME:		TE/TIN		~ <	2			DATE/TIME:	DATE/TIME:
Email Invoice to):		17.12-19	1	7.1	2	. L	٦				
COMMENTS/SP	ECIAL HANDLING/STORAGE OR DISPOSAL:	CC reports to:										
	SAMPLE DETAILS			ANALYSIS REQU	IRED I	ncludi	ng SU	ITES (I	NB. Sui	ite Cod	les must be listed to attract suite price)	Additional Information

SUSE ONLY		Solid(S) Water(W)		CONTAINER INFORMATION	w	ere Metals are requ	Additional Information				
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE TOTA (refer to codes below) BOTTL		NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	iota) Diocoimed-Fe & Mn	NT-4 (NO2, NO3)		Comments on likely contaminant levels, dilut or samples requiring specific QC analysis etc
	Leachate Sump	17/12/19 13/3	⊳ w	500ml, 5P, VS, N	1	*	*	1	*		Field Tests - pH, EC, Temp & D
	Leachate Tank LP1	17/12/19 13:32	w	, ,	1	× .	1	1	1		Field Tests - pH, EC, Temp & I
					_						
				·							
										Environmental D Wollongong ^{Work Order Reference} EW190	
		· · · · · · · · · · · · · · · · · · ·									
										Telephone : 02 42253125	
										-	
				TOTAL 10					-		



CERTIFICATE OF ANALYSIS

Work Order	EW1905498	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia, NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate	Date Samples Received	: 17-Dec-2019 15:50
Order number	: TBA.	Date Analysis Commenced	: 17-Dec-2019
C-O-C number	:	Issue Date	: 31-Dec-2019 09:29
Sampler	: Aneta Prosaroski, Glenn Davies		NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 2		Accredited for compliance with
No. of samples analysed	: 2		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.
- ED041G: LOR raised for Sulfate on various samples due to sample matrix.
- EK057G: LOR raised for Nitrite on sample No.2 due to sample matrix.
- EK059G-EK058G: LOR raised for NOx-Nitrate on sample 2 due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling Completed as per 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Leachate Sump	Leachate Tank LP1	 	
	Cl	ient sampli	ing date / time	17-Dec-2019 13:30	17-Dec-2019 13:45	 	
Compound	CAS Number	LOR	Unit	EW1905498-001	EW1905498-002	 	
				Result	Result	 	
EA005FD: Field pH							
рН		0.1	pH Unit	7.8	7.8	 	
EA010FD: Field Conductivity							
Electrical Conductivity (Non		1	µS/cm	16600	16200	 	
Compensated)							
EA116: Temperature							
Temperature		0.1	°C	32.1	28.3	 	
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	 	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	 	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	6000	5950	 	
Total Alkalinity as CaCO3		1	mg/L	6000	5950	 	
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	<5	 	
ED045G: Chloride by Discrete Analyser							
Chloride	16887-00-6	1	mg/L	2050	1990	 	
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	105	122	 	
Potassium	7440-09-7	1	mg/L	502	560	 	
EG020T: Total Metals by ICP-MS							
Manganese	7439-96-5	0.001	mg/L	0.412	0.425	 	
Iron	7439-89-6	0.05	mg/L	3.22	3.52	 	
EK040P: Fluoride by PC Titrator							
Fluoride	16984-48-8	0.1	mg/L	0.8	0.9	 	
EK055G: Ammonia as N by Discrete Ana	alyser						
Ammonia as N	7664-41-7	0.01	mg/L	1400	1450	 	
EK057G: Nitrite as N by Discrete Analys							
Nitrite as N	14797-65-0	0.01	mg/L	0.68	<0.10	 	
EK058G: Nitrate as N by Discrete Analy	/ser						
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.10	 	
EK059G: Nitrite plus Nitrate as N (NOx)		lvser					
Nitrite + Nitrate as N	by Discrete Ana	0.01	mg/L	0.69	<0.10	 	
EP005: Total Organic Carbon (TOC)							
Total Organic Carbon		1	mg/L	900	870	 	
		•					



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			Leachate Sump	Leachate Tank LP1	 	
	Cl	ient sampli	ing date / time	17-Dec-2019 13:30	17-Dec-2019 13:45	 	
Compound	CAS Number	LOR	Unit	EW1905498-001	EW1905498-002	 	
				Result	Result	 	
EP025FD: Field Dissolved Oxygen							
Dissolved Oxygen		0.01	mg/L	1.65	4.33	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	23.7	56.9	 	

OFFICE: 4	hellharbour City Council 1 Burelli St WOLLONGONG NSW 2 Punmore Quarterly Ground Waters	500		TURNAR	NIND REQUIREMENTS							Concerning on the			
		600		TURNAROUND REQUIREMENTS : Standard TAT (List due date):									Environmental Division		
PROJECT: D	unmore Quarterly Ground Waters	500			AT may be longer for some tests race Organics)	gent TAT (L	ist due date):				Wollongong				
				ALS QUO		COC SEQUENCE NUMBER (Circle)						k Order Reference			
ORDER NUMBER:					·			COC:	1 2	34	56	7 Rando		W1905499	
PROJECT MANAGER: J	oel Culton							OF:	1 2	3 4	5 6	7 Other			
SAMPLER:			SAMPLER N						EIVED BY:			RELINQUIS			
COC emailed to ALS? ()	(ES / NO)		EDD FORM	AT (or defau		Glenn			Ane	ta		DATE/TIME			
Email Reports to						17/12/19		17	12	19		DATE/TIME			
Email Invoice to :						1-1-1			10.1	•)		<u> </u>			
COMMENTS/SPECIAL H	ANDLING/STORAGE OR DISPOSAL	:	CC reports to:										Telephone	e : 02 42253125	
ALS USE ONLY	SAMPLE MATRIX: Solid				CONTAINER INFO	RMATION		SIS REQUIRI re Metals are requ		-			tered bottle required).	
										ార				Comments on likely contaminant levels, dilutions or samples requiring specific QC analysis etc.	
LAB ID	SAMPLE ID		DATE / TIME	MATRIX	TYPE & PRESERVATIN (refer to codes below)		Ammonia	NT-2A (Alka, So4, CI, FI) Filtered Ca, K	TOC	Dissolved Fe { Mn	NT-4 (NO2, NO3)				
	ВНА	171	12/19 12:2	R W	500mlP, SP, VS, N	4	1	1	. 1	1	1			Field Tests - pH, EC, Temp & SWL	
	BH1C		1 8:39	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL	
	BH2		8:59	w	· · · · · · · · · · · · · · · · · · ·		1	1	1	1	1		-	Field Tests - pH, EC, Temp & SWL	
	BH3		11:03	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL	
	BH4		9:22	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL	
	вн9		11:44	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL	
	BH10		15128	w			1	1	1	1	4			Field Tests - pH, EC, Temp & SWL	
	BH15		15:00				1	1	1	1	1			Field Tests - pH, EC, Temp & SWL	
	BH12R		13:20				4	1	*	1	1			Field Tests - pH, EC, Temp & SWL	
	BH13		13.03	s w			1	1	1	1	· •			Field Tests - pH, EC, Temp & SWI	
	BH14		10:4	-			1	1	1	1	1			Field Tests - pH, EC, Temp & SWI	
	BH16		~	w			1	✓	1	1	1	Can'4	Find	Field Tests - pH, EC, Temp & SWI	
	BH17R		12:45	- w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWI	
	BH18R	1	15:20				1	1	1	1	•	DRI	1.	Field Tests - pH, EC, Temp & SW	
л.	BH19R		9:32				1	1	1	×	1			Field Tests - pH, EC, Temp & SW	
	BH20		9: 25				1	1	1	1	1			Field Tests - pH, EC, Temp & Sw	
	BH20s	U	y 9:50				1	1	1	1	1			Field Tests - pH, EC, Temp & SW	
						TOTAL 10									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Cd Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCI preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Plastic; HS = HCI preserved Plastic; HS = HCI preserved Plastic; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass⁴; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solie; B = Unpreserved Bag.

··•• ····



CERTIFICATE OF ANALYSIS

Work Order	: EW1905499	Page	: 1 of 10
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia_NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters	Date Samples Received	: 17-Dec-2019 16:30
Order number	: TBA	Date Analysis Commenced	: 17-Dec-2019
C-O-C number	:	Issue Date	: 28-Dec-2019 06:54
Sampler	: Aneta Prosaroski, Glenn Davies		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS		Accreditation No. 825
No. of samples received	: 17		Accredited for compliance with
No. of samples analysed	: 17		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling completed as per EN/67.11 Groundwater 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BHA	BH1C	BH2	BH3	BH4
	Cl	ient sampli	ng date / time	17-Dec-2019 12:23	17-Dec-2019 08:39	17-Dec-2019 08:59	17-Dec-2019 11:03	17-Dec-2019 09:22
Compound	CAS Number	LOR	Unit	EW1905499-001	EW1905499-002	EW1905499-003	EW1905499-004	EW1905499-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	6.3	7.0	7.1	7.2	7.1
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	μS/cm	1100	7360	2360	1800	1730
EA116: Temperature								
Temperature		0.1	°C	20.1	22.9	22.2	19.0	18.8
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	260	2880	783	408	540
Total Alkalinity as CaCO3		1	mg/L	260	2880	783	408	540
ED041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	291	<5	90	126	141
ED045G: Chloride by Discrete Analys	ser							
Chloride	16887-00-6	1	mg/L	50	951	322	254	200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	135	147	136	152	183
Potassium	7440-09-7	1	mg/L	12	231	30	33	18
EG020F: Dissolved Metals by ICP-MS	5							
Manganese	7439-96-5	0.001	mg/L	0.089	0.098	0.844	0.171	0.252
Iron	7439-89-6	0.05	mg/L	3.10	10.9	8.62	2.04	4.08
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.4	0.7	0.2	0.1
EK055G: Ammonia as N by Discrete	Analvser							
Ammonia as N	7664-41-7	0.01	mg/L	0.21	380	17.3	34.3	6.13
EK057G: Nitrite as N by Discrete Ana								
Nitrite as N	14797-65-0	0.01	mg/L	0.04	<0.01	<0.01	0.11	<0.01
K058G: Nitrate as N by Discrete An								
Nitrate as N	14797-55-8	0.01	mg/L	0.56	<0.01	<0.01	10.6	0.01
EK059G: Nitrite plus Nitrate as N (NO								
Nitrite + Nitrate as N	JX) by Discrete Ana	0.01	mg/L	0.60	<0.01	<0.01	10.7	0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon (TOC)		1	mg/L	26	218	44	16	20
. eta. erganie earson			g/L		2.0			20



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		BHA	BH1C	BH2	BH3	BH4	
	Cli	ent sampli	ng date / time	17-Dec-2019 12:23	17-Dec-2019 08:39	17-Dec-2019 08:59	17-Dec-2019 11:03	17-Dec-2019 09:22
Compound	CAS Number	LOR	Unit	EW1905499-001	EW1905499-002	EW1905499-003	EW1905499-004	EW1905499-005
				Result	Result	Result	Result	Result
FWI-EN/001: Groundwater Sampling - De	pth							
Standing Water Level		0.01	m AHD	3.52	3.72	4.27	3.30	4.56



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH9	BH10	BH15	BH12R	BH13
	Ci	lient sampli	ing date / time	17-Dec-2019 11:44	17-Dec-2019 15:28	17-Dec-2019 15:00	17-Dec-2019 13:20	17-Dec-2019 13:03
Compound	CAS Number	CAS Number LOR Unit EW1905499-006		EW1905499-006	EW1905499-007	EW1905499-008	EW1905499-009	EW1905499-010
				Result	Result	Result	Result	Result
A005FD: Field pH								
рН		0.1	pH Unit	6.7	6.7	6.7	6.6	6.9
A010FD: Field Conductivity								
Electrical Conductivity (Non		1	µS/cm	4780	2330	10400	2550	1840
Compensated)								
A116: Temperature								
Temperature		0.1	°C	22.1	22.2	20.9	22.4	25.8
D037P: 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	1950	433	938	617	612
Total Alkalinity as CaCO3		1	mg/L	1950	433	938	617	612
D041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	70	440	256	311
ED045G: Chloride by Discrete Analys	ser							
Chloride	16887-00-6	1	mg/L	620	449	2740	260	104
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	215	27	214	292	197
Potassium	7440-09-7	1	mg/L	88	10	694	48	61
EG020F: Dissolved Metals by ICP-MS	5							
Manganese	7439-96-5	0.001	mg/L	0.679	0.160	0.444	0.525	0.208
Iron	7439-89-6	0.05	mg/L	0.35	0.15	12.8	0.06	0.13
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.3	0.7	0.4	0.3	0.4
EK055G: Ammonia as N by Discrete	Analyser							
Ammonia as N	7664-41-7	0.01	mg/L	143	1.91	111	0.15	1.24
EK057G: Nitrite as N by Discrete Ana								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.03	0.03	0.42	0.08
K058G: Nitrate as N by Discrete An			<u> </u>					
Nitrate as N	14797-55-8	0.01	mg/L	0.22	0.13	0.29	68.4	7.28
EK059G: Nitrite plus Nitrate as N (NO Nitrite + Nitrate as N	JX) by Discrete Ana	0.01	mg/L	0.22	0.16	0.32	68.8	7.36
		0.01	ing/E	0.22	0.10	0.52	00.0	7.50
P005: Total Organic Carbon (TOC)		1	mc/l	121	11	170	17	27
Total Organic Carbon		1	mg/L	121	11	170	17	21



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH9	BH10	BH15	BH12R	BH13
	Cl	ent sampli	ng date / time	17-Dec-2019 11:44	17-Dec-2019 15:28	17-Dec-2019 15:00	17-Dec-2019 13:20	17-Dec-2019 13:03
Compound	CAS Number	LOR	Unit	EW1905499-006	EW1905499-007	EW1905499-008	EW1905499-009	EW1905499-010
				Result	Result	Result	Result	Result
FWI-EN/001: Groundwater Sampling - De	pth							
Standing Water Level		0.01	m AHD	3.80	1.67	0.95	4.59	4.57



Sub-Matrix: WATER Matrix: WATER)		Clie	ent sample ID	BH14	BH16	BH17R	BH18R	BH19R
	Cl	ient sampli	ng date / time	17-Dec-2019 10:47	17-Dec-2019 00:00	17-Dec-2019 12:45	17-Dec-2019 15:20	17-Dec-2019 09:32
Compound	CAS Number	LOR	Unit	EW1905499-011	EW1905499-012	EW1905499-013	EW1905499-014	EW1905499-015
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	6.8		6.7		7.1
A010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	μS/cm	1970		2160		1940
A116: Temperature								
Temperature		0.1	°C	21.5		19.9		19.0
D037P: 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	704		444		501
Total Alkalinity as CaCO3		1	mg/L	704		444		501
D041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	108		158		201
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	243		389		270
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	186		161		159
Potassium	7440-09-7	1	mg/L	21		55		21
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.247		0.225		0.118
Iron	7439-89-6	0.05	mg/L	0.50		14.9		0.17
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.8		0.2		0.2
EK055G: Ammonia as N by Discrete A	nalvser							
Ammonia as N	7664-41-7	0.01	mg/L	2.86		12.9		5.43
EK057G: Nitrite as N by Discrete Ana	lvser							
Nitrite as N	14797-65-0	0.01	mg/L	0.02		0.02		0.09
K058G: Nitrate as N by Discrete Ana								
Nitrate as N	14797-55-8	0.01	mg/L	1.60		<0.01		0.05
EK059G: Nitrite plus Nitrate as N (NO								
Nitrite + Nitrate as N		0.01	mg/L	1.62		0.02		0.14
EN67 PK: Field Tests								
Field Observations		0.01			not found		dry	



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH14	BH16	BH17R	BH18R	BH19R	
	Cli	ent sampli	ng date / time	17-Dec-2019 10:47	17-Dec-2019 00:00	17-Dec-2019 12:45	17-Dec-2019 15:20	17-Dec-2019 09:32	
Compound	CAS Number	LOR	Unit	EW1905499-011	EW1905499-012	EW1905499-013	EW1905499-014	EW1905499-015	
				Result	Result	Result	Result	Result	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon		1	mg/L	32		32		32	
FWI-EN/001: Groundwater Sampling - De	pth								
Standing Water Level		0.01	m AHD	5.07		3.80		4.69	



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH20	BH20s	 	
	Cl	ient sampli	ng date / time	17-Dec-2019 09:45	17-Dec-2019 09:54	 	
Compound	CAS Number	LOR	Unit	EW1905499-016	EW1905499-017	 	
				Result	Result	 	
EA005FD: Field pH							
рН		0.1	pH Unit	7.4	7.4	 	
EA010FD: Field Conductivity							
Electrical Conductivity (Non Compensated)		1	µS/cm	1630	1340	 	
EA116: Temperature							
Temperature		0.1	°C	18.5	19.0	 	
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	 	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	 	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	393	387	 	
Total Alkalinity as CaCO3		1	mg/L	393	387	 	
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	170	240	 	
ED045G: Chloride by Discrete Analyser							
Chloride	16887-00-6	1	mg/L	210	60	 	
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	154	134	 	
Potassium	7440-09-7	1	mg/L	52	85	 	
EG020F: Dissolved Metals by ICP-MS							
Manganese	7439-96-5	0.001	mg/L	0.070	0.088	 	
Iron	7439-89-6	0.05	mg/L	1.36	<0.05	 	
EK040P: Fluoride by PC Titrator							
Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	 	
EK055G: Ammonia as N by Discrete Ana	alyser						
Ammonia as N	7664-41-7	0.01	mg/L	37.2	3.33	 	
EK057G: Nitrite as N by Discrete Analys							
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	 	
EK058G: Nitrate as N by Discrete Analy							
Nitrate as N	14797-55-8	0.01	mg/L	0.08	3.78	 	
EK059G: Nitrite plus Nitrate as N (NOx)		lvser					
Nitrite + Nitrate as N	by Discrete Ana	0.01	mg/L	0.09	3.78	 	
EP005: Total Organic Carbon (TOC)							
Total Organic Carbon		1	mg/L	20	18	 	
. etal el guille eu soli		1	g/L			· · · · · · · · · · · · · · · · · · ·	



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID		BH20	BH20s	 		
	Clie	nt sampliı	ng date / time	17-Dec-2019 09:45	17-Dec-2019 09:54	 	
Compound	CAS Number	LOR	Unit	EW1905499-016	EW1905499-017	 	
				Result	Result	 	
FWI-EN/001: Groundwater Sampling - De	epth						
Standing Water Level		0.01	m AHD	2.41	2.44	 	

CHAIN OF CUSTODY ALS Laboratory: please tick ->

Cl. Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Phr 02 8784 3665 Elsamples.sydnay@alservire.com

Ei – **Brisbane:** 32 Shand St. Stafford OLD 4053 Ph.07 3243 7222 Eisamples.brisbana@alaonviro.com Phi Gale 2024 Costa Costangens synneygenserver com Philor Costa 2024 Costangens Utagenegenserver com D Newcastle: 6 Rosegum Rd, Watabrook NSW 2004 Phi/02 4968 (433 Eisamples rewcastleigelservito com Phi/07 4766 000 Ei synnaylle androneanal@elsansro.com

Melbourne, 2-4 Westal: Rd. Springvale VIC 3171 Ph 03 8549 6600 Et samples.melbourne@alsenvirg.com Ci Adelaide: 2-1 Burna Rd, Pooraka SA 5095
 Ph. 66 8359 0860 E adea kie@alsenviro.com

⑦ Perth 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7655 Erisa nples perth@alsenviro.com C Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 E. launceston@alsenviro.com

1.1

2.

						200 L 0.20	a su saift ai	2211A0 G. 201	0		Ph: I	03 0331 2158 E. launceston@alsenviro.co	(75)
CLIENT: OFFICE:	Shellharbour City Council 41 Burelli St WOLLONGONG NSW 2500		TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some test	- ottandard the (List due date):								FOR LABORATORY USE ONL	
PROJECT:	Dunmore Quarterly Ground Waters EPL		e.g Ultra Trace Organics)	Non Standard or urgent TAT (List	due date						-	Cuetody Seel Intact?	Yes No N/A
ORDER NUMBER	R:	<u> </u>				—	EQUE	ICE NUM	BER	(Circle	•	Free Ica / Rozen ica bricks present u receipt?	Yes No N/A
PROJECT MANA	AGER: Joel Culton						2	3 4	5	6		Random Sample Temperature on Re	celpt: C
SAMPLER:	-	SAMPLER N	MOBILE:	RELINQUISHED BY:	OF:		2	3 4	5	6	-	Other commant	
COC emailed to A	ALS? (YES / NO)	EDD FORMA	AT (or default):	Anerly	in		- • •				REL	LINQUISHED BY:	RECEIVED BY:
Email Reports to						√ ()() ()()							
Email Invoice to :	:			11/3/20		1//	21	2.	`			re/time:	DATE/TIME:
COMMENTS/SPE					<u> </u>	187	21	$\underline{-}$	ر			-	

CIAL HANDLING/STORAGE OR DISPOSAL CC reports to:

ALS USE ONLY	SAMPL MATRIX: So	E DETAILS Dild(S) Water(W)		CONTAINER INFORMATION			SIS REQUIR		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)			Comments on likely contaminant levels, dilutions or samples requiring specific QC analysis etc.
	BH1C	11/3/20 11:40	w			1	✓ √	1	- <u>-</u>	~			Field Tests - pH, EC, Temp & SWL
	ВН3	11.35	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL
	BH4	12:52	w			1	1	1	-	-			Field Tests - pH, EC, Temp & SWL
	BH15	14:20	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL
	BH13	13:43	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL
	BH14	13:05	w			1	1	1	1	1			Field Tests - pH, EC, Temp & SWL
									1				
									Er W	vironm ollongo Work Ort EW	ental E ng der Refe 200	Division rence 1278	
									-				
									T e	lephone : 02	42253125	' 1 (5) (200) 111	
Vater Container Codes: P	= Unpreserved Plastic: N = Nitric Processor				10								

V = VOA Vial HCI Preserved; WB = VOA Vial Sodium Biaulphate Preserved; NS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Giass; H = HCI preserved Plastic; HS = HCI preserved Plastic; SP = Sulfuric Preserved Plastic; F = EorA Preserved Bottle; SP = Sulfuric Bag for Acid Sulphate Solis; B = Unpreserved Bag; Entry Solid Solid



CERTIFICATE OF ANALYSIS

Work Order	EW2001278	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 11-Mar-2020 16:00
Order number	: 126450	Date Analysis Commenced	: 11-Mar-2020
C-O-C number	:	Issue Date	: 18-Mar-2020 16:32
Sampler	: Glenn Davies		NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS		Accreditation No. 825
No. of samples received	: 6		Accredited for compliance with
No. of samples analysed	: 6		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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 Glenn Davies	Inorganic Chemist Environmental Services Representative	Sydney Inorganics, Smithfield, NSW Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 analysis due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Sampling completed as per EN/67.11 Groundwater Sampling.
- Field tests completed on day of sampling/receipt.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH1C Point 3	BH3 Point 5	BH4 Point 6	BH15 Point 7	BH13 Point 10
	Cli	ient sampli	ng date / time	11-Mar-2020 11:49	11-Mar-2020 11:35	11-Mar-2020 12:52	11-Mar-2020 14:20	11-Mar-2020 13:43
Compound	CAS Number	LOR	Unit	EW2001278-001	EW2001278-002	EW2001278-003	EW2001278-004	EW2001278-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	7.4	5.6	6.5	6.0	6.8
EA010FD: Field Conductivity								
Electrical Conductivity (Non		1	µS/cm	6970	2180	1100	1160	1300
Compensated)								
EA116: Temperature								
Temperature		0.1	°C	27.2	20.1	21.4	19.4	24.1
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	2360	460	294	639	434
Total Alkalinity as CaCO3		1	mg/L	2360	460	294	639	434
ED041G: Sulfate (Turbidimetric) as SC	04 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	86	99	586	125
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	934	328	112	3260	48
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.107	0.050	0.102	0.754	0.087
Iron	7439-89-6	0.05	mg/L	17.3	<0.05	0.46	25.7	<0.05
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	0.1	<0.1	0.2	0.2
EK055G: Ammonia as N by Discrete A	nalyser							
Ammonia as N	7664-41-7	0.01	mg/L	377	32.5	1.77	69.6	0.15
EK057G: Nitrite as N by Discrete Ana	lyser							
Nitrite as N	14797-65-0	0.01	mg/L	0.08	0.05	0.02	0.03	0.06
EK058G: Nitrate as N by Discrete Ana	alvser							
Nitrate as N	14797-55-8	0.01	mg/L	0.26	5.77	0.64	0.09	16.0
EK059G: Nitrite plus Nitrate as N (NO	x) by Discrete Ana	lvser						,
Nitrite + Nitrate as N		0.01	mg/L	0.34	5.82	0.66	0.12	16.1
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon		1	mg/L	167	11	13	145	16
QWI-EN 67.11 Sampling of Groundwa			5					
Standing Water Level		0.01	m AHD	3.26	3.15	4.35	0.75	4.29
etation and a second		0.01		0.20	5.10	4100	00	7.20



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH14 Point 11	 	
	Cl	ient sampli	ng date / time	11-Mar-2020 13:05	 	
Compound	CAS Number	LOR	Unit	EW2001278-006	 	
				Result	 	
EA005FD: Field pH						
рН		0.1	pH Unit	5.8	 	
EA010FD: Field Conductivity						
Electrical Conductivity (Non Compensated)		1	μS/cm	2460	 	
EA116: Temperature						
Temperature		0.1	°C	25.1	 	
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	125	 	
Total Alkalinity as CaCO3		1	mg/L	125	 	
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA					
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	136	 	
ED045G: Chloride by Discrete Analyser						
Chloride	16887-00-6	1	mg/L	115	 	
EG020F: Dissolved Metals by ICP-MS						
Manganese	7439-96-5	0.001	mg/L	0.310	 	
Iron	7439-89-6	0.05	mg/L	0.06	 	
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	0.1	mg/L	0.3	 	
EK055G: Ammonia as N by Discrete Ana	alyser					
Ammonia as N	7664-41-7	0.01	mg/L	0.04	 	
EK057G: Nitrite as N by Discrete Analys	ser					
Nitrite as N	14797-65-0	0.01	mg/L	0.30	 	
EK058G: Nitrate as N by Discrete Analy	ser					
Nitrate as N	14797-55-8	0.01	mg/L	202	 	
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser				
Nitrite + Nitrate as N		0.01	mg/L	202	 	
EP005: Total Organic Carbon (TOC)						
Total Organic Carbon		1	mg/L	49	 	
QWI-EN 67.11 Sampling of Groundwater	rs					
Standing Water Level		0.01	m AHD	4.74	 	

CHAIN OF CUSTODY

ALS Laboratory: please tick ->

(J. Sydney: 277 Woodpark Rd. Smithfield NSW 2176 Ph: 02 8784 8555 Elsamples sydney@alsenviro.com

 Brisbane: 32 Shand St. Stafford OLD 4053
 Ph.07 3243 7222 Eisamples, bisbane@alsenviro.com Ph. G. at one code Lastropes a principal section of the code of 22 de Lastropes a principal section 24 de Lastropes de Lastropes aprincipal section 24 de Lastropes de La

C Melbourne: 2-4 Westall Rol Spring vale VIC 3171 Ph:03 8549 9609 El samples.melbourne@alsenviro.com El Adelaide: 2-* Burna Rd. Pooraka SA 5095
 Ph. 08 8353 0890 Eredeta cergalsenviro.com

□ **Perth** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 El samplas.perth@alsenVro.com De azus roco si samples penngabernato po Launceston: 27 Wellingion St. Launceston TAS 7250 Ph: 03 6331 2158 E. launceston@alizenviro.com

1.1

2.

C				in on appendication designment of Costs	Ph: 03 0331 2155 E. launceston@alsenvire.com
CLIENT: OFFICE:	Shellharbour City Council 41 Burelli St WOLLONGONG NSW 2500	TURNAROUND REQUIR (Standard TAT may be longer (e.g., Ultra Trace Organics)			FOR LABORATORY USE ONLY (Circle)
PROJECT:	Dunmore Quarterly Leachate	ALS QUOTE NO.:	WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)	I she sa isa anta a ta
ORDER NUMBER	R:				receipt? No. IN/A
PROJECT MANA	AGER: Joel Culton				7 Random Sample Temperature on Receipt
SAMPLER:		SAMPLER MOBILE:	RELINQUISHED BY:	OF: 1 2 3 4 5 6 RECEIVED BY:	7 Other comment
COC emailed to A	ALS? (YES / NO)	EDD FORMAT (or default):		RECEIVED BT:	RELINQUISHED BY: RECEIVED BY:
Email Reports to			threte	and	
Email Invoice to :	:		DATE/TIME:	DATE/TIME: 11/3/20 16:45	DATE/TIME: DATE/TIME:
COMMENTS/SPE				10115	

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

ALS USE ONLY	SAM MATRIX	·	CONTAINER INFORMATI	CONTAINER INFORMATION					i must be listed to attract suite price)	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, dilution or samples requiring specific QC analysis etc.
	Leachate Sump	11/3/20	w			~	<u>- 0, 11</u> ✓		-	V ZZ		Field Tests - pH, EC, Temp & DO
	,											
							<u> </u>		<u> </u>	┾──┼		
							<u> </u>					
					+							
		· · · · · · · · · · · · · · · · · · ·			+					_		
							,				Environmental	Division
					_						Wollongong Work Order Re	erence
			_					-			EW200	1324
			_									
	1. The second										Telephone : 02 42253125	
				TOT	10		└─── <u></u>			<u> </u>		·
ter Container Codes: P	= Unpreserved Plastic; N = Nitric Pres	erved Plastic; ORC = Nitric Preser	ved ORC; SH = So	dium Hydroxide/Cd Preserved; S = Sodiu ight Unpreserved Vial SG = Sulfuric Pres Solis; B = Unpreserved Bag.	m Hydroxide Pres	erved Plasti	c; AG = Amber	Glass Unnre	served: AP -	Airfreight Linnroom	mod Plastia	



CERTIFICATE OF ANALYSIS

Work Order	EW2001324	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate	Date Samples Received	: 11-Mar-2020 16:00
Order number	: 126450	Date Analysis Commenced	: 11-Mar-2020
C-O-C number	:	Issue Date	: 17-Mar-2020 16:58
Sampler	: Glenn Davies		IT-Mai-2020 16:58
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Leachate Sump	 	
	Cl	ient sampli	ng date / time	11-Mar-2020 15:25	 	
Compound	CAS Number	LOR	Unit	EW2001324-001	 	
				Result	 	
EA005FD: Field pH						
рН		0.1	pH Unit	7.2	 	
EA010FD: Field Conductivity						
Electrical Conductivity (Non Compensated)		1	µS/cm	12300	 	
EA116: Temperature						
Temperature		0.1	°C	29.0	 	
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	3720	 	
Total Alkalinity as CaCO3		1	mg/L	3720	 	
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA					
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	204	 	
ED045G: Chloride by Discrete Analyser						
Chloride	16887-00-6	1	mg/L	1480	 	
ED093F: Dissolved Major Cations						
Calcium	7440-70-2	1	mg/L	21	 	
Potassium	7440-09-7	1	mg/L	36	 	
EG020T: Total Metals by ICP-MS						
Manganese	7439-96-5	0.001	mg/L	0.616	 	
Iron	7439-89-6	0.05	mg/L	2.74	 	
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	0.1	mg/L	0.4	 	
EK055G: Ammonia as N by Discrete An	alyser					
Ammonia as N	7664-41-7	0.01	mg/L	1000	 	
EK057G: Nitrite as N by Discrete Analy	ser					
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	 	
EK058G: Nitrate as N by Discrete Analy	/ser					
Nitrate as N	14797-55-8	0.01	mg/L	0.12	 	
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser				
Nitrite + Nitrate as N		0.01	mg/L	0.12	 	
EP005: Total Organic Carbon (TOC)						
Total Organic Carbon		1	mg/L	352	 	



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Leachate Sump	 	
	Cl	ient sampli	ing date / time	11-Mar-2020 15:25	 	
Compound	CAS Number	LOR	Unit	EW2001324-001	 	
				Result	 	
EP025FD: Field Dissolved Oxygen						
Dissolved Oxygen		0.01	mg/L	0.17	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	1.9	 	

ALS

 CHAIN OF CUSTODY
 □ Sydney: 277 W0

 Ph: 32 8734 8535 E
 ■ Newcastle: 5 Rc

 ALS Laboratory: please tick →
 □ Newcastle: 5 Rc

Bydney: 277 Woodpaix Rd: Smithield NSW 2176
 Brisbane: 32 Shand St: Stational OLD 4053
 Ph. 02 49734 8535 Examples bribbane@alterivino.com
 Newcastle: 5 Rosegum Rd: Warabrook NSW 2304
 Townsville: 11-15 Desma OL 8016 eQLD 4018
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: Warabrook NSW 2304
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: Warabrook NSW 2304
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: Warabrook NSW 2304
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: Warabrook NSW 2304
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: Warabrook NSW 2304
 Ph.02 4969 4433 Examples newcastles: 6 Rosegum Rd: NSW 2304

Melbourne: 2-4 Westall Rd. Springvale VIC 3171
Ph:03 3549 0600 E: samples.melbourne@alsenviro.com
 Adelaide: 2-1 Burma Rd. Pooraka SA 5065
Ph. 09 8559 0839 Eiacelaide@alsenviro.com

□ Perth: 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7655 E. samples perthigalsenviro.com □ Laurceston: 27 Wallington St. Laurceston TAS 7250 Ph: 09 8331 2158 E. Laurceston@alsenviro.com

1. . .

÷ ,

CLIENT:	Shellharbour City Council	NTS : Standard TAT (List due date)):						FOR LABORAT	ORY USE ONLY	(Circle)			
OFFICE:	41 Burelli St WOLLONGONG NS	V 2500	(Standard TAT may be longer for so e.g., Ultra Trace Organics)	and TAT may be longer for some tests								0	Yes	Na N/A
PROJECT:	Dunmore Quarterly Leachate	EPL	ALS QUOTE NO .:						BER (C	ircie)	Free ice / frozen ici recent?	e bricks present upor	Yee	No N/A
ORDER NUMBER:					coc	1	2	3 4	5	6	7 Random Sample T	emperature on Recei	pt	°C
PROJECT MANAGI	ER: Joel Culton				OF:	1	2	3 4	5	6	7 Other comment	ng pangkatan pangkat Pangkatan pangkatan pa		
SAMPLER:		SAME	LER MOBILE:	RELINQUISHED BY:	REC	EIVED	BY:				RELINQUISHED BY:		RECEIVED B	Y:
COC emailed to AL	.\$? (YES / NO)	EDD	FORMAT (or default):	Anetos	1	1~	C			-				
Email Reports to :				DATE/TIME:	DAT	E/TIME	;				DATE/TIME:		DATE/TIME:	
Email Invoice to :				11/3/20	1	1/3	120	> /	6:4	5				

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W) CONTAINER INFORMATION						SIS REQUIR e Motals are req			Additional Information			
LAB ID			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, ditutions, or samples requiring specific QC analysis etc.
	Leachate Storage Tank - LP1	11/3/20	w			1	1	1	1	1			Field Tests - pH, EC, Temp & DO
			-	·······.									
				·									
<u></u>											En Wo	vironm Silongc Work Or	nental Division ng der Reference 2001325
												EVV	2001325
		-											
											7 eter	ohone - 02	12253125
				······································							1 <u></u>		
			7877 8 -202										
				TOTAL	10								
iv = vua viai hui presarva	P = Unpreserved Plastic; N = Nitric Preserv d; VB = VOA Vial Sodium Bisulphate Preser I Bottle; E = EDTA Preserved Bottles; ST = 5	vod: VS = VOA Vial Sulfuria Brees	$p_{i} = (A) (- i)$	= Sodium Hydroxide/Cd Preserved; S = Sodium Nrfreight Unpreserved Vial SG = Sulfuric Preser ate Soils; B = Unpreserved Bag.	Hydroxide Pre ved Amber GI	ass; H=H0	tic; AG = Amb Cl preserved P	ər Glass Unpr lastic; HS ≭ I	eserved; AP - ICI preserved	Alrfreight Unp Speciation bot	reserved Plastic tle; SP = Sulfuric Preserved	Plastic; F =	Formaldehyde Preserved Glass;



CERTIFICATE OF ANALYSIS

Work Order	EW2001325	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate Tank EPL	Date Samples Received	: 11-Mar-2020 16:00
Order number	: 126450	Date Analysis Commenced	: 11-Mar-2020
C-O-C number	:	Issue Date	: 17-Mar-2020 14:14
Sampler	:		Inc-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received No. of samples analysed	: 1 : 1		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. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Sub-Matrix: WATER (Matrix: WATER)			ent sample ID	Leachate Storage Tank LP1 11-Mar-2020 15:30	 	
			ng date / time			
Compound	CAS Number	LOR	Unit	EW2001325-001	 	
				Result	 	
EA005FD: Field pH		0.4				
рН		0.1	pH Unit	6.9	 	
EA010FD: Field Conductivity						
Electrical Conductivity (Non Compensated)		1	µS/cm	9700	 	
EA116: Temperature						
Temperature		0.1	°C	24.1	 	
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	2710	 	
Total Alkalinity as CaCO3		1	mg/L	2710	 	
ED041G: Sulfate (Turbidimetric) as SO4 :	2- by DA					
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	205	 	
ED045G: Chloride by Discrete Analyser						
Chloride	16887-00-6	1	mg/L	1450	 	
ED093F: Dissolved Major Cations						
Calcium	7440-70-2	1	mg/L	161	 	
Potassium	7440-09-7	1	mg/L	221	 	
EG020T: Total Metals by ICP-MS						
Manganese	7439-96-5	0.001	mg/L	0.657	 	
Iron	7439-89-6	0.05	mg/L	3.26	 	
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	0.1	mg/L	0.3	 	
EK055G: Ammonia as N by Discrete Ana	lyser					
Ammonia as N	7664-41-7	0.01	mg/L	638	 	
EK057G: Nitrite as N by Discrete Analys						
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	 	
EK058G: Nitrate as N by Discrete Analys	ser					
Nitrate as N	14797-55-8	0.01	mg/L	0.86	 	
EK059G: Nitrite plus Nitrate as N (NOx)		lvser				
Nitrite + Nitrate as N		0.01	mg/L	0.86	 	
EP005: Total Organic Carbon (TOC)						



Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		Client sample ID		Client sample ID		Leachate Storage Tank LP1	 	
	Cl	ient sampli	ing date / time	11-Mar-2020 15:30	 	 				
Compound	CAS Number	LOR	Unit	EW2001325-001	 	 				
				Result	 	 				
EP005: Total Organic Carbon (TOC) - Con	tinued									
Total Organic Carbon		1	mg/L	315	 	 				
EP025FD: Field Dissolved Oxygen										
Dissolved Oxygen		0.01	mg/L	2.65	 	 				
Dissolved Oxygen - % Saturation		0.1	% saturation	31.5	 	 				

(ALS)	CHAIN OF CUSTODY ALS Laboratory: please tick →	Ph: 02 C Nev	Iney : 277 Woodpark 18784 8555 Etsample ⊭castle: 5 Rosegum 4968 9433 Etsartiple	es.sydney@alsen Rd. Warabrook N	viro.com Ph:07 3243 7222 E SW 2304 E3 Townsville; 14	.samples.bria 1-15 Desma (sbane@alsenviro Ct. Bohle QLD 48	.com Pt 18 C	h:03 8549 960 Adelaide: 2	2-4 Westall Ro) E: samples.m 1 Burma Rd. F 30 E:adelaide@	elbourne@als ?ooraka SA 509	enviro com 96	 Perth: 10 Ph: 08 9209 7 Launceste Ph: 03 6331 	07.1	Envir	onmental Division ongong ^{k Order Reference} W2001277
IENT:	Shellharbour City Council	*			IND REQUIREMENTS :	□ Stan	Standard TAT (List due date):					FOR	LAB	Wor	k Order Reference	
FICE:	41 Burelli St WOLLONGONG NSW	2500		(Standard TAT e.g., Ultra Trace	may be longer for some tests e Organics)		Standard or ur	gent TAT (Li	ist due date):			Cust	d y Sei	E1	W2001277
OJECT:	Dunmore Quarterly Surface Waters	5 EPL		ALS QUOTE	LS QUOTE NO.: WO/030/19 TENDER					COC SEQL	IENCE NUME	ER (Circle)	Free recel	ce/fr t?		
DER NUMBER:									000	1 2	3 4	56	7 Fland	sin Si		制に別の新作用100
OJECT MANAGER:	Joel Culton								OF:	1 2	3 4	56	7 Other	1515(151)		
MPLER:			SAMPLER N				IISHED BY:		REC	EIVED BY:			n%' INQUI	SHE		
C emailed to ALS?	(YES / NO)		EDD FORMA	T (or default)		17	refg		6	we						
ail Reports to :							15/20	\[. DAT	е/тіме: 1 / 3 / 2 -		16:45	DATE/TIM	: ,	elenhone	02 42253125
ail Invoice to :							13/25	ر ار	1	1/5/2	0 1	22.01			'n	· · · · · · · · · · · · · · · · · · ·
MMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:	CC reports to:													
ALS USE ONLY	SAMPLI MATRIX: So	E DETAILS lid(S) Water((W)	-	CONTAINER INF	ORMATIO	N				-			ited to attract sui	• •	Additional Information
LAB ID	SAMPLE ID	DAT	re / Time	MATRIX	TYPE & PRESERVAT (refer to codes belov		TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity		Comments on likely contaminant levels, dilutions, or samples requiring specific C analysis etc.
	SWP1	11/3/20	- 12:11	w				4	1	\$	1	~				Field Tests - pH
	SWC_2		14-49	w				1			1		1	 ✓ 		Field Tests - pH & Tem
·	SWC_UP		14.55	w				4	1		1	1	1			Field Tests - pH & Tem
	SWC_DOWN		14:58	w				1	1		1	1	1			Field Tests - pH & Tem
	SWC_DOWN_2		15:05	w				1	1		1	1	-			Field Tests - pH & Tem
					-											
· · · ·																
					i					·	-	+				
					<u> </u>											
						-										· ·
				┼───┤─		<u> </u>	-	<u> </u>	-	-					-	
	말했는 것 같은 것 같은 것 같은 것 같이 없는 것 같이 없는 것 같이 없다.					TOTA	10									

Arres 1



CERTIFICATE OF ANALYSIS

Work Order	EW2001277	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 11-Mar-2020 16:00
Order number	: 126450	Date Analysis Commenced	: 11-Mar-2020
C-O-C number	:	Issue Date	: 18-Mar-2020 16:32
Sampler	: Glenn Davies		NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 5		Accredited for compliance with
No. of samples analysed	: 5		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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 Glenn Davies	Inorganic Chemist Environmental Services Representative	Sydney Inorganics, Smithfield, NSW Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.
- EG020: Some samples were diluted and rerun due to matrix interference and LOR's have been raised accordingly. (High Total Dissolved Solids)
- Sampling and Field Tests supplied by ALS Wollongong.
- Sampling completed as per EN/67.6 Rivers and Streams
- 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
	Cli	ient sampli	ng date / time	11-Mar-2020 12:11	11-Mar-2020 14:49	11-Mar-2020 14:55	11-Mar-2020 14:58	11-Mar-2020 15:05
Compound	CAS Number	LOR	Unit	EW2001277-001	EW2001277-002	EW2001277-003	EW2001277-004	EW2001277-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	6.8	7.6	7.6	7.6	7.6
EA025: Total Suspended Solids dried	at 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	36	10	<5	8	160
EA045: Turbidity								
Turbidity		0.1	NTU	9.4		4.7	4.6	51.6
EA116: Temperature								
Temperature		0.1	°C		19.6	22.8	22.4	22.0
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	103	146	128	123	122
Total Alkalinity as CaCO3		1	mg/L	103	146	128	123	122
ED041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8		1450	1570	1830
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	52		9520	10400	11900
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	23		239	256	318
Magnesium	7439-95-4	1	mg/L	8		631	697	832
Sodium	7440-23-5	1	mg/L	31		5280	5760	6950
Potassium	7440-09-7	1	mg/L	12		194	212	247
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	0.90	0.05	0.07	0.06	<0.10
EG020T: Total Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	2.05	0.70	0.48	0.39	10.5
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9 N	0.01	mg/L		0.06	0.04	0.06	0.08
EK057G: Nitrite as N by Discrete Ana	_							
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Ana								
Nitrate as N	14797-55-8	0.01	mg/L		0.02	0.01	0.06	0.01
EK059G: Nitrite plus Nitrate as N (NC								
Nitrite + Nitrate as N	DX) by Discrete Ana	0.01	mg/L		0.02	0.01	0.06	0.01
		0.01			0.02	0.01	0.00	0.01



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
	Cl	ient sampli	ng date / time	11-Mar-2020 12:11	11-Mar-2020 14:49	11-Mar-2020 14:55	11-Mar-2020 14:58	11-Mar-2020 15:05
Compound	CAS Number	LOR	Unit	EW2001277-001	EW2001277-002	EW2001277-003	EW2001277-004	EW2001277-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
Ø Total Anions		0.01	meq/L	3.69		301	328	376
Ø Total Cations		0.01	meq/L	3.46		298	326	393
ø Ionic Balance		0.01	%	3.21		0.47	0.37	2.18

	CHAIN OF CUSTODY ALS Laboratory: please tick →	Sydney: 277 Woodpark Ph: 02 3784 3555 Eisample Newcastle: 5 Rosegum Ph:02 4968 9433 Eisample	es sydney@alse Rd, Warabrook	nviro.com Ph:07 3243 7222 I NSW 2304 Cl Townsville: 1	E.samples.bris 14-15 Desma C	bane@alsenviro. 	com P 18 🗆	Melbourne: h:03 8549 9600 Adelaide: 2- h: 08 8359 089) E: samples.n 1 Burnia Rd. P	ielbourne@als ⁰ coraka SA 50	enviro.com 95	Ph: 08 9209	Hod Way, Malaga V 7655 E: samples.pe ton: 27 Wellington S Environr	erth@alsen St, Launces		2,
CLIENT:	Shellharbour City Council			UND REQUIREMENTS :	Stand	dard TAT (List	due date):						Wollong	ona		
OFFICE:	41 Burelli St WOLLONGONG NSW	2500	(Standard TA e.g., Ultra Tra	F may be longer for some tests ce Organics)	Non :	Standard or urg	gent TAT (L	TAT (List due date):					Work Order Reference			No N/A
PROJECT:	Dunmore Quarterly Surface Waters	i .	ALS QUOT	E NO.: WO/030/19 TEND	ER				COC SEQL	IENCE NUME	BER (Circle)	EW2001			No N/A
ORDER NUMBER:	· · · · · ·							coc:	1 2	34	56	7				· •
PROJECT MANAGER:	Joel Culton					······································	_	OF:	1 2	3 4	56	7			₩ ₩₩ ₩₩₩₩	
SAMPLER:		SAMPLER N	OBILE:		RELINQU	ISHED BY:	· · ·	REC	EIVED BY:			REI				:
OC emailed to ALS? (YES / NO) EDD FORMAT (or default)				t):	$\begin{bmatrix} C \end{bmatrix}$	IDAN		4	an	2						
Email Reports to :		· · · · · · · · · · · · · · · · · · ·			DATE/TIN	lenn 1E:		DAT	E/TIME:			DA		V-RU		
Email Invoice to :				<u> </u>	111	13/20	>	1	е/тіме: 1/3/2	o 16	:65			MQ 11 30 1		
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L: CC reports to:							, ,				Telephone : 0	12 422531	125	
ALS USE ONLY		E DETAILS lid(S) Water(W)		CONTAINER INF	ORMATION	N				-			listed to attract suite		Additional	Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVAT (refer to codes below		TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity		Comments on likely co diutions, or samples re analysis etc.	
	SWP2	11.3.20 12.2	e w				1	1		1	1				Field Te	ests - pH
	SWP4 - Sand Mine Dam	1 12:18	w				1	*	1	~	1				Field Te	ests - pH
	SWP5	0 13:40	w				1	1	1	. イ	1	1	KY		Field Te	ests - pH
					ΤΟΤΑ											
V = VOA Vial HCI Preserve	P = Unpreserved Plastic; N = Nitric Preserve d; VB = VOA Vial Sodium Bisulphate Preserv Bottle; E = EDTA Preserved Bottles; ST = S	/ed; VS = VOA Vial Sulfuric Prese	rved; AV = Airfr	eight Unpreserved Vial SG = Sul	S = Sodium I furic Preserve	Hydroxide Prese ed Amber Glass	rved Plastic; ; H = HCl p	AG = Amber (reserved Plas	Glass Unpres- tic; HS = HCI	erved; AP - Ai preserved Sp	rfreight Unpre eclation bottle	served Plasti ; SP = Sulfur	c ic Preserved Plastic	c; F = For	maldehyde Preserved G	ass;

.

+

-



CERTIFICATE OF ANALYSIS

Work Order	EW2001326	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	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water	Date Samples Received	: 11-Mar-2020 16:00
Order number	: 126450	Date Analysis Commenced	: 11-Mar-2020
C-O-C number	:	Issue Date	: 18-Mar-2020 16:32
Sampler	: Glenn Davies		INATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 3		Accredited for compliance with
No. of samples analysed	: 3		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			SWP2	SWP4 - Sand Mine Dam	SWP5	
	Client sampling date / time			11-Mar-2020 12:26	11-Mar-2020 12:18	11-Mar-2020 13:40	
Compound	CAS Number	LOR	Unit	EW2001326-001	EW2001326-002	EW2001326-003	
				Result	Result	Result	
EA005FD: Field pH							
рН		0.1	pH Unit	7.6	9.0		
EA025: Total Suspended Solids dried a	t 104 ± 2°C						
Suspended Solids (SS)		5	mg/L	6	25		
EA045: Turbidity							
Turbidity		0.1	NTU	3.2	12.6		
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	14	49		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	407	272		
Total Alkalinity as CaCO3		1	mg/L	421	321		
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	181	300		
ED045G: Chloride by Discrete Analyser							
Chloride	16887-00-6	1	mg/L	315	422		
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	72	32		
Magnesium	7439-95-4	1	mg/L	40	55		
Sodium	7440-23-5	1	mg/L	230	329		
Potassium	7440-09-7	1	mg/L	24	18		
EG020F: Dissolved Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05		
EG020T: Total Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	0.10	0.08		
EN055: Ionic Balance							
Ø Total Anions		0.01	meq/L	21.1	24.6		
ø Total Cations		0.01	meq/L	17.5	20.9		
ø Ionic Balance		0.01	%	9.24	8.07		
EN67 PK: Field Tests							
Field Observations		0.01				dry	
EP005: Total Organic Carbon (TOC)							
Total Organic Carbon		1	mg/L		29		
EP030: Biochemical Oxygen Demand (E	3OD)						
Biochemical Oxygen Demand		2	mg/L		4		

BH3 12:20 W ✓ </th <th>ALS)</th> <th>ALS Laboratory: please tick →</th> <th></th> <th>Ph: 02 8784 8565 Etsample Newcastle: 5 Rosegum F Ph:02 4986 9433 Etsamples</th> <th>Rd. Warabrook I .newcastia@als</th> <th>ISW 2304 IC Townsville: enviro.com Ph:07-4796-0600</th> <th>t-t-15 Desma (E∵towns∿lle en</th> <th>Dt. Bohle QLD 4810 //rohmental@alsen.dr</th> <th>B El D.com P</th> <th>03 8399 90001 Adelaide: 2-1 1. 08 8359 0890</th> <th>Burma Rd, P</th> <th></th> <th></th> <th></th> <th>Wellington St. Laur E. launceston@alse</th> <th>ceston TAS 7250 hvirs.com</th> <th></th>	ALS)	ALS Laboratory: please tick →		Ph: 02 8784 8565 Etsample Newcastle: 5 Rosegum F Ph:02 4986 9433 Etsamples	Rd. Warabrook I .newcastia@als	ISW 2304 IC Townsville: enviro.com Ph:07-4796-0600	t-t-15 Desma (E∵towns∿lle en	Dt. Bohle QLD 4810 //rohmental@alsen.dr	B El D.com P	03 8399 90001 Adelaide: 2-1 1. 08 8359 0890	Burma Rd, P				Wellington St. Laur E. launceston@alse	ceston TAS 7250 hvirs.com	
Information Image: Analysis of the constrained of registrial (Link address) Image: Address of the constrained of registrial (Link address) Image: Address of the constrained of registrial (Link address) Image: Address of the constrained of the constrained of registrial (Link address) Image: Address of the constrained of registrial (Link address) Image: Address of the constrained of the constrained of registrial (Link address of registrial		-						•						1202033328	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	ONLY (Circle)	
RDEP. NUMBER: cost 1 2 3 4 6 6 7 2 3 4 6 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 3 4 5 6 7 2 2 3 4 5 6 7 2 2 2 2 2 2 2 2 2 2 2 2 2		41 Bureni St WOLLONGONG NSW 2500 e.g., Ultra Trace O				ce Organics) LI Non Standard or urgent TAT (List o				t due date): Cuscory Seal Tota				eat Intect?	Yes No.		
ROJECT MANAGER: Joid Cultion or 1 2 3 4 5 6 7 MARLER: OUECT MANAGER: Joid Cultion MANULE JE JOIL Join Cultion MATTEX Solid(S) Weath(W) Contrainer INFORMATION MANULES: Solid(S) Weath(W) Contrainer INFORMATION MANULES: Solid(S) Weath(W) Contrainer INFORMATION MANULES: Solid(S) Weath(W)		Dunmore Quarterly Ground W	Vaters EPL		ALS QUUI		USU/19 TEN			r		3 4	5 6	a part in section of the	emple T	Environmental Di	Vision
DATE / IMA: DATE / IMA: <thda:< th=""> DATE / IMA: <th< td=""><td></td><td>R: Joel Culton</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1 2</td><td>3 4</td><td>56</td><td>(Jistor)</td><td>ment</td><td>Wollongong</td><td></td></th<></thda:<>		R: Joel Culton									1 2	3 4	56	(Jistor)	ment	Wollongong	
DATE://WE: DATE://WE: <thdate: th="" we:<=""> DATE://WE: DATE://WE:<td>AMPLER:</td><td></td><td></td><td>SAMPLER M</td><td>OBILE:</td><td></td><td>RELING</td><td>ISHED BY:</td><td></td><td>RECE</td><td>IVED BY:</td><td>•</td><td></td><td>RELINQUISHE</td><td>D BY:</td><td>FW2000</td><td>nce</td></thdate:>	AMPLER:			SAMPLER M	OBILE:		RELING	ISHED BY:		RECE	IVED BY:	•		RELINQUISHE	D BY:	FW2000	nce
DATE / IMA: DATE / IMA: <thda:< th=""> DATE / IMA: <th< td=""><td>OC emailed to ALS</td><td>? (YES / NO)</td><td></td><td>EDD FORMA</td><td>T (or default</td><td>):</td><td></td><td></td><td></td><td>1</td><td>tri</td><td>àn</td><td></td><td></td><td></td><td>LV2002</td><td>118</td></th<></thda:<>	OC emailed to ALS	? (YES / NO)		EDD FORMA	T (or default):				1	tri	àn				L V2002	118
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: C reports to: Assusce outry SAMPLE DETAILS MATRIX: Solid(S) Water(W) C ONTAINER INFORMATION ANALYSIS REQUIRED including SUTTES (NE. Sub-Codes must be lated to atm; When Media are required, trock Total (officed both resured) or Diseword (inc fiberoid) (or Diseword (inc fiberoi											TIME:			DATE/TIME:			
Als USE ONE: SAMPLE DETAILS MATRIX Solid(S) Wate(W) CONTAINER INFORMATION NALYSIS REQUIRED including SUITES (NB. Suble Codes must be laded to diff. Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both With Where Meata are required. specify Teal (unified state required) at bisolwal (led flared both With Where Meata are required. specify Teal (unified state) at the BH10 Date / Time Matrix TYPE & PRESERVATIVE (refer to codes below) To TALL BOTTLES W V						and the second second second	11/1	6/20		117	161	ω_{-}	ii				
MATRIX SOUG) Wile(W) Where Metab are required, sectify Total Lafflered both required) or Descrive (feed flaued both required)		SA	MPLE DE	TAILS		CONTAINER IN	IFORMATIO	N	ANALYS	IS REQUIRI	D includir	IG SUITES (NB. Suite Coo	les must be listed to	o attra		
LAB IDSAMPLE IDDATE / TIMEMATRIXTYPE & PRESERVATIVE (refer to codes below)TOTAL BOTTLES $\frac{10}{1000}$ $\frac{10}{10000}$ $\frac{10}{1000000000000000000000000000000000$		MATRI	A: Solid(S)						Where	Metals are requ	ired, specify To		ottle required) or	Dissolved (field filtere	d botti	elephone 02 42253125	
BH10 17/6/20 (0:35 W V V V V V V V Field Tests - pH, BH3 12:20 W V V V V V V Field Tests - pH, BH4 12:44 W V V V V V V Field Tests - pH, BH9 17/6/20 /0:22 W V V V V V V Field Tests - pH, BH12R 10:43 W V V V V V V Field Tests - pH, BH13 17:08 W V V V V V V Field Tests - pH, BH14 12:30 W V V V V V V Field Tests - pH, BH15 17:00 W V V V V V V V Field Tests - pH, BH15 17:00 W V V V V V V V Field Tests - pH, BH15 17:00 W V V V V V V V V <t< th=""><th>LAB ID</th><th>SAMPLE ID</th><th></th><th>DATE / TIME</th><th>MATRIX</th><th></th><th></th><th></th><th>Ammonia</th><th>NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K</th><th>TOC</th><th>Dissolved Fe & Mn</th><th>NT-4 (NO2, NO3)</th><th></th><th></th><th></th><th></th></t<>	LAB ID	SAMPLE ID		DATE / TIME	MATRIX				Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	Dissolved Fe & Mn	NT-4 (NO2, NO3)				
BH3 $12.2\circ$ W \checkmark <th< td=""><td></td><td>BH1C</td><td>171</td><td>6/20 10:33</td><td>w</td><td></td><td></td><td></td><td>✓</td><td>✓</td><td>*</td><td></td><td>1</td><td></td><td></td><td>Field Tests - pH, EC,</td><td>Temp & S</td></th<>		BH1C	171	6/20 10:33	w				✓	✓	*		1			Field Tests - pH, EC,	Temp & S
BH4 12:44 W Image: Market Marke	· .	BH3		•	w				1	1	✓	1	1			Field Tests - pH, EC,	Temp & S
BH9 17/6/20 /0:22 W Image: Model of the standard state of the state of th		BH4			w				1	1	1	1	~			Field Tests - pH, EC,	Temp & S
BH12R 10:43 W Image: W <td></td> <td>ВН9</td> <td>17</td> <td></td> <td>w</td> <td></td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td></td> <td>Field Tests - pH, EC,</td> <td>Temp & §</td>		ВН9	17		w				1	1	1	1	1			Field Tests - pH, EC,	Temp & §
BH13 11:02 W Image: Margin and Mar		BH12R			w				1	1	1	1	1			Field Tests - pH, EC,	Temp & S
BH14 12:30 W Image: Market with the second seco		BH13			w				1	1	Ý	1	1			Field Tests - pH, EC,	Temp &
BH15 //:00 W Image: W<		BH14		12:30	w				1	1	1	1	1			Field Tests - pH, EC,	Temp &
		BH15		//:00	w				1	1	1	1	1			Field Tests - pH, EC,	Temp &
Image: state of the state		BH19R			w	,			1	1	1	1	1			Field Tests - pH, EC,	Temp &
Image: Second				~													
Image: Second																	
Image: Second																	
	<u> </u>			· ·													
																	
TOTAL 10							τοτι	10									. <u></u>

· · · ·



CERTIFICATE OF ANALYSIS

Work Order	EW2002778	Page	: 1 of 6
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541
Telephone	:	Telephone	Australia NSW Australia : +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 17-Jun-2020 15:09
Order number	: 126450	Date Analysis Commenced	: 17-Jun-2020
C-O-C number	:	Issue Date	: 03-Jul-2020 09:16
Sampler	: Glenn Davies, Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS		Accreditation No. 825
No. of samples received	: 9		Accredited for compliance with
No. of samples analysed	: 9		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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 Contact 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: LOR raised for NOx on samples 1 and 8 due to sample matrix.
- EK057G/EK058G: LOR raised for Nitrite and Nitrate on samples 1 and 8 due to sample matrix.
- ED041G: LOR raised for Sulfate on sample 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.
- Temperature performed by ALS Wollongong via in-house method EA016 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH1C	BH3	BH4	BH9	BH12R
	Cl	ient sampli	ng date / time	17-Jun-2020 10:33	17-Jun-2020 12:20	17-Jun-2020 12:44	17-Jun-2020 10:22	17-Jun-2020 10:48
Compound	CAS Number	LOR	Unit	EW2002778-001	EW2002778-002	EW2002778-003	EW2002778-004	EW2002778-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	6.8	7.5	7.2	6.9	6.8
A010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	μS/cm	6740	1780	2230	4720	2790
EA116: Temperature								
Temperature		0.1	°C	24.5	18.7	18.6	18.3	22.2
D037P: 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	2650	414	640	1530	605
Total Alkalinity as CaCO3		1	mg/L	2650	414	640	1530	605
ED041G: Sulfate (Turbidimetric) as S0	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	95	149	<1	420
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	790	259	293	627	425
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	86	148	221	228	309
Potassium	7440-09-7	1	mg/L	145	32	20	82	66
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.122	0.294	0.244	1.00	0.722
Iron	7439-89-6	0.05	mg/L	12.9	2.98	5.84	8.24	9.06
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 A	Analyser							
Ammonia as N	7664-41-7	0.01	mg/L	131	20.4	6.11	48.6	0.92
EK057G: Nitrite as N by Discrete Ana								
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	0.02	<0.01	0.01	0.05
K058G: Nitrate as N by Discrete Ana								
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	16.9	<0.01	<0.01	1.76
EK059G: Nitrite plus Nitrate as N (NO								
Nitrite + Nitrate as N		0.01	mg/L	<0.10	16.9	<0.01	0.01	1.81
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon		1	mg/L	179	15	21	81	15



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH1C	BH3	BH4	BH9	BH12R
	Cli	ent sampli	ng date / time	17-Jun-2020 10:33	17-Jun-2020 12:20	17-Jun-2020 12:44	17-Jun-2020 10:22	17-Jun-2020 10:48
Compound	CAS Number	LOR	Unit	EW2002778-001	EW2002778-002	EW2002778-003	EW2002778-004	EW2002778-005
				Result	Result	Result	Result	Result
QWI-EN 67.11 Sampling of Groundwaters								
Standing Water Level		0.01	m AHD	3.38	3.15	4.37	2.35	4.42



Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			BH14	BH15	BH19R	
	Ci	ient sampli	ng date / time	17-Jun-2020 11:08	17-Jun-2020 12:30	17-Jun-2020 11:00	17-Jun-2020 12:08	
Compound	CAS Number	LOR	Unit	EW2002778-006	EW2002778-007	EW2002778-008	EW2002778-009	
				Result	Result	Result	Result	
A005FD: Field pH								
pH		0.1	pH Unit	7.2	6.6	6.8	7.3	
A010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	µS/cm	1690	2350	9240	1760	
A116: Temperature								
Temperature		0.1	°C	20.3	20.8	18.1	18.5	
D037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	588	504	690	475	
Total Alkalinity as CaCO3		1	mg/L	588	504	690	475	
D041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	159	122	570	207	
D045G: Chloride by Discrete Analys	ser							
Chloride	16887-00-6	1	mg/L	146	275	2970	236	
D093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	167	173	194	162	
Potassium	7440-09-7	1	mg/L	30	47	632	22	
G020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.192	0.323	0.609	0.138	
Iron	7439-89-6	0.05	mg/L	0.45	<0.05	19.3	1.73	
K040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	0.4	0.2	0.1	
K055G: Ammonia as N by Discrete								
Ammonia as N	7664-41-7	0.01	mg/L	1.13	0.42	60.8	4.23	
K057G: Nitrite as N by Discrete Ana								
Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.05	<0.10	0.01	
		0.01						
K058G: Nitrate as N by Discrete An Nitrate as N	14797-55-8	0.01	mg/L	0.97	61.4	<0.10	0.07	
			ing/c	0.37	01.4	\$0.10	0.07	
K059G: Nitrite plus Nitrate as N (NC Nitrite + Nitrate as N		lyser 0.01	mg/L	0.99	61.4	<0.10	0.08	
		0.01	ing/c	0.99	01.4	NO. 10	0.00	
P005: Total Organic Carbon (TOC)						440	40	
Total Organic Carbon		1	mg/L	23	37	148	18	



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH13	BH14	BH15	BH19R	
	Cli	ent sampli	ng date / time	17-Jun-2020 11:08	17-Jun-2020 12:30	17-Jun-2020 11:00	17-Jun-2020 12:08	
Compound	CAS Number LOR Unit		EW2002778-006	EW2002778-007	EW2002778-008	EW2002778-009		
				Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters								
Standing Water Level		0.01	m AHD	4.40	4.89	0.74	4.64	

ellharbour City Council Burelli St WOLLONGONG NSW 2		CHAIN OF CUSTODY □ Sydney: 277 Woodpark Rd. Smithield NGW 2176 □ Briabane: 32 Shand SL Stafferd QLD 4053 ALS Laboratory: please tick → □ New castle: 5 Resemptines sydney@alsenvino.com Ph 07 3243 7222 Examples.shrisbane@alsenvino.com ALS Laboratory: please tick → □ New castle: 5 Resemptines new castle@alsenvino.com □ Townsville: 14-15 Desamples.shrisbane@alsenvino.com							095 m	El Perth 10 Hod Way, Melage WA 8690 Ph: 06 9209 765 Er samples perth@aleenviro.com El Launceston: ?? Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 El launceston@aleenviro.com					
Buralli St WOLLONGONG NSW 2		TURNAR	OUND REQUIREMENTS :	Standard TAT (Lis	t due date)	FORILABORATOR	YUSEONLY (Circle)								
DUCENI OL MOLLONGONG NOM 2	2500	(Standard TAT may be longer for some tests					e):			Custody Seal Inted?	rian and a state of the state				
Inmore Quarterly Leachate	· · · · ·		QUOTE NO.: WO/030/19 TENDER					UENCE NUM	IBER (Circle		Yes No. http://www.ipon Yes No				
				coo	: 1 2	34	56	and the second se	the second state of the second						
el Culton		1				OF	1 2	34	56	7 Other comment					
	SAMPLER M	OBILE:		RELINQUISHED BY:				:		RELINQUISHED BY:	RECEIVED BY:				
ES / NO)	EDD FORMA	T (or default): Ann Lo				A	NNA	\wedge							
							TE/TIME:	' '		DATE/TIME:	DATE/TIME:				
				17/6/20		r	7161	2D							
NDLING/STORAGE OR DISPOSAL	L: CC reports to:														
ALSUSE ONLY SAMPLE DETAILS MATRIX: Solid(S) Water(W)				CONTAINER INFORMATION				-			Additional Information				
SAMPLE ID	DATE / TIME	MATRIX			Ammonia	NT-2A (Alka, So4, Cl, Fl) Filtered Ca, K	TOC	Total Fe & Mn	NT-4 (NO2, NO3)		Comments on likely contaminant levels, diiu or samples requiring specific QC analysis et				
eachate Storage Tank - LP1	17/6/20 8:40	w			~	✓ – – – – – – – – – – – – – – – – – – –	1	· ·	✓		Field Tests - pH, EC, Temp & I				
											nental Division				
										Work Or	rder Reference 2002776				
										■III ■I Felephone : 02	1471 148 1471 1 148 148 1 14 1 0 4295 21 0 5				
				тотаі. 10							· · · · · · · · · · · · · · · · · · ·				
	IDLING/STORAGE OR DISPOSA SAMPLE ID Achate Storage Tank - LP1	SAMPLER M S / NO) EDD FORMA DDLING/STORAGE OR DISPOSAL: CC reports to: SAMPLE DETALS MATRIX: Solid(S) Water(W) SAMPLE ID DATE / TIME achate Storage Tank - LP1 /////20 Signamed Storage Tank - LP1 /////20 Signamed Storage Tank - LP1 /////20 Signamed Storage Tank - LP1 ////////////////////////////////////	SAMPLER MOBILE: S / NO) EDD FORMAT (or defau IDLING/STORAGE OR DISPOSAL: CC reports to: SAMPLE DETAILS MATRIX: Solid(S) Water(W) SAMPLE ID DATE / TIME MATRIX achate Storage Tank - LP1 17/6/20 8:40 W CONTRACT Storage Tank - LP1 17/6/20 8:40 V CONTRACT Storage Tank - LP1 17/6/20	SAMPLER MOBILE: S / NO) EDD FORMAT (or default): EDD FORMAT (or default): DILING/STORAGE OR DISPOSAL: CC reports to: SAMPLE DETAILS MATRIX: Solid(S) Water(W) CONTAINER INF CONTAINER INF SAMPLE ID DATE / TIME MATRIX: TYPE & PRESERVAT (refer to codes below) achate Storage Tank - LP1 17/6/20 8:400 W Image: Storage Tank - LP1 I	SAMPLER MOBILE: RELINQUISHED BY; S / NO) EDD FORMAT (or default): American Strengther St	SAMPLER MOBILE: RELINQUISHED BY: S / NO) EDD FORMAT (or default): DATE:TIME: //////20 JIDLING/STORAGE OR DISPOSAL: CC reports to: SAMPLE ID DATE / TIME MATRIX CONTAINER INFORMATION AMALL SAMPLE ID DATE / TIME MATRIX TYPE & PRESERVATIVE (refer to codes below) TOTALS Bachate Storage Tank - LP1 //////20 % 40 Bachate Storage Tank - LP1 ///////20 % 40 IDULING/STORAGE OR DISPOSAL: CC reports to: SAMPLE ID DATE / TIME MATRIX TYPE & PRESERVATIVE (refer to codes below) TOTALS Bottler DATE / TIME MATRIX TOTAL Bottler DATE / TIME MATRIX TOTAL Bottler DATE / TIME MATRIX TOTAL Bottler COLSPANE COLSPANE COLSPANE	SAMPLER MOBILE: RELINCUISHED BY: Relincuished BY: Relincuished BY: And the set of the set o	SAMPLE MOBILE: RELINQUISHED BY: RECEIVED BY SAMPLE DD FORMAT (or default): DATE TIME: DATE TIME: DATE TIME: 17/6/20 SAMPLE DETAILS CONTAINER INFORMATION MATRX: Solid(S) Water(W) CONTAINER INFORMATION SAMPLE DETAILS CONTAINER INFORMATION MATRX: Solid(S) Water(W) CONTAINER INFORMATION SAMPLE D DATE / TIME MATRX: Solid(S) Water(W) CONTAINER INFORMATION AMALYSIS REQUIRED Includ SAMPLE D DATE / TIME MATRX: Solid(S) Water(W) TYPE & PRESERVATIVE (roder to code to below) TOTALLS gift (L) (20) 8:40 Y achate Storage Tank - LP1 17/6/20 8:40 III IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SAMPLER MOBILE: RELINQUISHED BY: RECIVED BY: S. / NO) EDD FORMAT (or default):	SAMPLER MOBILE: RELINQUISHED BY: AVAIL (or default): AVAIL (or default): AVAIL (SC (RE) (V) (SC (RE) (V)) AVAIL (or default): AVAIL (SC (RE) (V) (SC (RE) (V)) C (reports to: SAMPLE DETAILS SAMPLE DETAILS SA	SAMPLE NO. RELINQUISING DY: ED FORMAT (or default): DATE // C RELINQUISING DY: AUX // C RECENCE DY: AUX // C RELINQUISING DY: DATE // C DURINGTORAGE OR DISPOSAL: CC reports to: SAMPLE DY: DATE // C DATE // C DATE // C DATE // C SAMPLE D DATE // TAME CONTAINER INFORMATION MALYSIS REQUIRED Including SUTES (NO. State Costs must be lated to create UNIC Society (S) Water (W) DATE // TAME MALYSIS REQUIRED Including SUTES (NO. State Costs must be lated to create UNIC society (S) Water (W) DATE // TAME TYPE & PRESERVATIVE (rafe to codes balow) TYPE & PRESERVATIVE SOCIETY (S) Water				

and the second second



CERTIFICATE OF ANALYSIS

Work Order	EW2002776	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate Tank EPL	Date Samples Received	: 17-Jun-2020 14:53
Order number	: 126450	Date Analysis Commenced	: 17-Jun-2020
C-O-C number	:	Issue Date	: 24-Jun-2020 19:21
Sampler	: Glenn Davies, Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 Contact 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: LOR raised for NOx due to sample matrix.
- EK057G/EK058G: LOR raised for Nitrite and Nitrate 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 EA016 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordace 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.



Sub-Matrix: WATER (Matrix: WATER)			ent sample ID	Leachate Storage Tank LP1 17-Jun-2020 08:40	 	
			ing date / time		 	
Compound	CAS Number	LOR	Unit	EW2002776-001	 	
			Result	 	 	
EA005FD: Field pH		• •				1
рН		0.1	pH Unit	7.6	 	
EA010FD: Field Conductivity						
Electrical Conductivity (Non Compensated)		1	µS/cm	11000	 	
EA116: Temperature						
Temperature		0.1	°C	14.1	 	
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	3010	 	
Total Alkalinity as CaCO3		1	mg/L	3010	 	
ED041G: Sulfate (Turbidimetric) as SO	04 2- by DA					
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<20	 	
ED045G: Chloride by Discrete Analyse	ər					
Chloride	16887-00-6	1	mg/L	2040	 	
ED093F: Dissolved Major Cations						
Calcium	7440-70-2	1	mg/L	230	 	
Potassium	7440-09-7	1	mg/L	190	 	
EG020T: Total Metals by ICP-MS						
Manganese	7439-96-5	0.001	mg/L	0.605	 	
Iron	7439-89-6	0.05	mg/L	0.69	 	
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	0.1	mg/L	0.2	 	
EK055G: Ammonia as N by Discrete A						
Ammonia as N	7664-41-7	0.01	mg/L	59.6	 	
EK057G: Nitrite as N by Discrete Anal						
Nitrite as N	14797-65-0	0.01	mg/L	<0.20	 	
EK058G: Nitrate as N by Discrete Ana						
Nitrate as N	14797-55-8	0.01	mg/L	<0.20	 	
EK059G: Nitrite plus Nitrate as N (NO)						
Nitrite + Nitrate as N	x) by Discrete Ana	0.01	mg/L	<0.20	 	
		0.01	ing, E	-0.20		
EP005: Total Organic Carbon (TOC)						



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			Leachate Storage Tank LP1	 	
	Cl	ient sampli	ing date / time	17-Jun-2020 08:40	 	
Compound	CAS Number	umber LOR Unit		EW2002776-001	 	
				Result	 	
EP005: Total Organic Carbon (TOC) - Con	tinued					
Total Organic Carbon		1	mg/L	309	 	
EP025FD: Field Dissolved Oxygen						
Dissolved Oxygen		0.01	mg/L	7.43	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	73.1	 	

ALS .	

CHAIN OF CUSTODY C) Sydney. 277 Woodpark Rd, Smithfield NSW 2175 Ph. 02 8784 8655 Eisamples sydney@alsenym.com ALS Laboratory: please tick ->

 Brisbane 32 Shand St. Stafford QLD 4053
 Ph/07 3243 7222 Etsamples brisbane Balcanviro.com Newcastle: 5 Rosegum Rd, Waraprook NSW 2304
 Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph 02 4968 9433 E samples rewrestle@alcenviro.com Ph 07 4796 0600 E, twinsulic enviroimental@alsenuro.com

G Melbourne: 2-4 Westall Rd. Spring vale VIC 3171 Ph/03 3549 6660 El samples melbourne@alsenviro.com Cl Adelaide: 2-1 Burma Rd. Peeraka SA 5095 Ph: 08 8359 0890 E an elaider@ alsensiro.com

◯ Perthi 10 Hod Way, Malage WA 6090 Phi 08 9209 7655 Er samples berth@alaenviro.com D Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2155 E. launceston@aisenvire.com

CLIENT:	Shellharbour City Council		TURNAROUND REQUIREMENTS : Standard TAT (List due date):										FOR LABORAT	ORY USE ON	LY (Circle	e)			
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		(Standard TAT may be longe e.g., Ultra Trace Organics)	r for some tests	Non Standard or urgent TAT	(List due date)	c							Custody Seel Intac	o		Yes	No	N/A
PROJECT:	Dunmore Quarterly Leachate		ALS QUOTE NO .:	WO/0	30/19 TENDER		coc	SEQU	ENCE	NUMB	R (C	ircle)		Free ice / frozen ic receipt?	a bricka present	upon	Yes	No	N/A
ORDER NUMBER:						coc:	1	2	3	4	5	6	7	Random Sample T	sinperature on F	tecelpt:		°C	
PROJECT MANAG	ER: Joel Culton			,		OF:	1	2	3	4	5	6	7	Other comment:	8 8 D.H.		1000		d ja sin
SAMPLER:		SAMPLER M	IOBILE:		RELINQUISHED BY:			Ρ̈́ΒΥ:					REL	INQUISHED BY:		REC	EIVED BY:		
COC emailed to AL	LS? (YES / NO)	EDD FORMA	T (or default):		Aneta		A	rr	10										
Email Reports to :	•				DATE/TIME:	DATI	E/TIM	Ę:	;				DAT	E/TIME:		DATI	E/TIME:		
Email Invoice to :				_	17/6/20	1	7	16	h.	\mathcal{O}									

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

ALS USE ONLY		E DETAILS lid(S) Water(W)				SIS REQUIR e Metals are requ		tract suite price) ttle 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, dilution or samples requiring specific QC analysis etc.	15,
	Leachate Sump	17/6/20 8:36	> w			*	1	*	1				Field Tests - pH, EC, Temp & DO	1
						-		- 						_
														_
														-
						-							mental Division	
												Work (Iong Drder Reference	_
		· ·											/2002773	_
									-					-
														-
					1									٦
												Telephone -	02 4 2 2 5 3 1 2 6	
				τοτα										
V = VOA Vial HCI Preserve	P = Unpreserved Plastic; N ≃ Nitric Preser d; VB = VOA Vial Sodium Bisulphate Prese Bottle; E = EDTA Preserved Bottles; ST =	rved: VS = VOA Vial Sulfuric Pres	erved: AV = /	= Sodium Hydroxide/Cd Preserved; S = Sodiur Airfreight Unpreserved Vial SG = Sutfuric Prese tate Soils; B = Unpreserved Bag.	n Hydroxide Pn rved Amber Gi	asarved Plasi lass; H = H0	tic; AG = Amb Cl preserved P	ar Glass Unpr lastic; HS = I	eserved; AP - HCI preserved	Airfreight Unp Speciation bo	reserved Plastic tle; SP = Sulfuric Pre	served Plastic; F =	Formaldehyde Preserved Glass;	



CERTIFICATE OF ANALYSIS

Work Order	EW2002773	Page	: 1 of 4
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 4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate	Date Samples Received	: 17-Jun-2020 15:10
Order number	: 126450	Date Analysis Commenced	: 17-Jun-2020
C-O-C number	:	Issue Date	: 24-Jun-2020 19:21
Sampler	:		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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 Contact 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/EK058G: LOR raised for Nitrite and Nitrate due to sample matrix.
- EK059G: LOR raised for NOx 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 EA016 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordace 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Leachate Sump				
	Cl	ient sampli	ng date / time	17-Jun-2020 08:38				
Compound	CAS Number	LOR	Unit	EW2002773-001				
				Result				
EA005FD: Field pH								
рН		0.1	pH Unit	7.7				
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	µS/cm	12000				
EA116: Temperature								
Temperature		0.1	°C	15.3				
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	3620				
Total Alkalinity as CaCO3		1	mg/L	3620				
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	104				
ED045G: Chloride by Discrete Analyser	•							
Chloride	16887-00-6	1	mg/L	1640				
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	7				
Potassium	7440-09-7	1	mg/L	12				
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.672				
Iron	7439-89-6	0.05	mg/L	1.96				
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.4				
EK055G: Ammonia as N by Discrete An	alyser							
Ammonia as N	7664-41-7	0.01	mg/L	611				
EK057G: Nitrite as N by Discrete Analy	ser							
Nitrite as N	14797-65-0	0.01	mg/L	<0.20				
EK058G: Nitrate as N by Discrete Analy	yser							
Nitrate as N	14797-55-8	0.01	mg/L	<1.00				
EK059G: Nitrite plus Nitrate as N (NOx)) by Discrete Ana	lyser						
Nitrite + Nitrate as N		0.01	mg/L	<1.00				
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon		1	mg/L	238				



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			Leachate Sump	 	
	Client sampling date / time			17-Jun-2020 08:38	 	
Compound	CAS Number LOR Unit		EW2002773-001	 	 	
				Result	 	
EP025FD: Field Dissolved Oxygen						
Dissolved Oxygen		0.01	mg/L	0.35	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	3.5	 	



CHAIN OF CUSTODY

Ph: 02 8784 8555 E:samples.sydney@alsenviro.com ALS Laboratory: please tick >

C Sydney 277 Woodpark Rd. Smithfield NSW 2176 E Brisbane: 32 Shand St Statford OLD 4053 Ph:07 3243 7222 E.samples.brisbane@alsenviro.com C New castle: 5 Rosegum Rd, Warabicok NSW 2304 C Townsville: 14-15 Desma Ct. Boble QLD 4818 Pb:02.4968.9d33 Essamples newcastiz@alsenvin.com Ph 07 4796 0600 E: towarsilla actionmental/Statepuire com C Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com C Adetaide: 2-1 Burma Rd Pooraka SA 5095 Di: 08.8350.0800 Eradelaide@aleanuice.com

🗇 Perth: 10 Hod Way. Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com Launceston: 27 Wellington St, Launceston TAS 7250
 R: 02 6231 2159 E: Jaunceston Galegatic com

			11002-1000 0	2.400 Latorar option	and the state of the		P. TOWARD BUILD	inori ine hensystemistriki	0.501.	1. 90 0455 005	០ ២.១៨៩៩៩៩៩៩ស្ត្	alashino com		Pil. 03 0331	a de la lacinesioniga.	Servino.com	
CLIENT:	Shellharbour City Council				TURNARC	UND REQUIREMENTS :	Stance	dard TAT (List	due date):					FOI	R LABORATORY U	SE ONLY (Circle)	
OFFICE:	41 Burelli St WOLLONGONG NSW	2500		-	(Standard TA e.g., Ultra Tra	T may be longer for some tests ace Organics)	🔲 Non (Standard or urg	ent TAT (LI	st due date):	:				ody Seal Intact?	Yes N	N/A
PROJECT:	Dunmore Quarterly Surface Waters	3		·		TE NO.: WO/030/19 TEND	ER				COC SEQU	ENCE NUMB	ER (Circle)	Free	i cë / inozen icë bricks p Ipr?	vesentupon Yes N	N/A
ORDER NUMBER:										coc:	1 2	34	56	7 Ran	dom Sample Temperati	re on Receipt	
PROJECT MANAGER:	Joel Culton									OF:	1 2	34	56	7 Othe	ar comment:		
SAMPLER:	·····		S	SAMPLER M	OBILE:			ISHED BY:			EIVED BY:			RELINQU	IISHED BY:	RECEIVED BY:	
COC emailed to ALS? (YES / NO)		E	EDD FORMA	T (or defau	(t):] An	eta			Arri	an					
Email Reports to :							DATE/TIME: DATE/TIME:						DATE/TIN	1E:	DATE/TIME:		
Email Invoice to :]] 7/6	,/20			7161	20					
COMMENTS/SPECIAL I	ANDLING/STORAGE OR DISPOSA	NL:	cc	reports to:										·			
ALS USE ONLY	USE ONLY SAMPLE DETAILS MATRIX: Solid(S) Water(W) CONT.					CONTAINER INF	ORMATION	N							listed to attract suite prid	xe) Additional Inform	ation
LAB ID	SAMPLE ID		DATE / T	TIME	MATRIX	TYPE & PRESERVA (refer to codes belo		TOTAL BOTTLES	ISS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity	Comments on likely contaminar dilutions, or samples requiring s analysis etc.	
	SWP2	n	16/20	12:59	w				4	1		1	1			Field Tests - p	Н
	SWP4 - Sand Mine Dam	1		13:15	w				4	1	1	1	1			Field Tests - p	н
	SWP5	1		11:14	w				4	1	1	√	~		DRY	Field Tests - p	Н
														Envir Wolld Wo	ronmental Di ongong ork Order Refer W2002	ence 2774	
							TOTA	10	,								

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

Felephone : 02 42253125

rved Glass;



CERTIFICATE OF ANALYSIS

Work Order	: EW2002774	Page	: 1 of 3
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water	Date Samples Received	: 17-Jun-2020 15:00
Order number	: 126450	Date Analysis Commenced	: 17-Jun-2020
C-O-C number	:	Issue Date	: 24-Jun-2020 19:21
Sampler	: Glenn Davies, Robert DaLio		A STATE STAT
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 3		Accredited for compliance with
No. of samples analysed	: 3		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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 Contact 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.
- Sampling completed by ALS Wollongong in accordace with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	
	Clie	ent sampli	ng date / time	17-Jun-2020 12:59	17-Jun-2020 13:15	17-Jun-2020 11:14	
Compound	CAS Number	LOR	Unit	EW2002774-001	EW2002774-002	EW2002774-003	
				Result	Result	Result	
EA005FD: Field pH							
рН		0.1	pH Unit	7.9	8.1		
EA025: Total Suspended Solids dried at	t 104 ± 2°C						
Suspended Solids (SS)		5	mg/L	7	14		
EA045: Turbidity							
Turbidity		0.1	NTU	1.7	4.6		
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	430	402		
Total Alkalinity as CaCO3		1	mg/L	430	402		
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	180	260		
ED045G: Chloride by Discrete Analyser							
Chloride	16887-00-6	1	mg/L	351	441		
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	87	58		
Magnesium	7439-95-4	1	mg/L	45	64		
Sodium	7440-23-5	1	mg/L	267	365		
Potassium	7440-09-7	1	mg/L	24	18		
EG020F: Dissolved Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05		
EG020T: Total Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	0.08	0.17		
EN055: Ionic Balance							
Ø Total Anions		0.01	meq/L	22.2	25.9		
Ø Total Cations		0.01	meq/L	20.3	24.5		
Ø Ionic Balance		0.01	%	4.63	2.75		
EN67 PK: Field Tests							
Field Observations		0.01				DRY	
EP005: Total Organic Carbon (TOC)							
Total Organic Carbon		1	mg/L		26		
EP030: Biochemical Oxygen Demand (E							
Biochemical Oxygen Demand		2	mg/L		2		
		-			-		



White the second second second

CHAIN OF CUSTODY Sydney. 277 Woodpark Rd. Smithtield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com

ALS Laboratory: please tick ->

Brisbane: 32 Shand St. Stafford OLD 4053. Ph:07 3243 7222 E.samples.brisbane@alserviro.com C Newcastle: 5 Rosegum Rd, Werabrook NSW 2304 Townsville: 14-15 Desma Ct. Bohle GLD 4818 Ph:02 4968 9433 E samples newcastle@alsenvire.com Ph:07_4796_0600 E: townsville.or yronmental@gatsom/ro.com Melbourne: 2-4 Westall Rd, Springvale VIC 317 1 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com Cl Adelaide: 2-1 Burma Bd. Popraka SA 5095 Ph: 08 8359 0890 E;adelaide@alsenviro.com

Perth: 10 Hoxi Way, Malaga WA 6090 Ph: 08 9209 7655 E; samples perth@aisenviro.com C Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@aisenvirc.com

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREN	NENTS : 🔲 Standard TAT (List due dat	e):	FOR LABORATORY USE (NI Y (Circle)
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for s e.g., Ultra Trace Organics)		-	Custody Seal Intact?	Yea No N/A
PROJECT:	Dunmore Quarterly Surface Waters EPL	ALS QUOTE NO .: WO/03		COC SEQUENCE NUMBER (Circl	e) Free ice / trozen ice bricks prese	intupon Yes No N/A
ORDER NUMBER:		•	· · · · ·	coc: 1 2 3 4 5	6 7 Random Sample Temperature o	n Seceral
PROJECT MANAG	ER: Joel Culton			OF: 1 2 3 4 5 (6 7 Other comment:	
SAMPLER:	· · · · · · · · · · · · · · · · · · ·	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY: A	RELINQUISHED BY:	RECEIVED BY:
COC emailed to AL	S? (YES / NO)	EDD FORMAT (or default):	- Aneta	Arrian		[
Email Reports to :			DATE/TIME	DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Invoice to :		······	17/6/20	17/0/20		

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

ALS USE ONLY		E DETAILS lid(S) Water(W)			N							sted to attract suite		Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP1	17/6/20 13:22	w			1	1	1	1					Field Tests - pH
	SWC_2	1 11:30	w			4			1		1	×		Field Tests - pH & Temp
	SWC_UP	11:24	w			1	1		1	1	1		-	Field Tests - pH & Temp
	SWC_DOWN	11:48	w			1	1		1	1	1			Field Tests - pH & Temp
	SWC_DOWN_2	J 11:42	w			1	1		-	1	1			Field Tests - pH & Temp
												Enviror		al Division
												Wollong	gong Order	Reference 002775
Water Container Codes: P V = VOA Vial HCI Preserved	>= Unpreserved Plastic; N = Nitric Preserved ; VB = VOA VIal Sodium Bisulphate Preserved	ed Plastic; ORC = Nitric Preserved ed; VS = VOA Vial Suffinic Preserved	ORC; SH = Sov	ToT/ Jum Hydroxide/Cd Preserved; S = Sodium		ved Plastic;	AG = Amber G	Glass Unprese	erved; AP - Airi	freight Unprese	erved F			

V = VOA Vial Fight Preserved, VB = VOA Vial Solium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Ainfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI 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.

Telephone : 02 42253125



CERTIFICATE OF ANALYSIS

Work Order	EW2002775	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 17-Jun-2020 15:03
Order number	: 126450	Date Analysis Commenced	: 17-Jun-2020
C-O-C number	:	Issue Date	: 26-Jun-2020 16:21
Sampler	: Glenn Davies, Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 5		Accredited for compliance with
No. of samples analysed	: 5		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 Contact 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.
- EG020: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordace with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
	Clie	ent samplii	ng date / time	17-Jun-2020 13:22	17-Jun-2020 11:30	17-Jun-2020 11:24	17-Jun-2020 11:48	17-Jun-2020 11:42
Compound	CAS Number	LOR	Unit	EW2002775-001	EW2002775-002	EW2002775-003	EW2002775-004	EW2002775-005
			-	Result	Result	Result	Result	Result
EA005FD: Field pH								
pH		0.1	pH Unit	7.0	7.2	7.0	7.4	7.3
EA025: Total Suspended Solids dried	at 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	20	11	18	6	10
EA045: Turbidity								
Turbidity		0.1	NTU	3.1		1.9	1.6	1.3
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	133	170	167	162	169
Total Alkalinity as CaCO3		1	mg/L	133	170	167	162	169
ED041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1		2130	2280	2100
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	68		14100	14900	14200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	30		337	356	337
Magnesium	7439-95-4	1	mg/L	12		998	1060	978
Sodium	7440-23-5	1	mg/L	38		8190	8890	8180
Potassium	7440-09-7	1	mg/L	19		287	313	287
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	1.31	<0.10	<0.10	<0.10	<0.10
EG020T: Total Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	2.13	0.24	0.19	<0.10	0.13
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L		1.68	0.34	0.72	0.28
EK057G: Nitrite as N by Discrete Ana								
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete An								
Nitrate as N	14797-55-8	0.01	mg/L		0.05	0.06	0.03	0.04
EK059G: Nitrite plus Nitrate as N (NC								
Nitrite + Nitrate as N		0.01	mg/L		0.05	0.06	0.03	0.04
		0.01				0.00	0.00	0.07
EN055: Ionic Balance Ø Total Anions		0.01	meg/L	4.58		445	471	448
		0.01	iiieq/L	4.00		440	4/1	440



Sub-Matrix: WATER	Client sample ID			SWP1	SWC_2	SWC_UP	SWC_Down	SWC_DOWN_2
(Matrix: WATER)				Point 1	Point 19	Point 20	Point 21	Point 22
	Cli	ent sampliı	ng date / time	17-Jun-2020 13:22	17-Jun-2020 11:30	17-Jun-2020 11:24	17-Jun-2020 11:48	17-Jun-2020 11:42
Compound	CAS Number	LOR	Unit	EW2002775-001	EW2002775-002	EW2002775-003	EW2002775-004	EW2002775-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Cations		0.01	meq/L	4.62		462	500	460
Ø Ionic Balance		0.01	%	0.52		1.88	2.96	1.41

C. Crick and a second

CHAIN OF CUSTODY ALS Laboratory: please tick ->

D Sydney 277 Whedpark Rd, Sm thlieid NSW 2176 Ph. 02 8784 8555 Etsamples.sydney@alsenviro.com

Brisbane, 32 Shand St, Stafford QLD 4063 Ph:07 3243 7222 Etsamples brisbane/@alservice.com The Control Sector 2010 Sec

C Nelbourne, 2-4 Westall Rd. Springvale VIC 3171 Ph:03 8549 5600 E. samples.melbourne@aisenviro.com Adelaida: 2-1 Burna Rd. Pooraka SA 5096 Ph: C8 8359 0890 Eiscelaide@alsenviro.com

🗇 Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: saniples.perth@alserviro.com C Launceston: 27 Wellington St, Launceston TAS 7250 Ph. 03 6331 2158 E: launcestori@alsenviro.com

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENT	S: Standard TAT (List due date):	FOR LABORATORY USE ONLY	Circial	
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some e.g., Ultra Trace Organics)	tests D Non Standard or urgent TAT (List	due date):	Cualody Seel intact?	Yes No N/A
PROJECT:	Dunmore Quarterly Ground Waters EPL		WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon	The second se
ORDER NUMBER	R:		······································	COC: 1 2 3 4 5 6	7 Random Sample Temperature on Recei	
PROJECT MANA	GER: Joel Culton		······································	OF: 1 2 3 4 5 6	7 Other comment:	
SAMPLER:		SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY: RE	ELINQUISHED BY:	RECEIVED BY:
COC emailed to A	ALS?(YES / NO)	EDD FORMAT (or default):	Robert.	Arete		
Email Reports to):		DATE/TIME:		ATE/TIME:	DATE/TIME:
Email Invoice to :	:		159-2 16:2	5 15/9/20		

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

LS USE ONLY		MPLE DETAILS X: Solid(S) Water(W)		CONTAINER INFORMATI	ON						nust be listed to attract suite price) olved (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)		Comments on likely contaminant levels, dilutio or samples requiring specific QC analysis etc.
1	BH1C	15.9.20 11:00	w			1	1	1	1	1		Field Tests - pH, EC, Temp & SW
٤	ВНЗ	13:51	2 W			1	1	1	1	1		Field Tests - pH, EC, Temp & SW
3	BH4	14:42	7 W			1	1	1	4	1		Field Tests - pH, EC, Temp & SW
4	BH9	10:45	w			4	1	1	1	~		Field Tests - pH, EC, Temp & SW
5	BH12R	11:40	> W			1	*	1	1	1		Field Tests - pH, EC, Temp & SV
6	BH13	N:53				1	1	1	1	1		Field Tests - pH, EC, Temp & SV
`	BH14	14:07	w			1	1	1	1	1		Field Tests - pH, EC, Temp & SV
٦	BH15	11.20	w			1	1	1	1	1		Field Tests - pH, EC, Temp & SV
S	BH19R	13:400				1	*	1	1	1		Field Tests - pH, EC, Temp & SV
										Wolloi Wor	onmental Division ngong k Order Reference W200417()
				TOT	AL 10					Telephone	• 02 422E3135	

V = VOA Vial HCI Preserved; VB = VOA Vial Socium Bisulphate Preserved; VS = VOA Vial Socium Pr



CERTIFICATE OF ANALYSIS

Work Order	EW2004170	Page	: 1 of 6
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Groundwaters EPL	Date Samples Received	: 15-Sep-2020 16:33
Order number	: 130985	Date Analysis Commenced	: 15-Sep-2020
C-O-C number	:	Issue Date	25-Sep-2020 15:08
Sampler	: Robert DaLio		125-Sep-2020 15:08
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER GROUNDWATERS		Accreditation No. 825
No. of samples received	: 9		Accredited for compliance with
No. of samples analysed	: 9		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 Contact 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 1 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH1C	BH3	BH4	BH9	BH12R	
	Cl	lient sampli	ng date / time	15-Sep-2020 11:00	15-Sep-2020 13:52	15-Sep-2020 14:48	15-Sep-2020 10:45	15-Sep-2020 11:40	
Compound	CAS Number	LOR	Unit	EW2004170-001	EW2004170-002	EW2004170-003	EW2004170-004	EW2004170-005	
			-	Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH		0.1	pH Unit	7.1	7.0	6.9	7.0	6.7	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)		1	µS/cm	7410	1350	2150	4550	2320	
EA116: Temperature									
Temperature		0.1	°C	25.3	19.1	19.5	20.1	21.4	
•		0.1	0	20.0	10.1	10.0	20.1	21.7	
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	2250	310	674	1640	664	
Total Alkalinity as CaCO3	/ 1-52-3	1	mg/L	2250	310	674	1640	664	
-		•	ilig/E	2200	010	014	1040		
ED041G: Sulfate (Turbidimetric) as So Sulfate as SO4 - Turbidimetric	04 2- by DA 14808-79-8	1	mg/L	<10	100	173	159	200	
		I	IIIg/L	<10	100	175	155	200	
ED045G: Chloride by Discrete Analys Chloride		4		1110	143	304	698	337	
	16887-00-6	1	mg/L	1110	143	304	090	337	
ED093F: Dissolved Major Cations		4				040		004	
Calcium	7440-70-2		mg/L	124	140	218	236	221	
Potassium	7440-09-7	1	mg/L	222	34	19	67	81	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5		mg/L	0.115	0.040	0.241	0.795	0.459	
Iron	7439-89-6	0.05	mg/L	14.9	<0.05	5.54	8.80	4.34	
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 A									
Ammonia as N	7664-41-7	0.01	mg/L	344	10.5	9.04	77.3	4.11	
EK057G: Nitrite as N by Discrete Ana	alyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.06	0.03	0.03	<0.01	
EK058G: Nitrate as N by Discrete An	alyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	27.4	<0.01	<0.01	0.75	
EK059G: Nitrite plus Nitrate as N (NC	() () by Dis <u>crete Ana</u>	lyser _							
Nitrite + Nitrate as N			mg/L	<0.01	27.5	0.03	0.03	0.75	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon		1	mg/L	214	15	23	77	31	



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	BH1C	BH3	BH4	BH9	BH12R
	Cli	ent sampli	ng date / time	15-Sep-2020 11:00	15-Sep-2020 13:52	15-Sep-2020 14:48	15-Sep-2020 10:45	15-Sep-2020 11:40
Compound	CAS Number	LOR	Unit	EW2004170-001	EW2004170-002	EW2004170-003	EW2004170-004	EW2004170-005
				Result	Result	Result	Result	Result
QWI-EN 67.11 Sampling of Groundwaters								
Standing Water Level		0.01	m AHD	2.96	3.01	4.21	2.92	4.15



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	BH13	BH14	BH15	BH19R	
	Cl	lient sampli	ing date / time	15-Sep-2020 11:55	15-Sep-2020 14:07	15-Sep-2020 11:20	15-Sep-2020 13:40	
Compound	CAS Number	LOR	Unit	EW2004170-006	EW2004170-007	EW2004170-008	EW2004170-009	
				Result	Result	Result	Result	
EA005FD: Field pH								
pH		0.1	pH Unit	6.6	5.9	6.9	7.0	
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	µS/cm	1070	1490	8700	1920	
EA116: Temperature								
Temperature		0.1	°C	21.0	21.6	19.2	19.3	
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	310	104	452	436	
Total Alkalinity as CaCO3		1	mg/L	310	104	452	436	
ED041G: Sulfate (Turbidimetric) as S	O4 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	201	499	228	
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	35	76	2690	311	
ED093F: Dissolved Major Cations							<u> </u>	
Calcium	7440-70-2	1	mg/L	148	108	167	156	
Potassium	7440-09-7	1	mg/L	15	88	425	24	
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.088	0.137	0.542	0.127	
Iron	7439-89-6	0.05	mg/L	0.16	0.05	17.1	1.92	
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	0.5	0.2	0.2	
EK055G: Ammonia as N by Discrete /							1	
Ammonia as N	7664-41-7	0.01	mg/L	0.27	0.03	49.5	4.38	
EK057G: Nitrite as N by Discrete Ana			3. –					
Nitrite as N	14797-65-0	0.01	mg/L	0.09	0.63	<0.01	0.04	
		0.01						
EK058G: Nitrate as N by Discrete An Nitrate as N	alyser 14797-55-8	0.01	mg/L	28.1	86.3	<0.01	0.05	
			ing/L	20.1	00.3	50.01	0.00	
EK059G: Nitrite plus Nitrate as N (NC Nitrite + Nitrate as N		0.01	ma/l	28.2	86.9	<0.01	0.09	
		0.01	mg/L	20.2	00.9	NU.U I	0.03	
EP005: Total Organic Carbon (TOC)		4			48	447	00	
Total Organic Carbon		1	mg/L	10	48	117	26	



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH13	BH14	BH15	BH19R	
	Cli	ient sampli	ng date / time	15-Sep-2020 11:55	15-Sep-2020 14:07	15-Sep-2020 11:20	15-Sep-2020 13:40	
Compound	CAS Number LOR Unit		Unit	EW2004170-006	EW2004170-007	EW2004170-008	EW2004170-009	
				Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters								
Standing Water Level		0.01	m AHD	4.12	4.52	0.72	4.55	

CHAIN OF CUSTODY

ALS Laboratory: please tick ->

CI **Sydney:** 277 Woodoark Rd. Gmith/ield NSW 2176 Ph. 02 8784 8555 E samples sydney@arsenvird com

Cl. Brisbane: 32 Shand St. Stafford QLD 4053 Ph:07 3243 7222 Etsamples birsbane@alservirg.com Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
 D Townsville: 14-15 Desma Ct, Bohle QLD 4918
 Ph 02 4608 94-33 E campies.newcastle@ciservino.com
 Ph 07 4798 0500 E townsville animotomenie@ciservino.com

Cl. Melbourne 2-4 Westell Rd, Spangtale VIC 3171 Ph:03 8549 9600 E: samples,melbourne@alsenviro.com Adelaide: 2-1 Burma Rd, Pubraka SA 5096
 Phr 08 6359 0690 Eradelaide@alsanviro.com

C Perth. 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com C 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 e.g., Ultra Trace Organics)	for some tests	D Non Standard or urge	nt TAT (List due	date):	:						8	Custody Seel Intar	ardalar ing kataké di	The local of the late	Yes	No	NZA
PROJECT:	Dunmore Quarterly Leachate		ALS QUOTE NO .:	WO/0	30/19 TENDER			coc	SEQUE	NCE N	UMBEI	۲ (Circ	:le)		Free ice <i>i f</i> rozen ic receipt?	e bricks present	upon 👌 🗧	Yes	No	N/A
ORDER NUMBER	k						coc:	1	2	3	4	5	6	7	Random Sample 1	emperature on F	leceipt:		°C	
PROJECT MANAG	GER: Joel Culton						OF;	1	2	3	4	5	6	7	Other comment:			MP 1		
SAMPLER:		SAMPLER N	MOBILE:		RELINQUISHED BY:		RECI	EIVEQ	BY:				F	RELIN	QUISHED BY:		RECE	EIVED BY:		
COC emailed to A	ALS? (YES / NO)	EDD FORM	AT (or default):		Poket.		A	ne	J-9											
Email Reports to	:				DATE/TIME:		DATE						1	DATE	TIME:		DATE	E/TIME:		
Email Invoice to :	· · · · · · · · · · · · · · · · · · ·				115.9.20	16:20	F	15	191	25										

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

ALS USE ONLY		E DETAILS lid(S) Water(W)		CONTAINER INFORMATIO	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).										
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 Sump	15.9.2 8:45	, w			1	1	1	1	~			Field Tests - pH, EC, Temp & DO						
									Ł.										
				-				Ε - \	Environ Mollone	mental 10ng	Division								
								_ '	Work (Order Re	14173								
······	٠								EV	v200	14175	:							
										W 7, W 1,		L							
					-														
								L											
									(elephone -	02 422531	25								
·								<u> </u>	ł										
······································																			
				TOTA	10														
				: Sodium Hydroxide/Cd Preserved; S ⇒ Sodiu	m Hydroxide Pre														
V = VOA Vial HCI Preserve Z = Zinc Acetate Preserved	d; VB = VOA Vial Sodium Bisulphate Prese Bottle; E = EDTA Preserved Bottles; ST ≠	rved; VS = VOA Vial Sulfuric Prea Sterile Bottle; ASS = Plastic Bag	erved; AV = A for Acid Sulpha	irfreight Unpreserved Vial SG = Sulfuric Prese ate Soils; B = Unpreserved Bag.	erved Amber G	lass; H = H	CI preserved Pi	astic; HS =	HCI preserved	d Speciation b	ottle; SP = Sulfuric P	reserved Plastic; F =	= Formaldehyde Preserved Glass;						



CERTIFICATE OF ANALYSIS

Work Order	EW2004173	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	: Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate	Date Samples Received	: 15-Sep-2020 16:37
Order number	: 130985	Date Analysis Commenced	: 15-Sep-2020
C-O-C number	:	Issue Date	22-Sep-2020 08:48
Sampler	: Robert DaLio		NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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 Contact 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: LOR raised for NOx due to sample matrix.
- EK057G: LOR raised for Nitrite 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.
- 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 accordace 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.



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			Leachate Sump				
	Client sampling date / time			15-Sep-2020 08:45				
Compound	d CAS Number LOR Unit		EW2004173-001					
				Result				
EA005FD: Field pH								
рН		0.1	pH Unit	7.7				
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)		1	µS/cm	11200				
EA116: Temperature								
Temperature		0.1	°C	18.0				
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	3640				
Total Alkalinity as CaCO3		1	mg/L	3640				
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	250				
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	1430				
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	178				
Potassium	7440-09-7	1	mg/L	258				
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.424				
Iron	7439-89-6	0.05	mg/L	1.59				
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.5				
EK055G: Ammonia as N by Discrete An	alyser							
Ammonia as N	7664-41-7	0.01	mg/L	734				
EK057G: Nitrite as N by Discrete Analy	ser							
Nitrite as N	14797-65-0	0.01	mg/L	<0.10				
EK058G: Nitrate as N by Discrete Analy	/ser							
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	557				



Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			Leachate Sump	 	
	Cl	ient sampli	ing date / time	15-Sep-2020 08:45	 	
Compound	CAS Number	LOR	Unit	EW2004173-001	 	
				Result	 	
EP025FD: Field Dissolved Oxygen						
Dissolved Oxygen		0.01	mg/L	0.13	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	1.4	 	



CHAIN OF CUSTODY C Sydney: 277 Woodpark Rd, Grathfield NSW 2178 Ph. 02 8784 8555 Eisampleo.sydney@alcenviro.com ALS Laboratory: please tick →

Brisbane: 32 Shand St. Stafford QLD 4053 Ph 07 3243 7222 Etsamples birsbane@alseriviro.com Newsastie: 5 Roseguni Rd. Warabrook NSW 2301
 Newsastie: 5 Roseguni Rd. Warabrook NSW 2301
 Drownsville: 14-15 Decria CL. Bonie OLD 4818
 Ph02 4948 9433 E samales reveastle@bisearvirg.com
 Ph07 4750 050 E: samales marginentel@bisearvirg.com

D Melbourne: 2-4 Westall Rd. Springsale VIC 3171 Ph:03 8649 9800 E: semples.melbourne@alsenvic.com D Adelaide: 2-1 Burma Rd. Pooraka SA 6095 Ph 08 5359 0890 Eladelaide@alcanviro.com

El Perth. 10 Hod Way. Malaga WA 6090 Ph: 08 9209 7665 E: camples.perth@alsenviro.com E Laungeston: 27 Wellington St. Laungeston TAS 7250 Ph. 03 6331 2155 El launceston@alsenviro.com

(Standard TAT may be low												FOR LABORATORY USE ONLY (Circle)			ic Be			
			le.d., Ultra Trace Organics)						Custody Seal Int	and share a state			No	N/A				
PROJECT: Dunmore Quarterly Leachate ALS QUOTE NO.: WO/030				0/030/19 TENDER	30/19 TENDER COC SEQUENCE NUMBER (Circle))	Free Ice / frozen receipt?	ice bricks pres	ent upon	Yes	- No (,)	N/A	
ORDER NUMBER:						coc:	1	2	3	45	6	7	Random Sample	Temporature o	on Receip	C. State State	.	
PROJECT MANAGER:	: Joel Culton					OF:	1	2	3	45	6	7	Other comment:		, Trisca			
SAMPLER:		SAMPLER MOBILE:		RELINQUISHED BY:		RECI	EIVED	BY:				RELI	NQUISHED BY	:		RECEIVED BY		
COC emailed to ALS?	(YES / NO)	EDD FORMAT (or default		- Post.			4n	et	5									
Email Reports to :				DATE/TIME:		DATE	E/TIME:	a	,			DATE	E/TIME:			DATE/TIME:		
Email invoice to :				15.9.0	16:25	1	5/	9/2	20									

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

ALS USE ONLY	Y 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.
1	Leachate Storage Tank - LP1	15.9. 8 8:3	> w			1	1	*	1	1				Field Tests - pH, EC, Temp & DO
													. ,	
				····						ا ا - ا		 untrol Div	deien	· · · · · · · · · · · · · · · · · · ·
										Env Wol	longor	ental Div Ng	//5/011	
									<u> </u>	· W		ng ler Refere 2004	^{nce} 172	
				. <u></u>						L	_ ~ ~ 2	_00		·
											N, V		Į.	
														·
										relep	hone : 02	42253125		
				тот/										
V = VOA Vial HCI Preservi	ater 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 Plastic; N = Nitric Preserved Plastic; F = Formaldehyde Preserved Glass; + YQA Vial HCI Preserved; VB = VQA 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 Plastic; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.													



Work Order	EW2004172	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	: LAMERTON HOUSE, LAMERTON CRESCENT	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Leachate Tank EPL	Date Samples Received	: 15-Sep-2020 16:37
Order number	: 130985	Date Analysis Commenced	: 15-Sep-2020
C-O-C number	:	Issue Date	22-Sep-2020 08:47
Sampler	: Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER LEACHATE		Accreditation No. 825
No. of samples received	: 1		Accredited for compliance with
No. of samples analysed	: 1		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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 Contact 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: LOR raised for NOx due to sample matrix.
- EK057G: LOR raised for Nitrite 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.
- 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 accordace 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.



Sub-Matrix: WATER (Matrix: WATER)			ent sample ID	Leachate Storage Tank LP1 15-Sep-2020 08:30	 	
		LOR	Unit	EW2004172-001		
Compound	CAS Number	LUR	Unit		 	
				Result	 	
EA005FD: Field pH pH		0.1	pH Unit	7.8	 	
		0.1	prionit	7.0		
EA010FD: Field Conductivity		1	µS/cm	12200		
Electrical Conductivity (Non Compensated)		1	µ3/cm	12200	 	
EA116: Temperature						
Temperature		0.1	°C	18.0	 	
-		0.1	9			
ED037P: Alkalinity by PC Titrator Hydroxide Alkalinity as CaCO3	DMO 040 004	1	mg/L	<1	 	
Carbonate Alkalinity as CaCO3	DMO-210-001 3812-32-6	1	mg/L	<1	 	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4420	 	
Total Alkalinity as CaCO3	71-52-3	1	mg/L	4420	 	
-		• •	mg/E			
ED041G: Sulfate (Turbidimetric) as SO4 Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	252	 	
		Г	ilig/E	232		
ED045G: Chloride by Discrete Analyser Chloride		1	ma/l	1560		
	16887-00-6	I	mg/L	1500	 	
ED093F: Dissolved Major Cations		1		4=4		
Calcium	7440-70-2	1	mg/L	174	 	
Potassium	7440-09-7	1	mg/L	279	 	
EG020T: Total Metals by ICP-MS		0.001				
Manganese	7439-96-5	0.001	mg/L	0.457	 	
Iron	7439-89-6	0.05	mg/L	1.29	 	
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	0.1	mg/L	0.5	 	
EK055G: Ammonia as N by Discrete An						
Ammonia as N	7664-41-7	0.01	mg/L	887	 	
EK057G: Nitrite as N by Discrete Analy	ser					
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	 	
EK058G: Nitrate as N by Discrete Analy	vser					
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	 	
EK059G: Nitrite plus Nitrate as N (NOx)	by Discrete Ana	lyser				
Nitrite + Nitrate as N		0.01	mg/L	<0.10	 	
EP005: Total Organic Carbon (TOC)						



Sub-Matrix: WATER (Matrix: WATER)		Cli	ent sample ID	Leachate Storage Tank LP1	 	
	Cl	ient sampli	ing date / time	15-Sep-2020 08:30	 	
Compound	CAS Number	LOR	Unit	EW2004172-001	 	
				Result	 	
EP005: Total Organic Carbon (TOC) - Con	tinued					
Total Organic Carbon		1	mg/L	577	 	
EP025FD: Field Dissolved Oxygen						
Dissolved Oxygen		0.01	mg/L	0.06	 	
Dissolved Oxygen - % Saturation		0.1	% saturation	0.6	 	

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 SL Stafford OLD 4053 Ph:07 3243 7222 E:samples.bisbane@alsenviro.com Newcastle: 5 Rosegum Rd. Warabrook NSW 2304
 Townsville: 14-15 Desma Ct. Bohle QLD 4818 Ph/02 4968 9433 E samples newcastle@alsenviro.com Ph:07 4796 0600 E; jowdsville environmental@alservice.com

C Melbourne: 2-4 Westall Rd. Springvale VIC 3171 Ph:03 8549 9660 E: samples.meibourne@alsenviro.com CI Adetaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 Eadelaide@alsenviro.com

C Perth: 19 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E; samples.perth@alsenviro.com C 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 ONL	Y (Circle)
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some te e.g., Ultra Trace Organics)	tandard TAT may be longer for some tests g. Ultra Trace Organics) INon Standard or urgent TAT (List								Custody Seal Intact?	Yes Na N/A
PROJECT:	Dunmore Quarterly Surface Waters	ALS QUOTE NO .: WO/030/19 T	ALS QUOTE NO.: WO/030/19 TENDER				ENCE N	UMBE	R (Circi	e)	Free ice / frozen ice bricks present up	ion Yes No N/A
ORDER NUMBER:				cc	ic: 1	2	3	4	5 €	7	Random Sample Temperature on Re	ceipt
PROJECT MANAG	ER: Joel Culton			0	F: 1	2	3	4	56	i 7	Other comment:	
SAMPLER:		SAMPLER MOBILE:	RELINQUISHED BY: 16:2	RE	CEIVE	D BY:				REL	INQUISHED BY:	RECEIVED BY:
COC emailed to AL	LS? (YES / NO)	EDD FORMAT (or default):	Obut.		A	re	L-g					
Email Reports to :	· · ·		DATE/TIME:	DA	TE/TIN					DAT	E/TIME:	DATE/TIME:
Email Invoice to :			15.9.2. 14:2	5.	(5	19	12	Ð				

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

		lid(S) Water(W)		CONTAINER INFORMATION			SIS REQUIR		Additional Information					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3	Alkalinity		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	SWP2	15.9.00 14:3	~ "			4	1		1	~				Field Tests - pH
٤	SWP4 - Sand Mine Dam	153	y w			1	1	1	1	1				Field Tests - pH
	SWP5	1 12:4	- w			1	1	*	1	1				Field Tests - pH
	,													
	= Unpreserved Plastic; N = Nitric Preserve			TO						Wa	vironme ollongon Work Ord EW2	g er Refere	nce	

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Ainfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Spe Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Work Order	EW2004174	Page	: 1 of 3
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia, NGW Australia
Telephone	:	Telephone	Australia NSW Australia : +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water	Date Samples Received	: 15-Sep-2020 16:36
Order number	: 130985	Date Analysis Commenced	15-Sep-2020
C-O-C number	:	Issue Date	22-Sep-2020 15:05
Sampler	: Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 3		Accredited for compliance with
No. of samples analysed	: 3		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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 Contact 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.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordace 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	
	Clie	ent samplii	ng date / time	15-Sep-2020 14:30	15-Sep-2020 15:30	15-Sep-2020 12:10	
Compound	CAS Number	LOR	Unit	EW2004174-001	EW2004174-002	EW2004174-003	
			-	Result	Result	Result	
EA005FD: Field pH							
рН		0.1	pH Unit	7.7	8.0		
EA025: Total Suspended Solids dried at	t 104 ± 2°C						
Suspended Solids (SS)		5	mg/L	10	8		
EA045: Turbidity							
Turbidity		0.1	NTU	26.7	2.0		
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	6		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	634	339		
Total Alkalinity as CaCO3		1	mg/L	634	345		
ED041G: Sulfate (Turbidimetric) as SO4	2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	280	275		
ED045G: Chloride by Discrete Analyser							
Chloride	16887-00-6	1	mg/L	438	441		
ED093F: Dissolved Major Cations							
Calcium	7440-70-2	1	mg/L	143	54		
Magnesium	7439-95-4	1	mg/L	57	55		
Sodium	7440-23-5	1	mg/L	317	320		
Potassium	7440-09-7	1	mg/L	29	15		
EG020F: Dissolved Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	0.20	<0.05		
EG020T: Total Metals by ICP-MS							
Iron	7439-89-6	0.05	mg/L	0.52	0.18		
EN055: Ionic Balance							
Ø Total Anions		0.01	meq/L	30.8	25.0		
Ø Total Cations		0.01	meq/L	26.4	21.5		
ø Ionic Balance		0.01	%	7.86	7.59		
EN67 PK: Field Tests							
Field Observations		0.01				DRY	
EP005: Total Organic Carbon (TOC)							
Total Organic Carbon		1	mg/L		39		
EP030: Biochemical Oxygen Demand (E	BOD)						
Biochemical Oxygen Demand		2	mg/L		<2		



Work Order	EW2004176	Page	: 1 of 4
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	LAMERTON HOUSE, LAMERTON CRESCENT	Address	1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Quarterly Surface Water EPL	Date Samples Received	: 15-Sep-2020 16:34
Order number	: 130985	Date Analysis Commenced	15-Sep-2020
C-O-C number	:	Issue Date	22-Sep-2020 18:18
Sampler	: Robert DaLio		IC MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER SURFACE WATER		Accreditation No. 825
No. of samples received	: 5		Accredited for compliance with
No. of samples analysed	: 5		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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 Contact 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.
- Sampling completed by ALS Wollongong in accordace with in-house sampling method EN/67.6 Rivers and Streams.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordace 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.



Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
	Clie	ent sampli	ng date / time	15-Sep-2020 15:35	15-Sep-2020 12:35	15-Sep-2020 12:25	15-Sep-2020 13:00	15-Sep-2020 12:50
Compound	CAS Number	LOR	Unit	EW2004176-001	EW2004176-002	EW2004176-003	EW2004176-004	EW2004176-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
рН		0.1	pH Unit	7.2	7.5	7.2	7.4	7.5
EA025: Total Suspended Solids dried	at 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	12	8	18	15	12
EA045: Turbidity								
Turbidity		0.1	NTU	1.2		3.3	3.2	4.3
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	368	131	175	161	146
Total Alkalinity as CaCO3		1	mg/L	368	131	175	161	146
ED041G: Sulfate (Turbidimetric) as S0	04 2- by DA							
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	240		1940	1670	838
ED045G: Chloride by Discrete Analys	er							
Chloride	16887-00-6	1	mg/L	357		12700	11200	6410
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	60		287	270	163
Magnesium	7439-95-4	1	mg/L	49		726	674	366
Sodium	7440-23-5	1	mg/L	282		6160	5690	3080
Potassium	7440-09-7	1	mg/L	16		220	206	113
EG020F: Dissolved Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	0.40	0.10	0.11	0.07	0.08
EG020T: Total Metals by ICP-MS								
Iron	7439-89-6	0.05	mg/L	2.30	0.49	0.40	0.33	0.35
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L		0.77	0.60	0.57	0.38
EK057G: Nitrite as N by Discrete Ana	lyser							
Nitrite as N	14797-65-0	0.01	mg/L		0.01	0.01	<0.01	0.01
EK058G: Nitrate as N by Discrete Ana	alyser							
Nitrate as N	14797-55-8	0.01	mg/L		0.37	0.12	0.15	0.27
EK059G: Nitrite plus Nitrate as N (NO		vser						
Nitrite + Nitrate as N		0.01	mg/L		0.38	0.13	0.15	0.28
EN055: Ionic Balance								
Ø Total Anions		0.01	meq/L	22.4		402	354	201
					1			



Sub-Matrix: WATER		Clie	ent sample ID	SWP1	SWC_2	SWC_UP	SWC_Down	SWC_DOWN_2
(Matrix: WATER)				Point 1	Point 19	Point 20	Point 21	Point 22
	Cli	ent samplii	ng date / time	15-Sep-2020 15:35	15-Sep-2020 12:35	15-Sep-2020 12:25	15-Sep-2020 13:00	15-Sep-2020 12:50
Compound	CAS Number	LOR	Unit	EW2004176-001	EW2004176-002	EW2004176-003	EW2004176-004	EW2004176-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Cations		0.01	meq/L	19.7		348	322	175
Ø Ionic Balance		0.01	%	6.45		7.27	4.77	6.93



Appendix C

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

(ALS)	CHAIN OF CUSTODY ALS Laboratory: please tick →	❑ Sydney, 277 Woodpark Ph: 02 8784 8555 Ersampl □ Newcastle: 5 Rosegum Ph:02 4968 9433 Ersample	es sydney@als Rd. Warabrool	enviro.com Ph:07 3243 7222 E (NSW 2304	Esamples.brish 4-15 Desma Ct	ane@alsonviro.c , Bohle QLD 481	om Ph:03 3 CLA	8549 9600 delaide: 2-) Et samples.n 1 Burma Rd, F	, Springvale VI elbourne@alse ooraka SA 509 jaisenviro com	enviro, com 15	Ph: 08 9209 76	od Way, Malaga 355 E: samples r n: 27 Wellington 158 E: launcesto	perth@alsenvi St, Launcesto	n TAS 7250
CLIENT:	Shellharbour City Council		TURNARO	OUND REQUIREMENTS :	Stand	ard TAT (List (lue date):					FOR	LABORATO	RY USE ON	ILY (Circle)
OFFICE:	Dunmore		(Standard TA	T may be longer for some tests acc Organics)	Non S	standard or urg	ent TAT (List	due date)):			2.2483883	dy Seal Intact?		Yes No N/A
PROJECT:	Dunmore Dust			TE NO.: WO/030/19 TEND	ER				COC SEQU	IENCE NUME	ER (Circle)	Free k	xe / frozen lixe b r?	ricks present	^{upon} Yas No N/A
ORDER NUMBER:							· · · · ·	coc:	1 2	34	56	7 Rando	m Sample Tem	perature on F	Receipt: C
PROJECT MANAGER:	Joel Culton							OF:	1 2	34	56	7 Other	comment:		
SAMPLER:		SAMPLER	NOBILE:		RELINQUI	SHED BY:		REC	EIVED BY:			RELINQUIS	SHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)	EDD FORM	AT (or defau	lt):	Ane	fa		A	wrig	3					
Email Reports to 🗄					DATE/TIM				E/TIME:			DATE/TIME	:		DATE/TIME:
Email Invoice to :					16/1	20		14	5/1/2	0					
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	AL: CC reports to	:												
ALS USE ONLY		E DETAILS blid(S) Water(W)		CONTAINER INF	ORMATION	I				-			ted to attract su filtered bottle requ		Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo		TOTAL BOTTLES	A04 (Ash, CM, TIS)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	DDG1	11/12/19-16/	1/2 AIR				4								
. 2	DDG2	, , , , ,	AIR				1				Er	vironm	ental Div	/ision	
3	DDG3		AIR	• • • •			1				† w	Ollongor Work Ore	ig Iar Bofore		
ч	DDG4		AIR				~					EW2	er Referen 2000	231	
											-				
		· · · · · · · · · · · · · · · · · · ·									_ Telep	hone : ()2 42	253125		
					,										
Water Container Codes:	P = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Plastic; N	red Plastic; ORC = Nitric Preserv	ed ORC; SH =	Sodium Hydroxide/Cd Preserved;	TOTA S = Sodium H	Hydroxide Prese	rved Plastic; AC	G = Amber	Glass Unpre	ierved; AP - A	irfreight Unpre	served Plastic	Processed Plac		naldabuda Processiad Glass:

Water Comainer Codes: P = Unpreserved Plastic; N = Nutric Preserved Plastic; V = Nutric Preserved Plastic; V = Vox Vial Sulprase Veal, V = Vox Vial Sulprase Veal, V = Vox Vial Sulfuric Preserved Vial SG = Sulfuric Prese



Work Order	EW2000231	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 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 16-Jan-2020 15:57
Order number	: 126450	Date Analysis Commenced	: 20-Jan-2020
C-O-C number	:	Issue Date	: 04-Feb-2020 09:31
Sampler	: Glenn Davies		HAC-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		Accreditation No. 825
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW



The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.
- Sample exposure period is 36 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)		Cli	ent sample ID	DDG1 11/12/19 - 16/01/20	DDG2 11/12/19 - 16/01/20	DDG3 11/12/19 - 16/01/20	DDG4 11/12/19 - 16/01/20	
	Cl	ient sampli	ng date / time	16-Jan-2020 14:15	16-Jan-2020 14:00	16-Jan-2020 14:10	16-Jan-2020 14:22	
Compound	CAS Number	LOR	Unit	EW2000231-001	EW2000231-002	EW2000231-003	EW2000231-004	
				Result	Result	Result	Result	
EA120: Ash Content								
Ash Content		0.1	g/m².month	5.6	3.9	6.2	3.6	
Ash Content (mg)		1	mg	119	82	132	132 77	
EA125: Combustible Matter								
Combustible Matter		0.1	g/m².month	1.8	0.8	1.5	0.8	
Combustible Matter (mg)		1	mg	37	18	32	17	
EA141: Total Insoluble Matter								
Total Insoluble Matter		0.1	g/m².month	7.4	4.7	7.7	4.4	
Total Insoluble Matter (mg)		1	mg	156	100	164	94	



CHAIN OF CUSTODY

ALS Laboratory: please tick →

El Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Phr 02 8784 8555 Etsamples.sydney@alserwira.com Brisbane 32 Shand St. Stafford QLD 4053 Ph:97 3243 7222 E:samples.brisbane@alsonviro.com Dewcastle: 5 Roseguin Rd, Warabrook NSW 2304
 Ph/02 4968 9433 Ersamples.newcastle@alsenviro.com D Townsville: 14-15 Desma Ct Boble QLD 4818 Ph/07 4796 0600 E: townsylie environmental@aisenvro.com

Cl. Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsemira.com I Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 06 8359 0890 Eradeiaide@alsenviro.com

□ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E; samples perth@alsenviro.com C Launceston: 27 Wellington St. Launcesion TAS 7250 Ph; 03 6331 2158 E: launuceton@alsenviro.com

1. 2

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMEN	NTS: 🛛 Standard TAT (List due date):		FOR LABORATORY USE O	
OFFICE:	Dunmore	(Standard TAT may be longer for son e.g., Ultra Trace Organics)	ne tests 🛛 🔲 Non Standard or urgent TAT i	(List due date):		Custody Seal Intect?	Yes No N/A
PROJECT:	Dunmore Dust	ALS QUOTE NO.: WO/030/1	9 TENDER	COC SEQUENCE NUME	BER (Circle)	Free ice / frozen ice bricks presen receipt?	tupon Yes No NA
ORDER NUMBER	R:			coc: 1 2 3 4	567	Random Sample Temperature on	Receipt
PROJECT MANA	GER: Joel Culton			OF: 1 2 3 4	567	Other comment:	
SAMPLER:		SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:	REL	LINQUISHED BY:	RECEIVED BY:
COC emailed to A	ALS? (YES / NO)	EDD FORMAT (or default):	Glenn	an			2
Emall Reports to	:		DATE/TIME:	DATE/TIME:	6:45 DAT	TE/TIME:	DATE/TIME:
Email Invoice to :				11/3/20 l	NE		

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

ALS USE ONLY		E DETAILS lid(S) Water(W)		CONTAINER INFORMATION			SIS REQUIRED includ	-				Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)				ivironment	al Divi	
	DDG1	10.3.20 11:00				4				Ollongong Work Order	Reference	
	DDG2	1 /1:10	AIR			1				EW20	1012	
	DDG3	10:54	AIR			1					ý ilite	
	DDG4	J 11:30	AIR			*			 	phone - 02 42250	114 114 1125	
Water Container Codes:	L P=Unoreserved Plastic: N = Nitric Preserv	ed Plastic: ORC = Nitric Preserved	L IORC: SH =	TOTAL Sodium Hydroxide/Cd Preserved; S = Sodium H		erved Plastic	AG = Amber Glass Unpre	served; AP - Airf	freight Unpreserved Pla	stic		
V - VOA Vial HCI Preserve	d; VB = VOA Vial Sodium Bisulphate Preserv Bottle: E = EDTA Preserved Bottles; ST = S	ved: VS = VOA Vial Sulfuric Presen	ved: AV = Air	freight Unpreserved Vial SG = Sulfuric Preserved	Amber Glas	s; H = HCl	preserved Plastic; HS = H0	C preserved Spe	ciation bottle; SP = Sul	furic Preserved Plas	tic; F = Form	naldehyde Preserved .

ENEM204



Work Order	EW2001273	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	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541
			Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 09-Mar-2020 16:18
Order number	: 126450	Date Analysis Commenced	: 13-Mar-2020
C-O-C number	:	Issue Date	: 18-Mar-2020 16:31
Sampler	:		INATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		Accreditation No. 825
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

• Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)			ent sample ID	DDG1 11/02/2020 - 10/03/2020 10-Mar-2020 11:00	DDG2 11/02/2020 - 10/03/2020 10-Mar-2020 11:10	DDG3 11/02/2020 - 10/03/2020 10-Mar-2020 10:54	DDG4 11/02/2020 - 10/03/2020 10-Mar-2020 11:30	
Compound	CAS Number	LOR	Unit	EW2001273-001	EW2001273-002	EW2001273-003	EW2001273-004	
				Result	Result	Result	Result	
EA120: Ash Content								
Ash Content		0.1	g/m².month	0.7	0.4	0.6	1.3	
Ash Content (mg)		1	mg	12	7	10	21	
EA125: Combustible Matter								
Combustible Matter		0.1	g/m².month	0.5	0.3	1.2	0.6	
Combustible Matter (mg)		1	mg	8	5	20	10	
EA141: Total Insoluble Matter								
Total Insoluble Matter		0.1	g/m².month	1.2	0.7	1.8	1.9	
Total Insoluble Matter (mg)		1	mg	20	12	30	31	

D Perth: 10 Hod Way, Malaga WA 6090 CHAIN OF CUSTODY C Sydney: 277 Woodpark Rd Smithfield NSW 2176 Brisbane: 32 Shand St. Stafford QLD 4053 Melbourne: 2-4 Westall Rd. Springvale VIC 3171. Phr 02 8784 8555 Etsamplas.svdnev@alsenviro.com Ph 07 3243 7222 E samples brisbane@alsonviro.com Ph:03 8549 9600 E. samples melbourne@alserviro.com Ph: 08 9209 7655 E; samples.perth@alsenviro.com C Newcastle: 5 Roserum Bd Warahrook NSW 2304 Townsville: 14-15 Desma Ct. Bobie QLD 4818 C Adelaide: 2-1 Burma Rd. Pooraka SA 5095 CI Launceston: 27 Wellington St. Launceston TAS 7250 ALS Laboratory: please fick > Ph/02 4968 9433 Ersamples newcastle@alserviro.com Ph 07 4796 0600 E: townsville environmental@alsenviro.com Ph: 08 8359 0890 E adelaide@atsenviro.com Ph: 03 6331 2158 E: launcesion@alsenviro.com EOR LABORATORY USE ONLY (Circle) CHENT Shellharbour City Council TURNAROUND REQUIREMENTS : Standard TAT (List due date): (Standard TAT may be longer for some tests Oustody Seal Intac/? OFFICE Non Standard or urgent TAT (List due date): Dunmore e.g., Ultra Trace Organics) Free ice / frozen ice bricks present upor COC SEQUENCE NUMBER (Circle) ALS QUOTE NO.: WO/030/19 TENDER PROJECT: Dunmore Dust acalat? Random Sample Temperature on Receipt 2 3 4 5 6 7 ORDER NUMBER: coc: 1 OF 4 2 3 ٨ 5 8 7 Other comment: PROJECT MANAGER: Joel Culton RELINQUISHED BY: RECEIVED BY: RELINQUISHED BY: RECEIVED BY: SAMPLER MOBILE: SAMPLER: Aneta DATE/TIME: 17/6/20 Aman COC emailed to ALS? (YES / NO) EDD FORMAT (or default): DATE/TIME: DATE/TIME: DATE/TIME: Email Reports to : M16/20 Email Invoice to COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to: ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) SAMPLE DETAILS Additional information CONTAINER INFORMATION ALS USE ONLY MATRIX: Solid(S) Water(W) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). Comments on likely contaminant levels. dilutions, or samples requiring specific QC analysis etc. TIS) TYPE & PRESERVATIVE TOTAL LABID SAMPLE ID DATE / TIME MATRIX сÑ, BOTTLES (refer to codes below) A04 (Ash) 9:27 1 AIR DDG1 17/6/20 Environmental Division Wollongong 1 DDG2 AIR 4.20 Work Order Reference EW2002772 1 DDG3 12:53 AIR 1 8:18 DDG4 AIR 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 Sulturic Preserved; VS = VOA Vial Sulturic Preserved; VI = Airfreight Unpreserved Plastic; AS = Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved; VS = VOA Vial Sulturic Preserved; VS = VOA Vial Sulturi

TOTAL

10



Work Order	EW2002772	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 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 17-Jun-2020 15:04
Order number	: 126450	Date Analysis Commenced	: 19-Jun-2020
C-O-C number	:	Issue Date	: 25-Jun-2020 11:26
Sampler	: Glenn Davies, Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		Accreditation No. 825
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Joel Mullarvey	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



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 Contact 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.

- Sample exposure period is 33 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)	Cl		ent sample ID	DDG1 15/05/2020 - 17/06/2020 17-Jun-2020 09:27	DDG2 15/05/2020 - 17/06/2020 17-Jun-2020 09:20	DDG3 15/05/2020 - 17/06/2020 17-Jun-2020 12:53	DDG4 15/05/2020 - 17/06/2020 17-Jun-2020 08:18	
Compound	CAS Number	LOR	Unit	EW2002772-001	EW2002772-002	EW2002772-003	EW2002772-004	
				Result	Result	Result	Result	
EA120: Ash Content								
Ash Content		0.1	g/m².month	0.3	0.3	0.4	1.6	
Ash Content (mg)		1	mg	6	5	8	32	
EA125: Combustible Matter								
Combustible Matter		0.1	g/m².month	0.3	0.1	0.4	0.8	
Combustible Matter (mg)		1	mg	5	3	8	15	
EA141: Total Insoluble Matter								
Total Insoluble Matter		0.1	g/m².month	0.6	0.4	0.8	2.4	
Total Insoluble Matter (mg)		1	mg	11	8	16	47	



CHAIN OF CUSTODY ALS Laboratory: place tick

E Sydney: 277 Woodpark Rd. Smithfield NSW 2176 Disbane. 32 Shand SL Stafford QLD 4053 Ph: 02 8784 8555 Etsamples.svdney@alsenviro.com Ph:07.3243.7222 Eisamples.brisbane@alsenviro.com Newcastle: 5 Rosemp Rd. Warstrock NSW 2304
 D. Teurs Blue 14 45 Common Common

II Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@atserviro.com

🗇 Perth: 10 Hod Way. Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com

(ALS)		Ph:02 4968 9433 E:sampl	es.newcastleg	ijalsenviro.com Ph 07 4796 0600 i	E: townsville environm	ionie ULU 48 mental@aisenvi	18 LLA ro.com Phil	Adelaide: 08 8359 0	2-1 Burma Rd 890 Etadelaide	, Pooraka 5 @alsenviro	A 5095 3.com		Ci Launcestor Ph: 03 6331 21	: 27 Weilington St. I58 E. launceston@	. Launcesto Walsenvio	on TAS 7250 com
CLIENT:	Shellharbour City Council		TURNA	ROUND REQUIREMENTS :	Standard	d TAT (List	due date):							ABORATORY		
OFFICE:	Dunmore		(Standard	TAT may be longer for some tests Trace Organics)	Non Star			due dat	e).				1000	y Seal Infact?	USEUR	· · · · · · · · · · · · · · · · · · ·
PROJECT:	Dunmore Dust	······		OTE NO.: WO/030/19 TEND					COC SEG		UMBER	(Circle)	Freeic	: / frozen ice brick	ks present	Yes No N/A upon
ORDER NUMBER:								co				5 6	receipt	n Sample Temper	y	NA NO
PROJECT MANAGER:	Joel Culton			······································						3		5 5 5	2111	omment.	adure un r	ecept G
SAMPLER:		SAMPLER	MOBILE:		RELINQUISH	IED BY;		RE	CEIVED BY	:			RELINQUIS			RECEIVED BY:
COC emailed to ALS?	(YES / NO)	EDD FORM	AT (or defa	ult):	1 Rub	-4-	,		Ane	ha						
Email Reports to :					DATE/TIME:				TE/TIME;	, ,			DATE/TIME:			DATE/TIME: ·
Email Invoice to :				,	15.9.1	<u>~</u> .	16:3	~~	15/3	ho						
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	AL: CC reports to	:						- [
						-									·	
ALS USE ONLY		E DETAILS blid(S) Water(W)		CONTAINER INF	ORMATION									d to attract suite p		Additional Information
							Where Me	talsare re	quired, specify 1	otai (unfilte	red bottle	no (beriuper	Dissolved (field fi	Itered bottle required	d).	Additional anormation
																Comments on likely contaminant levels, tilutions, or samples requiring specific QC
					_			ļ						analysis etc.		
LAB ID	0.4 M (2) = 1=	-														
LABID	SAMPLE ID	DATE / TIME	MATRIX	(refer to codes below		OTTLES	С,									
							(Ash, (
							₹,									
·········		· · · · · · · · · · · · · · · · · · ·					A04							ł	1	
	DDG1	15920 9:20	AIR			T	1							tal Divisio		·······
	DDG2						-			-		Wo	longong	Reference		······
		9:50					•		-			V E)0417	77	
	DDG3	14:21	AIR				~			1			20020	JU417	11	
	DDG4	1 7:35	* AIR				~								181	·
		P (
																· · · · · · · · · · · · · · · · · · ·
•••••.												ĩ elep	hone : 02 422	53126		·
			<u> </u>				—									· · · · · · · · · · · · · · · · · · ·
	· · · · · · · · · · · · · · · · · · ·		<u> </u>													

TOTAL

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; VS

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;

10

ENFM204



Work Order	EW2004177	Page	: 1 of 2
Client	SHELLHARBOUR CITY COUNCIL	Laboratory	Environmental Division NSW South Coast
Contact	: Joel Coulton	Contact	: Aneta Prosaroski
Address	ELAMERTON HOUSE, LAMERTON CRESCENT SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529	Address	 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Dust	Date Samples Received	: 15-Sep-2020 16:31
Order number	: 130985	Date Analysis Commenced	17-Sep-2020
C-O-C number	:	Issue Date	24-Sep-2020 13:37
Sampler	: Robert DaLio		Iac-MRA NATA
Site	: DUNMORE LANDFILL TENDER		
Quote number	: WO/030/19 TENDER DUST		Accreditation No. 825
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW



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 Contact 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.

• Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)	Cl		ent sample ID	DDG1 14/08/2020 - 15/09/2020 15-Sep-2020 09:28	DDG2 14/08/2020 - 15/09/2020 15-Sep-2020 09:50	DDG3 14/08/2020 - 15/09/2020 15-Sep-2020 14:21	DDG4 14/08/2020 - 15/09/2020 15-Sep-2020 07:35	
Compound	CAS Number	LOR	Unit	EW2004177-001	EW2004177-002	EW2004177-003	EW2004177-004	
				Result	Result	Result	Result	
EA120: Ash Content								
Ash Content		0.1	g/m².month	0.2	0.2	0.6	1.9	
Ash Content (mg)		1	mg	3	3	12	36	
EA125: Combustible Matter								
Combustible Matter		0.1	g/m².month	<0.1	<0.1	0.5	0.8	
Combustible Matter (mg)		1	mg	1	1	8	14	
EA141: Total Insoluble Matter								
Total Insoluble Matter		0.1	g/m².month	0.2	0.2	1.1	2.7	
Total Insoluble Matter (mg)		1	mg	4	4	20	50	



Appendix D

Surface Gas (Methane) Field Sheets

LIENT:	Shellharbour City Council	[] Newcastle: 5 Rose Ph.02 4069 9433 €:se	impies, rewcastle.ĝ	alsenviro.com Ph:07-4796-0600 E townsvill	stenend OLD 455 brisbane@alcenv na Ct, Bohle QLD eleminonmental@alac	4818 🖂		o 2™ wesair su, springval 00 E' samples.metbourne@ 2×1 Burma Rd. Popraka SA 890 E'adelaide@alsenviro.c		samples.perth@ali	Senviro.com
FFICE:	41 Burelli St WOLLONGONG			OUND REQUIREMENTS : S	tandard TAT (Li						
ROJECT:	Dunmore Quarterly Methane		e.g., Ultra T		on Standard or u		st due dete	a (·			ONLY (Circle)
RDER NUMBER:		esting	ALS QUO	VTE NO.: WO/030/19 TE	NDER			COC SEQUENCE NU	Custody Sea	l Infact? zen loe bricks pre	Yes No
ROJECT MANAGER	e Joel Culton							r	receipty	and the state of the	Yes No
WPLER:							0F;		CHERREN CONTRACTOR CONTRACTOR	ple Temperat ure	on Receipt
DC emailed to ALS			R MOBILE:	RELIN	QUISHED BY:			EIVED BY:	4 5 6 7 Other comm		
ail Reports to :		EDD FOR	MAT (or defau	lt):	lenn			theta	RELINQUISHED	BY:	RECEIVED BY:
all Invoice to :				DATE	IME:		1	E/TIME:			
				(A	lizh	1	~	41249	DATE/TIME:		DATE/TIME:
MMENIS/SPECIAI	HANDLING/STORAGE OR DISP	OSAL: CC reports	to:					11010	de		
ALS USE ONLY		PLE DETAILS						11/12/19			_
	MATRIA	Solid(S) Water(W)		CONTAINER INFORMATI	ON			ED including SUITES	(NB. Suite Codes must be listed to at	tract suite price)	
			+			Where M	ietalis are requ	uired, specify Totai (unfiltered	bottle required) or Dissolved (field filtered bo	(tle required).	Additional Information
lab id	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	8 2 5					Comments on likely contaminant levels, dilut or samples requiring specific QC analysis etc
	Methane	19/12/19				Surface Methane Testing					
			++				1				
									Environmental Di	vision	·
									Environmente		
					++				Work Order Refer	ence	
			+						Wollongong Work Order Refer	5569	
					++				anne 191 mill 🕂 Killer 🐂 👫		
			+		+						
			<u> </u>								
-											
										i, i panazari tra	
			├ - 			_			Telephone - 02 42253125		
									-	. 1	
					╆╼╼╆						
			╞╼╶╶┤╼								
			<u> </u>				T			┿╼╸╁	
					┼──┼-						
					┼──┼─						
		+	┣───┤──							<u> </u>	
										+ - +	
					├			·			
				The second s				I T		+ - +	
				TOTAL	10		-+-			┾╾──┼	
ontainer Codes: P=	Unpreserved Plastic; N = Nitric Preser /B = VOA Vial Sodium Bisulphate Prese ttle; E = EDTA Preserved Bottles; ST =	ved Plastic: OPC - Nik-								1	

			ALS Lan	dfill Emissions Re	port
ient: te:	Shellharbour City C Dunmore	Council		Date: Sampler(s)	11/12/2019 Glenn Davies, Aneta Prosaroski
<i>u.</i>	Samore		1	Gampion(G)	
Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
	A 1	6168 375 6168 344	302 461 302 464	1.8	
	A 3		302 463	8.6	
	A 4	6168 310	302 458	2.1	
	A 5	6168 289	302 455	1.7	
	A 6	6168 266	302 453	2.2	
	A 7 A 8	6168 242 6168 221	302 450 302 440	1.9	
				1.0	
	в 1	6168 059	302 419	1.6	
	в 2	6168 084	302 420	2.1	
	в 3	6168 117	302 423	2.1	
	в 4 в 5	6168 138 6168 164	302 423 302 430	2.1	
	в 6	6168 188	302 430	1.7	
	в 7	6168 210	302 437	1.4	
	в 8	6168 230	302 431	1.2	
	B 9		302 434	2.1	
	B 10 B 11		302 443 302 443	1.8 1.5	
	C 1 C 2	6168 338 6168 314	302 393 302 401	1.5	
	c 2	6168 277	302 401	1.6	
	c 4	6168 256	302 413	1.5	
	C 5 C 6	6168 235 6168 213	302 414 302 414	1.7	
	с 7		302 414	1.2	
	с 8 с 9		302 410	1.1	
			302 406 302 404	1.1 0.9	
	C 11		302 401	1.4	
	C 12 C 13		302 398 302 396	1.2	
	1				
	D 1		302 376	1.6	
	D 2 D 3		302 373 302 369	1.7	
		6168 127	302 367	2.0	
	D 5 D 6		302 374 302 365	1.7	
	D 7		302 365	1.5	
	D 8		302 370	1.3	
	D 9	6168 246	302 373	1.5	
	E 1	6168 249	302 347	1.4	
	E 2 E 3		302 344	1.4	
	E 3		302 342 302 344	1.6	
	E 5	6168 167	302 343	1.5	
	E 6 E 7		302 346 302 355	1.5	
	E 8		302 355	1.6	
	E 9 E 10		302 365 302 366	1.8	
	- 10	0100 00/	302 300	1.8	
	F 1	6168 154	302 315	1.7	
	F 2		302 214 302 213	1.4	
	F 3		302 213	1.5	
	F 5	6168 239	302 300	1.5	
	F 6	6168 253	302 297	1.2	
ite Offices				3.2	
andfill Weighbridge (General					
ublic) evolve Centre				3.1 3.8	
esalable area				1.2	
andfill Weighbridge (Tip Face)				1.2	
Nethane Blank (Pre testing) Nethane Blank (Post testing)				1.3	Taken at entrance to Dunmore site before main gate Taken at entrance to Dunmore site before main gate
	1			riz.	U
comments:					
		ntal Guidelines Solid Waste Li	another Necond Edition 2		

ALS

CHAIN OF CUSTODY Sydney: 277 Woodpark Rd. Smithfield NSW 2176 ALS Laboratory: please tick > Newcastle: 5 Roseguin Rd. Warsbrook NSW 2304

Sydney: 277 Woodpark Rd. Smithfield NSW 2176
 Ph 02 8794 8535 Esamples sydneygelsammo.com
 Newcastle: 5 Rosegum Rd. Warabrook NSW 2304
 Townsville: 14-15 Desma Cd, Bohle OLD 4818
 Ph:02 4065 9433 Esamples rewcastlegilsammo.com

Melbourne, 2-4 Westali Rd, Springvele VIC 3171
 Ph.03 8519 2600 E: samples.melbourne@alsenviro.com
 Adelaide: 2-1 Burma Rd. Poorska SA 5095
 Ph. 08 9350 0880 Estatelise/@alsenviro.com

D Perth: 10 Hod Way, Malaga WA 6090 Ph. 08 9205 7655 E: samples.perth@alcenviro.com D Launceston: 27 Weilington St. Launceston TAS 7250 Ph: 39 6351 2158 E: launceston@alcenviro.com

CLIENT:	Shellharbour City Council		TURNAROUND REQUIR	TURNAROUND REQUIREMENTS : Standard TAT (List due date);											Y (Circle)		teri kenti	10
OFFICE:	41 Burelli St WOLLONGONG NSW 2500		(Standard TAT may be longer for some tests e.g Ultra Trace Organics) IN Non Standard or urgent TAT (List due date):											iad?	Ye Ye	a N	o N/	A -
PROJECT:	Dunmore Quarterly Methane Testing		ALS QUOTE NO .:	WO/0	30/19 TENDER		COC	EQUEN		BER ((Circle)	Free ice / froze	foe bricks present i	noon _{Ye}	. .	o	Á.
ORDER NUMBER:						COC:	1	2	3 4	5	6	7	Random Samp	• Temperature on R	eceipt:	°c		
PROJECT MANAG	ER: Joel Culton	·				OF:	1	2	3 4	5	6	7	Other comment					
SAMPLER:		SAMPLER M	MOBILE:		RELINQUISHED BY:	REC	EIVED	BY:				RELI	NQUISHED B	/:	RECEIV	ED BY:		1000
COC emailed to Al	LS? (YES / NO)	EDD FORM	AT (or default):		Mana	A	nn	Le,										
Email Reports to				-	DATE/TIME:	DATE	ETIME	in.				DATE	E/TIME:		DATE/TI	ME:		
Email Invoice to :					10/3/20	11	Øľ	31	20	١								

+

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W) CONTAINER IN				ION ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite private the second									Additional Information		
						Where	Metals are req	lired, specify To	otal (unfiltered b	ottle required) o	Dissolved (field	filtered bottle req	uired).			
LAB ID	SAMPLEID	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	10/3/20	w			~	1									
				· · · · · · · · · · · · · · · · · · ·												
								- E	Nollons Work EV	mental gong Order R V20	Divisio eference 014	59				
									i èlehara.				<u>.</u>			
		· · · · · · · · · · · · · · · · · · ·														
				· · · · · · · · ·			<u> </u>									
	and the second states of th															
Water Container Codes: F	P = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Plastic; N = Nitric Preserved Plastic; N = Nitric Plastic	ed Plastic; ORC = Nitric Preserv	ed ORC; SH =	TOTAL Sodium Hydroxide/Cd Preserved; S = Socium	10 Hydroxide Pre	serveri Placti	c: AG = Ămba	r Glass Lippr	eservert' AP -	Airfreight : In	presented Pice					
V = VOA Vial HCI Preserved Z = Zinc Acetate Preserved	t; VB = VOA Vial Sodium Bisulphate Preser Bottle; E = EDTA Preserved Bottles; ST = 5	ved; VS = VOA Vial Sulfuric Pres Sterile Bottle; ASS = Plastic Bag	served; AV = Air for Acid Sulpha	freight Unpreserved Vial SG = Sulfuric Preser te Soils; B = Unpreserved Bag.	ved Amber Gi	ass; H = HC	preserved Pl	astic; HS = H	ICI preserved	Speciation b	ottle; SP = Sul	furic Preservec	Plastic; F =	Formaldehyde Preserved Glass;		

No.	Challbacks 07 C	-3		D .	10/03/2020
Client: Site:	Shellharbour City Coun Dunmore	CII		Date: Sampler(s)	1003/2020 Glenn Davies, Aneta Prosaroski
Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
	A 1	6168 326	302 461	2.4	
	A 2	6168 309	302 457	3.0	
	А 3	6168 3291	302 455	2.5	
	A 4	6168 268	302 445	2.4	
	A 5	6168 250	302 453	3.5	
	A 6	6168 232	302 448	3.9	
	A 7	6168 217	302 441	2.9	
	A 8	6168 196	302 434	2.5	
	B 1	6168 328	302 455	2.5	
	B 2	6168 311	302 465	2.3	
	B 3	6168 289	302 438	2.2	
	B 4	6168 272	302 439	2.3	
	B 5	6168 259	302 439	2.4	
	B 6	6168 249	302 439 302 438	2.6 3.7	
	- /	6168 234	302 438	3.7 6.0	
	B 9	6168 222 6168 206	302 435	2.6	
	B 10	6168 195	302 432	2.6	
	C 1	6168 25	302 392	2.7	
	c 2 c 3	6168 52	302 399	3.0	
	C 3 C 4	6168 94 6168 124	302 404 302 409	2.5 2.4	
	C 5	6168 176	302 415	2.3	
	C 6	6168 209	302 417	2.1	
	c 7	6168 257	302 413	2.1	
	C 8	6168 302	302 406	2.1	
	C 9 C 10	6168 355 6168 408	302 391 302 376	2.2	
	C 11	6168 422	302 371	2.3	
	C 12	6168 440	302 367	2.3	
	C 13	6168 469	302 371	2.4	
	D 1	0400.000	000.000		
	D 1	6168 232 6168 217	302 389 302 385	2.4	
	D 3	6168 195	302 384	2.5	
	D 4	6168 163	302 392	2.8	
	D 5	6168 128	302 395	2.5	
	D 6 D 7	6168 110 6168 100	302 391 302 392	2.4	
	D 8	6168 086	302 392	2.4 2.3	
	D 9	6168 063	302 384	2.2	
	E 1	6168 066	302 380	2.0	
	E 2 E 3	6168 076 6168 083	302 379 302 380	2.1	
	E 3	6168 083	302 380	2.2	
	E 5	6168 102	302 377	2.4	
	E 6	6168 125	302 368	2.2	
	E 7	6168 144	302 355	2.6	
	E 8	6168 177	302 339	2.6	
	E 9 E 10	6168 200 6168 225	302 335 302 331	3.8 2.6	
			·		a
	F 1	6168 098	302 361	1.7	
	F 2	6168 117	302 357	1.4	
	F 3	6168 149	302 343	1.5	
	F 4	6168 177	302 327	1.4	
	5	6168 200	302 317	1.5	
	F 6	6168 218	302 314	1.2	
	G 2	6169 450	202.252		
	G 2 G 3	6168 459 6168 438	302 352 302 320	2.1	
	G 4	6168 415	302 285	2.2	
	G 5	6168 406	302 252	2.3	
			1	1	

ike Offices 1 6 f68 107 302 557 2.2 levolve Centre 1 6 f68 474 302472 6.2 ruckwas Dauliding 1 6 f68 478 302472 6.2 andfill Weighbridge (Tip Face) 1 6 f68 488 302421 2.8 andfill Weighbridge (Tip Face) 1 6 f68 488 302421 2.8 andfill Weighbridge (Tip Face) 1 6 f68 488 302421 2.8 andfill Weighbridge (Tip Face) 1 6 f68 488 302421 2.8 andfill Weighbridge (Tip Face) 1 6 f68 488 302421 36.7 andfill Weighbridge (Tip Face) 1 8 f68 36.7 36.7						
Image: state	H	1 1	6168 162	302 408	2.2	
Image: Section of the section of	H	1 2	6168 109	302 355	2.3	
Image: style s	F	1 3	6168 056	302 320	2.4	
Image: style s	H	4	6168 019	302 289	2.5	
Image: style s	F	I 5	6168 430	302 257	2.6	
Image: Section of the section of t	ŀ	6	6168 398	302 225		
Image: Section of the section of t	H	7				
III						
Image: state						
Image: state		-				
Image: state					2.5	
III	H	11	6168 162	302 72	2.8	
Image: Section of the section of t	H	12	6168 109	302 70	2.9	
Note </td <td>H</td> <td>13</td> <td>6168 056</td> <td>302 82</td> <td>2.4</td> <td></td>	H	13	6168 056	302 82	2.4	
iii <i< td="">i<i<i< td="">i<i< td="">i<i< td="">iiii<i< td="">i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<< td=""><td>H</td><td>14</td><td>6168 019</td><td>302 119</td><td>9.0</td><td></td></i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<i<<></i<></i<></i<></i<i<></i<>	H	14	6168 019	302 119	9.0	
i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i <td>F</td> <td>15</td> <td>6167 989</td> <td>302 151</td> <td>12.0</td> <td></td>	F	15	6167 989	302 151	12.0	
NoteNot	+					
i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i						
Note </td <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td>		-				
Image: style						
Image: style s						
NNN </td <td></td> <td>-</td> <td>6167 872</td> <td>302 318</td> <td>2.5</td> <td></td>		-	6167 872	302 318	2.5	
Image: style s	F	21	6167 877	302 367	2.7	
NomeNo	H	22	6167 886	302 412	3.6	
11000	H	23	6167 899	302 464	5.6	
Image: style	H					
Image: style	H		6168 415			
11000 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td></th<>						
nnn <th< td=""><td></td><td></td><td></td><td></td><td></td><td>New Weinhhridge</td></th<>						New Weinhhridge
nnn						in a seguendige
Image: style s						
111						
111						
i i <td>H</td> <td>31</td> <td>6168 168</td> <td>302 596</td> <td>2.2</td> <td></td>	H	31	6168 168	302 596	2.2	
11000 <th< td=""><td></td><td>32</td><td>6168 142</td><td>302 614</td><td>2.2</td><td></td></th<>		32	6168 142	302 614	2.2	
nnn <th< td=""><td>H</td><td>33</td><td>6168 110</td><td>302 635</td><td>2.2</td><td></td></th<>	H	33	6168 110	302 635	2.2	
NNNNN00000N0000 <td< td=""><td>H</td><td>34</td><td>6168 090</td><td>302 642</td><td>2.3</td><td>Organic Garden Waste</td></td<>	H	34	6168 090	302 642	2.3	Organic Garden Waste
1 30 0.00 302 32 32 1 37 0.00 305 2.0 1 37 0.00 305 2.0 1 1 0.00 305 2.0 2.0 1 1 0.00 305 305 305 1 1 0.00 305 305 305 1 1 0.00 305 305 305 1 1 0.00 305 305 305 1 1 0.00 305 305 305 1 1 0.00 305 305 305 1 1 0.00 302 2.00 2.00 1 1 0.00 302 2.00 2.00 1 1 0.00 302 2.00 2.00 1 0.00 302 302 2.00 1 0.00 302 302 2.00 1 0.00 302 2.00 2.00 1 0.00 302 2.00 2.00 1 0.00 302 2.00 2.00 1 0.00 302 2.00 <	H	35				
1 3 1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
Image: state	H	37	6168 114	302 565	2.0	
Image: Section of the section of th	H	38	6168 150	302 542	2.1	
Image: Section of the section of th						
Image: Section of the section of th		1	6168 125	302 101	3.6	
i i 000000 000000 000000 00000 0000		2				
Image: second		3				
Image: Second		4				
1 1 1000000000000000000000000000000000000						
1 1 1000000000000000000000000000000000000						
1 1 10420 30227 34 1 10420 30227 32 1 10420 30270 32 1 10420 30200 32 1 104650 30202 32 1 104650 30202 32 1 104650 30242 32 1 104650 30244 32 1 104650 30244 32 1 104650 30244 32 1 104650 30244 32 1 104650 30244 32 1 104650 30240 32 1 104650 30247 32 1 104650 30240 32 1 104650 30240 32 1 104650 30240 32 1 104650 30240 32 1 104650 30240 32 1 104650 30240 32 1 104650 30240 32		1	6168 146	302 267	2.8	
Image: Section of the section of th	L.	2	6168 189	302 255	2.4	
Image: Section of the section of th		3	6168 239	302 237	2.6	
Image: Section of the section of th						
Image: Second	`	4				
k 2 646 629 302 390 22 k 3 646 641 302 444 23 k 4 646 554 302 444 23 k 4 646 554 302 444 23 k 5 646 558 302 446 23 k 5 646 557 302 410 23 k 646 557 302 410 23 k 646 557 302 410 23 k 646 551 302 300 23 k 646 653 302 302 23 k 646 653 302 32 23 k 646 653 302 427 23 k 646 653 302 427 23 k 302 427 23 302 k 3		5	6168 284	302 199	2.5	
k 2 646 629 302 390 22 k 3 646 641 302 444 23 k 4 646 554 302 444 23 k 4 646 554 302 444 23 k 5 646 558 302 446 23 k 5 646 557 302 410 23 k 646 557 302 410 23 k 646 557 302 410 23 k 646 551 302 300 23 k 646 653 302 302 23 k 646 653 302 32 23 k 646 653 302 427 23 k 646 653 302 427 23 k 302 427 23 302 k 3						
k 2 646 629 302 390 22 k 3 646 641 302 444 23 k 4 646 554 302 444 23 k 4 646 554 302 444 23 k 5 646 558 302 446 23 k 5 646 557 302 410 23 k 646 557 302 410 23 k 646 557 302 410 23 k 646 551 302 300 23 k 646 653 302 302 23 k 646 653 302 32 23 k 646 653 302 427 23 k 646 653 302 427 23 k 302 427 23 302 k 3	ĸ	1	6168 516	302 362	2.2	
k 3 6166 541 302 424 2.3 k 4 6166 554 302 446 2.3 k 6166 564 302 446 2.3 k 6166 587 302 446 2.3 k 6166 587 302 446 2.3 k 1 6168 587 302 447 2.3 k 2 302 447 2.3 2.3 k 1 6168 563 302 427 2.3 2.3 k 3 6168 563 302 277 2.3 2.3 k 1 6168 563 302 377 2.3 2.3 k 3 302 427 2.3 302 437 302 43 k 1 6168 563 302 377 2.3 302 437 302 437 k 302 477 302 477 302 47 302 47 302 47 k 302 477 302 47 302 47 302 47 302 47 k 1 6168 430 302 47 302 47						
k d 606854 30244 23 L 6 608588 30246 23 L 1 60657 30240 23 L 1 60657 30247 23 L 1 60657 30247 23 L 1 60657 30247 23 L 3 60653 30247 23 L 3 60653 30247 23 L 4 60653 30247 23 L 4 616551 30230 23 L 6 616551 302376 23 L 6 616552 30236 23 L 6 616557 322 23 L 6 616517 30247 22 L 6 10257 23 L 616847 30247 23 L 1 616848 302421 28 </td <td>r</td> <td>2</td> <td></td> <td></td> <td></td> <td></td>	r	2				
k 6 6166 588 302 446 2.3 i 1 6168 587 302 410 2.3 i 1 6168 587 302 375 2.3 i 1 6168 563 302 277 2.2 i 1 6168 563 302 376 2.3 i 1 6168 532 302 376 2.3 i 1 6168 532 302 376 2.3 i 1 6168 532 302 376 2.3 i 1 6168 637 302 472 2.3 i 1 6168 637 302 472 2.3 i 1 6168 471 302 472 2.3 i 1 6168 473 302 421 2.3 i 1 6168 483 302 421 2.3	k	3	6168 541	302 424	2.3	
Image:	ĸ	4	6168 554	302 464	2.3	
Image:	k	5	6168 588	302 446	23	
1 2 6168 572 302 375 2.3 1 3 6168 563 302 427 2.2 1 4 6168 563 302 300 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 572 302 376 2.3 1 6169 503 302 185 3.7 1 6168 197 302 175 2.2 1 6168 197 302 427 2.2 1 6168 147 302 427 2.2 1 6168 147 302 427 2.2 1 6168 458 302 421 2.6 1 6168 458 302 421 2.6 1 6168 458 302 421 2.6 1 6168 458 302 421 3.6 1 6168 458 302 421 3.6 1 1 1.6		† ĭ			2.0	
1 2 6168 572 302 375 2.3 1 3 6168 563 302 427 2.2 1 4 6168 563 302 300 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 563 302 376 2.3 1 1 6168 572 302 376 2.3 1 6169 503 302 185 3.7 1 6168 197 302 175 2.2 1 6168 197 302 427 2.2 1 6168 147 302 427 2.2 1 6168 147 302 427 2.2 1 6168 458 302 421 2.6 1 6168 458 302 421 2.6 1 6168 458 302 421 2.6 1 6168 458 302 421 3.6 1 6168 458 302 421 3.6 1 1 1.6		-				
Image: Log Sector Se	L	1				
L 4 6168 551 302 300 2.3 L 5 6168 545 302 376 2.3 L 6 6168 532 302 340 2.2 Compressor Shed 1 6167 950 302 185 3.7 Compressor Shed 1 6168 197 302 257 2.2 Compressor Shed 1 6168 147 302 247 2.2 Compressor Shed 1 6168 474 302 427 2.2 Compressor Shed 1 6168 488 302 421 2.6 Compressor Shed 1 6168 488 302 421 2.6 Compressor Shed 1 6168 488 302 421 2.6 Real M (Pro Letsing) 1 2.6 7.6 7.6 Real M (Pro Letsing) 1 1.6	L	2	6168 572	302 375	2.3	
L S 6168 645 302 376 2.3 L B B 302 349 2.3 Compressor Shed 1 6168 532 302 349 2.3 Compressor Shed 1 6167 950 302 155 3.7 Compressor Shed 1 6168 197 302 257 2.2 Revoke Centrle 1 6168 474 302 257 2.2 Levokean Eluifing 1 6168 474 302 427 2.2 Andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.3 Andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.3 Andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.4 Andfill Weighbridge (Tip Face) 1 E 302 7 302 7 Reine Blank (Pre Isting) 1 E 2.0 Taken at entrance to Dummore site before main gate Reiners Elank (Pro Isteting) E 2.0 Taken at entrance to Dummore site before main gate Comments: Sampling performed in accordance UPA Environmental Guidelines Sold Waste Landfills, Second Edition, 2015 Sampling Sampling <td>L</td> <td>. 3</td> <td>6168 563</td> <td>302 427</td> <td>2.2</td> <td></td>	L	. 3	6168 563	302 427	2.2	
L 6 6168 532 302 349 22 compressor Shed 1 6167 950 302 185 17 cis Offices 1 6169 197 302 577 22 cevelve Carbre 1 6168 147 302 427 22 rukwash Building 1 6168 434 302 427 22 andfil Weighbridge (Tip Face) 1 6168 48 302 421 28 andfil Weighbridge (Tip Face) 1 6168 48 302 421 302 72 andfil Weighbridge (Tip Face) 1 1 6168 48 302 421 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 72 302 72 andfil Weighbridge (Tip Face) 1 2 302 72 302 72 telstane Blank (Pre testing) 1 1 20 Taken at envirance to Dummore site before main gate	L	. 4	6168 551	302 390	2.3	
L 6 6168 532 302 349 22 compressor Shed 1 6167 950 302 185 17 cis Offices 1 6169 197 302 577 22 cevelve Carbre 1 6168 147 302 427 22 rukwash Building 1 6168 434 302 427 22 andfil Weighbridge (Tip Face) 1 6168 48 302 421 28 andfil Weighbridge (Tip Face) 1 6168 48 302 421 302 72 andfil Weighbridge (Tip Face) 1 1 6168 48 302 421 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 421 302 72 andfil Weighbridge (Tip Face) 1 1 802 72 302 72 andfil Weighbridge (Tip Face) 1 2 302 72 302 72 telstane Blank (Pre testing) 1 1 20 Taken at envirance to Dummore site before main gate	L	5	6168 545	302 376	2.3	
Impressor Shed 1 6167 950 302 185 3 7 ite Offices 1 6168 197 302 557 2 2 kevoke Centre 1 6168 197 302 457 2 2 ite offices 1 6168 474 302 472 2 2 ite offices 1 6168 474 302 472 2 2 ite offices 1 6168 484 302 421 2 8 andfill Weighbridge (Tip Face) 1 6168 488 302 421 2 8 andfill Weighbridge (Tip Face) 1 7 89,7 7						
iii 0 0000 1 6 108 07 302 567 2.2 tevolvo Centre 1 6 168 474 302472 2.2 ruckwash Buiding 1 7.3 7.3 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 7.8 7.8	L	6	6168 532	302 349	2.2	
iii 0 0000 1 6 108 07 302 567 2.2 tevolvo Centre 1 6 168 474 302472 2.2 ruckwash Buiding 1 7.3 7.3 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 6 168 488 302 421 2.8 andfill Weighridge (Tip Face) 1 7.8 7.8						
terview Centre 1 6168 474 302472 2 2 ruckwash Building 1 2.3 2.3 andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.6 andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.6 andfill Weighbridge (Tip Face) 1 2.6 2.6 andfill Weighbridge (Tip Face) 1 2.6 2.6	Compressor Shed	1	6167 950	302 185	3.7	
nuckwash Building 1 2.3 andfill Weighbridge (Tip Face) 1 6168.488 302.421 2.6 andfill Weighbridge (Tip Face) 1 2.3 2.6 otet 2.3 2.6 2.6 otet 2.0 2.6 2.6 otet 2.6 2.6 2.6	Site Offices	1	6168 197	302 557	2.2	
ruckwash Building 1 2.3 andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.8 andfill Weighbridge (Tip Face) 1 2.8 2.8 andfill Weighbridge (Tip Face) 1 2.8 andfill Weighbridge (Tip Face) 1 2.8 andfill Weighbridge (Tip Face) 1 2.8 eterne Blank (Pre testing) 1 2.8 testane Blank (Pre testing) 1 2.9 testane Blank (Pre testing) 1 2.9 testane Blank (Pre testing) 1 2.9 Taken at entrance to Dummore site before main gate	Revolve Centre	1	6168 474	302472	2.2	
andfill Weighbridge (Tip Face) 1 6168 488 302 421 2.6 andfill Weighbridge (Tip Face) 1 2.6	Truckwash Building	1				
andfill Waghbridge (Tip Face) - 1 28.7 I All All All All All All All All All Al	Landfill Weighbridge (Tip Face)			302 421		
tethane Blank (Pre testing) 2.0 Taken at entrance to Dummore site before main gate tethane Blank (Pos testing) 1.8 Taken at entrance to Dummore site before main gate	Landfill Weighbridge (Tip Face) -					
Itemane Blank (Post testing) 19 Taken at entrance to Dummore site before main gate	Toilet	1			26.7	
Itemane Blank (Post testing) 19 Taken at entrance to Dummore site before main gate						
Itemane Blank (Post testing) 19 Taken at entrance to Dummore site before main gate	Methane Blank (Pre testing)				2.0	Taken at entrance to Dunmore site before main gate
Comments: ampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016						
ampling performed in accordance to EPA Environmental Guidelines Sold Waste Landfills, Second Edition, 2016		ı			1.0	
ampling performed in accordance to EPA Environmental Guidelines Sold Waste Landfills, Second Edition, 2016	Comments:					
					0	
			-			

l			ALS Landf	ill Emissions Re	port
Client:	Shellharbour City (Council		Date:	11/06/2020
Site:	Dunmore			Sampler(s)	Glenn Davles, Arrian Zautsen
Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A	1	6168 216	302 446	4.0	
A	2	6168 230	302 447	2.8	
4	3	6168 245	302 452	2.8	
A		6168 262	302 455	4.6	
	-				
Α		6168 284	302 457	4.3	
A	6	6168 300	302 456	2.1	
A	7	6168 316	302 458	2.0	
A	8	6168 333	302 460	1.6	
				-	
В	1	6168 333	302 437	1.6	
E	2	6168 318	302 437	1.4	
E		6168 300	302 439	2.5	
E		6168 282	302 440	2.8	
E			302 440	2.2	
E	6	6168 244	302 440	3.6	Methane Cage
E	7	6168 224	302 437	3.2	
E	8	6168 204	302 434	2.8	
E	9	6168 176	302 434	2.3	
E	10	6168 156	302 432	2.0	
	1	1	1		
C	1	6168 415	302 383	3.2	
C	2	6168 353	302 400	2.9	
c	3	6168 292	302 414	2.5	
C	4	6168 220	302 423	2.5	
C	5	6168 196	302 424	3.3	
C		6168 165	302 421	4.2	
C		6168 132	302 417	6.8	
C		6168 086	302 411	7.0	
C	9	6168 054	302 408	6.1	
		6168 152	302 325	3.1	
		6168 173	302 315	3.1	Methane Cage
C		6168 195	302 314	3.5	
		6168 218	302 310	3.4	
C		6168 231 6168 247	302 307	3.7	
			302 305 302 304	3.6 2.7	
L	· · ·	0100 202	002 004	2.1	1
E	: 4	6168 259	302 321	1.9	
E		6168 239	302 321	1.9	
E			302 335	2.3	
E		6168 170	302 333	2.3	
E		6168 132	302 356	2.0	
E			302 360	2.5	Methane Cage
E		6168 079	302 366	2.5	
E			302 372	2.2	
E			302 389	2.1	
E			302 298	1.9	
F	1	6168 062	302 382	2.4	
F		6168 075	302 387	2.6	
F	3	6168 129	302 391	2.2	
F	4	6168 173	302 395	2.0	
F					
F	5	6168 216	302 387	1.9	
		6168 216 6168 237	302 387	2.2	

		6168 447 6168 427	302 359 302 324	<u>1.5</u> 1.7	
C		6168 408	302 290	2.4	
C		6168 406	302 260	1.5	
ŀ	4 1	6168 218	302 534	2.0	
		6168 183	302 582	1.9	
		6168 147	302 603	1.8	
		6168 115	302 622	3.1	
		6168 080	302 616	4.9	
ł			302 579	4.0	
ł		6168 113	302 563	3.4	
ŀ	8	6168 168	302 528	2.4	
ŀ	H 9	6168 029	302 504	2.1	
ł	H 10	6168 954	302 498	3.5	
ł	1 11	6168 885	302 433	1.6	
ł	1 12	6168 873	302 376	1.7	
ŀ	1 13	6168 868	302 335	2.1	
ł	1 14	6168 869	302 284	4.2	
		ļ			
	1 1	6168 125	302 247	4.8	
	1 2	6168 124	302 206	4.1	
	I 3	6168 111 6168 110	302 149 302 096	2.3	
	4	0108 110	302 090	2.0	
	1	6168 355	302 200	1.9	
	J 2	6168 302	302 218	2.0	
	J 3	6168 269	302 230	4.0	
,	J 4	6168 201	302 254	3.8	
	J 5	6168 153	302 268	14.3	
ł	< 1	6168 524	302 384	1.8	
٢	2	6168 540	302 418	1.7	
ł		6168 548	302 448	2.7	
+ +		6168 564	302 425	2.0	
r	5	6168 557	302 401	2.7	
l	1	6168 743	302 336	2.3	
l	2	6168 700	302 305	2.2	
l	3	6168 664	302 255	2.1	
I	- 4	6168 623	302 237	2.1	
	- 5	6168 587	302 215	2.0	
1	6	6168 549	302 178	2.1	
		1	1		
ompressor Shed	1	l	ļ!	1.9	
ffice	1	 		1.8	
ommunity Recycling Centre	1			2.4	
LD Weighbridge				2.5	
LD Weighbridge Toilet		<u> </u>		2.5	
evolve Shop	<u> </u>	<u> </u>		1.8	
uilding Truckwash	1	l		1.9	
lew Weighbridge	1	L	<u> </u>	2.3	
lethane Blank (Pre testing)				1.9	Taken at entrance to Dunmore site before main gate
1ethane Blank (Post testing)	1			2.2	Taken at entrance to Dunmore site before main gate

ALS Landfill Emissions Report						
lient: ite:	Shellharbour City Co Dunmore	puncil		Date: Sampler(s)	8/09/2020 Robert DaLlo, Arrian Zautsen	
Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments	
	A 1	6168 185	302 337	2.1		
	A 2	6168 160	302 355	3.6		
	A 3	6168 126	302 348	2.1		
	A 4	6168 106	302 350	2.0		
	A 5	6168 085	302 347	2.0		
	A 6	6168 050	302 234	2.0		
		0100 000	002 204	2.0		
		0100 101	202 227			
	B 1	6168 101	302 337	2.2		
	B 2	6168 070	302 335	3.3		
	B 3	6168 051	302 336	2.5		
	B 4	6168 027	302 331	2.2		
	B 5	6167 799	302 331	2.2		
	в 6	6167 975	302 325	2.5		
	в 7	6168 930	302 321	2.0		
	в 8	6168 890	302 318	2.0		
	В 9	6168 838	302 315	2.0		
	1					
	C 1	6168 263	302 267	2.0		
	C 2	6168 206	302 281	2.5		
	C 3	6168 132	302 301	2.2		
	C 4	6168 641	302 317	3.0		
	C 5	6167 997	302 318	2.8		
	C 6	6167 950	302 313	2.2		
	C 7 C 8	6167 898 6167 863	302 307 302 290	2.3 2.3		
		0107 003	302 280	2.3		
	D 1	6167 939	302 270	1.9		
	D 2	6167 967	302 274	1.8		
	D 3	6167 991	302 260	1.9		
	D 4	6168 022	302 277	1.9		
	D 5	6168 048	302 275	1.9		
	D 6	6168 067	302 277	1.9		
	D 7	6168 087	302 283	2.0		
	D 8	6168 172	302 245	3.0		
	D 9	6168 227	302 200	2.0		

E	1	6168 155	302 221	2.5	
E	2	6168 175	302 201	2.2	
E	3	6168 213	302 180	2.0	
E		6168 067	302 227	1.8	
E			302 229	1.9	
E		6168 033	302 223	1.9	
E					
			302 237	1.9	
E	8	6167 968	302 245	1.9	
F		6167 869	302 257	1.8	
F		6167 901	302 257		Methane Cage
F	3	6167 932	302 249	1.9	
F	4	6167 959	302 227	1.9	
F	5	6167 980	302 214	1.9	Methane Cage
F	6	6168 005	302 209	1.9	
F	7	6168 034	302 208	1.9	
_					
F	8	6168 061	302 200	1.9	
1					
G	1	6168 213	302 149	2.0	
G	2	6168 225	302 182	2.0	
G	3	6168 250	302 209	2.0	
G	4	6168 273	302 247	2.0	
н	1	6168 147	302 057	1.9	
н			302 037	1.9	
н		6168 083	302 001	1.9	
н		6168 012	302 968	1.9	
н			301 968	1.9	
н		6167 900	301 969	1.9	
н			301 023	2.0	
Н	8	6167 750	302 088	4.2	
Н			302 137	4.0	
н			302 315	2.7	
н	11		302 300	2.2	
н	12	6168 232	302 292	2.1	
н	13	6168 265	302 186	2.0	
н	14	6168 223	302 146	2.0	
н	15	6167 743	302 387	2.1	
н	16	6167 795	302 394	2.2	
н	17		302 402	2.1	
н			302 408	2.1	
н			302 414	2.1	
н	20		302 430	2.1	
н			302 359	2.1	
	21	0100 510	302 338	2.1	
L		1	I		1

			I		
	1	0107 004	302 215	1.9	
1	2		302 210	1.9	
1	4	6167 923 6167 916	302 056 302 011	1.9	
1		0107 510	302 011	1.9	
J	1	6168 169	302 092	1.9	
J	2	6168 120	302 107	1.9	
J	3	6168 077	302 124	1.9	
J	4	6168 021	302 143	2.0	
J	5	6168 958	302 164	2.0	
ĸ		6168 377	302 324	2.5	
К			302 301	2.4	
K	3	6168 358	302 273	2.4	
к	4	6168 370	302 268	2.3	
к	5	6168 392	302 385	2.3	
к	6	6168 406	302 324	2.3	
к	7	6168 378	302 359	2.3	
к	8	6168 341	302 350	2.3	
ĸ			302 300	2.3	
, in the second s		0100 000	002 000	2.0	
L	2	6168 522	302 202	1.9 1.9	
L .	3		302 178 302 146	1.9	
	3	6168 841	302 148	2.0	
L			302 129	2.0	
	6		302 078	2.0	
<u> </u>	7		302 079	2.0	
	8	6168 306	302 037	2.0	
1	9		302 001	2.0	
L	. 10	6168 240	301 963	2.0	
					
compressor Shed	1			12.5	
Office	1			2.5	
Community Recycling Centre	1			2.5	
DLD Weighbridge	<u> </u>			2.3	
OLD Weighbridge Toilet				2.2	
Revolve Shop	<u> </u>			2.1	
Building Truckwash New Weighbridge	1			2.3	
AOM ALCIGUDUNDA	1	<u> </u>	1	2.3	
Methane Blank (Pre testing)				2.4	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				2.3	Taken at entrance to Dunmore site before main gate
Comments:					
Sampling performed in accordanc	e to EPA Environme	ental Guidelines Solid Waste	Landfills, Second Edition, 2	016	
as concentrations are reported a	s raw values withou	t correction for background co	oncentration.		



Appendix E

Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Overflow Event



Work Order	EW2003592	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	Address	: 1/19 Ralph Black Dr, North Wollongong 2500
	SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529		4/13 Geary PI, North Nowra 2541 Australia NSW Australia
Telephone	:	Telephone	: +61 2 4225 3125
Project	: Dunmore Landfill Overflows	Date Samples Received	: 10-Aug-2020 15:05
Order number	: 130985	Date Analysis Commenced	: 10-Aug-2020
C-O-C number	:	Issue Date	17-Aug-2020 13:33
Sampler	:		IAC-MRA NATA
Site	:		
Quote number	: WO/030/19 TENDER OVERFLOW DISCHARGE		Accreditation No. 825
No. of samples received	: 2		Accredited for compliance with
No. of samples analysed	: 2		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW



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 Contact 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.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordace with in-house sampling method EN/67.4 Lakes and Reservoirs

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	SWP1	SWP2			
				Point 1	Point 1			
Client sampling date / time			10-Aug-2020 13:45	10-Aug-2020 13:55				
Compound	CAS Number	LOR	Unit	EW2003592-001	EW2003592-002			
				Result	Result			
EA005FD: Field pH								
рН		0.1	pH Unit	7.2	7.2			
EA025: Total Suspended Solids dried	EA025: Total Suspended Solids dried at 104 ± 2°C							
Suspended Solids (SS)		5	mg/L	<5	<5			



Appendix F

Calibration Certificates



EQUIPMENT SHEET / CALIBRATION CERTIFICATE

Instrument:	Inspectra Laser (ATEX)
Serial No:	5700418

.....

Equipment Information	Enclosed	Comment
Inspectra Laser ATEX Instrument Manual	\checkmark	
AC Charger Cable (Australian)	\checkmark	
ATEX Charger	\checkmark	
12VDC Vehicle Charger	\checkmark	
Sample Handle	\checkmark	
Sampling Probe	\checkmark	
Telescoping Wand	\checkmark	
C10 Regulator + Tubing		
3mm Hex Driver (Red)		
Inspectra Spanner Wrench Hydrophobic		
Filters x 5		
Cotton Filters x 20		
Dust Filters (Yellow) x 5		
Harness Straps	\checkmark	
Yellow Gazomat Carry Case	\checkmark	

	Calibration Results	
Parameter	Standard	Result
CH4	10ppm	10ppm

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure. ECO Standard Rental Terms and Conditions apply to all equipment calibrations.

Regards,

Geremy Kil

Equipment Specialist Eco Environmental Holdings

03-Dec-2019

Adelaide Office Tel: +61 8 8293 3355 adelaide@ecoenvironmental.com.au

CERTIFICATION OF CALIBRATION





% F

Issued by: QED Environmental Systems Ltd.

Calibration certificate number

Instrument Laser One

Serial number

19248 H-01690

19248

10.00

Max % error

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	2.5	2.6	2.5	2.5	2.53	0.10	0.01	0.01
1000	3.2	3	3.2	3.2	3.13	0.20	0.02	0.02
1000	10.3	10.7	10.7	10.7	10.70	0.40	0.04	0.04
1000	107	101	101	101	101.00	6.00	0.60	0.60
1000	1000	1005	1005	1005	1005.00	5.00	0.50	0.50
					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 %
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00	10.00
10.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
10.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00
100.00	15.00	15.00	15.10	15.10	15.07	0.10	0.10	0.10
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00
100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
		7			Uncertainty	10.00		%

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 %
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2.00	2.01	2.01	2.01	2.01	0.01	0.10	0.10
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00
					Uncertainty	0.10		%
					Max % error	0.10		% FS

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM Registered in England and Wales 1898734







Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temperature	21.4	С
Pressure	1004	mBar `

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
Synthetic Air	S1624403EE	19/05/2023	Synthetic Air
3 ppm	1431235G	11/04/2024	CH4
10 ppm	1140315G	11/04/2024	СН4
100 ppm	51100861	10/04/2024	СН4
1000 ppm	\$1100299\$	10/04/2024	CH4
1.0 vol	S1198415S	10/04/2024	СН4

Calibration results Pass

Next scheduled calibration

25/11/2020

Calibration date 25/11/2019

Calibration done by Laura McBride

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM Registered in England and Wales 1898734 Page



UNIT 29, 756-758 BURWOOD HWY • FERNTREE GULLY • VIC 3156 • AUSTRALIA • PH: +61 3 9752 3782 • FAX: +61 3 9752 3783 EMAIL: sales@anri.com.au www.anri.com.au

Date: 9.9.19

1

Attn: MeeLan Liew Air-Met Scientific Pty. Ltd. 7-11 Ceylon Street Nunawading Vic. 3131

O/N 721424

Calibration Verification Certificate # 5042

Manufacture/Model S/N	: Gazor : 38109	mat Inspectra Laser CH	14 analyser		
		0-100%			
Gas used N2 BOC High Purity reads		: 0.0ppm	Specification +	/-10%	
Gas used Calgaz 50ppm CH4 in Air reads		: 50.2ppm	(45-55ppm)	Conforms	
Gas used Calgaz 500ppm CH4 in Air reads		: 502ppm	n (450-550ppm)		
Gas used Calgaz 1.0% CH4 in Air reads		: 10280ppm (1.0%)	(0.9-1.1%)	Conforms	
Gas used Calgaz 2.5% CH4 in Air reads		: 2.6%	(2.25-2.75%)	Conforms	
Gas used Linde 99.9% CH4 reads		: 103.0%	(90-110%)	Conforms	
Comments	: Calib	oration OK			

Next Service/calibration Due : 9.9.20

Stephen Hurst ANRI Instruments & Controls Pty Ltd