Global Resource Recovery

Annual Monitoring Report EPL 229-02

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CDM Smith

listen. think. deliver.

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Glossary

ANZECC	Australian and New Zealand Environment & Conservation Council
ARMCANZ	Agriculture & Resource Management Council of Australia & New Zealand
CSM	Conceptual Site Model
DHWQO	Darwin Harbour Water Quality Objectives
EMP	Environmental Management Plan
EPL	Environmental Protection Licence
GWMP	Groundwater Monitoring Program
GRR	Global Resource Recovery
GMP	Groundwater Management Plan
IBC	Intermediate Bulk Container
LWTF	The Darwin Liquid Waste Treatment Facility
NT EPA	Northern Territory Environmental Protection Authority
NATA	National Accredited Testing Authority
PFAS	Isolation of Per- and polyfluoroalkyl substance
SWMP	Surface Water Monitoring Plan
TOR	Terms of Reference

Section 1 Introduction

The Darwin Liquid Waste Treatment Facility (LWTF) is located within East Arm Industrial Precinct, Northern Territory (Figure 1). The facility is owned by Smorgon Fuels Pty Ltd, trading as Global Resource Recovery (GRR) and licenced by the Northern Territory Environment Protection Authority (NT EPA) under the *Waste Management and Pollution Control Act* and the *Water Act*.

The facility receives liquid wastes, including listed wastes as defined in the Act, from maritime, mining and oil and gas industries in the Darwin Region. Wastes that cannot be treated onsite are consolidated and transported to suitable local or interstate licensed facilities.

The facility and regulatory obligations are managed under a few administrative documents but primarily the Environment Protection Licence (EPL) 229-02 (Appendix A), and Smorgon Fuels (Global Resource Recovery) Darwin Liquid Waste Treatment Facility Environmental Management Plan (Global Resource Recovery, July 2022).

An environmental monitoring program is administered by GRR. The environmental program includes the monitoring of groundwater, surface waters and air emissions.

Conditions 62 and 63 of the Licence requires GRR to provide an annual monitoring report. The annual monitoring report must be provided to the NT EPA within ten (10) days after the anniversary of the date of the licence. This report includes the environmental monitoring results in relation to the Licence for the period between 29 June 2022 and 28 June 2023 (herein referred to as the reporting period).

As per the requirements of Condition 63 of the Licence, this report:

- is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';
- reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;
- includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;
- includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;
- provides an assessment on groundwater levels, including groundwater contours and tidal influence;
- reports on all exceedances and investigations undertaken for this licence; and
- includes an assessment of environmental impact from the activity.

The facility has recently been sold and will be trading as Global Resource Recovery (NT). The new owners will undergo the process of renewing the EPL 229-02 in conjunction with an update to the wastes that will be received at the site in the future. There will be a significant decrease in the types of wastes able to be received and as such an assumption that the conditions to EPL 229-02 will be altered moving forward.

1.1 NT EPA Licence

The Licence commenced on 29 June 2022 and will expire on 28 June 2027. The boundary of the Licence is shown in Figure 2. The licence is available on the NT EPA website at https://ntepa.nt.gov.au/your-business/public-registers/licences-and-approvals-register/environment-protection-licences/listed-waste-handlers/smorgen-fuels-pty-ltd

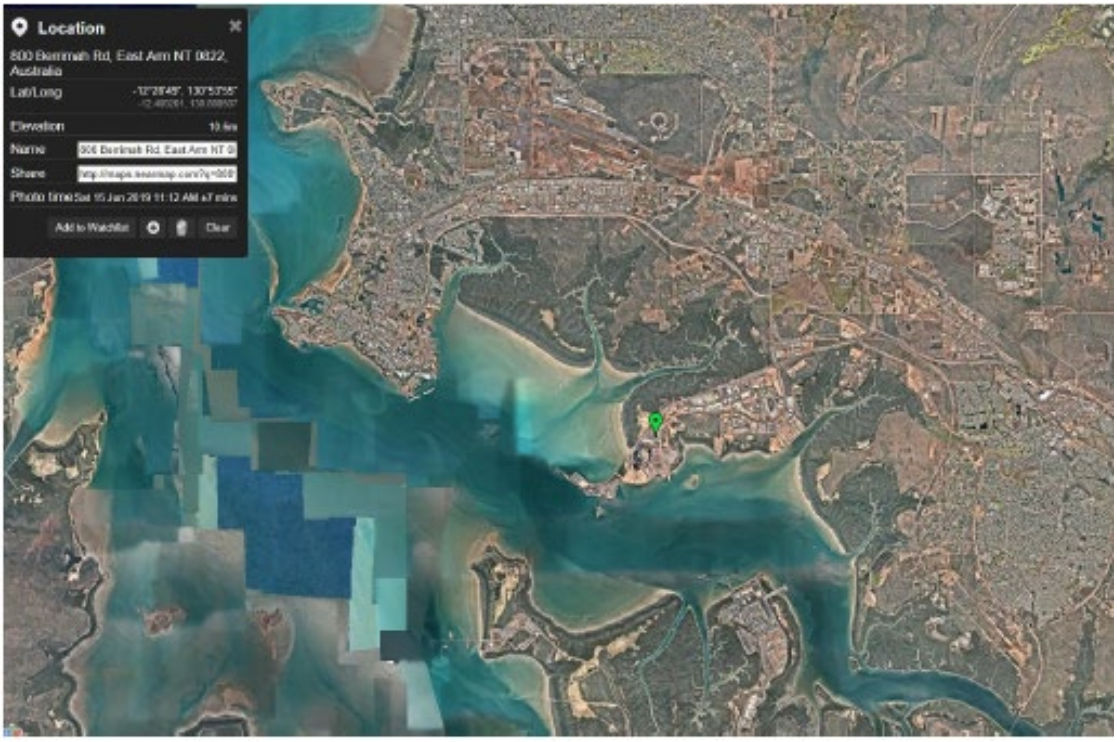


Figure 1 **Darwin Liquid Waste Treatment Facility Location (sourced from GRR EMP)**



Figure 2 **Detail of the LWTF showing boundary of the Leases Area (sourced from GRR EMP)**

1.2 GRR Environmental Monitoring

Several aspects of the operation of the GRR facility may impact upon the environment. Licence requires that GRR undertake environmental monitoring of these aspects and the environmental receptors that may be impacted. These are outlined in the GRR facility environmental management plan (EMP) and include:

- Discharges to water, including:
  - Stormwater discharge
  - Bund water discharge
- Discharges to air, including:
  - Stack emission monitoring;
- Discharges to land and surrounding environment, including:
  - Groundwater monitoring.

GRR has developed and implements several routine monitoring programs to meet the requirements of the Licence. The objectives, methods and results of these monitoring programs have been included in the relevant sections of this report.

The environmental monitoring was carried out in general accordance with:

- Australian and New Zealand Guidelines for Water Quality: Sampling, AS/NZS 5667.1, 1998.
- National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM), 1999, as amended in 2013 (ASC NEPM).
- National Environment Protection Council (NEPC) National Environment Protection (Air Toxics) Measure (NEPM), 1999, as amended in 2013 (ASC NEPM).
- NT EPA, 2018. Guideline for Reporting on Environmental Monitoring, (May 2016). Updates?

1.3 Site context

1.3.1 Climate

The climate of Darwin is characterised by a tropical monsoonal climate with a distinct Dry Season (May to September) and Wet Season (October to April). The Dry Season is dominated by dry, cool weather with little rain, low humidity and wide-ranging temperatures. The onset and duration of the Wet Season varies between years, however most rainfall in the Northern Territory is associated with monsoonal troughs and/or from isolated convective storms (BoM 2022). High precipitation rates are commonly experienced during storm events in the wet season.

The Darwin Airport Bureau of Meteorology station is located approximately 7.5 km northwest of the Project area. The average annual rainfall for Darwin is 1,731.2 mm. Most of the annual rainfall occurs between November and March. The mean minimum temperature is 23.2ºC and the mean maximum temperature is 32.1ºC (BoM 2022) (Appendix B).

Synoptic winds during the dry season tend to be dominated by the southeast trade winds, while light west to north-westerlies predominate during the wet season. Sea breezes from the northwest occur on most afternoons throughout the year.

Tropical cyclones occur in the Darwin region on average about once per year.

1.3.2 Storm Surge and High Tide Inundation

The site is located above the highest tides and the Palmerston Area Storm Surge Inundation mapping shows that the site is above the flood level estimate until year 2100.

Section 2 Groundwater Monitoring

In accordance with EPL requirements, the Groundwater Monitoring Events (GMEs) are undertaken as per EPL229-02 Attachment B which outlines the groundwater monitoring scope and analytical program. The purpose of the GMEs is to measure standing water level (SWL) and collect groundwater samples for laboratory analysis from the two existing on site monitoring bores and three off site monitoring bores. The bore locations are presented in Figure 3.

The GMEs during this annual reporting period were undertaken on the following dates:

- 30 June 2022 - Quarterly
- 21 July 2022 – Monthly
- 19 August 2022 - Monthly
- 29 September 2022– Quarterly
- 26 October 2022 – Monthly
- 30 November 2022 – Monthly
- 21 December 2022 – Quarterly
- 25 January 2023 – Monthly
- 27 February 2023 - Monthly
- 24 March 2023 – Annual
- 28 April 2023 – Monthly
- 30 May 2023 – Monthly

Specific details on the methodologies implemented for each GME are described within the individual monitoring reports attached as Appendix C. A summary of the typical groundwater sampling programme and testing schedule is described in Table 1.

Table 1 Groundwater sampling programme 2022-2023

Sample Round	Environmental Monitoring Bores	Analysis
Monthly	EMB 7 EMB 12 EMB 15	Standing Water Levels
	EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS. DO)
Quarterly	EMB 7 EMB 12 EMB 15	Standing Water Levels

Sample Round	Environmental Monitoring Bores	Analysis
	EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS. DO) Nutrients (NH3, NOx, TKN, TN, TP) Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) Dissolved Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb. Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons PFAS Phenolic Compounds Glycols
Annual	EMB 7 EMB 12 EMB 15 EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS. DO) Nutrients (NH3, NOx, TKN, TN, TP) Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) Dissolved Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb. Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons PFAS Phenolic Compounds Glycols

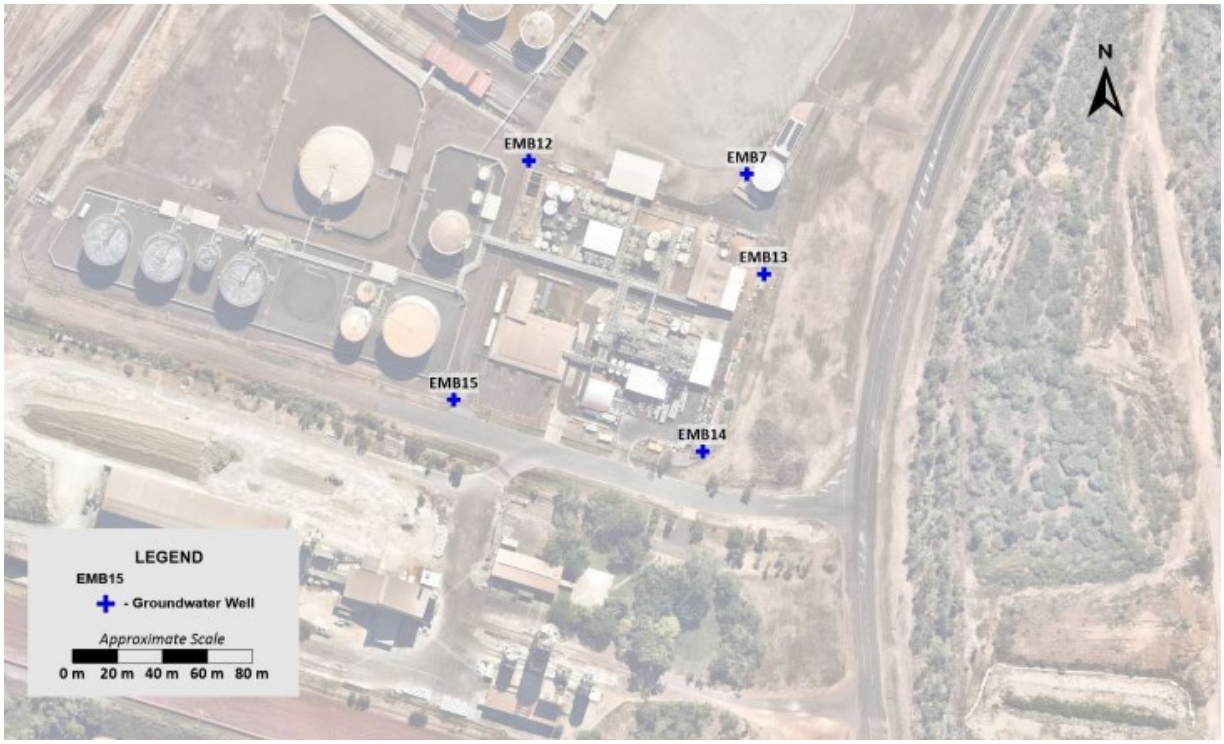


Figure 3 **Darwin Liquid Waste Treatment Facility Groundwater Bore Location**

2.1 Groundwater Sampling Methodology

All groundwater sampling events were conducted by Greencap and sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and https://www.waterquality.gov.au/anz-guidelines. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009).
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and interlaboratory duplicates and rinsate and trip blanks.

The field records, laboratory data and calibration records of groundwater sampling events undertaken by Greencap are provided in Appendix C.

2.2 Groundwater Assessment Criteria

There are no specific assessment criteria outlines in EPL 229-012 for Groundwater. EPL229-02 Attachment B outlines the parameters to be analysed and the frequency of analysis for each bore.

2.3 Quality Assurance/Quality Control

Quality Assurance / Quality Control (QA/QC) measures for this investigation were based on AS4482.1–2005 and included:

- Appropriate sample labelling, preservation, storage and transport under chain of custody procedures.
- Laboratory analyses conducted within appropriate holding times.
- Analysis of laboratory QA/QC samples including duplicates, blanks, matrix spikes, matrix spike duplicates, and surrogates.
- The use of laboratories that hold NATA accreditation for the analyses undertaken. The laboratories used for the analyses were Eurofins and ALS. The laboratories are approved by the National Association of Testing Authorities (NATA), and the analyses conducted are within the NATA registration of the laboratories.
- Collection and analysis of field QA/QC samples including duplicates and blanks.

The QA/QC controls are considered adequate as per the relevant standards and guidelines.

2.3.1 Internal Laboratory QA/QC

The results of the internal quality assurance programs of the laboratory are presented with the NATA test certificates (Appendix C). Appropriate internal laboratory QA/QC was reported by both laboratories.

2.4 Groundwater Monitoring Results

2.4.1 Field parameters

The methodologies described in Section 2.1 were implemented during each of the GMEs during this annual reporting period. Bore conditions were recorded and are presented within each monitoring report. Generally, the bore network is of acceptable condition.

While gauging the standing water level (SWL) in each of the suitable wells with an interface probe, no non-aqueous phase liquid (NAPL) was detected in any of the monitoring wells. As described in Section 2.1, field water quality parameter measurements were measured in each of the sampled wells during purging using a calibrated water quality meter.

Water quality observations made throughout the GMEs during this monitoring period are available in the individual GME reports, attached as Appendix C. A summary of the water quality parameters and field observations from this annual reporting period are provided in Table 2.

Standing water levels have remained fairly consistent with previous years of monitoring (Figure 4). There is a distinct seasonal trend in response to the wet and dry season with groundwater levels being predominantly by rainfall driven recharge. During the wet season a groundwater mound emerges then dissipates in the dry season. However, due to a lack of data loggers in the groundwater wells, the recorded SWL have been recorded as ‘snap-shots’ on the days of sampling events.

Note: SWL data for the offsite groundwater bores (EMB7, EMB12 and EMB15) was only available for late 2020 onwards, whereas onsite bore (EMB13, EMB14) SWL data has been available since 2018.

Table 2 Groundwater quality parameters – June 30 2022 – 30 May 2023

Well ID	SWL (mb TOC)	SWL (mBGL)	SWL (mAHD)	In-situ Parameters					
				pH	Temp (oC)	ORP (mv)	EC (µS/cm)	TDS (mg/L)	DO (%)
Quarterly – 30 June 2022									
EMB 7	2.918	2.918	3.51	-	-	-	-	-	-
EMB 12	2.593	2.593	3.907	-	-	-	-	-	-
EMB 13	4.572	3.772	4.264	3.54	32.1	68.5	291.5	190.45	72.6
EMB 14	4.85	4.15	4.405	6.30	33.0	80.4	238.5	154.7	59.8
EMB 15	2.119	2.119	5.265	-	-	-	-	-	-
Monthly – 21 July 2022									
EMB 7	3.319	3.319	3.109	-	-	-	-	-	-
EMB 12	3.003	3.003	3.497	-	-	-	-	-	-
EMB 13	5.051	4.251	3.785	3.52	32.5	4.7	292.7	191.75	49.8
EMB 14	5.227	4.527	4.028	6.22	33.6	23.5	253	164.45	58.7
EMB 15	2.381	2.381	5.003	-	-	-	-	-	-
Monthly – 19 August 2022									
EMB 7	3.81	3.81	2.618	-	-	-	-	-	-
EMB 12	3.503	3.503	2.997	-	-	-	-	-	-
EMB 13	5.47	4.67	3.366	3.38	31.8	46.6	294.8	192.4	46.3
EMB 14	5.795	5.095	3.46	5.85	33.3	3.7	249.2	162.5	75.1
EMB 15	2.699	2.699	4.685	-	-	-	-	-	-
Quarterly – 29 September 2022									
EMB 7	4.174	4.174	2.254	-	-	-	-	-	-
EMB 12	3.986	3.986	2.514	-	-	-	-	-	-
EMB 13	6.041	5.241	2.795	3.30	32.1	51.6	290.9	187.85	52
EMB 14	6.376	5.676	2.879	5.75	33.6	21.1	259.2	167.7	70.6
EMB 15	3.043	3.043	4.341	-	-	-	-	-	-
Monthly – 26 October 2022									
EMB 7	2.914	2.914	3.514	-	-	-	-	-	-
EMB 12	2.662	2.662	3.838	-	-	-	-	-	-
EMB 13	4.644	3.844	4.192	3.38	32.3	31.9	279.4	182	50.9
EMB 14	5.007	4.307	4.248	5.71	34.3	18.7	286.9	167.5	47.5
EMB 15	2.205	2.205	5.179	-	-	-	-	-	-
Monthly – 30 November 2022									
EMB 7	1.641	1.641	4.787	-	-	-	-	-	-
EMB 12	1.427	1.427	5.073	-	-	-	-	-	-
EMB 13	3.093	2.293	5.743	3.34	32.3	40.8	293.4	189.3	24.9
EMB 14	2.709	2.009	6.546	5.92	32.8	11.8	338.4	221.65	60.8

Well ID	SWL (mb TOC)	SWL (mBGL)	SWL (mAHD)	In-situ Parameters					
				pH	Temp (oC)	ORP (mv)	EC (µS/cm)	TDS (mg/L)	DO (%)
EMB 15	1.549	1.549	5.835	-	-	-	-	-	-
Quarterly – 21 December 2022									
EMB 7	1.312	1.312	5.116	-	-	-	-	-	-
EMB 12	1.628	1.628	4.872	-	-	-	-	-	-
EMB 13	2.914	2.114	5.992	3.47	33.3	125.2	275.9	179.4	12.8
EMB 14	2.416	1.716	6.839	6.14	34.5	16.5	202.7	131.3	28.6
EMB 15	1.184	1.184	6.2	-	-	-	-	-	-
Monthly – 25 January 2023									
EMB 7	1.461	1.461	4.967	-	-	-	-	-	-
EMB 12	1.371	1.371	5.129	-	-	-	-	-	-
EMB 13	2.867	2.067	6.039	4.48	32.7	-21.4	167.8	106.6	21
EMB 14	2.946	2.246	6.309	6.43	33.3	-34.7	154.9	101.4	16.8
EMB 15	0.851	0.851	6.533	-	-	-	-	-	-
Monthly – 27 February 2023									
EMB 7	0.603	0.603	5.825	-	-	-	-	-	-
EMB 12	0.913	0.913	5.587	-	-	-	-	-	-
EMB 13	1.732	0.932	7.714	3.75	32.7	-44.7	248.1	161.2	25.9
EMB 14	1.391	0.691	7.864	6.34	33.2	47.3	171.1	150.35	21.8
EMB 15	0.523	0.523	6.861	-	-	-	-	-	-
Annual – 24 March 2023									
EMB 7	1.128	1.128	5.3	6.04	32.7	114.1	210.6	137.85	53.4
EMB 12	1.181	1.181	5.397	6.49	36.1	102.8	388.4	313.7	54.3
EMB 13	2.486	1.686	6.96	4.03	34.8	101.3	266.7	961.75	21.4
EMB 14	2.457	1.757	6.798	5.39	34.9	109.4	242.8	951.1	40.6
EMB 15	0.682	0.682	6.702	4.14	37.1	193.6	219.1	941.9	75.2
Monthly – 28 April 2023									
EMB 7	1.438	1.438	4.99	-	-	-	-	-	-
EMB 12	1.372	1.372	5.206	-	-	-	-	-	-
EMB 13	2.981	2.181	6.465	3.89	33.1	39.3	291.7	170.15	21.3
EMB 14	3.003	2.303	6.243	6.42	32.9	-4.3	226.3	144.85	30.1
EMB 15	0.912	0.912	6.472	-	-	-	-	-	-
Monthly – 30 May 2023									
EMB 7	2.188	2.188	4.24	-	-	-	-	-	-
EMB 12	2.032	2.032	4.546	-	-	-	-	-	-
EMB 13	3.787	2.987	5.659	3.67	32.4	-35.6	257.9	171.6	-35.6
EMB 14	4.007	3.307	5.239	6.39	33.6	-11.9	237.1	163.1	21.7

Well ID	SWL (mb TOC)	SWL (mBGL)	SWL (mAHD)	In-situ Parameters					
				pH	Temp (oC)	ORP (mv)	EC (µS/cm)	TDS (mg/L)	DO (%)
EMB 15	1.648	1.648	5.736	-	-	-	-	-	-

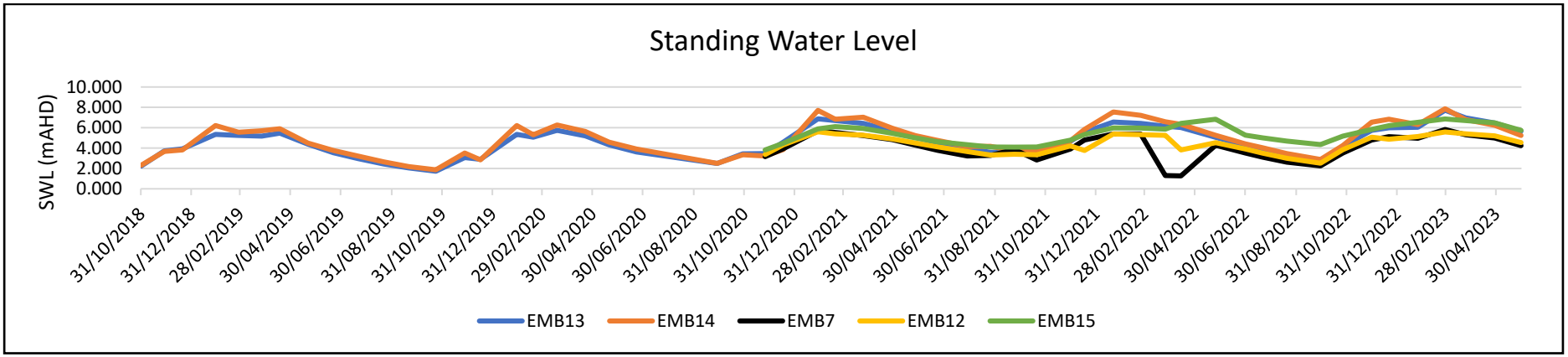


Figure 4 **Standing Water Level (mAHD)**

2.4.2 Water Quality Results Assessment

The results are shown in Appendix D as raw data, there are no trigger values to assess against. The majority of analysis was undertaken at Eurofins Laboratory, whilst the metals and glycols were tested at ALS Laboratory. The results of the groundwater analysis are summarised in the appendices of the individual monitoring reports attached as Appendix C. These results are provided both in the raw laboratory report documentation and summarised within the individual reports for reference. The laboratory analytical results are presented in Appendix B of the monitoring event-dedicated reports.

The majority of BTEXN, TRH, PFAS and Glycols have been consistently recorded below the laboratory limit of reporting (LOR). Results detected above the LOR are generally below the acceptance criteria.

The major anions and cations have generally increased during the annual monitoring event in the peak of the wet season with lower results during the monthly GMEs in the drier months. There is no trend differentiation for the dissolved metals.

Key groundwater analytical data is presented in the graphs below. Trend lines and associated r^2 values have been included on the graphs. The trend lines show the general changes of data (increases or decreases) across time and the r^2 values show the strength or reliability of those trends. R^2 values range between 0 and 1. The higher the number (i.e. closer to 1) the stronger or more reliable the trend. The lower the number (i.e. closer to 0) the weaker or less reliable the trend.

Key findings from a review of the water quality results:

- Generally, the water quality at the Site is indicative of a shallow freshwater aquifer, even given its proximity to the coastline, the EC values throughout the year indicate that there is no saltwater intrusion into this aquifer.
- pH values observed in groundwater are slightly to moderately acidic, which is common in Top End groundwaters. The EMB 13 is overall more acidic than the EMB 14.
- TDS values are relatively low at the conclusion of purging the wells, which typically accumulate some sediment between GMEs while the wells are undisturbed. This trend is observed during sampling, where the initial groundwater water quality readings during pumping show high turbidity values, decreasing as groundwater purging continues. The groundwater had a light brown to brown colour and no odours or sheens were noted from any of the bores during the monitoring.

2.4.2.1 EMB 13 and EMB14 (on-site bores)

- Nutrient concentrations (Total Nitrogen, Oxides of Nitrogen and Total Phosphorus) have generally been decreasing in the onsite bores since 2018. NH3 concentrations show a general decreasing trend since 2020. These trends are considered weak with low r^2 values (Figure 5; Figure 6; Figure 7; Figure 8).
- Dissolved metal concentrations generally show a decreasing trend at site since 2018 (Figure 9; Figure 10; Figure 11; Figure 12; Figure 13; Figure 14; Figure 15). Selenium and zinc concentrations show a weak increasing trend (Figure 16; Figure 17). These trends are considered weak due to their low r^2 values. However, this may also indicate that concentrations are generally remaining stable.
- Hydrocarbon levels remained stable across monitoring events, as shown by the low r^2 value (Figure 18). Naphthalene concentrations have a generally decreasing trend since 2018 (Figure 19). This trend is considered weak due to the low r^2 value. The levels have remained stable for the last 2 years. It is noted that for these parameters, for events where there is no data available, events have been displayed as 0 and the graphs appear to infer there have been spikes in the concentration levels. The raw data is presented in Appendix D.
- PFAS concentrations have shown weak increasing trends at site across monitoring events with a low r^2 (Figure 20). Phenol concentrations show a weak decreasing trend with a low r^2 value since 2020. However, since late 2021

concentration levels have remained stable (Figure 22). Cyanide (Figure 21) have remained stable with a low r^2 value. These weak trends generally infer that these concentrations are remaining stable.

- The low r^2 values and weak trends reflects the highly variable data from seasonal changes between the wet and dry seasons and the limited data sets. Low r^2 values may also indicate that data points are remaining stable. As more data becomes available it is expected that the strength of the trends will increase, i.e. they will become more accurate.

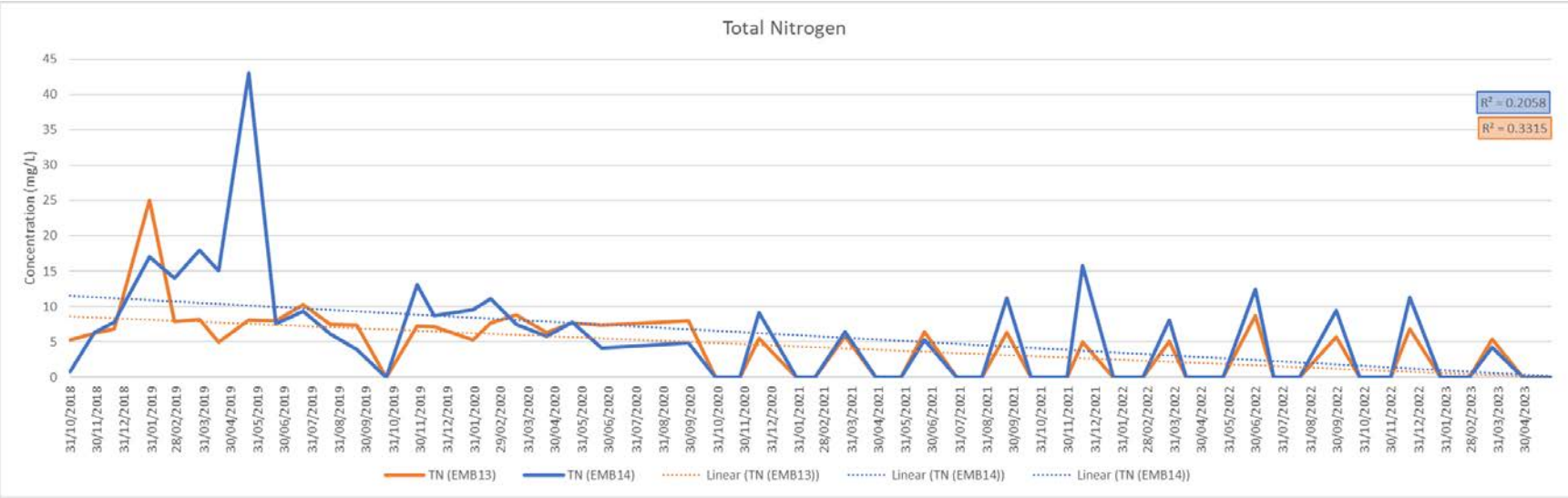


Figure 5 **Total Nitrogen Concentrations**

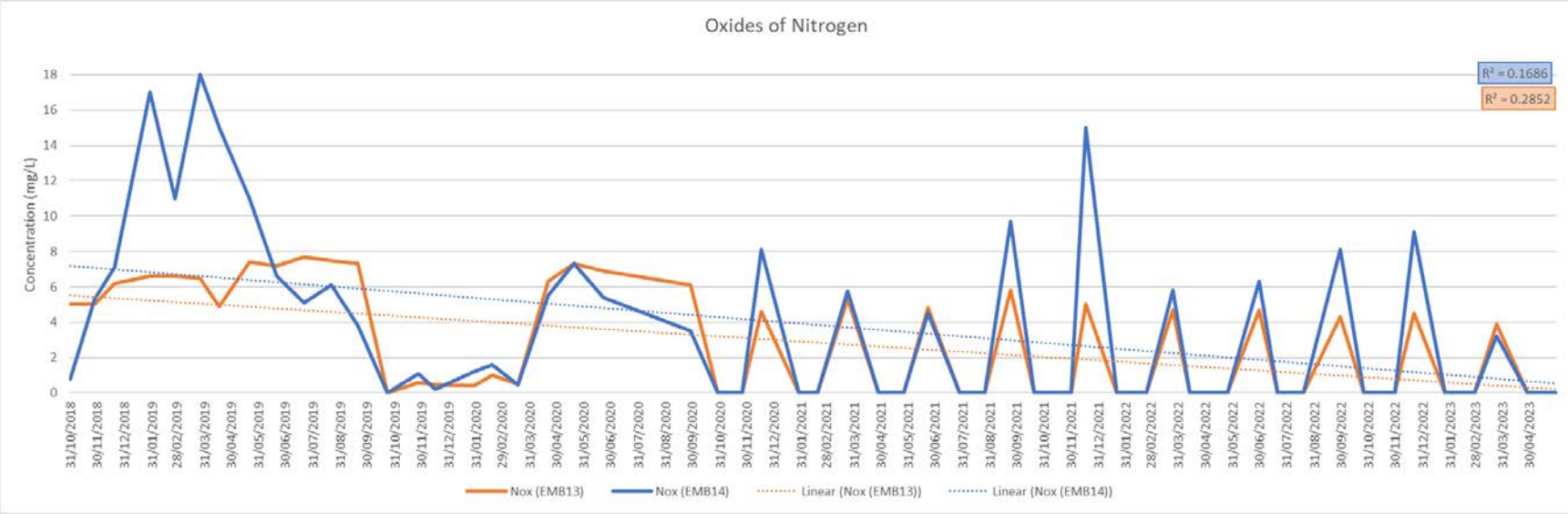


Figure 6 **Oxides of Nitrogen Concentrations**

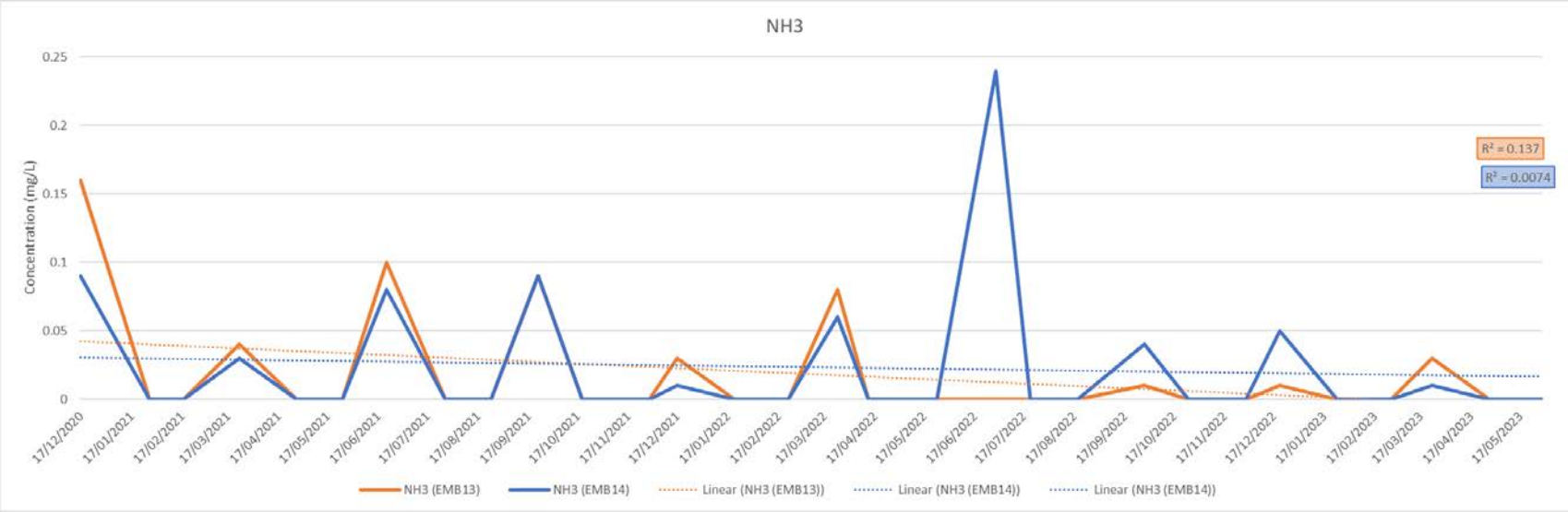


Figure 7 **NH3 Concentrations**

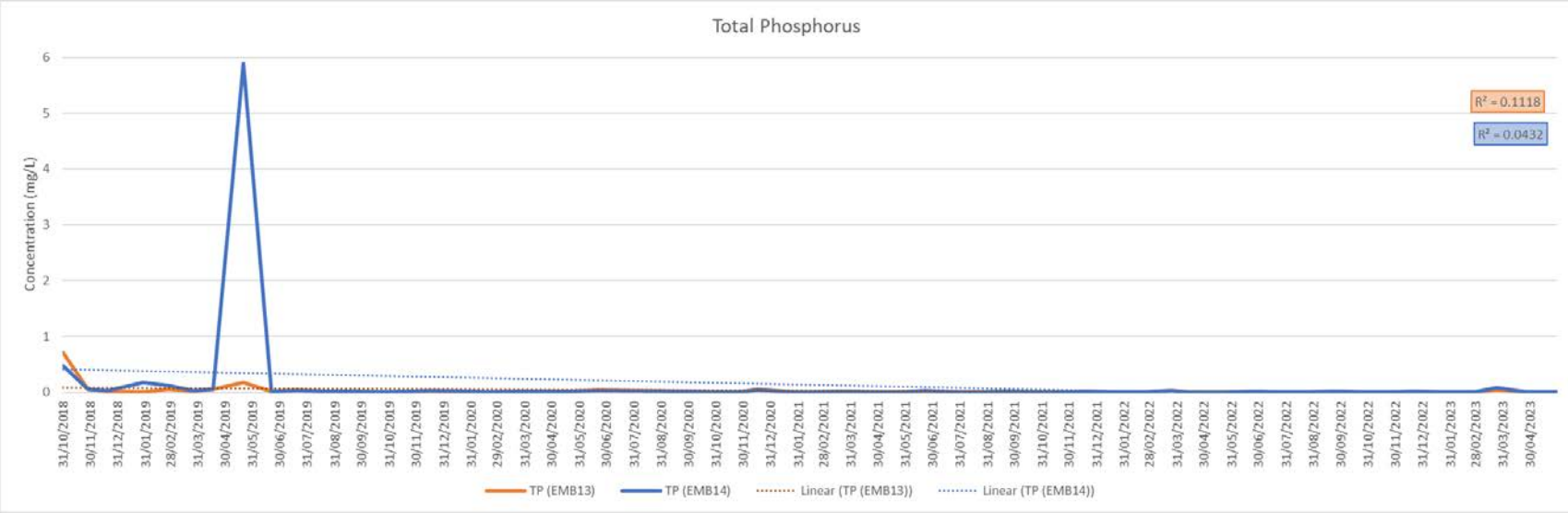


Figure 8 **Total Phosphorus Concentrations**

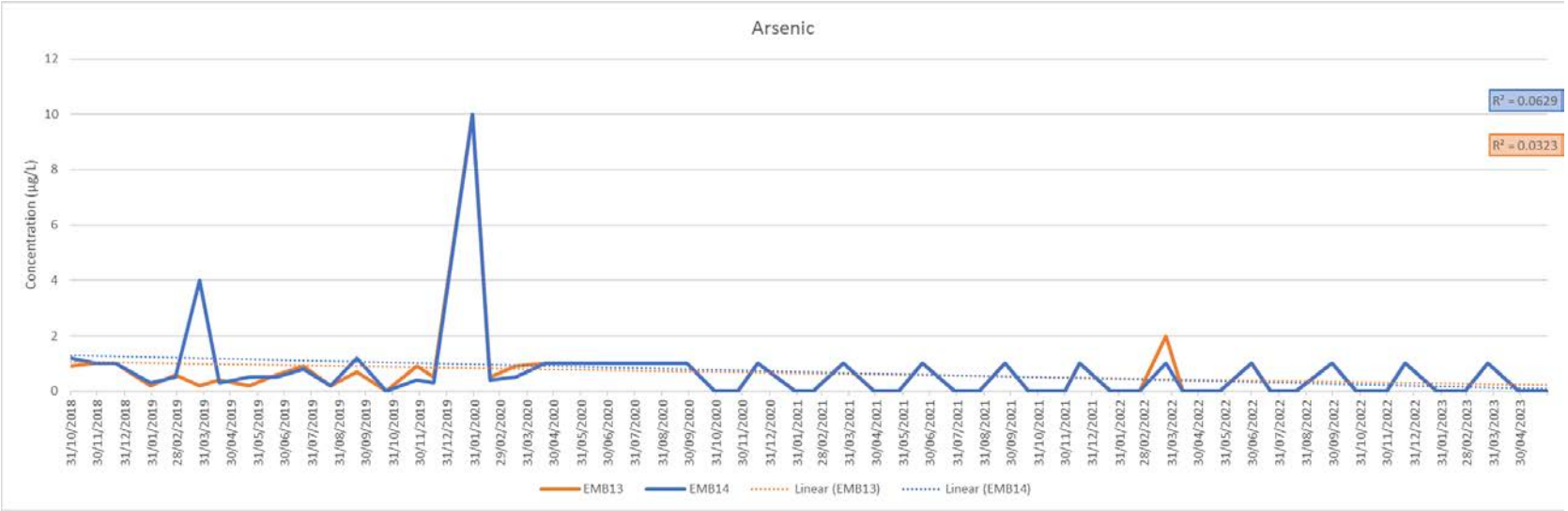


Figure 9 **Arsenic Concentrations**

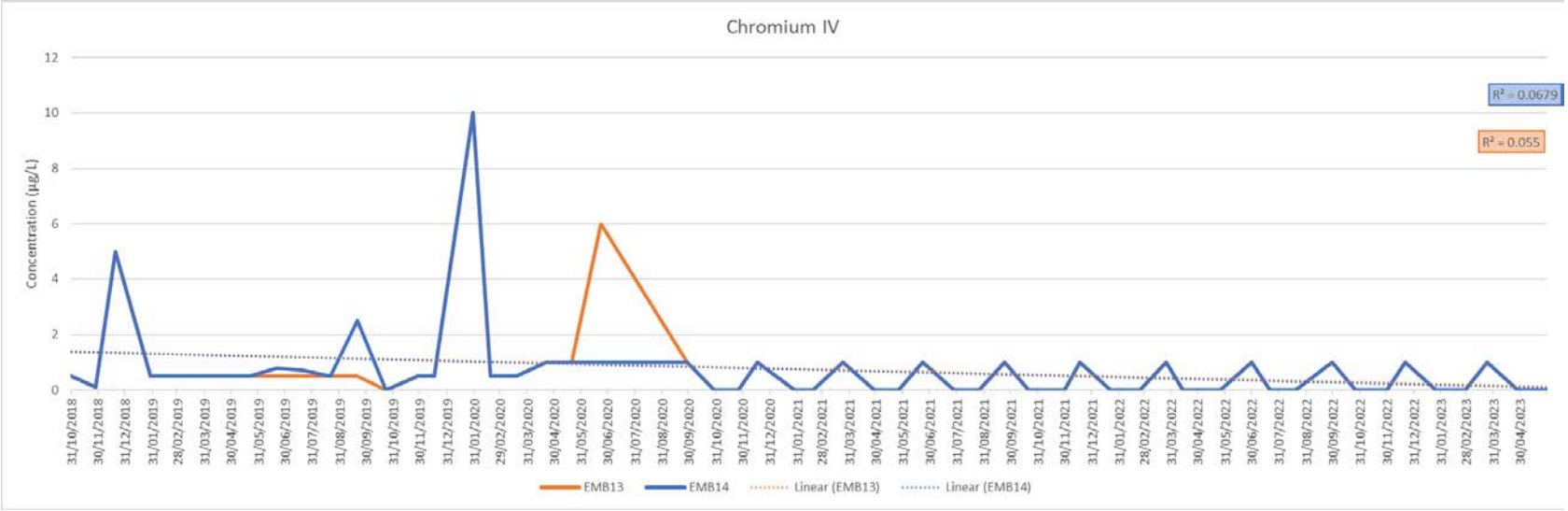


Figure 10 **Chromium IV Concentrations**

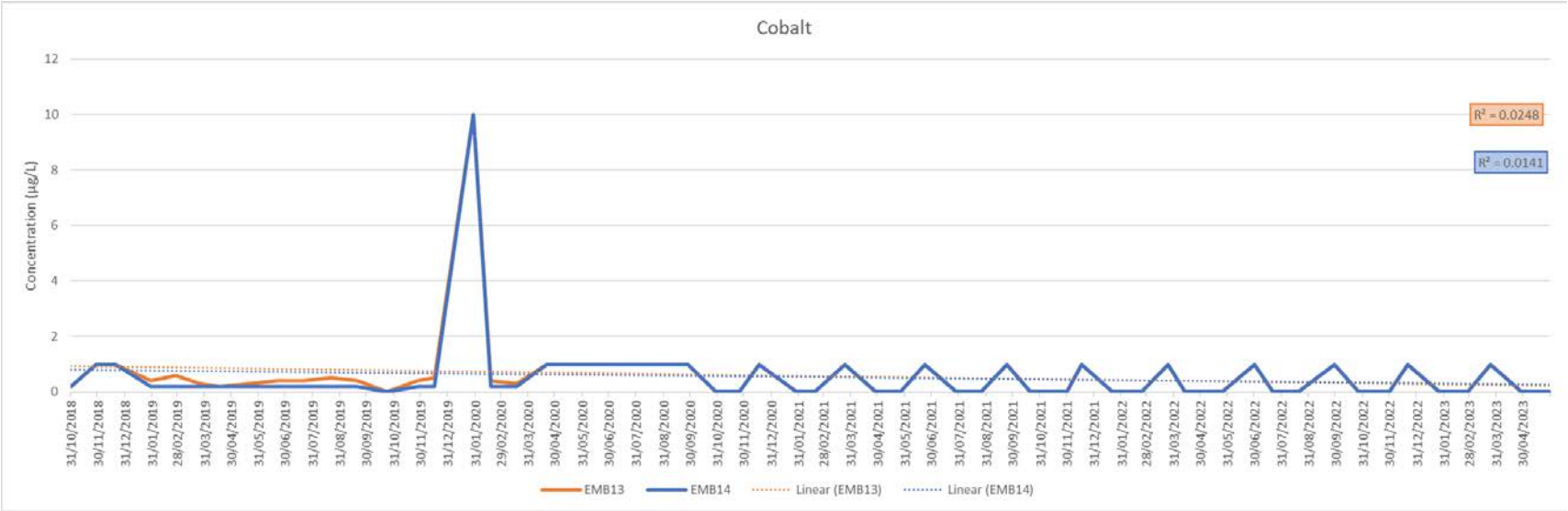


Figure 11 **Cobalt Concentrations**

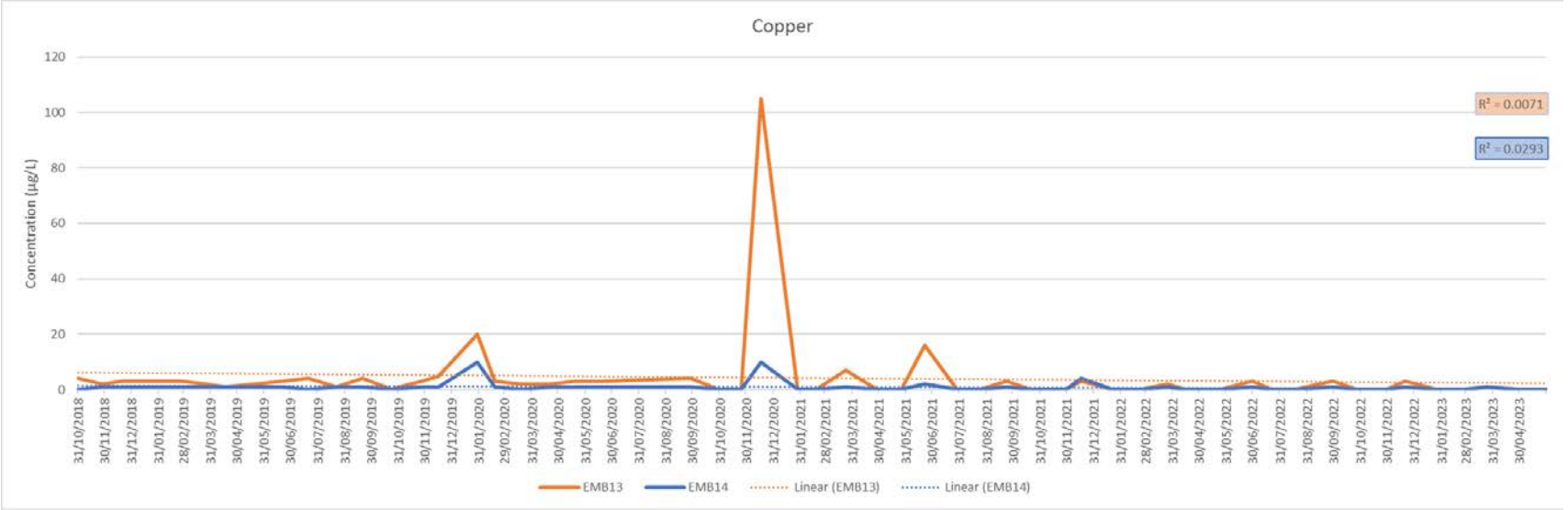


Figure 12 **Copper Concentrations**

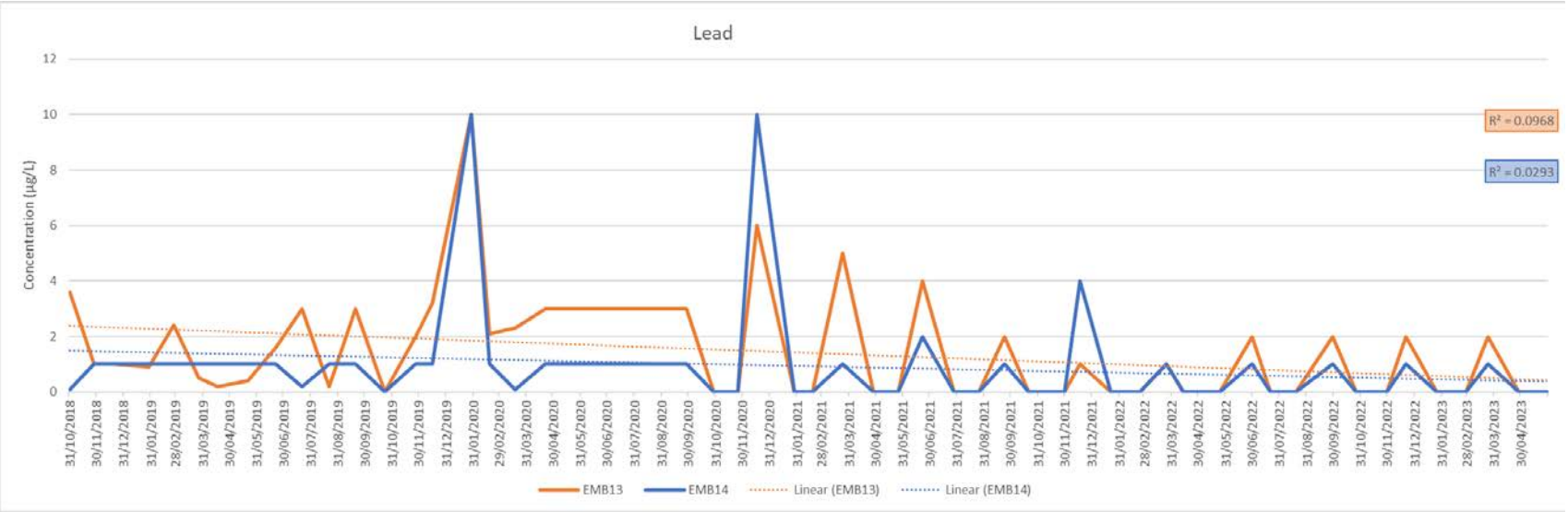


Figure 13 **Lead Concentrations**

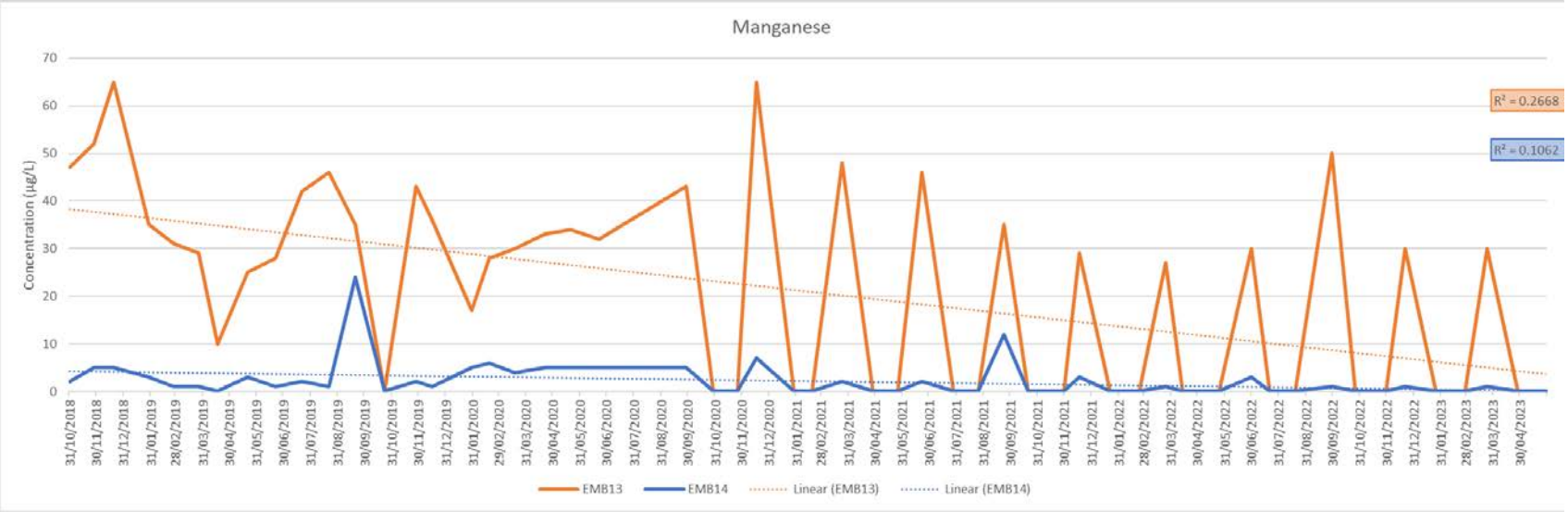


Figure 14 **Manganese Concentrations**

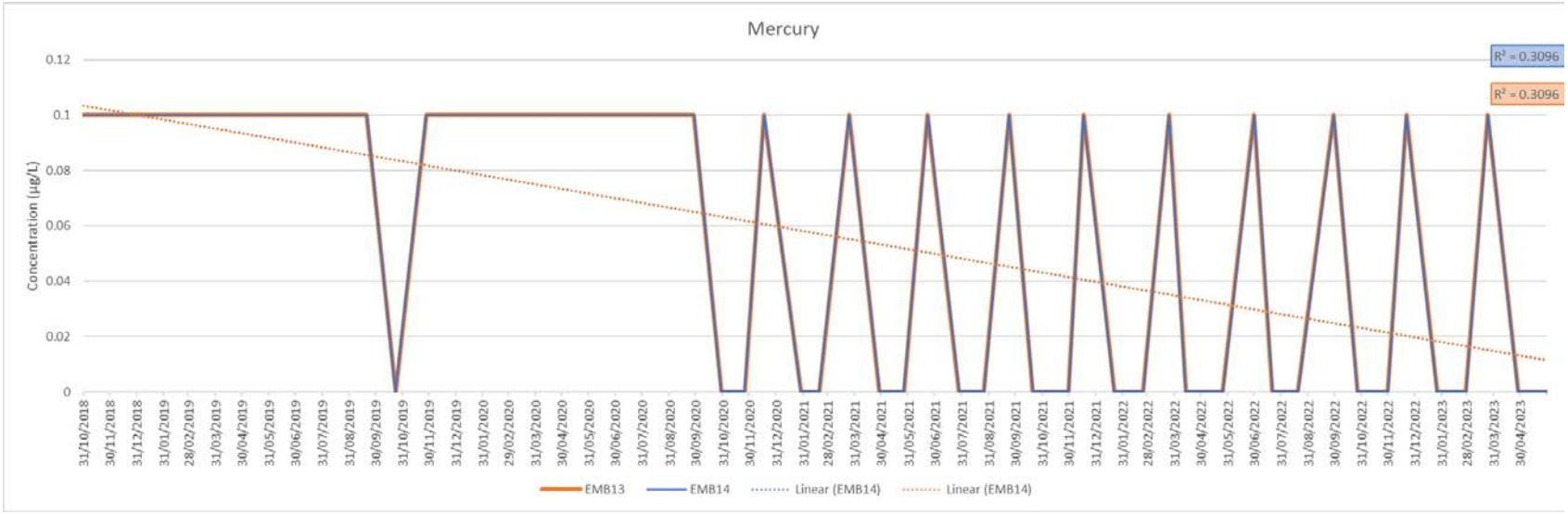


Figure 15 **Mercury Concentrations**

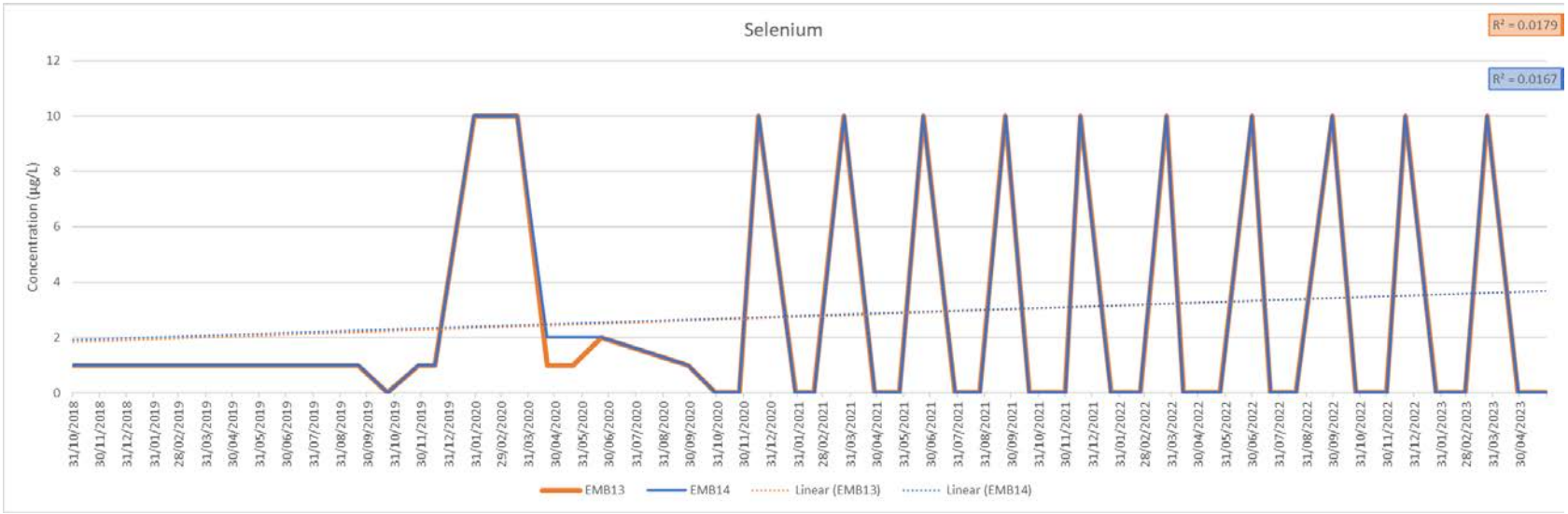


Figure 16 **Selenium Concentrations**

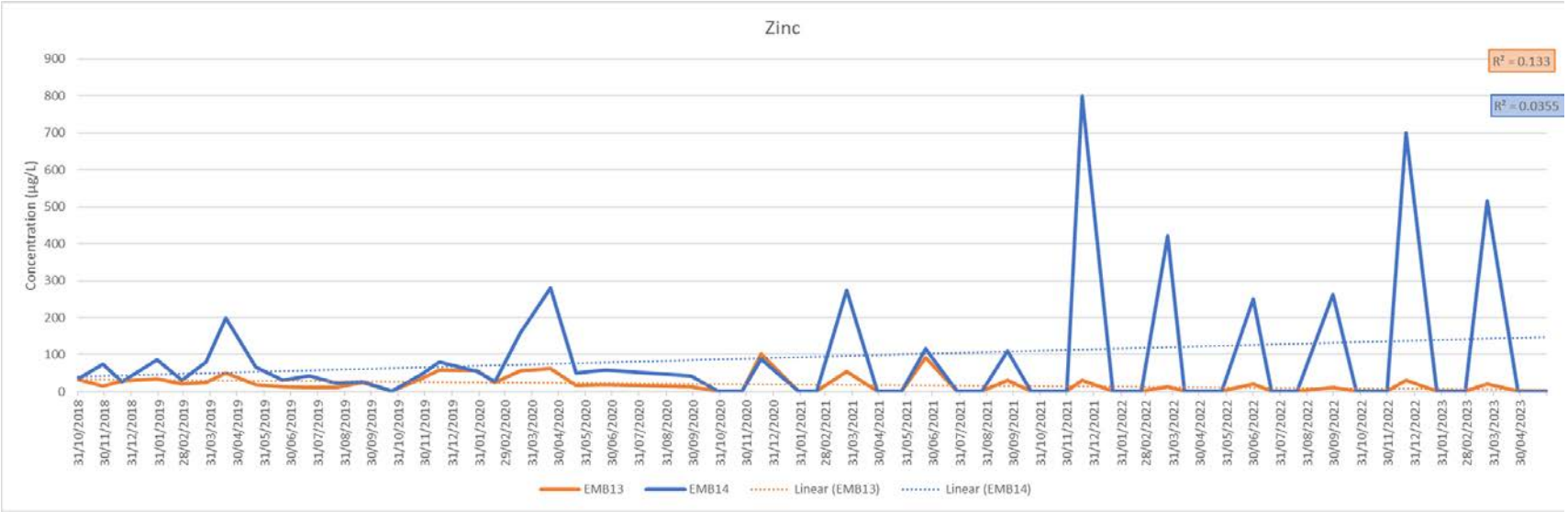


Figure 17 **Zinc Concentrations**

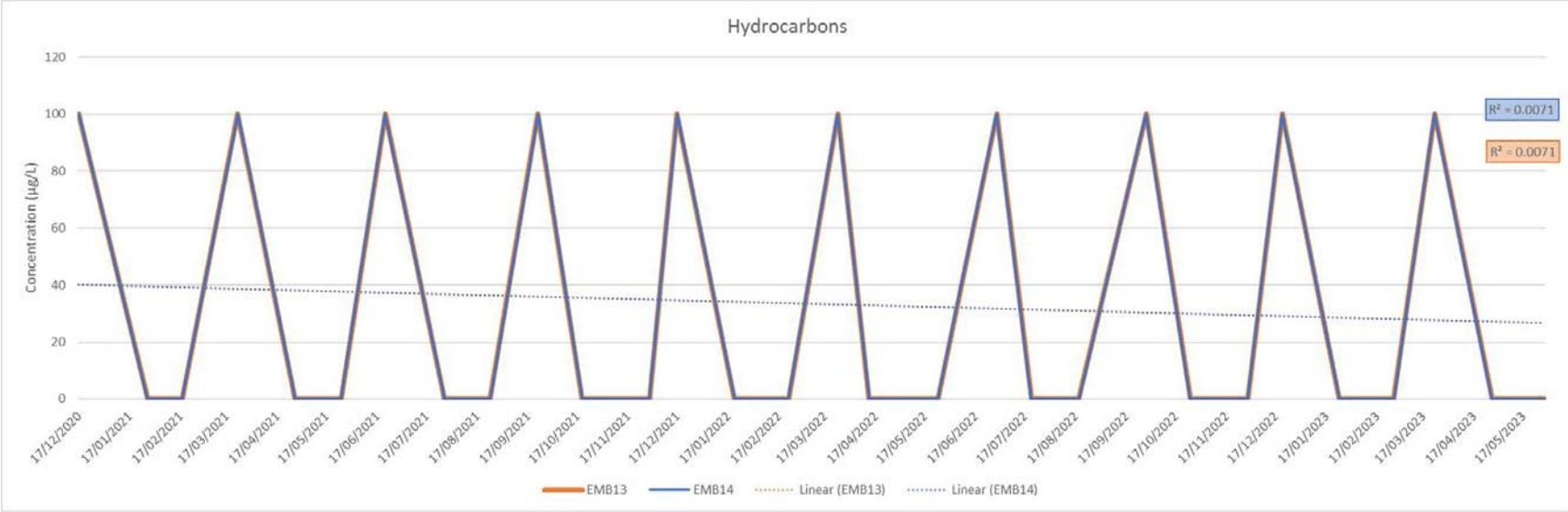


Figure 18 **Hydrocarbon Concentrations**

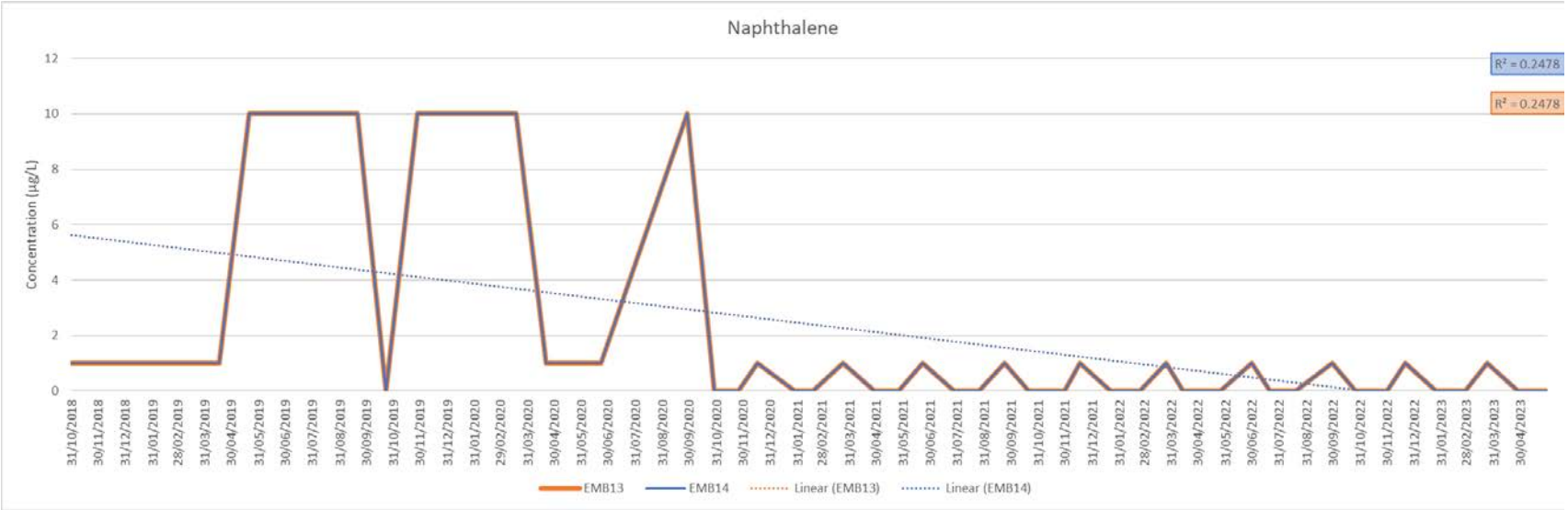


Figure 19 **Naphthalene Concentrations**

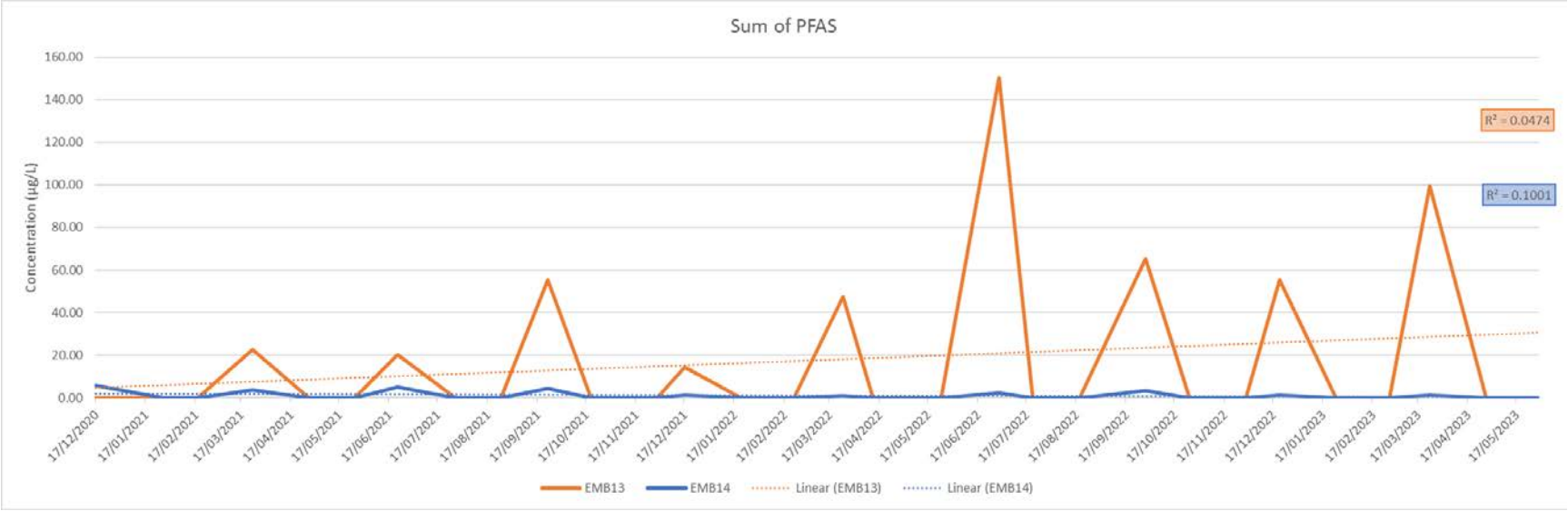


Figure 20 **Sum of PFAS Concentrations**

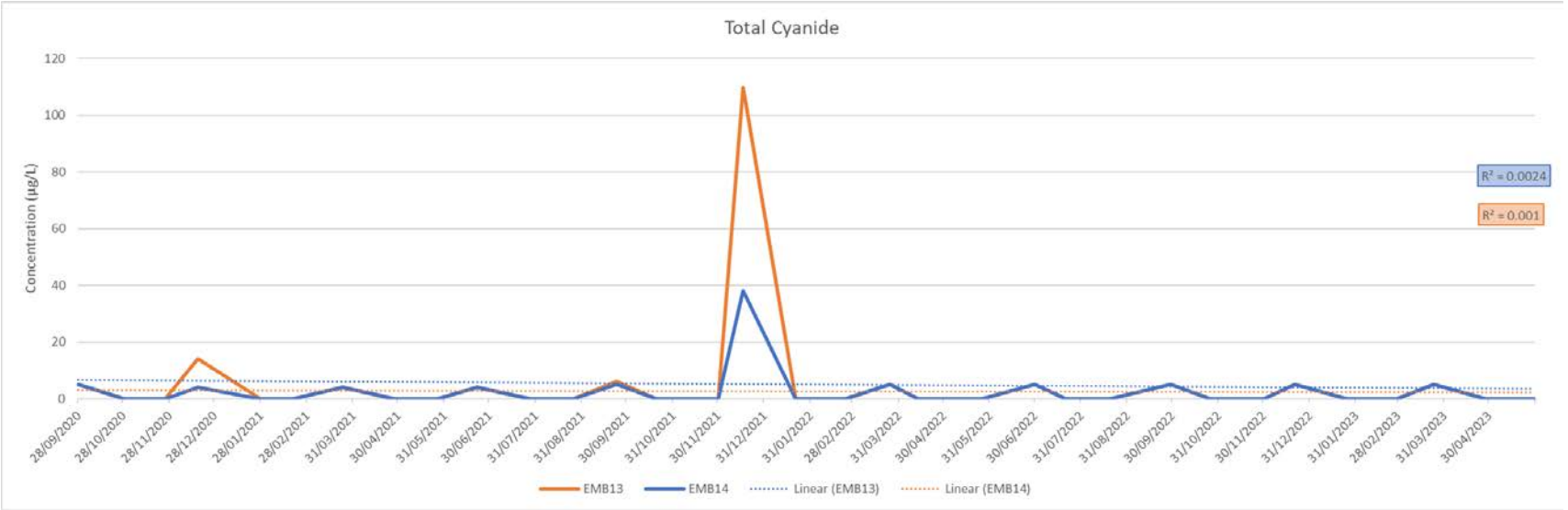


Figure 21 **Total Cyanide Concentrations**

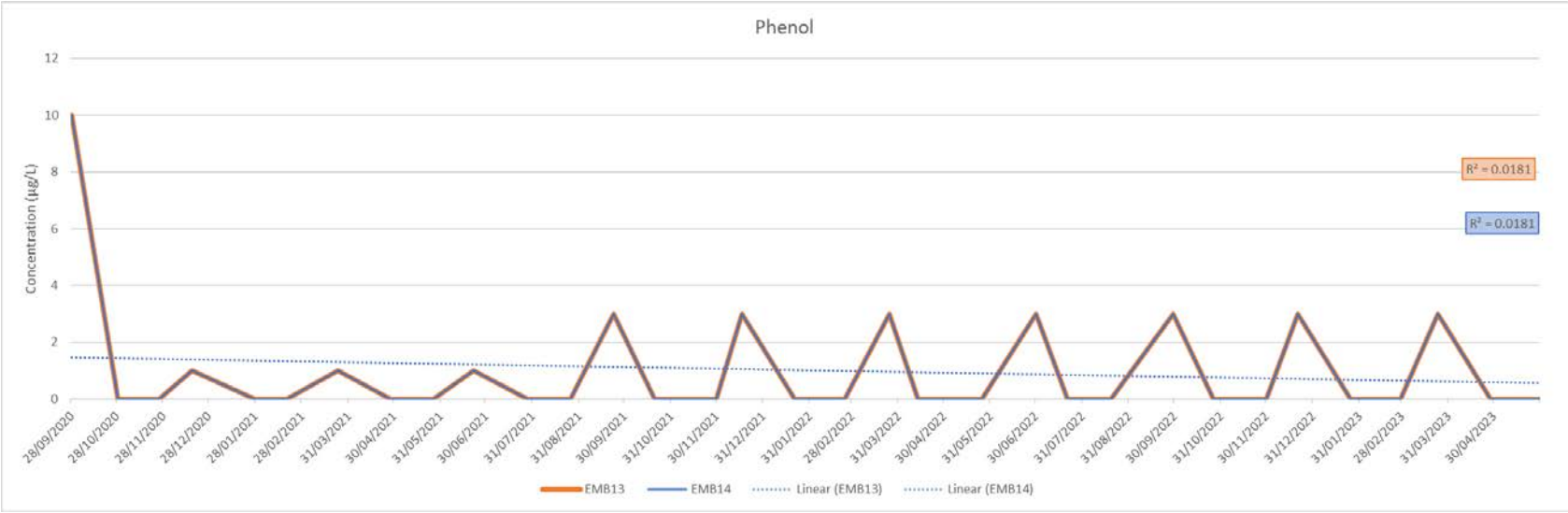


Figure 22 **Phenol Concentrations**

2.4.2.2 EMB7, EMB12, and EMB15 (off-site bores)

- Nutrient concentrations (Total Nitrogen, Oxides of Nitrogen, NH3 and Total Phosphorus) have generally been increasing in the offsite bores since 2020. NH3 concentrations have been increasing in EMB7 with a high r^2 value, whereas EMB12 and EMB15 have remained fairly stable with low r^2 value (Figure 26). Oxides of Nitrogen show a slight increase in EMB15 and EMB7 and EMB12 has fairly stable conditions (Figure 24). All those trends are considered weak due to low r^2 value. Total Nitrogen and Phosphorus have been increasing in all offsite bores with strong r^2 values indicating that this trend is strong (Figure 25 and Figure 26).
- All metals either show stable or decreasing conditions (Figure 27, Figure 28, Figure 29, Figure 30, Figure 31, Figure 31, Figure 32 and Figure 33) . Most decreasing trends have a high r^2 value indicating that those trends are strong.
- Hydrocarbon & Naphthalene have remained stable in all offsite bores (Figure 34 and Figure 35).
- Sum of PFAS showed different trends for each offsite bore. EMB7 showed an increasing trend in Sum of PFAS concentrations, however trend is considered weak due to low r^2 value (Figure 37). EMB15 show fairly stable conditions and EMB12 show a strong decrease trend (high ^{r2} value) (Figure 36).
- Phenol and Total Cyanide show a slight increase with strong r^2 values, therefore trend is considered strong (Figure 38 and Figure 39)
- Note: Data for the offsite shores is still very limited with only three data points for each bore site. Therefore, even if trends are considered strong due to high r^2 value, those trends are not very reliable yet. However, as more data will become available observed trends will become more accurate.

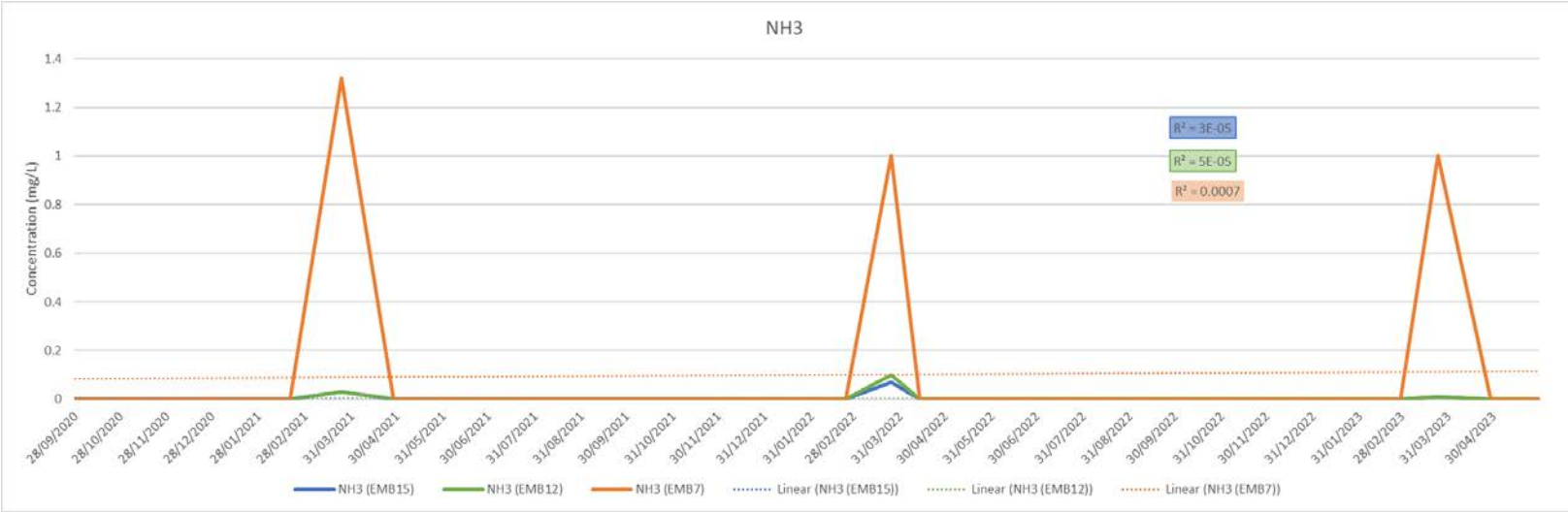


Figure 23 **NH3 Concentrations**

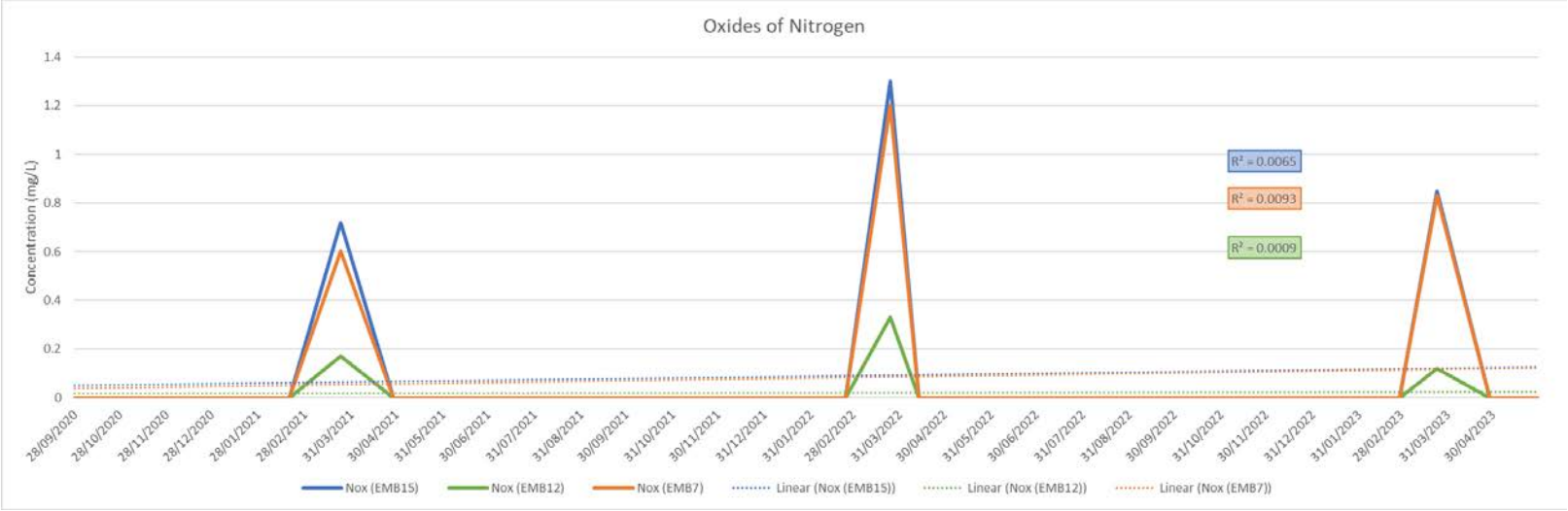


Figure 24 **Oxides of Nitrogen Concentrations**

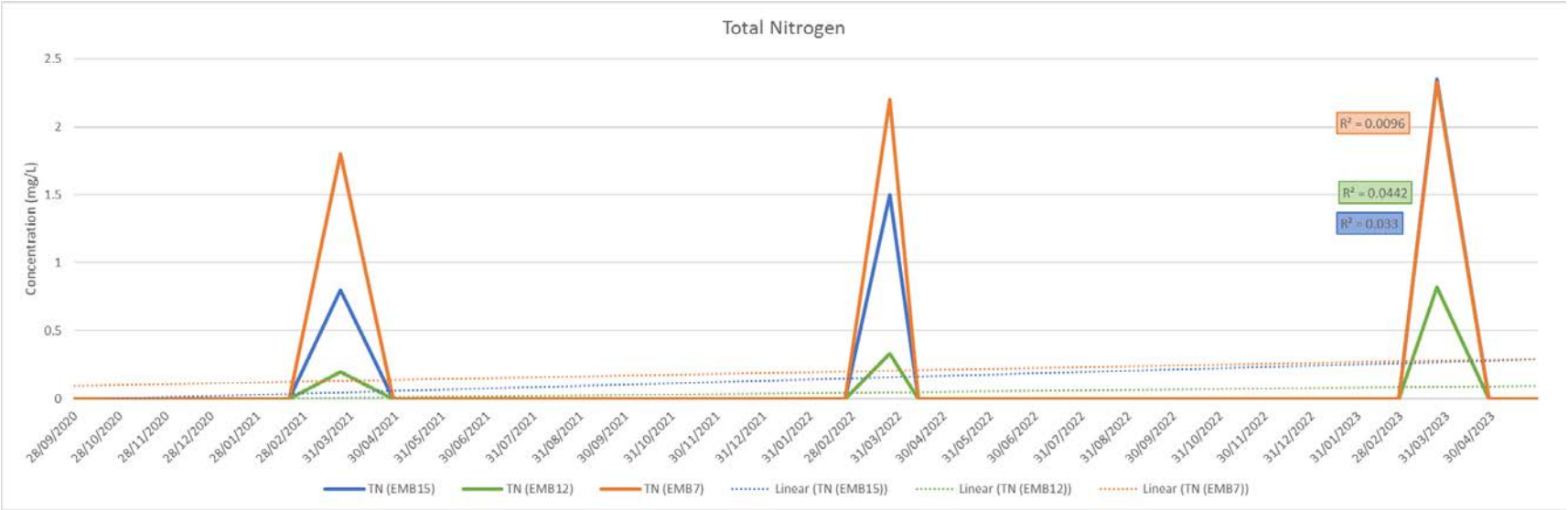


Figure 25 **Total Nitrogen Concentrations**

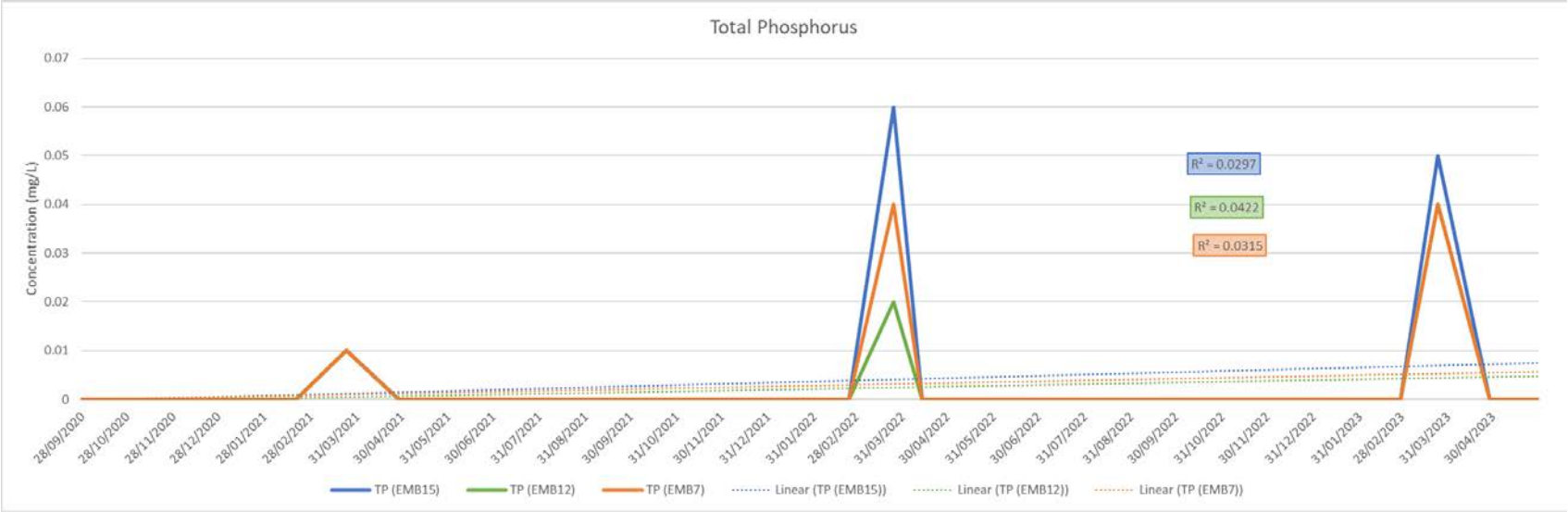


Figure 26 **Total Phosphorus Concentrations**

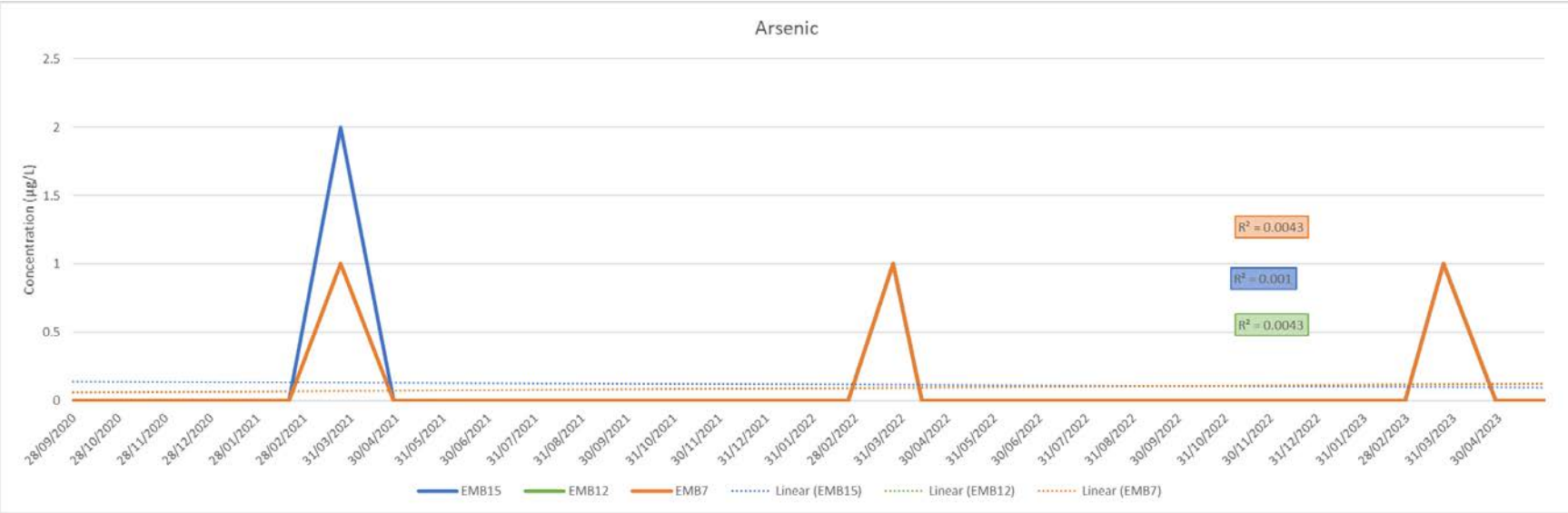


Figure 27 **Arsenic Concentrations**

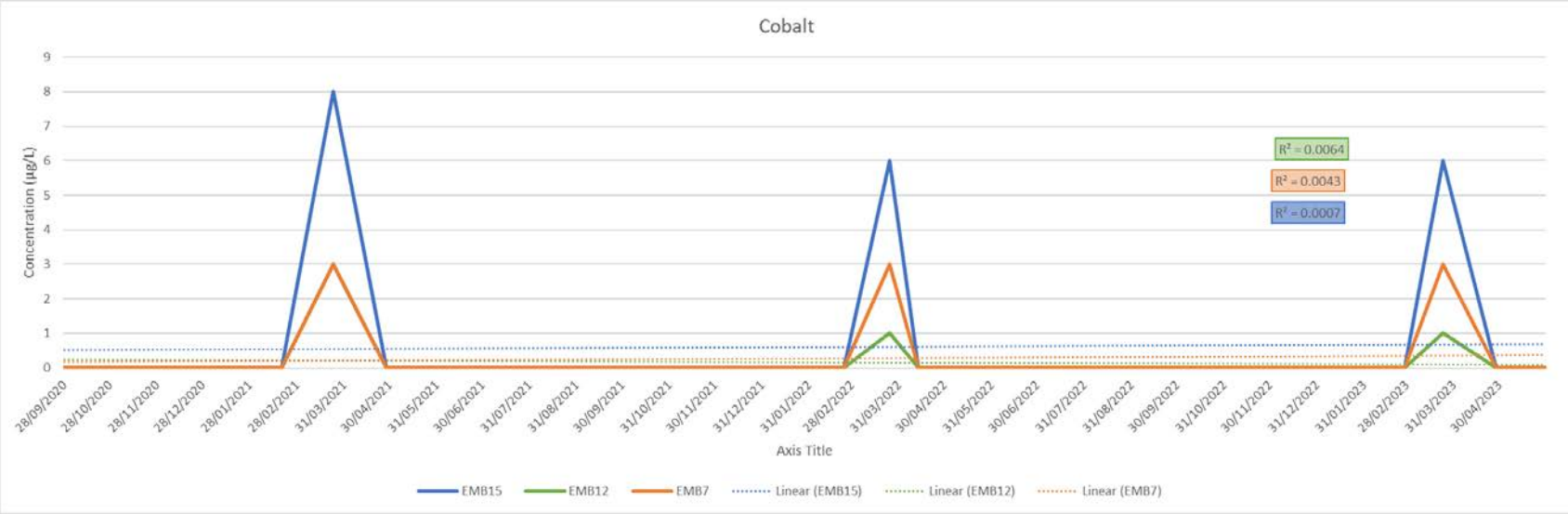


Figure 28 **Cobalt Concentrations**

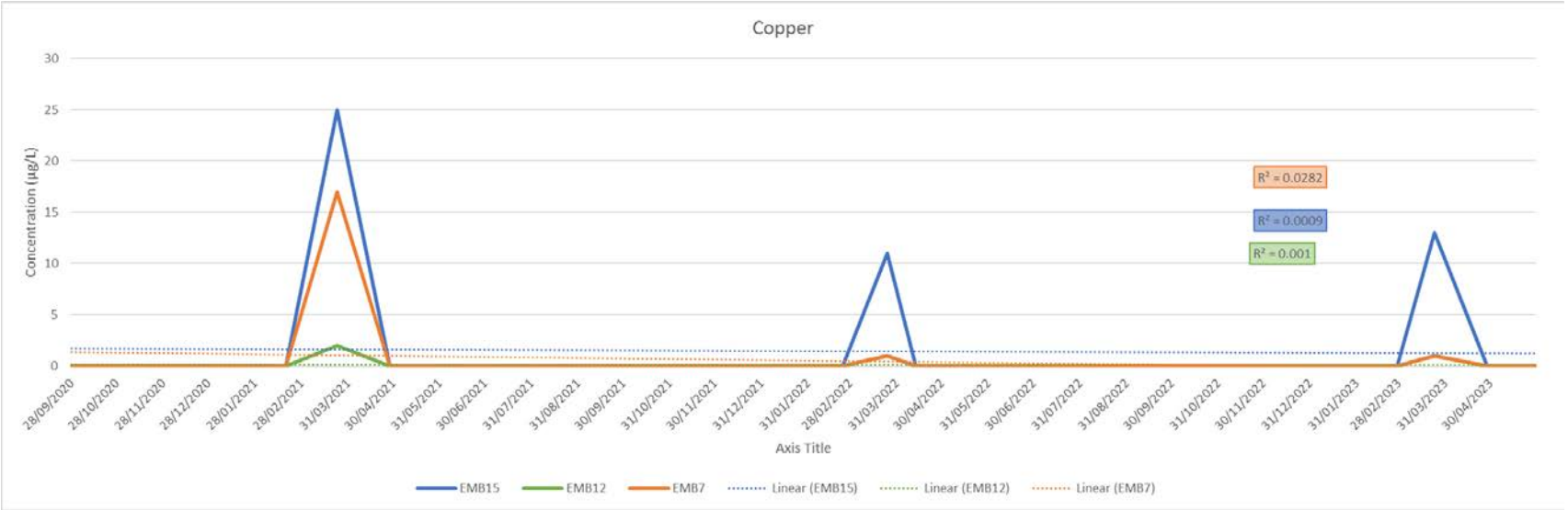


Figure 29 Copper Concentrations

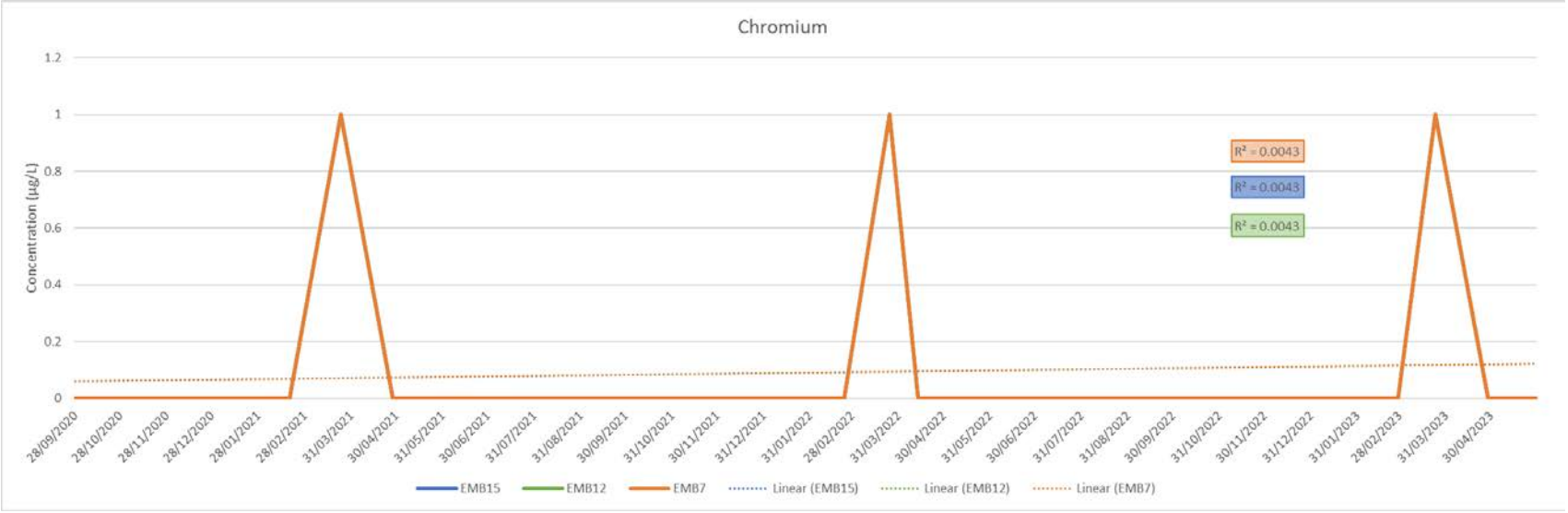


Figure 30 Chromium, Mercury & Selenium Concentrations

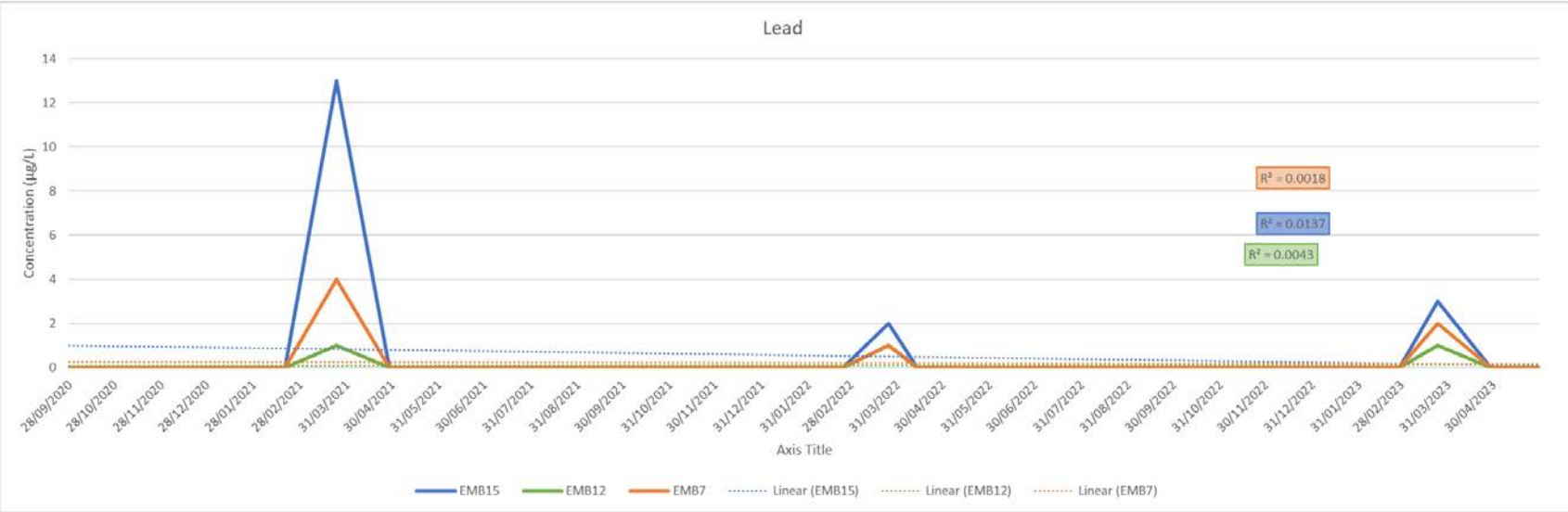


Figure 31 **Lead Concentrations**

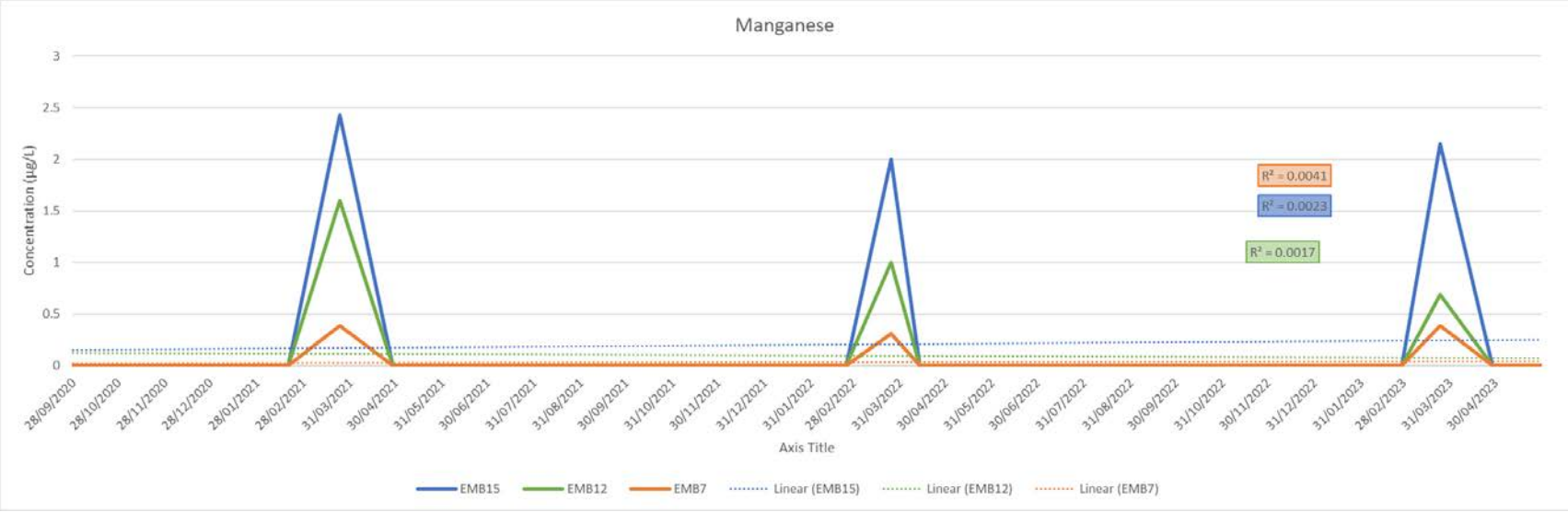


Figure 32 **Manganese Concentrations**

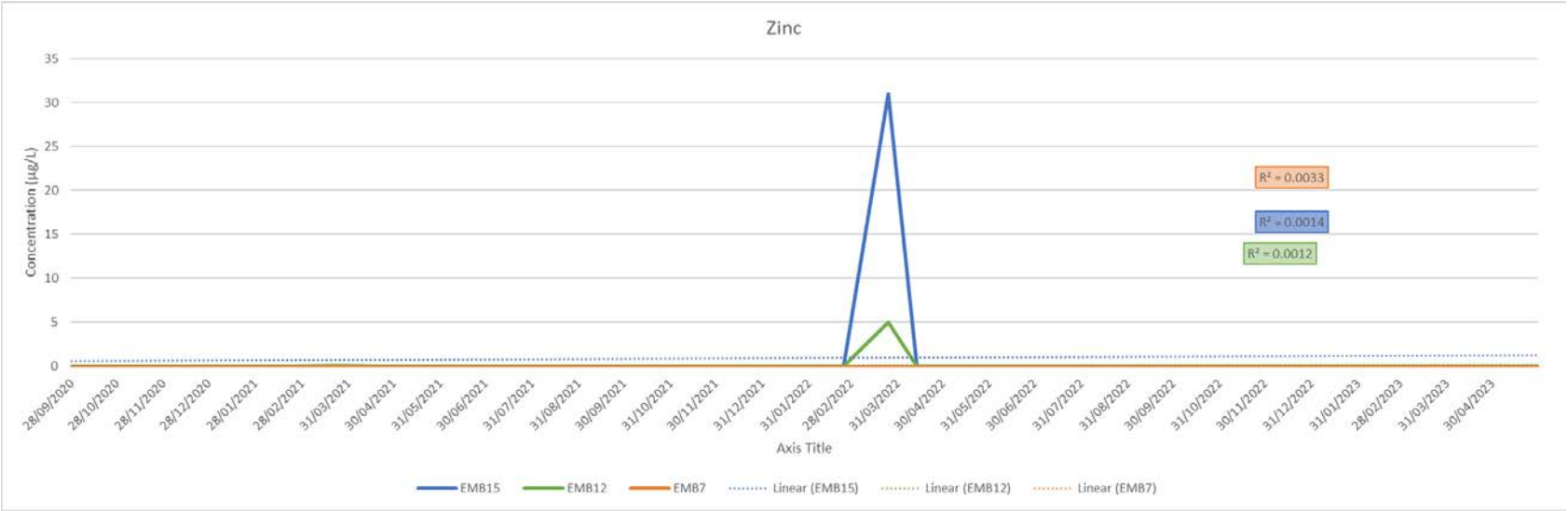


Figure 33 **Zinc Concentrations**

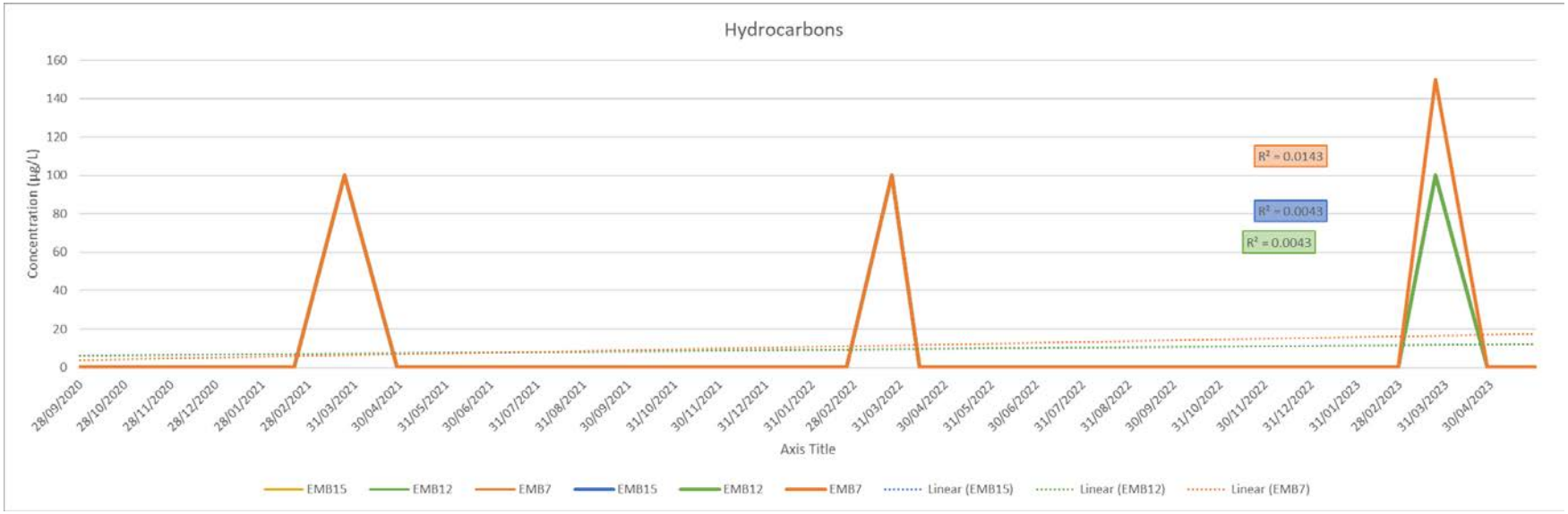


Figure 34 **Hydrocarbon Concentrations**

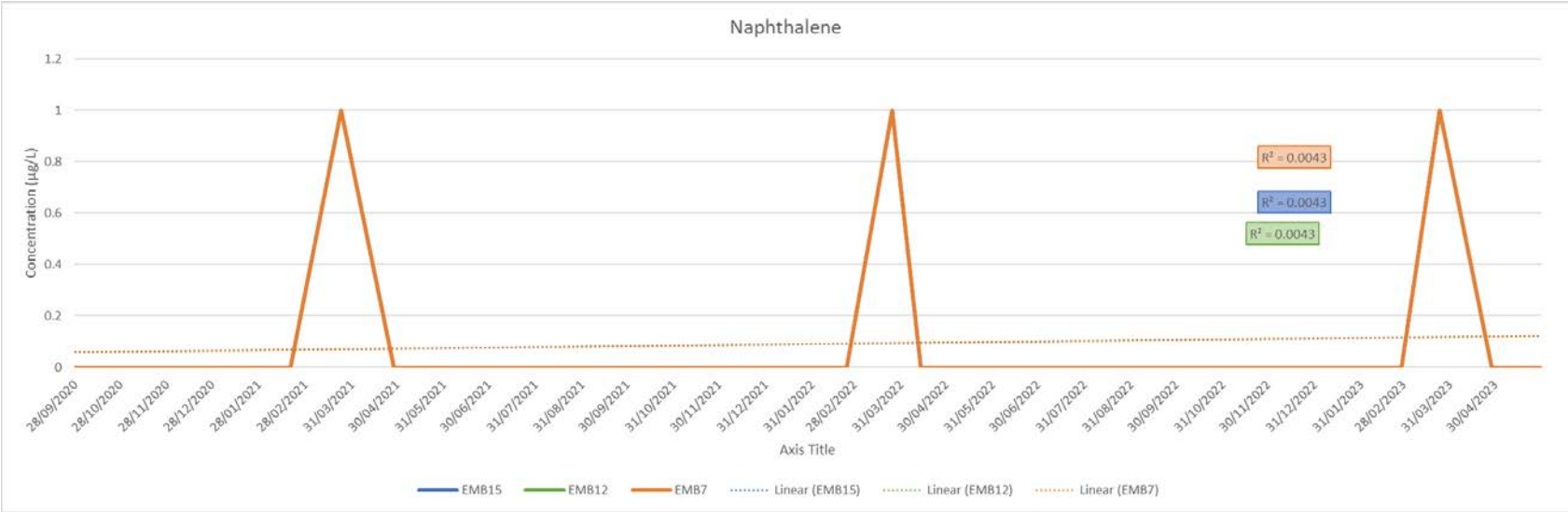


Figure 35 **Naphthalene Concentrations**

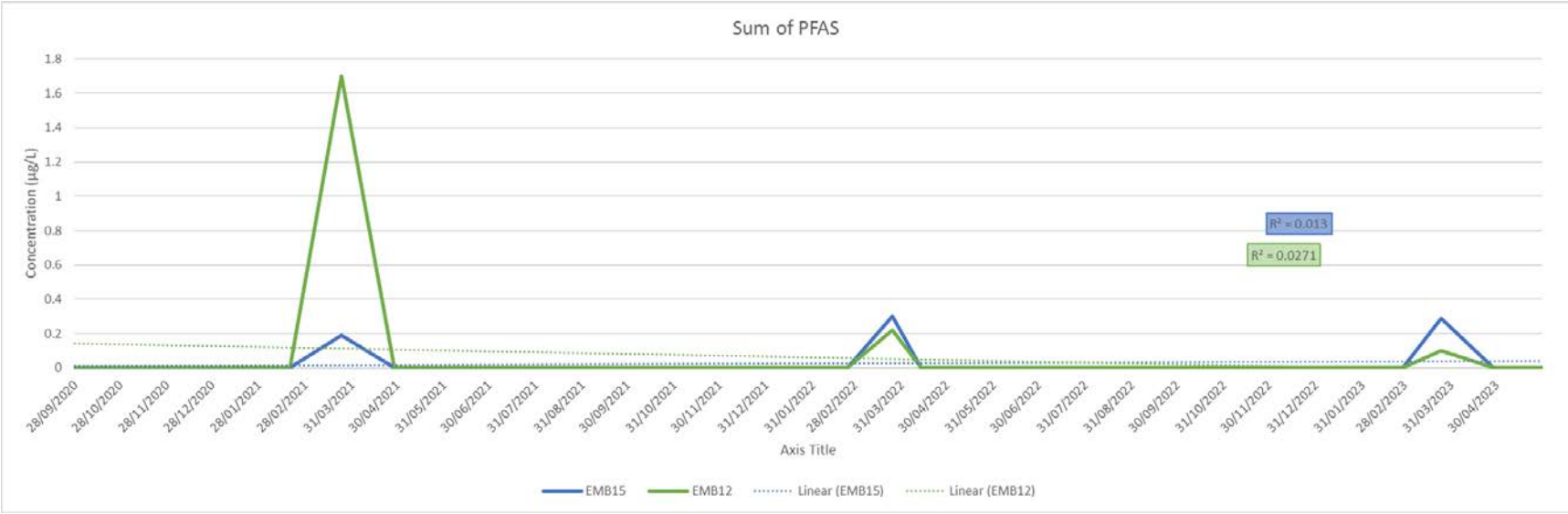


Figure 36 **Sum of PFAS Concentrations of EMB15 and EMB12**

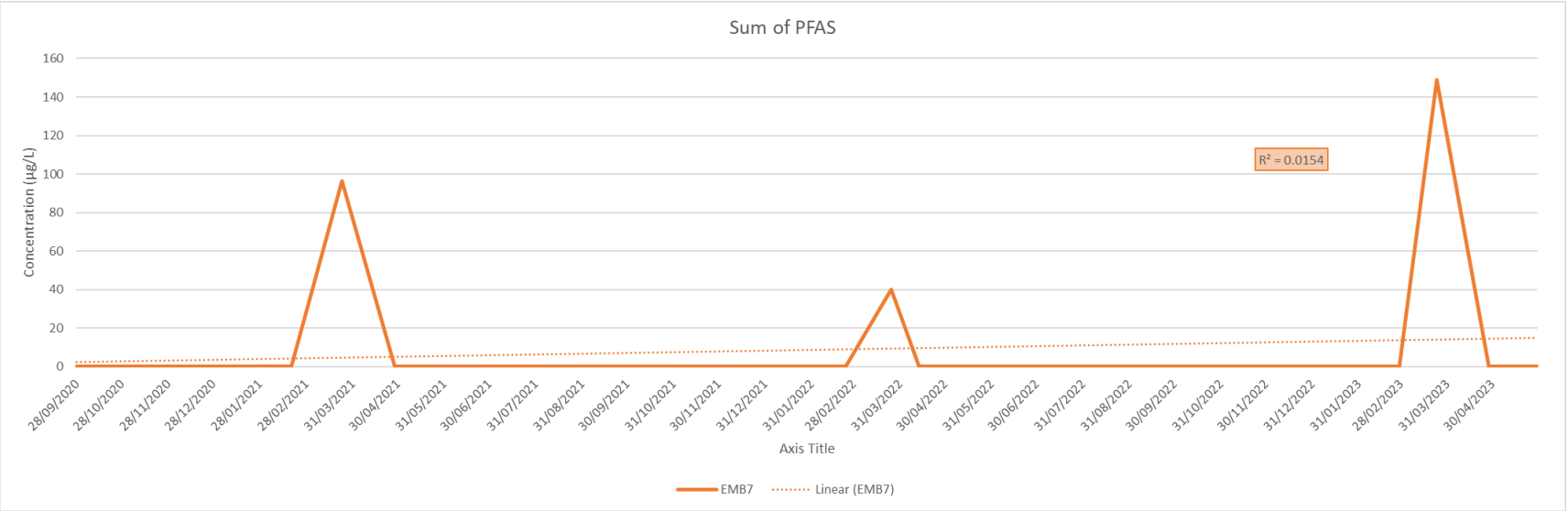


Figure 37 **Sum of PFAS Concentrations of EMB7**

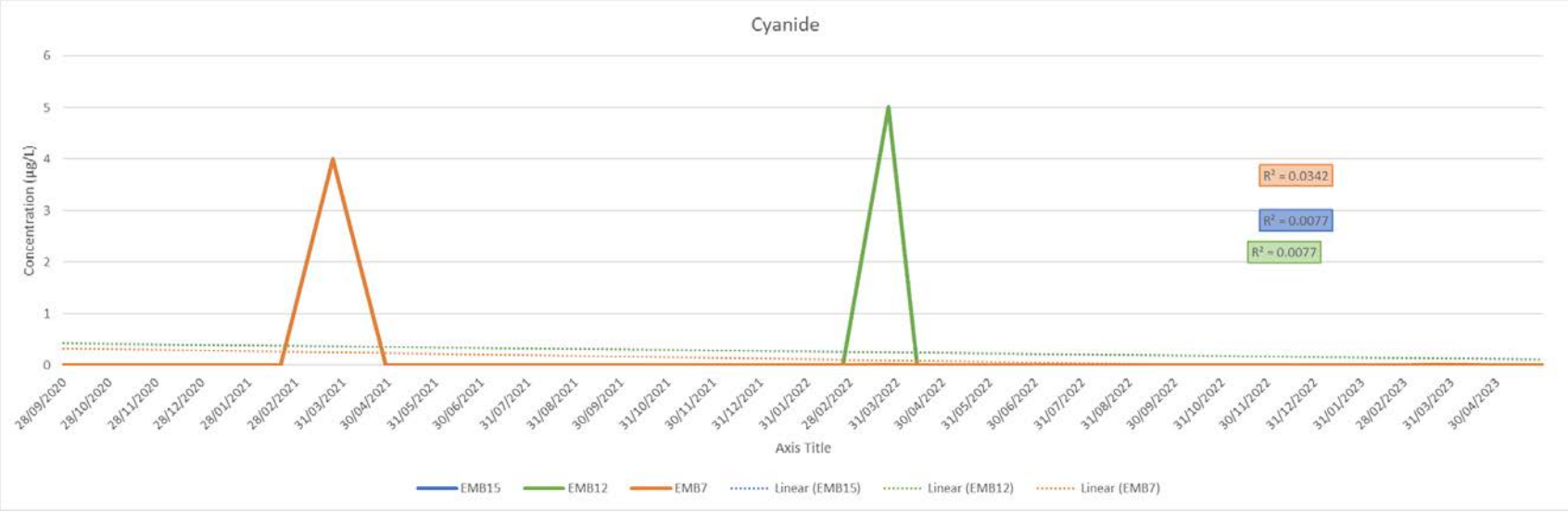


Figure 38 **Total Cyanide Concentrations**

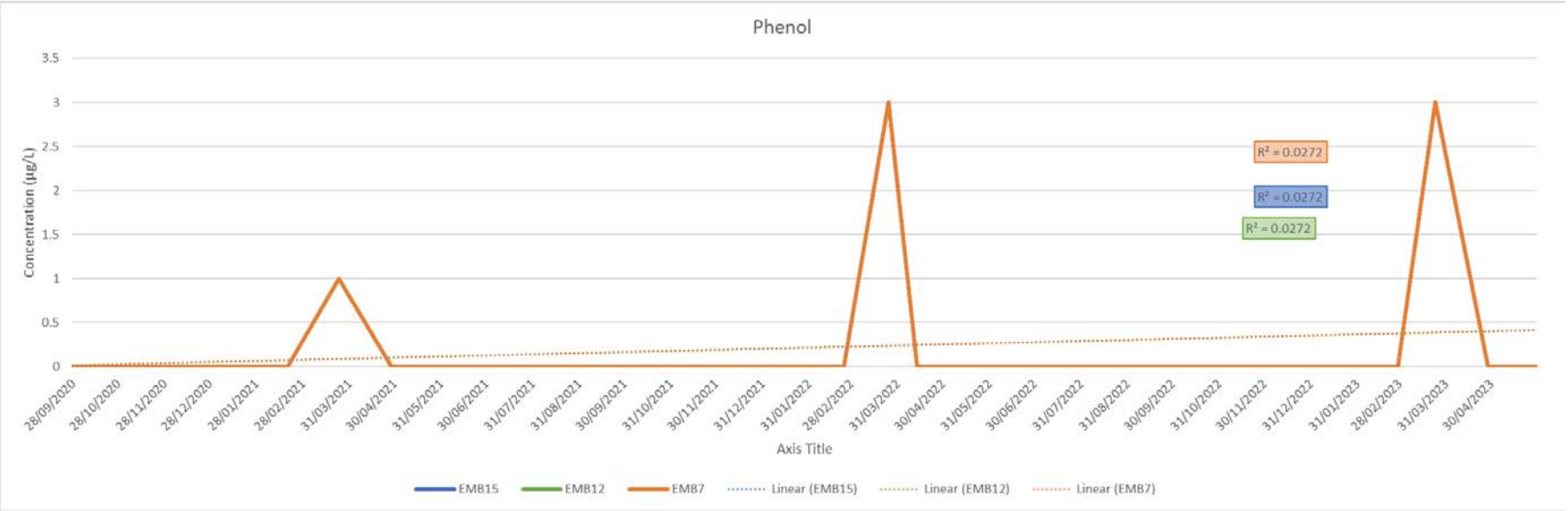


Figure 39 Phenol Concentrations

2.4.3 Compliance with Licence Conditions and Discussion

As per Clause 42 of EPL229-2 (July 2022 to June 2023), the licensee must conduct groundwater monitoring in accordance with Appendix B (monthly, quarterly and annually). Based on this clause there are no non-compliances.

There are likely to be background levels of some heavy metals in the wider East Arm area based on historical results prior to the site becoming operational. Weak trends (both increasing and decreasing) in dissolved metals indicate that past and current activities on site are unlikely to have had an impact on heavy metal concentrations.

EPL229-02 does not provide any specific trigger values for assessment of PFAS; however, whilst technically not a non-compliance of conditions 60.1 or 60.2, PFAS compounds were reported above the limit of reporting (0.1 µg/L) in samples collected from EMB13 and EMB14 during all monitoring events from July 2021 to May 2023. Historical data prior to July 2021, have reported concentrations of PFAS compounds above the limit of reporting. Weak increasing trends have been determined for EMB13 since 2020. Due to the low r^2 value of these weak trends, the concentrations are generally considered stable. The data indicates that PFAS concentrations have been potentially present in the groundwater at the site before the site was operational (pre-2018) and while the source of contamination is unknown, it is unlikely that past and current activities on the GRR or Vopak site's have not had an impact on the concentrations.

The significant environmental receptors are the mangrove communities and the Darwin Harbour to the east and west of the site. Groundwater flow direction during the wet season (December to April) is generally moving in a northwest direction, toward the mangrove community and Darwin Harbour. During the dry season (April to October), groundwater is flowing in a northeast direction towards Berrimah.

While the potential for groundwater contamination is minimised through the extensive use of impervious surfaces across the site and through all storage tanks being above ground and located in bunded concrete containment areas; groundwater contamination is recognised as a potential risk as contamination could be associated with loss of integrity in bunded containment structures in operations areas or through the interaction of surface water with ground water following an uncontained spill outside operational areas. Such occurrences could result in the uncontrolled release of waste materials into the groundwater system which could impact on local marine environment.

Section 3 Surface Water Monitoring

In accordance with EPL requirements, the Surface Water Monitoring events are undertaken as per EPL229-02 Appendix A which outlines the surface water monitoring scope and analytical program. The purpose of the surface water monitoring is to measure in-situ parameters and collect surface water samples for laboratory analysis from the stormwater discharge pit. The stormwater discharge pit and monitoring location is presented in Figure 40.

The stormwater process is presented in Appendix E, with daily in-situ parameters taken during release times and monthly full analytical suites in compliance with Appendix A of EPL 229-02.

The Surface Water Monitoring for full analytical suites during this annual reporting period were undertaken monthly on the following dates:

- 09 October 2022
- 22 November 2022
- 15 December 2023
- 31 January 2023
- 16 February 2023
- 14 March 2023
- 3 April 2023

There was no surface water discharge between the months of June 2022 and September 2022 and none in May 2023, so no monitoring was undertaken.

Specific details on the methodologies implemented for each surface water sampling event are described below. A summary of the typical surface water sampling programme and testing schedule is described in Table 3.

Table 3 Surface Water Sampling Programme 2022-2023

Sample Round	Environmental Monitoring Bores	Analysis
Daily	SWMP1	In-situ parameters (pH, temp, EC, DO)
Before a discharge event	SWMP1	In-situ parameters (pH, temp, EC, DO) Nutrients (NH3, NOx, TKN, TN, TP) Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb. Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons Cyanide Glycols Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) PFAS Polychlorinated Biphenyls Total Suspended Solids (TSS) Total Dissolved Solids (TDS)



Figure 40 **Darwin Liquid Waste Treatment Stormwater Monitoring Location**

3.1 Surface Water Sampling Methodology

Surface water monitoring has been undertaken at site since October 2018. GRR staff undertake the surface water monitoring and samples are collected from the final chamber of a stormwater pit. Field readings are taken from the contents of the sample bucket using a portable probe. Samples required for laboratory analysis are transferred directly into the relevant sample bottles from the same bucket.

The following methodology was applied:

- Sample jars and sample bucket are collected from an appropriate laboratory.
- The rain gauge is checked, and the reading is recorded.
- The jar labelled as 'Rain' is filled with contents from the gauge. If there is not enough to fill the jar, the rain bucket around the side of the administration building is used to fill the jar. The rain bucket is then emptied.
- A bucket connected to a chain is lowered into the stormwater pit, filled with water and raised.
- A jar labelled, 'Stormwater' is rinsed three times with the water from the stormwater pit, then the jar is filled.
- The bucket is emptied back into the pit and is left upside down, near the pit.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All surface water samples were collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.

The field records and calibration records of surface water sampling events undertaken by GRR staff are provided in Appendix F and laboratory certificates are provided in Appendix G.

GRR has also established its own laboratory facilities on site to enable it to test incoming waste streams, monitor and develop treatment methodologies and monitor compliance. The Laboratory is also utilised for analysis of the product glycol and oils generated prior to sale.

3.2 Surface Water Assessment Criteria

The EMP and EPL 229-02 prescribes several surface water assessment criteria to determine the acceptability and investigation limits of individual analytes in the water before it is discharged from site. Where exceedances to these criteria are reported from field water quality measurements or laboratory results, a EPL 229-02 requires notification of these exceedances to NT EPA in accordance with EPL Clause 54.

These acceptance criteria have been summarised in Table 4.

Table 4 EPL 229-02 Surface water acceptance criteria values

Parameter	Units	Acceptance Limit (EPL 229-02 Attachment A)
In-situ		
pH	pH units	7.0-8.5
Dissolved Oxygen	%	80-100
Nutrients		
Total Phosphorous	µg/L	20
Total Nitrogen	µg/L	270
Oxides of Nitrogen	µg/L	20
Ammonium	µg/L	20
Metals (total and dissolved)		
Antimony	µg/L	270
Arsenic	µg/L	4.5
Boron	µg/L	5,100
Cadmium	µg/L	5.5
Chromium VI	µg/L	4.4
Cobalt	µg/L	1
Copper	µg/L	1.3
Lead	µg/L	4.4
Manganese	µg/L	80
Mercury	µg/L	0.4
Nickel	µg/L	70
Selenium	µg/L	3
Vanadium	µg/L	100
Zinc	µg/L	15
Hydrocarbons		
Benzene	µg/L	700

Parameter	Units	Acceptance Limit (EPL 229-02 Attachment A)
Toluene	µg/L	180
Naphthalene	µg/L	70
Other		
PFOS	µg/L	0.13
PFAS	µg/L	220
Total Cyanide	µg/L	4
Phenols	µg/L	400
TSS	mg/L	10

3.3 Quality Assurance/Quality Control

Stormwater samples were collected from the relevant surface water monitoring location on all occasions. Quality Assurance / Quality Control (QA/QC) measures for this investigation were based on AS4482.1–2005 and include:

- Appropriate sample labelling, preservation, storage and transport under chain of custody procedures.
- Laboratory analyses conducted within appropriate holding times.
- The use of laboratories that hold NATA accreditation for the analyses undertaken. The laboratories used for the analyses were Eurofins. The laboratories are approved by the National Association of Testing Authorities (NATA), and the analyses conducted are within the NATA registration of the laboratories.

The QA/QC controls are considered adequate as per the relevant standards and guidelines.

3.4 Surface Water Monitoring Results

The methodologies described in Section 3.1 were implemented during each of the surface water monitoring events during this annual reporting period. Field water quality parameter measurements (Table 5) were collected at the sample site using a calibrated water quality meter. The analytical and physico-chemical results are presented in a spreadsheet (Appendix H). Table 6 provides a summary of the results from the monthly monitoring events for this annual reporting period. Due to data of the majority of parameters being unavailable for the initial years of monitoring, the long term average has been based on the 2020/2021, 2021/2022 and 2022/2023 reporting periods. As more data becomes available each year, these averages will become more refined and trends will be determined.

Table 5 In-situ Surface Water Monitoring Parameter Results

Site ID	Date	In-situ Parameters			
		Temperature (°C)	pH	EC (µS/cm)	DO (%)
SWMP1	29/09/2022				
SWMP1	03/10/2022				
SWMP1	08/10/2022				
SWMP1	09/10/2022	28	7.6	420	87.7
SWMP1	13/10/2022	26	7.42	270	83.9
SWMP1	16/10/2022	25	7.17	427	85.9
SWMP1	15/11/2022	30	7.87	541	85.4
SWMP1	16/11/2022	26	7.49	116	86.3

Site ID	Date	In-situ Parameters			
		Temperature (°C)	pH	EC (µS/cm)	DO (%)
SWMP1	18/11/2022	25	7.54	93	87.5
SWMP1	21/11/2022	31	7.22	49	81.7
SWMP1	25/11/2022	26	7.5	244	80.3
SWMP1	28/11/2022	28	7.25	64	83.9
SWMP1	29/11/2022	28	7.11	170	86.7
SWMP1	30/11/2022	28	7.2	162	86.1
SWMP1	07/12/2022	26	7.3	110	87.4
SWMP1	16/12/2022	28	7.26	142	84
SWMP1	19/12/2022	28	7.25	120	82
SWMP1	21/12/2022	27	7.36	124	82.9
SWMP1	22/12/2022	27	7.35	127	84.9
SWMP1	23/12/2022	27	7.41	115	87.1
SWMP1	28/12/2022	26	7.19	112	82
SWMP1	29/12/2022	28	7.3	140	83.1
SWMP1	30/12/2022	29	7.29	164	82.9
SWMP1	03/01/2023	26	7.41	126	85.6
SWMP1	04/01/2023	26	7.35	156	86.1
SWMP1	06/01/2022	26	7.2	116	84
SWMP1	09/01/2023	27	7.29	120	86.8
SWMP1	25/01/2023	26	7.45	126	85.9
SWMP1	30/01/2023	27	7.41	130	82.6
SWMP1	03/02/2023	27	7.54	121	86.1
SWMP1	06/02/2023	26	7.89	94	87
SWMP1	10/02/2023	27	7.62	91	86.2
SWMP1	13/02/2023	25	7.42	86	88.1
SWMP1	15/02/2023	28	7.84	42	84.2
SWMP1	20/02/2023	27	7.65	59	85.3
SWMP1	22/02/2023	27	7.71	62	86
SWMP1	24/02/2023	28	7	102	87.2
SWMP1	26/02/2023	26	7.6	114	84.3
SWMP1	28/02/2023	27	7.68	120	82.6
SWMP1	03/03/2023	28	7.59	121	85.1
SWMP1	08/03/2023	27	7.62	123	84.9
SWMP1	09/03/2023	28	7.58	115	84.7
SWMP1	15/03/2023	26	7.21	98	86.1
SWMP1	21/03/2023	25	7.1	112	80.6
SWMP1	27/03/2023	27	7.8	101	89.2

Site ID	Date	In-situ Parameters			
		Temperature (°C)	pH	EC (µS/cm)	DO (%)
SWMP1	05/04/2023	28	7.92	108	88
SWMP1	11/04/2023	26	7.5	112	85.2
SWMP1	12/04/2023	27	7.7	124	88.3
SWMP1	14/04/2023	27	7	78	82.5

Key findings from a review of the water quality results include:

- In-situ measurements were within the licence trigger value range.
- Some Nutrients, Metals, Hydrocarbons and others had values preceding by '<' indicating that concentrations had been detected, but not at precise concentrations. For example, data for naphthalene has been displayed conservatively, i.e. it has been assumed that the detection has been at the upper limit of the possible detection range. For example, where naphthalene has been recorded as <1000 µg/L, it has been assumed that the reading was 1000 µg/L.
- Nutrients (Total Phosphorous, Total Nitrogen, Oxides of Nitrogen and Ammonium) all exceeded the licence trigger value (Figure 41). Total Phosphorous and Total Nitrogen were both multiple times above trigger values throughout the reporting period. These Exceedances were considered reportable as they occurred across at least three consecutive monitoring events. Ammonium and Oxides of Nitrogen exceeded once the licence trigger value throughout the reporting period (Figure 42). However, only one data point for Oxides of Nitrogen was recorded in during the reporting period. All Nutrients 2023 average concentrations exceeded the trigger values.
- Six metals (Arsenic, Cobalt, Copper, Manganese, Selenium, Zinc) were determined to exceed the licence trigger values. Copper, Manganese and Zinc had all multiple exceedances (Figure 45, Figure 46 and Figure 48.), whereas Arsenic, Cobalt and Selenium all had one data point above the trigger values throughout the recording period (Figure 43, Figure 44 and Figure 47). The 2023 average concentrations for these parameters except Arsenic and Selenium, also exceeded the trigger values. Overall, many of the metals showed a decline in the concentration values, compared to the 2022 report. In the 2021-2022 report period nine metal concentrations exceeded the licence trigger values, whereas in the most recent report period only six metals exceeded. Additionally, Arsenic had one exceeded trigger value, but the concentration value is not reportable because the parameter measures were not greater than or equal to three times the trigger value.
- Exceedances were recorded for Naphthalene from the hydrocarbons for 4 consecutive months (Figure 49.). Those exceedances were well above the licence trigger values.
- Total suspended solids had four out of seven results that were above the licence trigger values in the reporting period (Figure 51). The exceedance in October was four times more than the trigger value. Exceedances were recorded for Total Cyanide for all reported concentration values throughout the recording period (Figure).
- Trend lines and r^2 values were included on each graph to present the general increases and decreases in concentrations over time and the relative strength (i.e., reliability) of these trends. Total Nitrogen, Manganese, Copper and Naphthalene show an increasing trend, whereas TSS, Cyanide and Cobalt show a decreasing trend. All trend lines had very low r^2 values, indicating that the strength of these trends is weak (i.e., low reliability). These weak trends also imply that concentrations are generally remaining stable.

Table 6 Surface Water Monitoring Results Summary – July 2022 to June 2023

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022/23 Value Range	2022 /23 Average	Long-term Average (2020 – 2023) ^	2022/23 Reportable Exceedances*
In-situ							
Temp (°C)		-	Daily	25 -27	27	28.88	-
pH		7.0-8.5	Daily	7.0 – 7.92	7.44	7.09	No
EC (us/cm)		-	Daily	42 -541	140.59	298.52	-
Dissolved Oxygen (%)		80-100	Daily	80.3 – 89.2	85.09	84.73	No
Major Ions							
Calcium (mg/L)	0.5	-	Monthly	3.1 – 21	8.04	31.94	-
Magnesium (mg/L)	0.5	-	Monthly	0.5 – 0.9	0.59	2.62	-
Sodium (mg/L)	0.5	-	Monthly	5.7 – 81	21.17	50.76	-
Potassium (mg/L)	0.5	-	Monthly	1.1 - 5	2.16	5.91	-
Carbonate (mg/L)	10	-	Monthly	<10	<10	12.24	-
Bicarbonate (mg/L)	20	-	Monthly	20 – 110	44	89.75	-
Chloride (mg/L)	1	-	Monthly	4.6 – 100	25.24	71.87	-
Sulphate (mg/L)	5	-	Monthly	5.0 – 6.6	5.27	9.16	-
Nutrients							
Total Phosphorous (mg/L)	0.01	0.02	Monthly	0.01 – 0.06	0.03	0.16	Yes
Total Nitrogen (mg/L)	0.2	0.27	Monthly	0.2 – 2.1	2.04	1.47	Yes
Oxides of Nitrogen (mg/L)	0.5	0.02	Monthly	<0.05	<0.05	0.05	Yes
Ammonium (mg/L)	0.01	0.02	Monthly	0.01 – 0.14	0.03	0.04	Yes
Metals (total and dissolved)							
Antimony (µg/L) (total)	5	270	Monthly	5	5	14.41	No
Antimony (µg/L) (dissolved)	5	270	Monthly	5	5	11.57	No
Arsenic (µg/L) (total)	1	4.5	Monthly	1 - 9	3.14	7.89	No
Arsenic (µg/L) (dissolved)	1	4.5	Monthly	1 - 5	1.57	3.30	No
Barium (ug/L) (total)	20	-	Monthly	40 - 320	117.14	311.91	-
Barium (ug/L) (dissolved)	20	-	Monthly	30 - 300	108.57	278.39	-
Beryllium (ug/L) (total)	1	-	Monthly	1	1	2.44	-
Beryllium (ug/L) (dissolved)	1	-	Monthly	1	1	2.14	-
Boron (µg/L) (total)	50	5,100	Monthly	50 - 500	200	507.95	No

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022/23 Value Range	2022 /23 Average	Long-term Average (2020 – 2023) ^	2022/23 Reportable Exceedances*
Boron (µg/L) (dissolved)	50	5,100	Monthly	50 - 500	197.14	465.09	No
Cadmium (µg/L) (total)	0.2	5.5	Monthly	0.2	0.2	0.56	No
Cadmium (µg/L) (dissolved)	0.2	5.5	Monthly	0.2	0.2	0.54	No
Chromium VI (µg/L) (total)	1	4.4	Monthly	1	1	3.48	No
Chromium VI (µg/L) (dissolved)	1	4.4	Monthly	1	1	2.88	No
Cobalt (µg/L) (total)	1	1	Monthly	1 - 2	1.14	3.98	Yes
Cobalt (µg/L) (dissolved)	1	1	Monthly	1 - 3	1.29	3.77	Yes
Copper (µg/L) (total)	1	1.3	Monthly	1 - 4	3	5.17	Yes
Copper (µg/L) (dissolved)	1	1.3	Monthly	1 -3	1.43	3.74	Yes
Lead (µg/L) (total)	1	4.4	Monthly	1	1	2.91	No
Lead (µg/L) (dissolved)	1	4.4	Monthly	1	1	2.58	No
Manganese (µg/L) (total)	5	80	Monthly	21 – 290	114.43	477.20	Yes
Manganese (µg/L) (dissolved)	5	80	Monthly	19 – 290	106.29	435.91	Yes
Mercury (inorganic) (µg/L) (total)	0.1	0.4	Monthly	0.1	0.1	0.34	No
Mercury (inorganic) (µg/L) (dissolved)	0.1	0.4	Monthly	0.1 – 0.2	0.11	0.31	No
Nickel (µg/L) (total)	1	70	Monthly	2 – 9	4.71	11.90	No
Nickel (µg/L) (dissolved)	1	70	Monthly	2 – 9	4.29	12.40	No
Selenium (µg/L) (total)	1	3	Monthly	1 – 5	2	9.08	Yes
Selenium (µg/L) (dissolved)	1	3	Monthly	1 – 13	2.71	3.19	Yes
Vanadium (µg/L) (total)	5	100	Monthly	5 – 9	5.57	14.63	No
Vanadium (µg/L) (dissolved)	5	100	Monthly	5	5	12.91	No
Zinc (µg/L) (total)	5	15	Monthly	230 – 1800	730	1515.21	Yes
Zinc (µg/L) (dissolved)	5	15	Monthly	160 - 1700	554.29	1183.29	Yes
Hydrocarbons							
Benzene (µg/L)	1	700	Monthly	1 - 100	57.57	69.92	No
Toluene (µg/L)	1	180	Monthly	1 - 100	57.57	69.92	No
Ethylbenzene (µg/L)			Monthly	1 - 100	57.57	69.92	-
Xylene (µg/L)			Monthly	2 - 300	115.43	142.94	-
Naphthalene (µg/L)	1	70	Monthly	10 - 1000	575.71	533.40	Yes

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022/23 Value Range	2022 /23 Average	Long-term Average (2020 – 2023) ^	2022/23 Reportable Exceedances*
PAHS (µg/L)	1		Monthly	1	1	2.04	-
TRH (µg/L)	100	-	Monthly	100 - 2920	1150	2697.47	-
Organic Alcohols							
Monoethylene Glycol (mg/L)	20	-	Monthly	20 -200	45.71	356.74	-
Triethylene Glycol (mg/L)	20	-	Monthly	20 - 200	45.71	28.57	-
Other							
PFOS (µg/L)	0.01	0.13	Monthly	0.01 – 0.11	0.03	1.77	No
PFAs (µg/L)	0.1	220	Monthly	0.1 – 1.22	0.40	0.68	No
Polychlorinated Biphenyls (ug/L)	5	-	Monthly	5	5	3.45	-
Total Cyanide (µg/L)	5	4	Monthly	5	5	6.17	Yes
Total Halogenated Phenol (µg/L)	10	400	Monthly	10 – 30	12.86	10.12	No
Total Non-halogenated Phenol (µg/L)	100	400	Monthly	100	100	449.13	No
TSS (mg/L)	5	10	Monthly	5 – 44	16.57	18.53	Yes
TDS (mg/L)	10	-	Monthly	10 - 250	111	315.99	-

^Long term average based on reporting period 2020/2021 onwards as significant portions data was missing from preceding reporting periods (2018/2019 and 2019/2020) and reliable averages were unable to be calculated.

*Reportable exceedances include an exceedance of a trigger value on three consecutive occasions (and all subsequent consecutive occasions) and/or an exceedance on a single occasion where the parameter measures greater than or equal to three times the trigger value.

Note: Where concentration results preceded by '<' have been identified in the data, these values have been conservatively assumed to represent the upper limit of the value (e.g. <100 µg/L represents 100 µg/L). These assumed values have been used to determine averages in the above table and to depict the data in the graphs below.

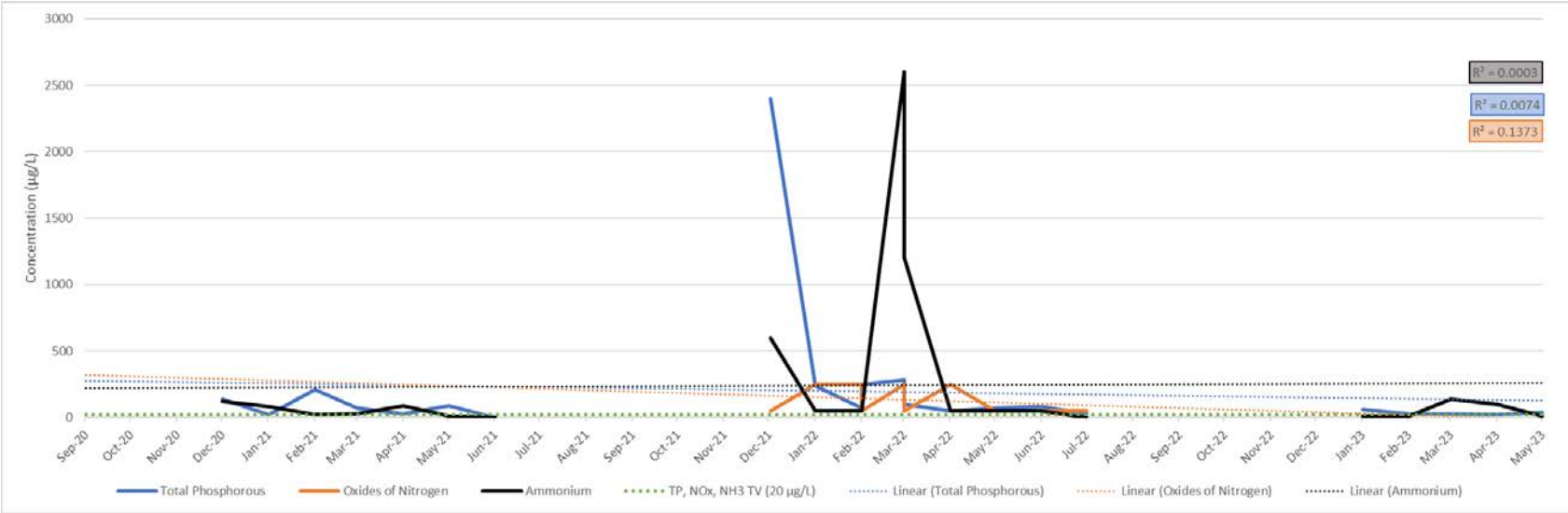


Figure 41 **Total Phosphorus, Oxides of Nitrogen and Ammonium Concentrations**



Figure 42 **Total Nitrogen Concentrations**

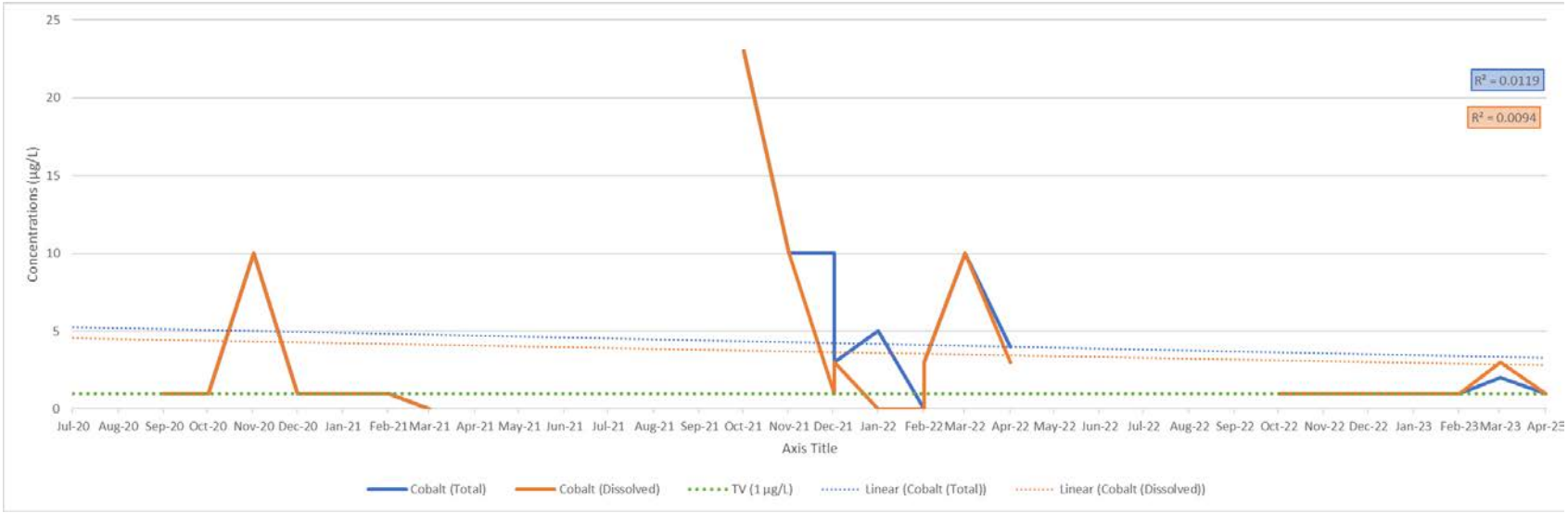


Figure 43 **Cobalt Concentrations**

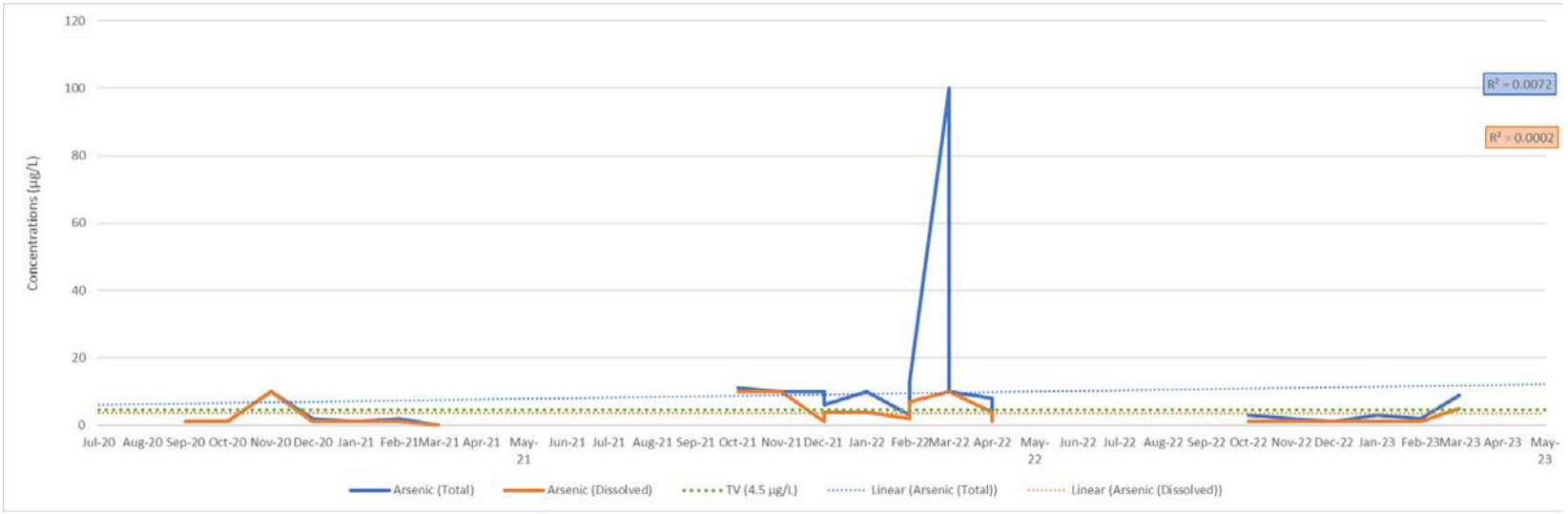


Figure 44 **Arsenic Concentrations**

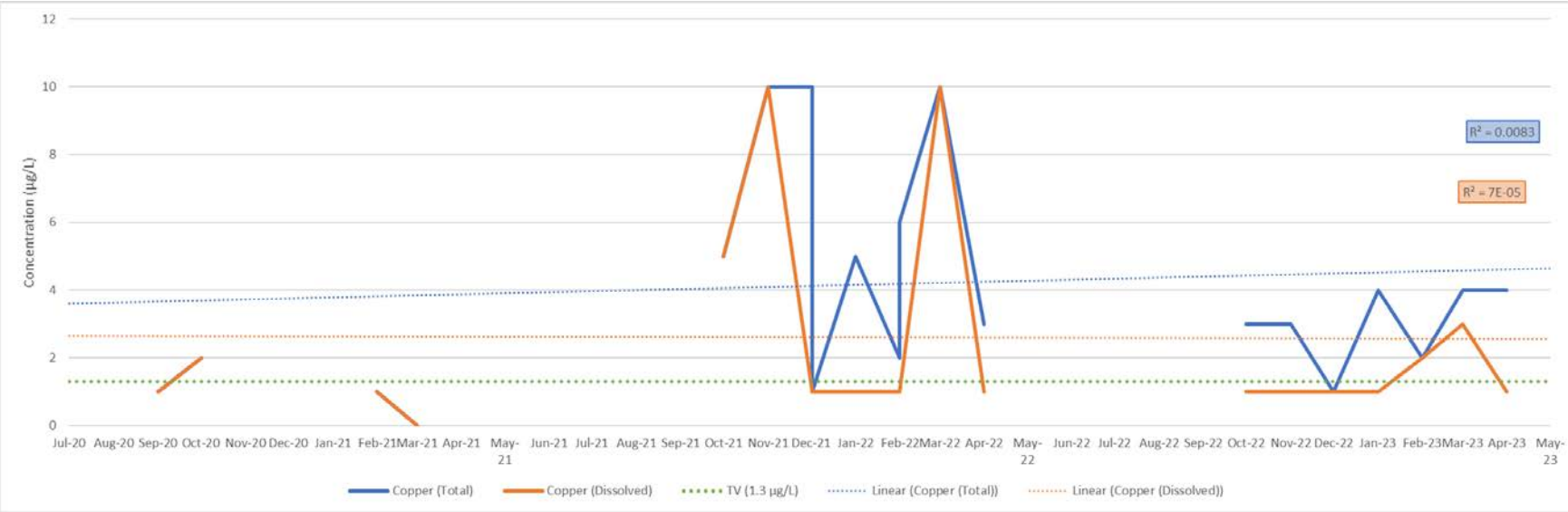


Figure 45 **Copper Concentrations**

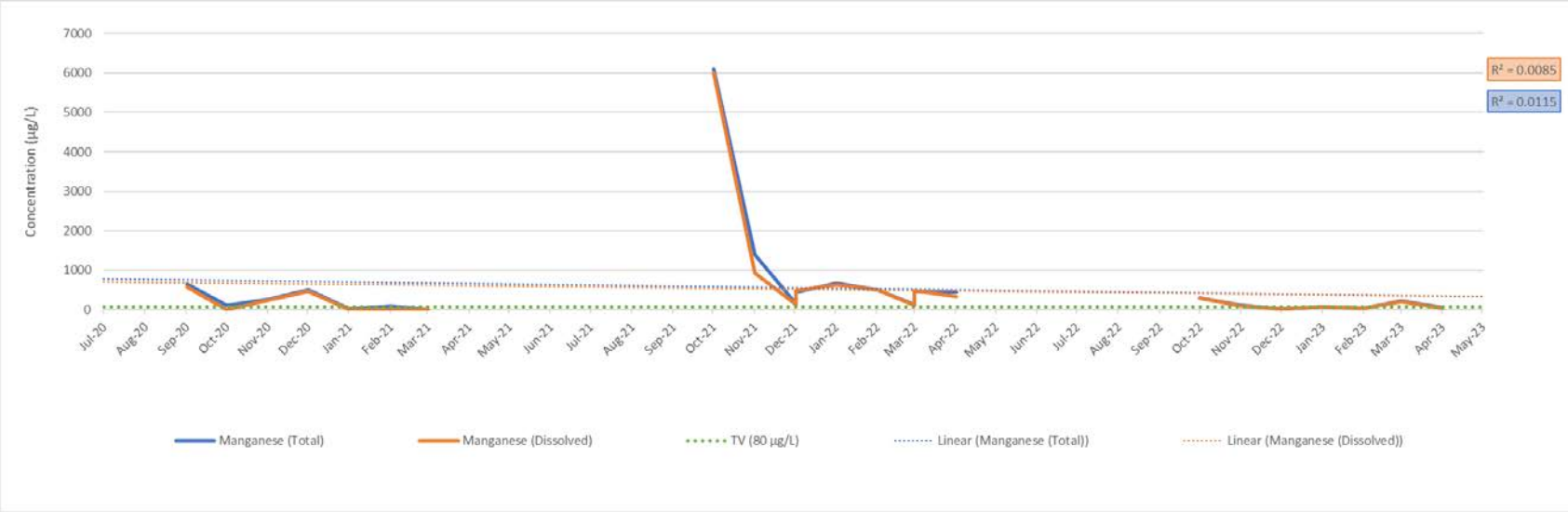


Figure 46 **Manganese Concentrations**

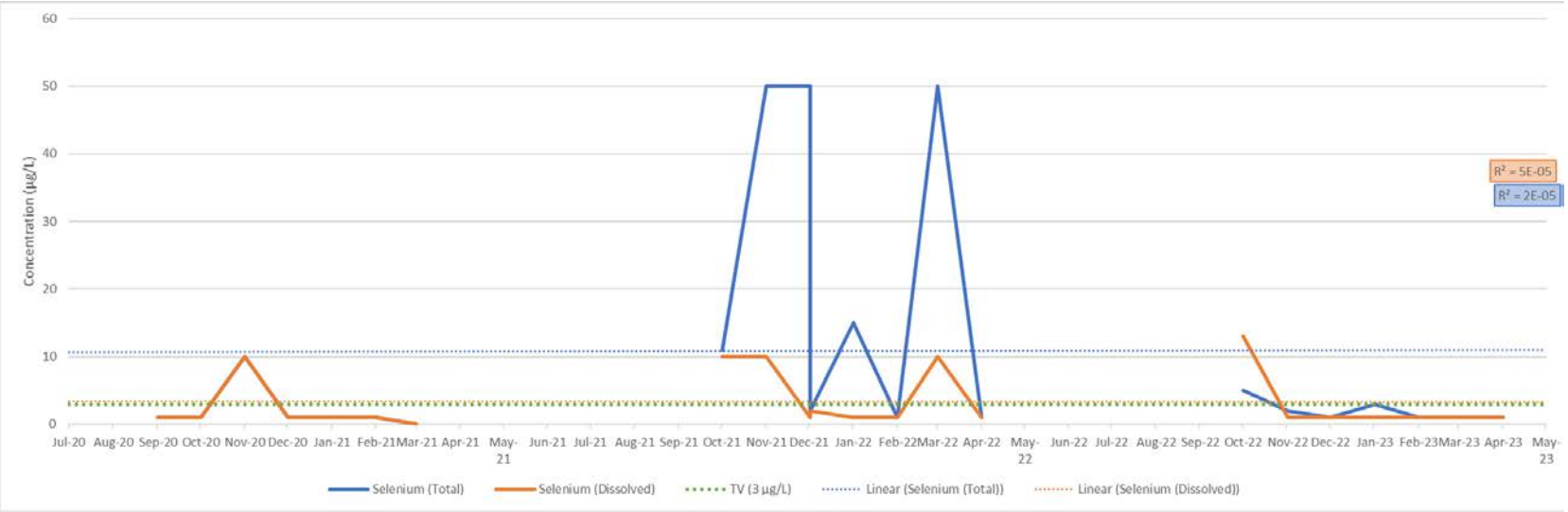


Figure 47 **Selenium Concentrations**

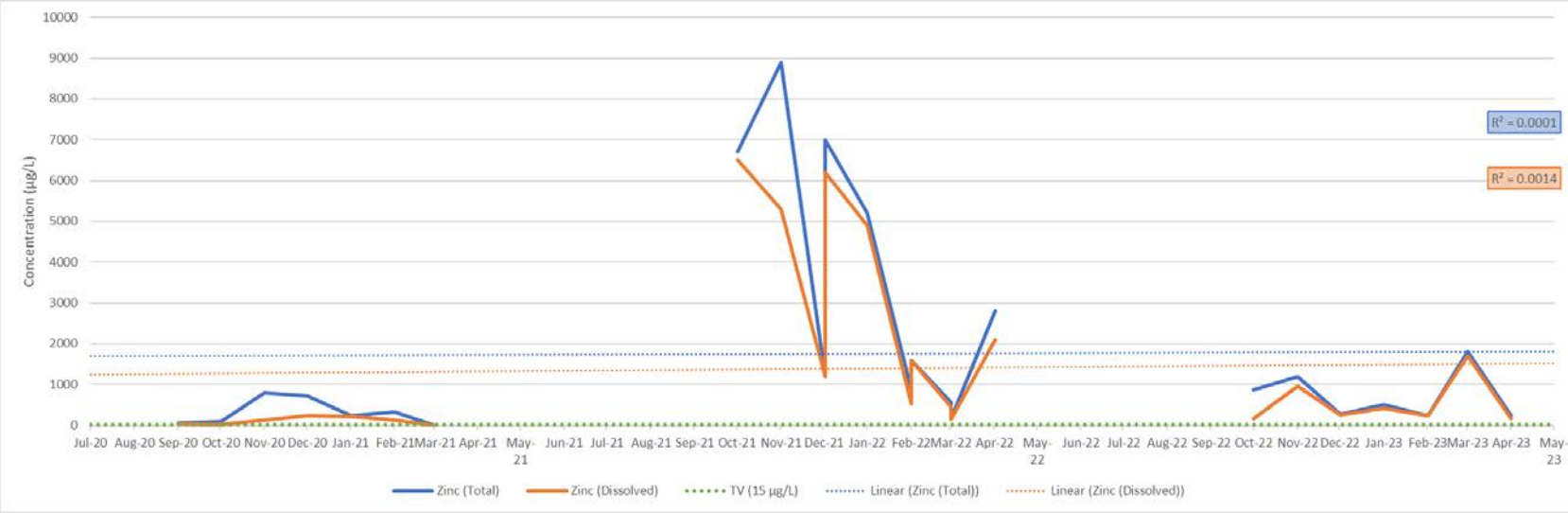


Figure 48 **Zinc Concentrations**

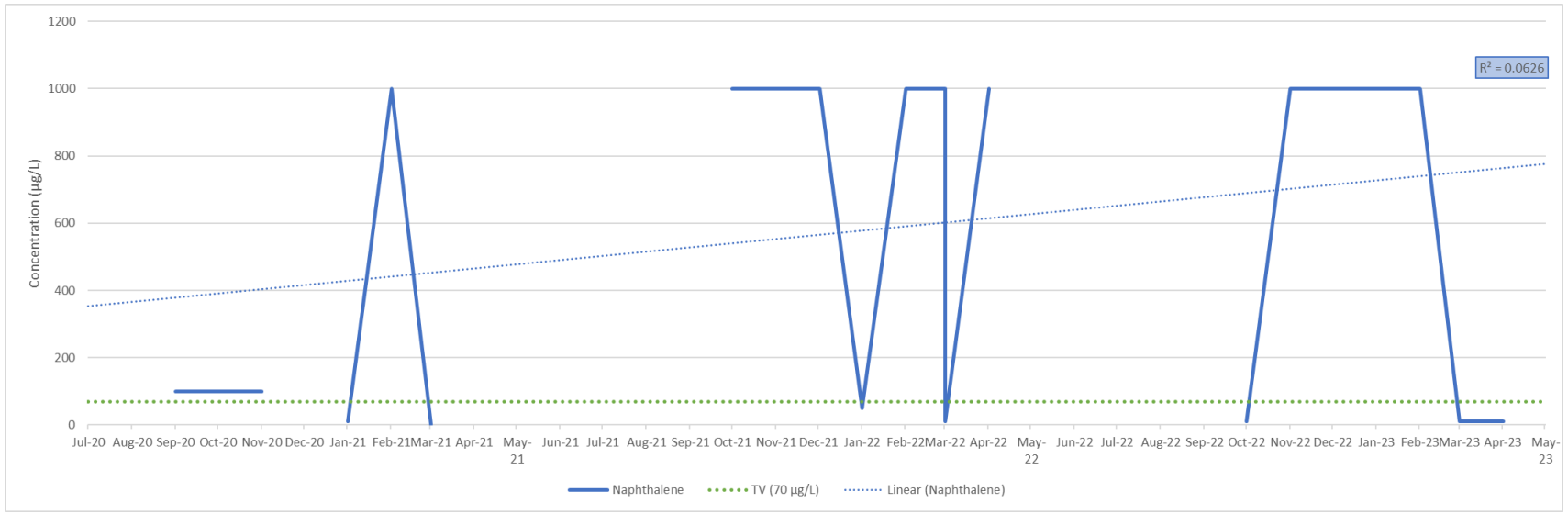


Figure 49 **Naphthalene Concentrations**

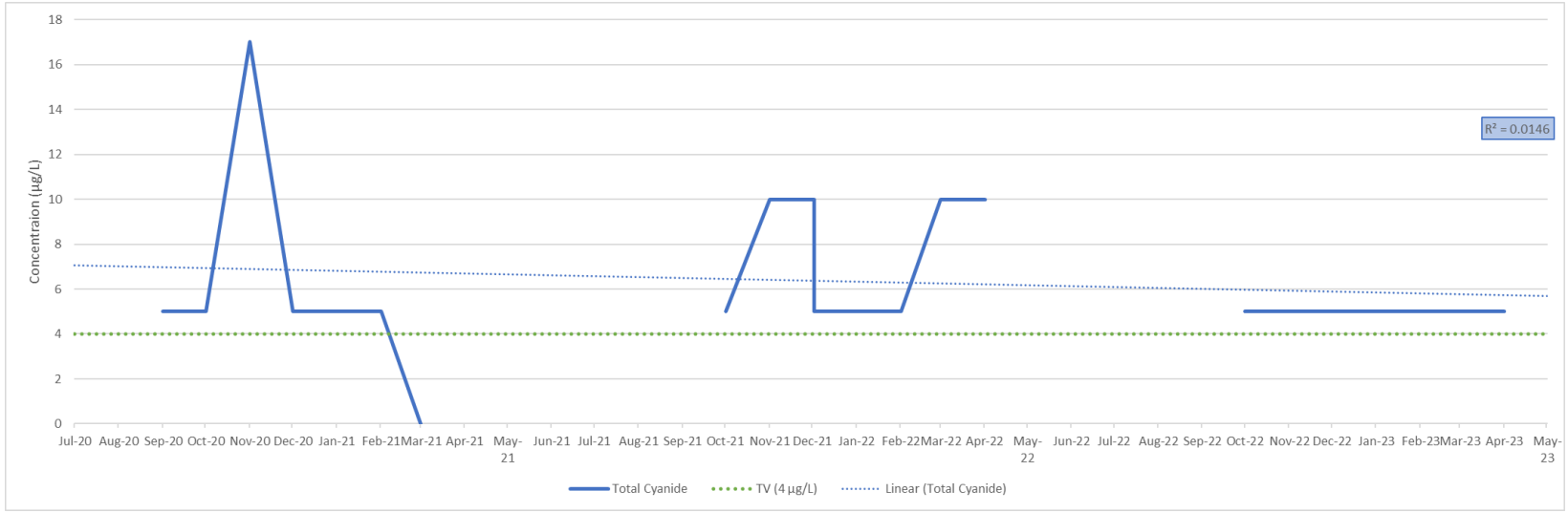


Figure 50 **Cyanide Concentrations**



Figure 51 Total Suspended Solids Concentrations

3.5 Compliance with Licence Conditions and Discussion

As per Clause 41 of EPL 299-02, the licensee must conduct surface water monitoring in accordance with Attachment A. Based on this clause, there are no non-compliances.

Trends could not be determined for reported surface water concentrations due to limited datasets.

For in-situ parameters during the reporting period, the 2023 average results were generally aligned with the long-term average, except for EC. As the data in the long-term average is only utilised from the 2020/2021 and 2021/2022 and 2022/2023 reporting periods, the averages are expected to evolve and come into further alignment as more data is included. It is also noted that the results for metals and nutrients are likely being naturally derived from soils and dust washed into the stormwater pits as these are not been utilised in manufactured form on site.

Due to the change in ownership of the site and site resourcing, exceedances were not reported to the NT EPA.

Section 4 Air Quality Monitoring

No air quality monitoring was undertaken during the 2022-2023 reporting period. This occurred as a result of the site effectively being emptied of waste and mothballed from January 2023. As a result, there was no operational activity on site and therefore no risk of emissions to environment requiring monitoring.

Section 5 Conclusions and Recommendations

The groundwater and surface water monitoring undertaken during this annual reporting period has met the requirements of the EPL 229-02. The air monitoring was not undertaken in this reporting period. The results from this annual reporting period indicate that activities being undertaken on the GRR site does not pose a risk to the surrounding environment. Although the surrounding environment exhibits minimal to no impact from the site activities, groundwater and air quality monitoring will continue to be undertaken as per NT EPA requirements.

It is recommended that the groundwater analytical dataset be reviewed and assessed to determine whether the recorded exceedances are a trend or represent naturally occurring background concentrations (e.g., copper, nickel and zinc). The outcome of this assessment should be considered when evaluating the suitability of the current acceptance criteria. It is also noted that the results for metals and nutrients are likely being naturally derived from soils and dust washed into the stormwater pits as these are not been utilised in manufactured form on site.

It is recommended that where the Limit of Reporting is greater than the licence trigger value, the parameter be collected and analysed as ultra-trace. This will provide a more accurate reading for detecting trigger value exceedances.

Based on the proposed changes to site it is recommended that the stormwater, surface water and groundwater monitoring programs be significantly paired back to be representative of the actual wastes and works occurring on the site. Likewise the monitoring of the boiler stack appears redundant as it is a natural gas boiler.

Section 6 Disclaimer and Limitations

This report has been prepared by CDM Smith Australia Pty Ltd (CDM Smith) for the sole benefit of GRR for the sole purpose of informing the outcomes of the Global Resource Recovery Plant Annual Monitoring Report.

This report should not be used or relied upon for any other purpose without CDM Smith's prior written consent. Neither CDM Smith, nor any officer or employee of CDM Smith, accepts responsibility or liability in any way whatsoever for the use of or reliance on this report for any purpose other than that for which it has been prepared.

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b. used or relied upon by any other party; or

c. filed with any Governmental agency or other person or quoted or referred to in any public document.

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a. has relied upon and presumed the accuracy of this information;

b. has not verified the accuracy or reliability of this information (other than as expressly stated in this report);

c. has not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this report to GRR; and

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If further information becomes available, or additional assumptions need to be made, CDM Smith reserves its right to amend this report.

Appendix A EPL 229-02

ntepa Northern Territory Environment Protection Authority

ENVIRONMENT PROTECTION LICENCE

(Pursuant to section 34 of the *Waste Management and Pollution Control Act*)

Licensee	Smorgon Fuels Pty Ltd
Licence Number	**EPL229 - 02**
Registered Business Address	Smorgon Fuels Pty Ltd 644 Chapel Street South Yarra VIC 3141
ACN	094 541 723
ABN	84 094 541 723
Premises Address	Section 05783 Hundred of Bagot plan(s) S2005/171A 800 BERRIMAH RD, EAST ARM
Anniversary Date:	29 June
Commencement Date:	29/06/2022
Expiry Date:	28/06/2027
Scheduled Activity	Collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis, other than in or for the purpose of a sewage treatment plant. Operating **premises**, other than a sewage treatment plant, associated with collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis.
Description	Operation of a liquid waste treatment facility capable of treating, storing and recycling a variety of industrial liquid waste including the treatment of waste water and the recycling of ethylene glycol for the maritime, mining and oil and gas industries in the Darwin region.

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Antimony, antimony compounds	✗	✗	✓	✓	✗	✗
Arsenic, arsenic compounds	✗	✗	✓	✓	✗	✗
Barium compounds other than barium sulphate	✗	✗	✓	✓	✗	✗
Basic solutions or bases in solid form	✗	✗	✓	✓	✓	✗
Beryllium, beryllium compounds	✗	✗	✓	✓	✗	✗
Boron compounds	✗	✗	✓	✓	✗	✗
Cadmium, cadmium compounds	✗	✗	✓	✓	✗	✗
Chlorates	✗	✗	✓	✓	✗	✗
Acidic solutions or acids in solid form	✗	✗	✓	✓	✓	✗
Chromium compounds that are hexavalent or trivalent	✗	✗	✓	✓	✗	✗
Cobalt compounds	✗	✗	✓	✓	✗	✗
Containers that are contaminated with residues of a listed waste	✗	✗	✓	✓	✗	✗
Copper compounds	✗	✗	✓	✓	✗	✗
Cyanides (inorganic)	✗	✗	✓	✓	✗	✗
Encapsulated, chemically fixed, solidified or polymerised wastes	✗	✗	✓	✓	✗	✗
Ethers	✗	✗	✓	✗	✗	✗
Filter cake	✗	✗	✓	✗	✗	✗
Fire debris and fire washwaters	✗	✗	✓	✓	✗	✗
Fly ash	✗	✗	✓	✓	✗	✗
Halogenated organic solvents	✗	✗	✓	✗	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Highly odorous organic chemicals (including mercaptans and acrylates)	✗	✗	✓	✗	✗	✗
Inorganic fluorine compounds excluding calcium fluoride	✗	✗	✓	✓	✗	✗
Inorganic sulfides	✗	✗	✓	✓	✗	✗
Isocyanate compounds	✗	✗	✓	✗	✗	✗
Lead, lead compounds	✗	✗	✓	✓	✗	✗
Mercury, mercury compounds	✗	✗	✓	✓	✗	✗
Nickel compounds	✗	✗	✓	✓	✗	✗
Non-toxic salts	✗	✗	✓	✓	✗	✗
Organic phosphorus compounds	✗	✗	✓	✗	✗	✗
Organic solvents excluding halogenated solvents	✗	✗	✓	✓	✓	✗
Organohalogen compounds that are not otherwise specified in this Schedule	✗	✗	✓	✗	✗	✗
Perchlorates	✗	✗	✓	✗	✗	✗
Phenols, phenol compounds including chlorophenols	✗	✗	✓	✗	✗	✗
Phosphorus compounds other than mineral phosphates	✗	✗	✓	✓	✗	✗
Residue from industrial waste treatment or disposal operations	✗	✗	✓	✓	✗	✗
Selenium, selenium compounds	✗	✗	✓	✓	✗	✗
Soils contaminated with a listed waste	✗	✗	✓	✗	✗	✗
Surface active agents (surfactants) that contain principally organic constituents and that may contain metals and inorganic materials	✗	✗	✓	✓	✗	✗
Vanadium compounds	✗	✗	✓	✓	✗	✗
Waste chemical substances arising from R&D or teaching activities where the effects on human health and/or the environment are not known	✗	✗	✓	✓	✗	✗
Wastes containing peroxides other than hydrogen peroxide	✗	✗	✓	✓	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste containing cyanides from heat treatment and tempering operations	✗	✗	✓	✗	✗	✗
Waste from the production, formulation and use of biocides and phytopharmaceuticals	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of organic solvents	✗	✗	✓	✓	✓	✗
Waste from the production, formulation and use of photographic chemicals and processing materials	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	✗	✗	✓	✓	✗	✗
Waste from the production and preparation of pharmaceutical products	✗	✗	✓	✓	✗	✗
Waste mineral oils unfit for their original intended use	✗	✗	✓	✓	✓	✗
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✓	✓	✓	✗
Waste pharmaceuticals, waste drugs and waste medicines	✗	✗	✓	✗	✗	✗
Waste resulting from surface treatment of metals and plastics	✗	✗	✓	✓	✗	✗
Waste tarry residues arising from refining, distillation and any pyrolytic treatment	✗	✗	✓	✗	✗	✗
Waste substances and articles containing or contaminated with PCBs, PCNs, PCTs and/or PBBs	✗	✗	✓	✗	✗	✗
Zinc compounds	✗	✗	✓	✓	✗	✗

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 229 - 02

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ATTACHMENTS

1 Attachment A - Surface Water Monitoring.pdf
2 Attachment B - Groundwater Monitoring.pdf
3 Attachment C - Stack Emission Monitoring.pdf

ENVIRONMENT PROTECTION LICENCE 229 - 02

INFORMATION ABOUT THIS LICENCE

- This licence does not in any way relieve the licence holder from its obligations to comply with the *Waste Management and Pollution Control Act* (WMPC Act), including the general environmental duty in section 12 of the WMPC Act and the duty to notify of incidents causing or threating to cause pollution under section 14 of the WMPC Act.

Duration of a licence (section 40, 43 and 45 of the WMPC Act)

- A licence will remain in force until its expiry date or until it is surrendered by the licensee or is suspended or cancelled in accordance with the WMPC Act.
- The licensee must notify the Northern Territory Environment Protection Authority (NT EPA) within 14 days after ceasing to conduct the activity.
- The licensee may, with the approval of the NT EPA, surrender the licence to the NT EPA.

Amendment or Revocation of a licence (section 37 of the WMPC Act)

- The licensee may apply to amend or revoke a condition of this licence.
- A fee applies and the application must be made using the designated form via NT EPA Online.
- The NT EPA may also amend or revoke a condition of this licence as set out in section 38 of the WMPC Act.

Transfer of a licence (section 46 of the WMPC Act)

- The licensee can apply to transfer their licence to another person.

Renewal of a licence (section 40 of the WMPC Act and section 3 of the Regulations)

- The licensee may apply for the renewal of their licence not earlier than 90 days, and not later than 30 days, before their licence expires.
- A fee applies and the application must be made via NT EPA Online.

Public Register

- A copy of environment protection licences and any plans for environmental management, reports, submissions or documents required as a condition of an environment protection licence, will be placed on a register in accordance with section 9 of the WMPC Act.
- A copy of the Annual Return will be placed on the register.
- The NT EPA makes this register freely available from the NT EPA website.

Environment Protection Objectives (Part 4 of the WMPC Act), and Water Quality Standards (section 73 of the *Water Act*)

- An Environment Protection Objective (EPO) is a statutory instrument to establish principles on which:
  a. environmental quality is to be maintained, enhanced, managed or protected;
  b. pollution, or environmental harm resulting from pollution, is to be assessed, prevented, reduced, controlled, rectified or cleaned up; and
  c. effective waste management is to be implemented or evaluated.
- In accordance with section 18 of the WMPC Act a beneficial use, quality standard, criteria or objective declared under section 73 of the *Water Act* and in force is an environment protection objective for the purposes of the WMPC Act.

- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
    - Declaration of Beneficial Uses and Objectives Darwin Harbour Region - surface water

Environmental Interests

- This section highlights sensitivity of the surrounding land use and environment associated with the location of the approved activity.
- Sites of Conservation Significance (SOCS) - Darwin Harbour Region. SOCS number 6
- Ramsar Wetland - none

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 39 of the WMPC Act, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In determining whether the licensee has committed an offence, the licensee may be liable for the conduct of its directors, employees or agents.
- The licensee should ensure that each of its directors, employees, contractors or agents are aware of, and comply with, this licence.
- In this licence, unless the contrary intention appears, words that are defined in the WMPC Act are intended to have the meaning given to them in that Act.

LICENCE CONDITIONS

GENERAL

1 The licensee must ensure the contact details recorded in NT EPA Online for this licence are correct at all times.

2 The licensee must at all times have a 24 hour emergency contact.

3 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 50 business days of the anniversary of the commencement date of this licence, for each year or part of a year that this licence is in force.

4 The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:

4.1 environment protection licence number issued under the WMPC Act; and

4.2 24 hour emergency contact details.

5 The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.

6 The licensee must ensure, at all times, that the activity is covered by a policy of insurance or other form of indemnity that will cover the likely costs or preventing, minimising or making good environmental damage that may result from the activity.

7 The licensee must provide to the NT EPA, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the NT EPA.

8 All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by uploading the document via NT EPA Online (or by emailing waste@nt.gov.au).

9 The licensee must maintain and implement the documents listed in Table 2.

Table 2 - Documents relating to this licence

Document Ref.	Document Name
GRR-DRW-FOR-210	Environmental Management Plan
Revision H	Emergency Response Plan
GRR-DRW-PRO-401-R2	Bulk Truck Receival
GRR-DRW-PRO-301 Rev 2	Pre-acceptance Sampling
GRR-DRW-PRO-402-R2	Bulk Wastewater Unloading
GRR-DRW-PRO-403-R2	Packaged Waste Receival

10 Within 10 business days of any amendment being made to a document listed in Table 2 the licensee must provide the amended document to the NT EPA, along with:

10.1 a tabulated summary of the amendment(s) with document references;

10.2 reasons for the amendment(s); and

10.3 an assessment of environmental risk associated with the amendment(s).

11 The NT EPA may require the licensee to revise or amend and resubmit any amended document. Where the NT EPA requires a document to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

12 The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.

13 The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:

13.1 the person to whom the complaint was made;

13.2 the person responsible for managing the complaint;

13.3 the date and time the complaint was reported;

13.4 the date and time of the event(s) that led to the complaint;

13.5 the contact details of the complainant if known, or where no details are provided a note to that effect;

13.6 the nature of the complaint;

13.7 the nature of event(s) giving rise to the complaint;

13.8 prevailing weather conditions at the time (where relevant to the complaint)

13.9 the action taken in relation to the complaint, including any follow-up contact with the complainant; and

13.10 if no action was taken, why no action was taken.

14 The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

15 Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the NT EPA prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this licensee, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

16 The licensee must, without limiting any other condition of this licence, in conducting the licenced activity, do all things reasonable and practicable to ensure the licenced activity does not adversely affect the relevant Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:

- *Darwin Harbour Region - surface water - aquaculture, environment, cultural, rural stock and domestic*

17 The licensee must not collect, transport, store, recycle, treat or dispose of listed waste other than the listed waste specified in Table 1.

18 The licensee must ensure any plant and equipment used by the licensee in conducting the activity:

18.1 is reasonably fit for the purpose and use to which it is put;

18.2 is maintained;

18.3 is operated by a person trained to use the plant and equipment; and

18.4 is operated by, or operated by a person accompanied by, a person trained to handle, store or dispose of listed waste in connection with the activity.

19 The licensee must ensure that wastewater generated from washing plant and equipment associated with the activity does not cause pollution.

20 The licensee must segregate waste received at the premises in clearly designated areas for recycling, re-use or disposal.

21 The licensee must ensure that all materials that are likely to cause environmental harm are handled and stored in areas with a containment system in accordance with the relevant Australian Standard. Where no relevant Australian Standard exists, the containment system must be sized to contain 110% of the volume of the largest container within the area.

22 No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved in writing by the NT EPA.

23 The licensee must ensure that all listed waste being transported to and from the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.

24 The licensee must ensure that all listed waste is delivered to a premises licenced under section 30 of the WMPC Act to receive that listed waste.

25 The licensee must comply with the National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure.

DISCHARGES AND EMISSIONS

26 The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water which discharge has not been specifically authorised by another condition of this licence).

27 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.

28 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.

Discharges to water

29 This licence does not authorise the discharge of waste water resulting from the licenced activity through the storm water drain discharge point WMP1 identified in Attachment A.

30 The licensee must ensure that water discharged through the storm water drain at WMP1 identified in Attachment A, does not exceed the trigger values specified in Attachment A.

31 The licensee must ensure that the water discharged through the storm water drain at WMP1 identified in Attachment A does not:

31.1 consist of water from any other source than stormwater. Where stormwater has collected within bunded areas, then water quality analysis must confirm the stormwater pH and dissolved oxygen values are within the ranges specifiied in Attachment A and does not contain the nutrients, metals and metalloids, hydrocarbons, organic alcohols and other contaminants listed in Attachment A;

31.2 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;

31.3 cause or generate odours which would adversely affect the use of surrounding waters;

31.4 cause algal blooms in the receiving water;

31.5 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;

31.6 cause mortality of fish or other aquatic organisms; or

31.7 cause adverse impacts on plants.

Emissions to air

32 The licensee must ensure that the emissions from all emission events do not exceed the trigger values specified in Attachment C.

33 The licensee must install, operate and maintain pollution control equipment to minimise contaminants or waste in emissions to air.

34 The activity must not cause or release, beyond the boundary of the premises:

34.1 visible steam;

34.2 smoke;

34.3 offensive odour;

34.4 dust or particulates; or

34.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.

35 The licensee must comply with the National Environment Protection (Air Toxics) Measure.

Environmental Audit

36 The licensee must undertake, annually, and as prescribed by the conditions of this licence, an environmental audit by a qualified person to evaluate the:

36.1 extent to which compliance has been acheived with this licence; and

36.2 ability of management systems to manage waste and prevent environmental harm resulting from pollution.

37 The licensee must submit the proposed scope for the environmental audit no later than 20 business days prior to the proposed commencement date of the environmental audit (which must be specified when the proposed scope is submitted), to the NT EPA for review and approval.

38 The NT EPA may require the licensee to revise or amend and resubmit any proposed scope for an environmental audit. Where the NT EPA requires the environmental audit scope to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

39 The licensee must ensure that each environmental audit:

39.1 is not commenced until written approval of the environmental audit scope is received from the NT EPA; and

39.2 is undertaken in accordance with the approved scope.

40 The licensee must ensure that, for each environmental audit undertaken by the licensee:

40.1 a written report is prepared and signed by the qualified person who conducted the audit;

40.2 the written report is completed within 2 calendar months of the licensee's receipt of the NT EPA's approval of the environmental audit scope; and

40.3 the written report is provided in full to the NT EPA within 5 business days of being signed by the qualified person.

MONITORING

41 The licensee must conduct surface water monitoring in accordance with Attachment A

42 The licensee must conduct ground water monitoring in accordance with Attachment B.

43 The licensee must conduct Stack Emission Monitoring in accordance with Attachment C.

44 The licensee must, prior to the inital wet season release of storm water from the storm water collection pit as identified in Attachment A, ensure that the quality of the water is within the trigger values specified in Attachment A.

45 The licensee must conduct surface water monitoring for parameters listed in Attachment A in any bunded area where rainfall has collected and the licensee is considering transfer to the stormwater system.

46 The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.

47 The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).

48 The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.

49 The licensee must ensure any samples collected in accordance with the Attachment A, Attachment B and Attachment C or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.

50 The licensee must ensure that, for each sample collected in accordance with Attachment A, Attachment B and Attachment C or the activity the following information must be recorded and retained:

50.1 the date on which the sample was collected;

50.2 the time at which the sample was collected;

50.3 the location at which the sample was collected;

50.4 the name of the person who collected the sample;

50.5 the chain of custody forms relating to the sample;

50.6 the field measurements (if any) and analytical results (if any) relating to the sample; and

50.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

51 The licensee must keep records of all transfers of stormwater from bunded areas to the stormwater system including:

51.1 results of water quality analysis taken as required by condition 32.1 of this licence;

51.2 the date and time when the transfer began and ceased; and

51.3 the volume transferred to the stormwater system.

52 The licensee must keep and maintain records relating to the activity undertaken and the listed waste handled by the licensee in each successive 12 month period following the commencement of this licence, which include:

52.1 the date of collection;

52.2 the source of the listed waste;

52.3 the name of the transport company, if not the licensee;

52.4 the vehicle registration;

52.5 a description of the listed waste;

52.6 the quantity of the listed waste;

52.7 the final destination of the listed waste; and

52.8 whether the listed waste was stored, recycled, treated or disposed of.

53 The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.

54 The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.

55 The licensee must notify the NT EPA of any non-compliance with this licence by completing the Non-Compliance Notification via NT EPA Online (or by emailing waste@nt.gov.au), as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.

56 The licensee must include in the notification of non-compliance the following information:

56.1 when the non-compliance was detected and by whom;

56.2 the date and time of the non-compliance;

56.3 the actual and potential causes and contributing factors to the non-compliance;

56.4 the risk of environmental harm arising from the non-compliance;

56.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;

56.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur;

56.7 if no action was taken, why no action was taken; and

56.8 a date when an incident investigation report will be submitted to the NT EPA.

57 A non-compliance with this licence includes:

57.1 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on three consecutive sampling occasions;

57.2 subsequent consecutive exceedances of trigger values as described in condition 58.1; and

57.3 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on a single occasion where the parameter measures greater than or equal to three times the trigger value.

58 The licensee must notify the NT EPA of any exceedance of trigger value as specified in Attachment A, Attachment B and Attachment C as soon as practicable after (and in any case within 24 hours after) first becoming aware of the exceedance.

59 The licensee must keep records of all exceedances of trigger values specified in Attachment A, Attachment B and Attachment C. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.

60 The licensee must ensure that the notification of the trigger value exceedance includes the following information:

60.1 when the exceedance was detected and by whom;

60.2 the date and time of the exceedance;

60.3 the actual and potential causes and contributing factors to the exceedance;

60.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant trigger values as specified in Attachment A, Attachment B and Attachment C;

60.5 the action(s) that have or will be undertaken to address the exceedance and any resulting environmental harm; and

60.6 if no action was taken, why no action was taken.

61 The licensee must submit a completed Annual Return via NT EPA Online within 10 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.

62 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

63 The licensee must ensure that each Monitoring Report:

63.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';

63.2 reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;

63.3 includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;

63.4 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;

63.5 provides an assessment on groundwater levels, including groundwater contours and tidal influence;

63.6 reports on all exceedances and investigations undertaken for this licence; and

63.7 includes an assessment of environmental impact from the activity.

64 The NT EPA may require the licensee to revise or amend and resubmit any Monitoring Report. Where the NT EPA requires the Monitoring Report to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



Peter Vasel
Director Environmental Operations
Delegate of the Northern Territory
Environment Protection Authority
Dated: 05/07/2022

END NOTES

This licence is a renewal which supercedes EPL229-01 with an expiry date of 28 June 2027

EPL229-01 was a renewal on 29 June 2020 with an expiry date of 28 June 2020

EPL229 was issued on 21 December 2017 with an expiry date of 23 December 2019

The End Notes are to assist with historical records.

DEFINITIONS

All terms in the Licence which are defined in the *Waste Management and Pollution Control Act* have the meaning given in that Act unless otherwise or further defined in this section.

DEFINITION	In this licence, unless a contrary intention appears:
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Scheduled activity as described on the covering page of this licence.
Air	includes any layer of the atmosphere.
Annual fee	yearly fee payable in respect of the activity as specified in the WMPC Act and the Regulations.
Annual Return	an NT EPA prescribed format for demonstrating and reporting compliance with the conditions of this licence and providing information on waste volumes for the preceding 12 month period.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting.
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: (a) noise, odour, heat and electromagnetic radiation; (b) a prescribed substance or prescribed class of substances; and (c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental audit	has the meaning given in section 47 of the WMPC Act.

Environmental harm	(a) any harm to or adverse effect on the environment; or (b) any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental nuisance	means: (a) an adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) an unsightly or offensive condition caused by contaminants or waste.
Incident	includes: (a) an accident, emergency or malfunction; and (b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.
Listed waste	a waste included under Schedule 2 of the Regulations.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: (a) is not trivial or negligible in nature; (b) consists of an environmental nuisance of a high impact or on a wide scale; (c) results, or is likely to result, in not more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of not more than $50,000 or the prescribed amount (whichever is greater).
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an NT EPA prescribed format for notifying the NT EPA of a non-compliance.
NT EPA Online	online system for Environment Protection Licence (EPL), Environment Protection Approval (EPA) and Waste Discharge Licence (WDL) lodgement and maintenance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	(a) emit, discharge, deposit, or disturb, directly or indirectly, a contaminant or waste; or (b) cause, permit, or fail to prevent, directly or indirectly, the emission, discharge, deposition, disturbance or escape of a contaminant or waste.
Pollution	(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or (b) a contaminant or waste, effect or phenomenon, that is present in the

	environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.
Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Regulations	*Waste Management and Pollution Control (Administration) Regulations*.
Rehabilitation Plan	a written plan to ensure that the objectives of rehabilitation are achieved as set out in the NT EPA Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) is irreversible or otherwise of a high impact or on a wide scale; (b) damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) results or is likely to result in more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of more than $50,000 or the prescribed amount (whichever is greater).
Stormwater	water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Trigger values	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Waste	(a) a solid, a liquid or a gas; or (b) a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	water that contains a contaminant or waste.
Water	includes: (a) surface water, ground water and tidal waters; (b) coastal waters of the Territory, within the meaning of the Coastal Waters (Northern Territory Powers) Act 1980 of the Commonwealth; and (c) water containing an impurity.
WMPC Act	the Northern Territory *Waste Management and Pollution Control Act*.

Appendix B Site Weather Data

Monthly Rainfall (millimetres)

EAST ARM

Station Number: 014260 · State: NT · Opened: 1991 · Status: Open · Latitude: 12.48°S · Longitude: 130.90°E · Elevation: 10 m

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1992	300.3	119.8	193.7	162.3	6.0			2.0	9.0	210.4	165.8		
1995			694.8										
2000		707.8	427.1	334.8		0.0	0.0	0.0	3.0	75.1	32.7	286.2	
2001	261.8	509.4	340.0	76.3	3.0	0.0	15.0	0.0	0.0	85.3			
2002	123.0	378.0	246.5	51.5	8.5	0.0	0.0	0.0	51.0		203.5		
2003	513.0			0.0	0.0	0.0	0.0	3.0	2.0		273.0	391.0	
2004	412.5	393.0	408.0	6.0	53.5	26.0	0.0	0.0	0.0	31.0		256.5	
2005	424.0	208.0	155.4	33.5	0.0	0.0	0.0	0.0	6.3	49.4	158.1		
2006	437.9		492.8		16.0	0.0	0.0	0.0	0.5	39.6	47.4		
2007	259.3	380.3		16.2	53.0	1.0	*0.0*	*0.0*	31.0	17.4		335.0	
2008	447.5	555.2		0.0	0.0	0.0	0.0	0.0	3.0		107.1	303.6	
2009	355.7	473.1	127.5		11.0	1.9	0.0	0.0	11.0	37.5	63.7	494.2	
2010	789.2	429.8	214.4		6.0	0.0	2.0	0.0			197.7	407.4	
2011	673.7	991.8								102.0	130.0	290.7	
2021	*502.0*	*346.0*	*209.5*	*68.5*	0.0	*6.0*	0.0	*55.0*	1.5	*62.0*	*100.0*	407.0	*1757.5*
2022	*514.5*	*189.2*	*158.1*	*89.8*	*10.0*	9.0	0.0	0.0	13.0	123.5	*324.0*	433.5	*1864.6*
2023	*307.5*	*488.0*	*210.5*	*139.0*	*0.0*	*0.0*	*0.0*						

Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Australian Government
Bureau of Meteorology

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Monthly Rainfall (millimetres)

EAST ARM

Station Number: 014260 · State: NT · Opened: 1991 · Status: Open · Latitude: 12.48°S · Longitude: 130.90°E · Elevation: 10 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Lowest	123.0	119.8	127.5	0.0	0.0	0.0	0.0	0.0	0.0	17.4	32.7	256.5	1757.5
Highest	789.2	991.8	694.8	334.8	53.5	26.0	15.0	55.0	51.0	210.4	324.0	494.2	1864.6

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

Australian Government
Bureau of Meteorology

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Appendix C Groundwater Monitoring Reports

26 July 2022

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George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (JULY 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the July 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – July 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 21 July 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – July 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	21/07/2022	3.319	3.319	3.109	9.237
EMB12	21/07/2022	3.003	3.003	3.497	9.325
EMB13	21/07/2022	5.051	4.251	3.785	10.245
EMB14	21/07/2022	5.227	4.527	4.028	9.803
EMB15	21/07/2022	2.381	2.381	5.003	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – July 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.52	32.5	49.8	292.7	0.14	191.75	6.27	4.7
EMB14	6.22	33.6	58.7	253	0.12	164.45	6.83	23.5

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in August 2022.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – July 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – July 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further In Managing Risk

Client: GRR		Job No: J174436	
Project: GME		Gauged by: VB	
Location: East Arm, NT		Date: 21/07/2022	

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1328	EMB13	–	5.041	–	9.314	
1339	EMB14	–	5.227	–	10.245	
1416	EMB7	–	3.319	–	9.237	
1421	EMB12	–	3.003	–	9.325	
1424	EMB15	–	2.381	–	9.314	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB13
Location:	East Arm, NT	Date: 21-Jul-22	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.314	(m)	Device:	micropurge	peristaltic	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry		
Casing type:	PVC / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	interface	non-interface			
Depth to water:	5.041	(m bTOC)	Screen (from - to), m	6.314 - 9.314				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond ~~mS/cm~~ / mS/cm	~~ORP~~ DO ~~%~~ mV	~~mg/L / ppm~~ / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L / SAL PSU / *TURB NTU
1329	INT	5.058	32.5	3.68	378.5	46.7	-42.3	194.3 / 0.19
1332	2	5.853	32.4	3.61	420.0	44.9	-17.3	191.05 / 0.15
1335	4	6.034	32.4	3.53	299.8	44.2	-11.9	193 / 0.14
1338	6	6.242	32.4	3.52	294.1	45.7	-5.1	191.75 / 0.14
1341	8	6.492	32.5	3.52	295.4	50.0	3.4	191.40 / 0.14
1344	10	6.651	32.5	3.52	292.7	49.8	4.7	191.75 / 0.14 / 6.27

Observations during Sampling:- eg odours, sheens, turbidity, water colour, etc

10L PURGED

L-M TURBIDITY, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further In Managing Risk

Client: ~~DIPL~~ GAA	Job No: J17~~7914~~ 4436	**Well ID**
Project: P~~FAS Testing~~ GME	Sampled by: VB	EMB14
Location: N~~TES Site, Yarrawonga NT~~ EAST ARM, NT	Date: 21/7/22	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	10.245	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer
Casing diameter:	50	(mm)	Method:	(low-flow)	4-well-volume	purged dry	
Casing type:	(PVC) / steel / other		WQM Make:	YSI			
Depth to product	—	(m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	5.277	(m bTOC)	Screen (from - to), m	7.245 – 10.245			
Product thickness	—	(m)	Pump Depth (m bTOC)				

***Other Sampling Equipment / Method**

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) / mS/cm	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L	SAL PSU	TURB NTU
1354	INT	5.441	33.6	6.20	260.1	24.7	10.0	170.30	0.12	
1357	2	6.109	33.7	6.21	251.7	23.6	44.7	163.80	0.12	
1400	4	6.534	33.6	6.22	251.0	23.7	54.2	163.15	0.12	
1403	6	7.047	33.6	6.22	251.9	23.8	55.1	163.80	0.12	
1406	8	7.159	33.6	6.23	252.1	23.6	57.9	163.80	0.12	
1409	10	7.159	33.6	6.22	253.0	23.5	58.7	164.45	0.12	6.83

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
10 L PURGED
L-M TURB, CLEAR, NO SHEEN/ODOURS

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates
Duplicate ID
Triplicate ID
Blanks
Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

19 August 2022

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Winnellie, NT 0820
P: (08) 7906 1300
www.greencap.com.au

George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (AUGUST 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the August 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – August 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 19 August 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – August 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	19/08/2022	3.81	3.81	2.618	9.237
EMB12	19/08/2022	3.503	3.503	2.997	9.325
EMB13	19/08/2022	5.47	4.67	3.366	10.245
EMB14	19/08/2022	5.795	5.095	3.46	9.803
EMB15	19/08/2022	2.699	2.699	4.685	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – August 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.38	31.8	46.3	294.8	0.14	192.40	6.39	46.6
EMB14	5.85	33.3	75.1	249.2	0.12	162.50	6.56	3.7

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in September 2022.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – August 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

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This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – August 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further In Managing Risk

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 19/8/22

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1209	EMB7	—	3.81	—	9.237	
1212	EMB12	—	3.503	—	9.235	
1216	EMB15	—	2.699	—	9.314	
1245	EMB13	—	5.470	—	~~9.314~~ 10.245	
1322	EMB14	—	5.795	—	~~10.245~~ 9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB13
Location:	East Arm, NT	Date: 19/8/22	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	10.245 ~~9.314~~	(m)	Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other		WQM Make:	YSI			
Depth to product	—	(m bTOC)	WL Meter:	interface	non-interface		
Depth to water:	5.470	(m bTOC)	Screen (from - to), m	~~6.314 - 9.314~~ 7.245 - 10.245			
Product thickness		(m)	Pump Depth (m bTOC)				

***Other Sampling Equipment / Method**

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond ~~uS/cm~~ / mS/cm	ORP mV	DO mg/L / ppm / ~~%~~	*Turbidity, Colour, Odour, Sheen, etc* SAL PSU ~~Fe(II)~~ TDS mg/L TURB NTU
1256	INT	5.593	31.4	5.13	3068	58.2	37.1	0.14 19245
1259	2	5.911	31.6	3.36	292.7	46.9	33.2	0.14 191.10
1302	4	6.259	31.8	3.32	293.7	46.7	34.7	0.14 191.10
1305	6	6.456	31.9	3.38	294.4	46.1	37.2	0.14 191.10
1308	8	6.682	31.8	3.38	294.6	47.1	44.2	0.14 192.40
1311	10	6.852	31.8	3.38	294.7	46.8	45.1	0.14 192.40
1314	12	7.011	31.8	3.38	294.8	46.6	46.3	0.14 192.40 6.39

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 12L PURGED

L-M TURBIDITY, NO SHEEN/ODOUR CLEAR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further In Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB14
Location:	East Arm, NT	Date: 19/8/22	

WELL DETAILS		SAMPLING EQUIPMENT				
Well depth:	~~9.803 10.245~~ (m)	Device:	micropurge	(peristaltic)	footvalve	bailer
Casing diameter:	50 (mm)	Method:	(low-flow)	4-well-volume	purged dry	
Casing type:	(PVC) / steel / other	WQM Make:	YSI			
Depth to product	— (m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	5.795 (m bTOC)	Screen (from - to), m	~~7.245 10.245~~ 6.803 - 9.803			
Product thickness	— (m)	Pump Depth (m bTOC)				

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L SAL PSU T-NB NTU
1322	INT	5.989	33.4	6.05	255.7	25.9	50.2	166.40 0.12
1325	2	6.283	33.4	6.06	256.5	10.3	45.1	166.40 0.12
1328	4	6.653	33.4	6.05	256.6	2.4	51.0	167.05 0.12
1331	6	6.926	33.3	6.02	254.4	-0.7	55.0	166.40 0.12
1334	8	7.156	33.3	5.92	253.2	1.4	61.3	163.80 0.12
1337	10	7.201	33.3	5.90	252.6	1.8	62.2	163.80 0.12
1340	12	7.424	33.3	5.85	249.2	3.7	75.1	162.50 0.12 6.56

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 12 L PURGED
LOW TURBIDITY, NO SHEEN/ODOUR, CLEAR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates
Duplicate ID
Triplicate ID

Blanks
Rinsate ID

Other Comments

18 October 2022

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Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – QUARTERLY GROUNDWATER MONITORING EVENT (SEPTEMBER 2022)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken quarterly groundwater monitoring at the Site in accordance with the Northern Territory Environment Protection Authority (NT EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A. This report details the results of the September 2022 quarterly monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016.*

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of quarterly groundwater sampling from monitoring wells EMB13 and EMB14.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Monitoring Event

Previous quarterly monitoring events were conducted in September 2021, December 2021 and June 2022. A comparison of analytical results above laboratory limits of reporting (LoRs) between the quarterly monitoring events is presented in Table 3.

2.0 Groundwater Quarterly Monitoring Event – September 2022

The quarterly monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in two monitoring bores (EMB13 and EMB14).
- Laboratory analytical testing of samples collected from EMB13 and EMB14, including:
  - Ø Major cations and anions
  - Ø Nutrients
  - Ø Heavy metals
  - Ø Hydrocarbon compounds
  - Ø Cyanide

- Ø Glycols
- Ø Polychlorinated Biphenyls (PCBs)
- Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

All groundwater wells were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and https://www.waterquality.gov.au/anz-guidelines. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odour, sheens and any other anomalies. The groundwater was generally clear and no odours or sheens were noted from either bore during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – September 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	29/09/22	4.174	4.174	2.254	9.237
EMB12	29/09/22	3.986	3.986	2.514	9.325
EMB13	29/09/22	6.041	5.241	2.795	10.245
EMB14	29/09/22	6.376	5.676	2.879	9.803
EMB15	29/09/22	3.043	3.043	4.341	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Austalian Height Datum

Table 2 – September 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.30	32.1	52.0	291	0.13	188	5.97	51.6
EMB14	5.75	33.6	70.6	259	0.12	168	6.83	21.1

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Nutrients & Inorganics					
Total Phosphate (as P)	23/09/21	µg/L	10	<10	20
	17/12/21	µg/L		10	20
	30/06/22	µg/L		<10	<10
	29/09/22	µg/L		10	10
Total Nitrogen	23/09/21	µg/L	200	6,300	11,200
	17/12/21	µg/L		5,000	15,800
	30/06/22	µg/L		8,700	12,500
	29/09/22	µg/L		5,700	9,400
Kjeldahl Nitrogen Total	23/09/21	µg/L	200	500	1,500
	17/12/21	µg/L		<200	800
	30/06/22	µg/L		4,000	6,200
	29/09/22	µg/L		1,400	1,300
Oxides of Nitrogen	23/09/21	µg/L	50	5,000	9,700
	17/12/21	µg/L		5,000	15,000
	30/06/22	µg/L		4,700	6,300
	29/09/22	µg/L		4,300	8,100
Ammonia (as N)	23/09/21	µg/L	10	90	90
	17/12/21	µg/L		30	<10
	30/06/22	µg/L		<10	240
	29/09/22	µg/L		10	40

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Cyanide (total)	23/09/21	µg/L	5	6	<5
	17/12/21	µg/L		110	38
	30/06/22	µg/L		<5	<5
	29/09/22	µg/L		<5	<5
Anions					
Chloride	23/09/21	µg/L	1,000	77,000	67,000
	17/12/21	µg/L		45,000	6,100
	30/06/22	µg/L		45,000	19,000
	29/09/22	µg/L		48,000	56,000
Sulphate (as SO_4)	23/09/21	µg/L	5,000	<5,000	<5,000
	17/12/21	µg/L		5,300	14,000
	30/06/22	µg/L		<5,000	<5,000
	29/09/22	µg/L		<5,000	11,000
Total Alkalinity (as $CaCO_3$)	23/09/21	µg/L	20,000	<20,000	<20,000
	17/12/21	µg/L		<20,000	26,000
	30/06/22	µg/L		<20,000	32,000
	29/09/22	µg/L		<20,000	48,000
Cations					
Calcium	23/09/21	µg/L	500	1,000	12,000
	17/12/21	µg/L		1,000	28,000
	30/06/22	µg/L		1,200	14,000
	29/09/22	µg/L		3,000	26,000
Magnesium	23/09/21	µg/L	500	800	2,300
	17/12/21	µg/L		700	1,700
	30/06/22	µg/L		600	1,400
	29/09/22	µg/L		700	1,800
Potassium	23/09/21	µg/L	500	1,000	3,600
	17/12/21	µg/L		1,100	3,200
	30/06/22	µg/L		2,200	3,100
	29/09/22	µg/L		1,000	3,800
Sodium	23/09/21	µg/L	500	18,000	18,000
	17/12/21	µg/L		18,000	3,800
	30/06/22	µg/L		20,000	6,700

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
	29/09/22	µg/L		17,000	13,000
Heavy Metals (filtered)					
Arsenic	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	<1
	30/06/22	µg/L		1	<1
	29/09/22	µg/L		1	<1
Barium	23/09/21	µg/L	1	51	213
	17/12/21	µg/L		50	363
	30/06/22	µg/L		50	224
	29/09/22	µg/L		51	322
Boron	23/09/21	µg/L	50	<50	<50
	17/12/21	µg/L		50	<50
	30/06/22	µg/L		60	<50
	29/09/22	µg/L		<50	<50
Copper	23/09/21	µg/L	1	3	<1
	17/12/21	µg/L		3	4
	30/06/22	µg/L		3	<1
	29/09/22	µg/L		3	1
Lead	23/09/21	µg/L	1	2	<1
	17/12/21	µg/L		<1	<1
	30/06/22	µg/L		2	<1
	29/09/22	µg/L		2	<1
Manganese	23/09/21	µg/L	1	35	12
	17/12/21	µg/L		29	3
	30/06/22	µg/L		29	3
	29/09/22	µg/L		48	1
Nickel	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	1
	30/06/22	µg/L		2	<1
	29/09/22	µg/L		2	<1
Zinc	23/09/21	µg/L	5	30	109
	17/12/21	µg/L		30	799
	30/06/22	µg/L		15	250

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
	29/09/22	µg/L		10	262
PFAS					
Sum of PFAS (n=30)	23/09/21	µg/L	0.1	55.49	4.45
	17/12/21	µg/L		14.23	1.1
	30/06/22	µg/L		150.5	2.39
	29/09/22	µg/L		65.36	3.43

The results for the September 2022 quarterly monitoring event are summarised as follows:

- Heavy metals (antimony, beryllium, boron, cadmium, chromium, cobalt, mercury, selenium and vanadium (all filtered)), cyanide, hydroxide alkalinity as $CaCO_3$, carbonate alkalinity as $CaCO_3$, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), phenols, glycols and organochlorine pesticides (OCP) were all reported to be below the LoRs for both monitoring bores.
- Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals (barium, copper, manganese and zinc) were reported above the LoRs in both monitoring bores.
- Arsenic, lead and nickel were reported above LoRs in EMB13 and bicarbonate alkalinity as $CaCO_3$, total alkalinity as $CaCO_3$ and sulfate as SO_4 were reported above LoRs in EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a decrease in reported concentrations for the sum of PFAS in EMB13 between the June 2022 and September 2022 quarterly monitoring events.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

A rinsate blank sample (RB01) was collected on 29 September 2022 and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank sample was collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the sampling event and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blank was prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the monitoring event.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted a quarterly groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in September 2022. Physico-chemical groundwater parameters were measured in the field and samples were collected from two monitoring bores (EM13 and EMB14) and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, beryllium, cadmium, chromium, cobalt, mercury, selenium and vanadium), cyanide, hydroxide alkalinity (as $CaCO_3$), carbonate alkalinity (as $CaCO_3$), total recoverable hydrocarbons, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, glycols and organochlorine pesticides were reported to be below the laboratory limits of reporting in both monitoring bores.

Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – barium, copper, manganese and zinc were reported equal to or above the laboratory limits of reporting in both monitoring bores.

Arsenic, lead and nickel were reported above laboratory limits of reporting in EMB13 and bicarbonate alkalinity (as $CaCO_3$), total alkalinity (as $CaCO_3$) and sulfate (as SO_4) were reported above laboratory limits of reporting in EMB14.

A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a decrease in reported concentrations for the sum of PFAS in EMB13 between the June 2022 and September 2022 quarterly monitoring events

The next quarterly groundwater monitoring event is scheduled to occur in December 2022.

Attachments

1 Statements of Limitation
2 Field Record Sheets
3 Results Summary Tables (including QA/QC)

Appendices

A Environmental Protection Licence 229-01
B Laboratory Certificates of Analysis

Yours Sincerely,



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Groundwater Monitoring Event – September 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

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Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No:	J174436
Project: GME		Gauged by:	VB
Location: East Arm, NT		Date:	29/9/22

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0941	EMB7	—	4.174	—	9.237	
0947	EMB12	—	3.986	—	9.235	
0950	EMB15	—	3.043	—	9.314	
1011	EMB13	—	6.041	—	10.245	
1120	EMB14	—	6.876	—	9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SLIGHT WIND, PART CLOUDY, RAINED ON 28/9

MANY ANTS OBSERVED UNDER GATTIC

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB13
Location:	East Arm, NT	Date: 29/9/22	

WELL DETAILS		SAMPLING EQUIPMENT				
Well depth:	10.245 (m)	Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50 (mm)	Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other	WQM Make:	YSI			
Depth to product	— (m bTOC)	WL Meter:	interface	non-interface		
Depth to water:	6.041 (m bTOC)	Screen (from - to), m	7.245 - 10.245			
Product thickness	— (m)	Pump Depth (m bTOC)	—			

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SLIGHT WIND, PART OVERCAST, RAINED YESTERDAY (28/9)

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L / SAL PSU / TURB NTU
1021	INT	6.198	32.2	3.29	282.6	11.2	35.8	183.30 0.13
1024	2	6.484	32.1	3.27	284.7	28.4	42.0	185.25 0.13
1027	4	6.786	32.1	3.28	287.5	35.0	40.5	187.85 0.14
1030	6	7.027	32.1	3.29	290.6	40.8	42.6	189.80 0.14
1033	8	7.283	32.1	3.29	291.0	43.0	46.7	189.15 0.14
1036	10	7.491	32.1	3.29	293.0	48.8	49.8	189.90 0.14
1039	12	7.762	32.1	3.30	290.9	51.6	52.0	187.85 0.13 5.97
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 12L PURGED
L-M TURB, L.BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - metals*	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOLS	2	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID QC01 - 1 AMBER 2 VIALS

Triplicate ID QC01A - "

Blanks

Rinsate ID

RB01 - 1 AMBER 2 VIAL

TB01 - 2 VIAL

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB14
Location:	East Arm, NT	Date: 29/9/22	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	9.803 (m)		Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50 (mm)		Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other		WQM Make:	YSI			
Depth to product	- (m bTOC)		WL Meter:	interface	non-interface		
Depth to water:	6.376 (m bTOC)		Screen (from - to), m	6.803 - 9.803			
Product thickness	- (m)		Pump Depth (m bTOC)	-			

***Other Sampling Equipment / Method**

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SLIGHT WIND, PART OVERCAST, RAINED YESTERDAY (28/9)

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L	SAL PSU	TURB NTU
1122	INT	6.547	33.7	5.82	259.7	43.6	13.5	170.95	0.12	
1125	2	6.914	33.7	5.82	261.6	28.1	9.9	170.95	0.12	
1128	4	7.171	33.7	5.82	263.4	18.4	14.3	173.55	0.12	
1131	6	7.302	33.6	5.81	265.6	16.1	23.9	174.20	0.12	
1134	8	7.563	33.6	5.76	264.5	15.6	31.1	171.60	0.12	
1137	10	7.791	33.6	5.65	257.6	19.7	73.7	166.40	0.12	
1140	12	7.947	33.6	5.66	255.3	20.1	75.6	166.40	0.12	
1143	14	8.201	33.6	5.75	254.2	21.1	70.6	167.70	0.12	6.83
			SAMPLED							

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

L-M TURB, L. BROWN, NO SHEENS/ODOURS
SAMPLED AFTER 14L PURGED

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - metals*	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOL	1	

Duplicates
Duplicate ID
Triplicate ID
Blanks
Rinsate ID

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Other Comments

Groundwater Monitoring Event – September 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to September 2022

Greencap Project No.: J174436

				SWL	Field Parameters									Metals																	
				Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (filtered)	Beryllium (Filtered)	Boron (filtered)	Cadmium (Filtered)	Chromium (total) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)
				mbgl	^{0}C	pH unit	(µS/cm)	PSU	mV	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL													1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5
Monitoring Round	Field ID	Sampled Date	Lab Reports																										
Sep-21	EMB13	23/09/2021	827604 & ES2134300	5.803	36.8	7.24	281.3	0.13	-35.2	32.7	183.09	3.91	<1	<1	51	<1	<50	<0.2	<1	<1	3	2	35	<0.1	<1	1	<10	30
	EMB14			6.465	33.3	5.41	377.6	0.18	93.2	18.4	250.26	6.09	<1	<1	213	<1	<50	<0.2	<1	<1	<1	<1	12	<0.1	<1	<1	<10	109
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	3.276	33.4	3.75	272.4	0.13	99.4	22.1	176.8	4.75	<1	1	50	<1	50	<1	<1	<1	3	<1	29	<0.1	1	10	<10	30
	EMB14			3.416	35.1	6.39	204.7	0.09	68	33	122.6	5.81	<1	<1	363	<1	<50	<1	<1	<1	4	<1	3	<0.1	1	10	<10	799
Jun-22	EMB13	30/06/2022	901960 & ES2222495	4.572	32.1	3.54	291.5	0.14	68.5	72.6	190.45	6.14	<1	1	50	<1	60	<0.1	<1	<1	3	2	29	<0.1	2	<10	<10	15
	EMB14			4.850	33.0	6.3	238.5	0.11	80.4	59.8	154.7	6.61	<1	<1	224	<1	<50	<0.1	<1	<1	<1	<1	3	<0.1	<1	<10	<10	250
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	5.241	32.1	3.30	290.9	0.13	51.6	52	187.85	5.97	<1	1	51	<1	<50	<0.1	<1	<1	3	2	48	<0.1	2	<10	<10	10
	EMB14			5.676	33.6	5.75	259.2	0.12	21.1	70.6	167.7	6.83	<1	<1	322	<1	<50	<0.1	<1	<1	<1	<1	1	<0.1	<1	<10	<10	262

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to September 2022

Greencap Project No.: J174436

				Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions					TRH - NEPM 2013 Fractions							
				Ammonium Ion (as N)	Nitrate + Nitrite (oxides of nitrogen) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CACO3)	Bicarbonate Alkalinity (as CACO3)	Hydroxide Alkalinity (as CACO3)	Total Alkalinity (as CACO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	Naphthalene	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less NAPTHALENE	C16-C34	C34-C40	C10 - C40 (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				10	50	200	200	10	5	1000	5000	10000	2000	20000	20000	500	500	500	500	20	50	100	100	100	1	20	20	50	50	100	100	100
Monitoring Round	Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	90	5800	6300	500	<10	6	77000	<5000	<10000	<20000	<20000	<20000	1000	800	1000	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			90	9700	11200	1500	20	<5	67000	<5000	<10000	<20000	<20000	<20000	12000	2300	3600	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	30	5000	5000	<200	10	110	45000	5300	<10000	<20000	<20000	<20000	1000	700	1100	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			<10	15000	15800	800	20	38	6100	14000	<10000	26000	<20000	26000	28000	1700	3200	3800	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<10	4700	8700	4000	<10	<5	45000	<5000	<10000	<20000	<20000	<20000	1200	600	2200	20000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			240	6300	12500	6200	<10	<5	19000	<5000	<10000	32000	<20000	32000	14000	1400	3100	6700	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	10	4300	5700	1400	10	<5	4800	<5000	<10000	<20000	<20000	<20000	3000	700	1000	17000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			40	8100	9400	1300	10	<5	5600	11000	<10000	48000	<20000	48000	26000	1800	3800	13000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to September 2022

Greencap Project No.: J174436

				MAH								PAH																			
				Benzene	Ethylbenzene	Isopropyl benzene (cumene)	Styrene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Monitoring Round	Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to September 2022

				PCBs								Phenols (Halogenated)										Phenols (non-Halogenated)											Glycols			
				Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCB*	2-Chlorophenol	2.4-Dichlorophenol	2.4.5-Trichlorophenol	2.4.6-Trichlorophenol	2.6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Tetrachlorophenols - Total	Total Halogenated Phenol*	2-Cyclohexyl-4.6-dinitrophenol	2-Methyl-4.6-dinitrophenol	2-Methylphenol (o-Cresol)	2-Nitrophenol	2.4-Dimethylphenol	2.4-Dinitrophenol	3&4-Methylphenol (m&p-Cresol)	4-Nitrophenol	Dinoseb	Phenol	Total Non-Halogenated Phenol*	Di-Ethylene Glycol	Ethylene glycol	Propylene glycol	Triethylene glycol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	3	3	10	10	3	10	10	30	10	100	30	3	10	3	30	6	30	100	3	100	20000	20000	20000	20000
Monitoring Round	Field ID	Sampled Date	Lab Reports																																
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to September 2022

				PFAS - Perfluoroalkyl carboxylic acids (PFCAs)												PFAS - Perfluoroalkyl sulfonamido substances							PFAS - Perfluoroalkyl sulfonic acids (PFSAs)							
				Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	Perfluorooctane sulfonamide (FOSA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Monitoring Round	Field ID	Sampled Date	Lab Reports																										
Sep-21	EMB13	23/09/2021	827604 & ES2134300	1	5.5	5.4	1.7	1.2	0.04	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.56	1.4	1.1	1.0	0.29	0.1	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.8	4.5	3.8	1.4	0.97	0.03	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.17	0.28	0.21	0.27	0.09	0.08	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Jun-22	EMB13	30/06/2022	901960 & ES2222495	2.6	14	13	4.7	3.1	0.39	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.23	0.77	0.49	0.47	0.15	0.15	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	1.2	6.7	4.1	1.9	1.4	0.05	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.35	1.2	0.74	0.69	0.19	0.14	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01

				PFAS - n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				PFASs Summations				
				1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum (PFHxS + PFOS)	Sum of US EPA PFAS (PFOS + PFOA)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of WA DWER PFAS (n=10)	Sum of PFASs (n=30)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
Monitoring Round	Field ID	Sampled Date	Lab Reports									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	0.04	40	61	< 0.01	<0.01	1.2	1.2	55.41	55.49
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.29	0.29	4.35	4.45
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.03	1.6	1.1	< 0.01	<0.01	0.97	0.97	14.17	14.23
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.09	0.09	1.02	1.1
Jun-22	EMB13	30/06/2022	901960 & ES2222495	0.1	110	2.6	< 0.01	<0.01	3.1	3.1	150	150.49
	EMB14			<0.01	0.11	0.02	< 0.01	<0.01	0.15	0.15	2.24	2.39
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	0.04	49	0.97	< 0.01	<0.01	1.4	1.4	65.27	65.36
	EMB14			<0.01	0.1	0.02	< 0.01	<0.01	0.19	0.19	3.29	3.43

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring
Relative Percentage Duplicate Results Table
September 2022

Greencap Project No.: J174436

			Lab Report Number	927414	927414		927414	ES2234929	
			Field ID	EMB13	QC01	RPD	EMB13	QC01A	RPD
			Sampled Date/Time	29/09/2022	29/09/2022		29/09/2022	29/09/2022	
Chem_Group	**ChemName**	**Units**	**EQL**						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6 (Primary): 2 (Interlab)	<6.0	<6.0	0	<6.0	<2.0	0
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benz(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a) pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0		
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<5.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<5.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring
Blank Results Table
September 2022

Greencap Project No.: J174436

			Lab Report Number	927414	927414
			Field ID	RB01	TB01
			Sampled_Date/Time	29/09/2022	29/09/2022
			Sample Type	Rinsate	Trip_B
Chem_Group	**ChemName**	**Units**	**EQL**		
	Perfluorooctanoate	mg/l	0.00001		
BTEX	Benzene	µg/L	1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C6 - C9	µg/L	20	<20	<20
	C10 - C14	µg/l	50	<50	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/L	50	<100	
	C10 - C40 (Sum of total)	µg/L	100	<100	
	C6-C10	mg/l	0.02	<0.02	<0.02

Groundwater Monitoring Event – September 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01

ntepa Northern Territory Environment Protection Authority

ENVIRONMENT PROTECTION LICENCE

(Pursuant to section 34 of the *Waste Management and Pollution Control Act*)

Licensee	Smorgon Fuels Pty Ltd
Licence Number	**EPL229 - 01**
Registered Business Address	Smorgon Fuels Pty Ltd 644 Chapel Street South Yarra VIC 3141
ACN	094 541 723
ABN	84 094 541 723
Premises Address	Section 05783 Hundred of Bagot plan(s) S2005/171A 800 BERRIMAH RD, EAST ARM
Anniversary Date:	29 June
Commencement Date:	29/06/2020
Expiry Date:	28/06/2022
Scheduled Activity	Collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis, other than in or for the purpose of a sewage treatment plant. Operating **premises**, other than a sewage treatment plant, associated with collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis.
Description	Operation of a liquid waste treatment facility capable of treating, storing and recycling a variety of industrial liquid waste including the treatment of waste water and the recycling of ethylene glycol for the maritime, mining and oil and gas industries in the Darwin region.

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Chromium compounds that are hexavalent or trivalent	✗	✗	✓	✓	✗	✗
Cobalt compounds	✗	✗	✓	✓	✗	✗
Containers that are contaminated with residues of a listed waste	✗	✗	✓	✓	✗	✗
Copper compounds	✗	✗	✓	✓	✗	✗
Cyanides (inorganic)	✗	✗	✓	✓	✗	✗
Encapsulated, chemically fixed, solidified or polymerised wastes	✗	✗	✓	✓	✗	✗
Ethers	✗	✗	✓	✗	✗	✗
Filter cake	✗	✗	✓	✗	✗	✗
Fire debris and fire washwaters	✗	✗	✓	✓	✗	✗
Fly ash	✗	✗	✓	✓	✗	✗
Halogenated organic solvents	✗	✗	✓	✗	✗	✗
Highly odorous organic chemicals (including mercaptans and acrylates)	✗	✗	✓	✗	✗	✗
Inorganic fluorine compounds excluding calcium fluoride	✗	✗	✓	✓	✗	✗
Inorganic sulfides	✗	✗	✓	✓	✗	✗
Isocyanate compounds	✗	✗	✓	✗	✗	✗
Lead, lead compounds	✗	✗	✓	✓	✗	✗
Mercury, mercury compounds	✗	✗	✓	✓	✗	✗
Nickel compounds	✗	✗	✓	✓	✗	✗
Non-toxic salts	✗	✗	✓	✓	✗	✗
Organic phosphorus compounds	✗	✗	✓	✗	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Organic solvents excluding halogenated solvents	✗	✗	✓	✓	✓	✗
Organohalogen compounds that are not otherwise specified in this Schedule	✗	✗	✓	✗	✗	✗
Percholates	✗	✗	✓	✗	✗	✗
Phenols, phenol compounds including chlorophenols	✗	✗	✓	✗	✗	✗
Phosphorus compounds other than mineral phosphates	✗	✗	✓	✓	✗	✗
Residue from industrial waste treatment or disposal operations	✗	✗	✓	✓	✗	✗
Selenium, selenium compounds	✗	✗	✓	✓	✗	✗
Soils contaminated with a listed waste	✗	✗	✓	✗	✗	✗
Surface active agents (surfactants) that contain principally organic constituents and that may contain metals and inorganic materials	✗	✗	✓	✓	✗	✗
Vanadium compounds	✗	✗	✓	✓	✗	✗
Waste chemical substances arising from research and development or teaching activities, including those substances which are not identified and/or are new and the effects of which on human health and/or the environment are not known	✗	✗	✓	✓	✗	✗
Wastes containing peroxides other than hydrogen peroxide	✗	✗	✓	✓	✗	✗
Waste containing cyanides from heat treatment and tempering operations	✗	✗	✓	✗	✗	✗
Waste from the production, formulation and use of biocides and phytopharmaceuticals	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of organic solvents	✗	✗	✓	✓	✓	✗
Waste from the production, formulation and use of photographic chemicals and processing materials	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	✗	✗	✓	✓	✗	✗
Waste from the production and preparation of pharmaceutical products	✗	✗	✓	✓	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste mineral oils unfit for their original intended use	✗	✗	✓	✓	✓	✗
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✓	✓	✓	✗
Waste pharmaceuticals, waste drugs and waste medicines	✗	✗	✓	✗	✗	✗
Waste resulting from surface treatment of metals and plastics	✗	✗	✓	✓	✗	✗
Waste tarry residues arising from refining, distillation and any pryolytic treatment	✗	✗	✓	✗	✗	✗
Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs), polychlorinated nalthalenes (PCNs), polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBS)	✗	✗	✓	✗	✗	✗
Zinc compounds	✗	✗	✓	✓	✗	✗
Acidic solutions or acids in solid form	✗	✗	✓	✓	✓	✗
Antimony, antimony compounds	✗	✗	✓	✓	✗	✗
Arsenic, arsenic compounds	✗	✗	✓	✓	✗	✗
Barium compounds other than barium sulphate	✗	✗	✓	✓	✗	✗
Basic solutions or bases in solid form	✗	✗	✓	✓	✓	✗
Beryllium, beryllium compounds	✗	✗	✓	✓	✗	✗
Boron compounds	✗	✗	✓	✓	✗	✗
Cadmium, cadmium compounds	✗	✗	✓	✓	✗	✗
Chlorates	✗	✗	✓	✓	✗	✗

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 229 - 01

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INFORMATION ABOUT THIS LICENCE

- This licence does not in any way relieve the licence holder from its obligations to comply with the *Waste Management and Pollution Control Act* (WMPC Act), including the general environmental duty in section 12 of the WMPC Act and the duty to notify of incidents causing or threating to cause pollution under section 14 of the WMPC Act.

Duration of a licence (section 40, 43 and 45 of the WMPC Act)

- A licence will remain in force until its expiry date or until it is surrendered by the licensee or is suspended or cancelled in accordance with the WMPC Act.
- The licensee must notify the Northern Territory Environment Protection Authority (NT EPA) within 14 days after ceasing to conduct the activity.
- The licensee may, with the approval of the NT EPA, surrender the licence to the NT EPA.

Amendment or Revocation of a licence (section 37 of the WMPC Act)

- The licensee may apply to amend or revoke a condition of this licence.
- A fee applies and the application must be made using the designated form via NT EPA Online.
- The NT EPA may also amend or revoke a condition of this licence as set out in section 38 of the WMPC Act.

Transfer of a licence (section 46 of the WMPC Act)

- The licensee can apply to transfer their licence to another person.

Renewal of a licence (section 40 of the WMPC Act and section 3 of the Regulations)

- The licensee may apply for the renewal of their licence not earlier than 90 days, and not later than 30 days, before their licence expires.
- A fee applies and the application must be made via NT EPA Online.

Public Register

- A copy of environment protection licences and any plans for environmental management, reports, submissions or documents required as a condition of an environment protection licence, will be placed on a register in accordance with section 9 of the WMPC Act.
- A copy of the Annual Return will be placed on the register.
- The NT EPA makes this register freely available from the NT EPA website.

Environment Protection Objectives (Part 4 of the WMPC Act), and Water Quality Standards (section 73 of the *Water Act*)

- An Environment Protection Objective (EPO) is a statutory instrument to establish principles on which:
  a. environmental quality is to be maintained, enhanced, managed or protected;
  b. pollution, or environmental harm resulting from pollution, is to be assessed, prevented, reduced, controlled, rectified or cleaned up; and
  c. effective waste management is to be implemented or evaluated.
- In accordance with section 18 of the WMPC Act a beneficial use, quality standard, criteria or objective declared under section 73 of the *Water Act* and in force is an environment protection objective for the purposes of the WMPC Act.

- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
    - Declaration of Beneficial Uses and Objectives Darwin Harbour Region - surface water

Environmental Interests

- This section highlights sensitivity of the surrounding land use and environment associated with the location of the approved activity.
- Sites of Conservation Significance (SOCS) - Darwin Harbour Region. SOCS number 6
- Ramsar Wetland - none

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 39 of the WMPC Act, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In determining whether the licensee has committed an offence, the licensee may be liable for the conduct of its directors, employees or agents.
- The licensee should ensure that each of its directors, employees, contractors or agents are aware of, and comply with, this licence.
- In this licence, unless the contrary intention appears, words that are defined in the WMPC Act are intended to have the meaning given to them in that Act.

LICENCE CONDITIONS

GENERAL

1 The licensee must ensure the contact details recorded in NT EPA Online for this licence are correct at all times.

2 The licensee must at all times have a 24 hour emergency contact.

3 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 50 business days of the anniversary of the commencement date of this licence, for each year or part of a year that this licence is in force.

4 The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:

4.1 environment protection licence number issued under the WMPC Act; and

4.2 24 hour emergency contact details.

5 The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.

6 The licensee must ensure, at all times, that the activity is covered by a policy of insurance or other form of indemnity that will cover the likely costs or preventing, minimising or making good environmental damage that may result from the activity.

7 The licensee must provide to the NT EPA, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the NT EPA.

8 All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by uploading the document via NT EPA Online (or by emailing waste@nt.gov.au).

9 The licensee must maintain and implement the documents listed in Table 2.

Table 2 - Documents relating to this licence

Document Reference	Document Name
N/A	Environmental Management Plan - May 2020
N/A	Emergency Management Plan - May 2020
WI08-04-01	Bulk Truck Receival
WI08-04-02	Pre-acceptance Sampling
WI08-04-06	Bulk Wastewater Unloading
WI08-04-09	Packaged Waste Receival

10 Within 10 business days of any amendment being made to a document listed in Table 2 the licensee must provide the amended document to the NT EPA, along with:

10.1 a tabulated summary of the amendment(s) with document references;

10.2 reasons for the amendment(s); and

10.3 an assessment of environmental risk associated with the amendment(s).

11 The NT EPA may require the licensee to revise or amend and resubmit any amended document. Where the NT EPA requires a document to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

12 The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.

13 The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:

13.1 the person to whom the complaint was made;

13.2 the person responsible for managing the complaint;

13.3 the date and time the complaint was reported;

13.4 the date and time of the event(s) that led to the complaint;

13.5 the contact details of the complainant if known, or where no details are provided a note to that effect;

13.6 the nature of the complaint;

13.7 the nature of event(s) giving rise to the complaint;

13.8 prevailing weather conditions at the time (where relevant to the complaint)

13.9 the action taken in relation to the complaint, including any follow-up contact with the complainant; and

13.10 if no action was taken, why no action was taken.

14 The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

15 Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the NT EPA prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this licensee, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

16 The licensee must, without limiting any other condition of this licence, in conducting the licenced activity, do all things reasonable and practicable to ensure the licenced activity does not adversely affect the relevant Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:

- *Darwin Harbour Region - surface water - aquaculture, environment, cultural, rural stock and domestic*

17 The licensee must not collect, transport, store, recycle, treat or dispose of listed waste other than the listed waste specified in Table 1.

18 The licensee must ensure any plant and equipment used by the licensee in conducting the activity:

18.1 is reasonably fit for the purpose and use to which it is put;

18.2 is maintained;

18.3 is operated by a person trained to use the plant and equipment; and

18.4 is operated by, or operated by a person accompanied by, a person trained to handle, store or dispose of listed waste in connection with the activity.

19 The licensee must ensure that wastewater generated from washing plant and equipment associated with the activity does not cause pollution.

20 The licensee must segregate waste received at the premises in clearly designated areas for recycling, re-use or disposal.

21 The licensee must ensure that all materials that are likely to cause environmental harm are handled and stored in areas with a containment system in accordance with the relevant Australian Standard. Where no relevant Australian Standard exists, the containment system must be sized to contain 110% of the volume of the largest container within the area.

22 No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved in writing by the NT EPA.

23 The licensee must ensure that all listed waste being transported to and from the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.

24 The licensee must ensure that all listed waste is delivered to a premises licenced under section 30 of the WMPC Act to receive that listed waste.

25 The licensee must comply with the National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure.

DISCHARGES AND EMISSIONS

26 The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water which discharge has not been specifically authorised by another condition of this licence).

27 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.

28 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.

Discharges to water

29 This licence does not authorise the discharge of waste water resulting from the licenced activity through the storm water drain discharge point WMP1 identified in Attachment A.

30 The licensee must ensure that water discharged through the storm water drain at WMP1 identified in Attachment A, does not exceed the trigger values specified in Attachment A.

31 The licensee must ensure that the water discharged through the storm water drain at WMP1 identified in Attachment A does not:

31.1 consist of water from any other source than stormwater. Where stormwater has collected within bunded areas, then water quality analysis must confirm the stormwater pH and dissolved oxygen values are within the ranges specifiied in Attachment A and does not contain the nutrients, metals and metalloids, hydrocarbons, organic alcohols and other contaminants listed in Attachment A;

31.2 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;

31.3 cause or generate odours which would adversely affect the use of surrounding waters;

31.4 cause algal blooms in the receiving water;

31.5 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;

31.6 cause mortality of fish or other aquatic organisms; or

31.7 cause adverse impacts on plants.

Emissions to air

32 The licensee must ensure that the emissions from all emission events do not exceed the trigger values specified in Attachment C.

33 The licensee must install, operate and maintain pollution control equipment to minimise contaminants or waste in emissions to air.

34 The activity must not cause or release, beyond the boundary of the premises:

34.1 visible steam;

34.2 smoke;

34.3 offensive odour;

34.4 dust or particulates; or

34.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.

35 The licensee must comply with the National Environment Protection (Air Toxics) Measure.

Environmental Audit

36 The licensee must undertake, annually, and as prescribed by the conditions of this licence, an environmental audit by a qualified person to evaluate the:

36.1 extent to which compliance has been acheived with this licence; and

36.2 ability of management systems to manage waste and prevent environmental harm resulting from pollution.

37 The licensee must submit the proposed scope for the environmental audit no later than 20 business days prior to the proposed commencement date of the environmental audit (which must be specified when the proposed scope is submitted), to the NT EPA for review and approval.

38 The NT EPA may require the licensee to revise or amend and resubmit any proposed scope for an environmental audit. Where the NT EPA requires the environmental audit scope to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

39 The licensee must ensure that each environmental audit:

39.1 is not commenced until written approval of the environmental audit scope is received from the NT EPA; and

39.2 is undertaken in accordance with the approved scope.

40 The licensee must ensure that, for each environmental audit undertaken by the licensee:

40.1 a written report is prepared and signed by the qualified person who conducted the audit;

40.2 the written report is completed within 2 calendar months of the licensee's receipt of the NT EPA's approval of the environmental audit scope; and

40.3 the written report is provided in full to the NT EPA within 5 business days of being signed by the qualified person.

MONITORING

41 The licensee must conduct surface water monitoring in accordance with Attachment A

42 The licensee must conduct ground water monitoring in accordance with Attachment B.

43 The licensee must conduct Stack Emission Monitoring in accordance with Attachment C.

44 The licensee must, prior to the inital wet season release of storm water from the storm water collection pit as identified in Attachment A, ensure that the quality of the water is within the trigger values specified in Attachment A.

45 The licensee must conduct surface water monitoring for parameters listed in Attachment A in any bunded area where rainfall has collected and the licensee is considering transfer to the stormwater system.

46 The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.

47 The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).

48 The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.

49 The licensee must ensure any samples collected in accordance with the Attachment A, Attachment B and Attachment C or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.

50 The licensee must ensure that, for each sample collected in accordance with Attachment A, Attachment B and Attachment C or the activity the following information must be recorded and retained:

50.1 the date on which the sample was collected;

50.2 the time at which the sample was collected;

50.3 the location at which the sample was collected;

50.4 the name of the person who collected the sample;

50.5 the chain of custody forms relating to the sample;

50.6 the field measurements (if any) and analytical results (if any) relating to the sample; and

50.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

51 The licensee must keep records of all transfers of stormwater from bunded areas to the stormwater system including:

51.1 results of water quality analysis taken as required by condition 32.1 of this licence;

51.2 the date and time when the transfer began and ceased; and

51.3 the volume transferred to the stormwater system.

52 The licensee must keep and maintain records relating to the activity undertaken and the listed waste handled by the licensee in each successive 12 month period following the commencement of this licence, which include:

52.1 the date of collection;

52.2 the source of the listed waste;

52.3 the name of the transport company, if not the licensee;

52.4 the vehicle registration;

52.5 a description of the listed waste;

52.6 the quantity of the listed waste;

52.7 the final destination of the listed waste; and

52.8 whether the listed waste was stored, recycled, treated or disposed of.

53 The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.

54 The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.

55 The licensee must notify the NT EPA of any non-compliance with this licence by completing the Non-Compliance Notification via NT EPA Online (or by emailing waste@nt.gov.au), as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.

56 The licensee must include in the notification of non-compliance the following information:

56.1 when the non-compliance was detected and by whom;

56.2 the date and time of the non-compliance;

56.3 the actual and potential causes and contributing factors to the non-compliance;

56.4 the risk of environmental harm arising from the non-compliance;

56.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;

56.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur;

56.7 if no action was taken, why no action was taken; and

56.8 a date when an incident investigation report will be submitted to the NT EPA.

57 A non-compliance with this licence includes:

57.1 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on three consecutive sampling occasions;

57.2 subsequent consecutive exceedances of trigger values as described in condition 58.1; and

57.3 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on a single occasion where the parameter measures greater than or equal to three times the trigger value.

58 The licensee must notify the NT EPA of any exceedance of trigger value as specified in Attachment A, Attachment B and Attachment C as soon as practicable after (and in any case within 24 hours after) first becoming aware of the exceedance.

59 The licensee must keep records of all exceedances of trigger values specified in Attachment A, Attachment B and Attachment C. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.

60 The licensee must ensure that the notification of the trigger value exceedance includes the following information:

60.1 when the exceedance was detected and by whom;

60.2 the date and time of the exceedance;

60.3 the actual and potential causes and contributing factors to the exceedance;

60.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant trigger values as specified in Attachment A, Attachment B and Attachment C;

60.5 the action(s) that have or will be undertaken to address the exceedance and any resulting environmental harm; and

60.6 if no action was taken, why no action was taken.

61 The licensee must submit a completed Annual Return via NT EPA Online within 10 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.

62 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

63 The licensee must ensure that each Monitoring Report:

63.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';

63.2 reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;

63.3 includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;

63.4 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;

63.5 provides an assessment on groundwater levels, including groundwater contours and tidal influence;

63.6 reports on all exceedances and investigations undertaken for this licence; and

63.7 includes an assessment of environmental impact from the activity.

64 The NT EPA may require the licensee to revise or amend and resubmit any Monitoring Report. Where the NT EPA requires the Monitoring Report to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



Leonie Cooper
Director Environment Authorisations
Delegate of the Northern Territory
Environment Protection Authority
Dated: 10/08/2020

END NOTES

This licence is a renewal which supercedes EPL229 with an expiry date of 28 June 2022

EPL229 was issued on 21 December 2017 with an expiry date of 23 December 2019

DEFINITIONS

All terms in the Licence which are defined in the *Waste Management and Pollution Control Act* have the meaning given in that Act unless otherwise or further defined in this section.

DEFINITION	In this licence, unless a contrary intention appears:
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Scheduled activity as described on the covering page of this licence.
Air	includes any layer of the atmosphere.
Annual fee	yearly fee payable in respect of the activity as specified in the WMPC Act and the Regulations.
Annual Return	an NT EPA prescribed format for demonstrating and reporting compliance with the conditions of this licence and providing information on waste volumes for the preceding 12 month period.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting.
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: (a) noise, odour, heat and electromagnetic radiation; (b) a prescribed substance or prescribed class of substances; and (c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental audit	has the meaning given in section 47 of the WMPC Act.

Environmental harm	(a) any harm to or adverse effect on the environment; or (b) any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental nuisance	means: (a) an adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) an unsightly or offensive condition caused by contaminants or waste.
Incident	includes: (a) an accident, emergency or malfunction; and (b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.
Listed waste	a waste included under Schedule 2 of the Regulations.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: (a) is not trivial or negligible in nature; (b) consists of an environmental nuisance of a high impact or on a wide scale; (c) results, or is likely to result, in not more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of not more than $50,000 or the prescribed amount (whichever is greater).
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an NT EPA prescribed format for notifying the NT EPA of a non-compliance.
NT EPA Online	online system for Environment Protection Licence (EPL), Environment Protection Approval (EPA) and Waste Discharge Licence (WDL) lodgement and maintenance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	(a) emit, discharge, deposit, or disturb, directly or indirectly, a contaminant or waste; or (b) cause, permit, or fail to prevent, directly or indirectly, the emission, discharge, deposition, disturbance or escape of a contaminant or waste.
Pollution	(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or (b) a contaminant or waste, effect or phenomenon, that is present in the

	environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.
Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Regulations	*Waste Management and Pollution Control (Administration) Regulations*.
Rehabilitation Plan	a written plan to ensure that the objectives of rehabilitation are achieved as set out in the NT EPA Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) is irreversible or otherwise of a high impact or on a wide scale; (b) damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) results or is likely to result in more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of more than $50,000 or the prescribed amount (whichever is greater).
Stormwater	water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Trigger values	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Waste	(a) a solid, a liquid or a gas; or (b) a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	water that contains a contaminant or waste.
Water	includes: (a) surface water, ground water and tidal waters; (b) coastal waters of the Territory, within the meaning of the Coastal Waters (Northern Territory Powers) Act 1980 of the Commonwealth; and (c) water containing an impurity.
WMPC Act	the Northern Territory *Waste Management and Pollution Control Act*.

Groundwater Monitoring Event – September 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ **Sydney Laboratory** Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 6 Monterey Road Dandenong South VIC 3175 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Greencap NT P/L	Project №	J174436	Project Manager	Varun Bhagwat	Sampler(s)	VB
Address	Unit 11 / 14 Winnellie Road Winnellie, NT 0820	Project Name	Groundwater Monitoring	EDD Format (Esdat, EQUIS etc)	Esdat	Facility Code	Handed over by: VB on 29/9/22
Contact Name	Varun Bhagwat						Email for Invoice: Varun.Bhagwat@greencap.com.au
Phone №	0428 829 444						Email for Results: Varun.Bhagwat@greencap.com.au
Special Directions							
Purchase Order	PO307870						
Quote ID №							

Containers (Change container type & size if necessary)

Required Turnaround Time (TAT) (Default will be 5 days if not ticked)

♦Surcharge will apply

☐ Overnight (reporting by 9am)♦ ☐ Same day♦ ☐ 1 day♦ ☐ 2 days♦ ☐ 3 days♦ ☑ 5 days (Standard) ☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B11C: Cation Suite	B11E: Anion Suite	B19A: Nutrient Suite	Ammonia	PCB	PFAS	Total Cyanide	B4A: TRH/BTEX/NPAH/Phenols	BTEXN	TRH/BTEXN								500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	EMB13	29/09/22	Water	X	X	X	X	X	X	X	X										1		2	2	2	1			
2	EMB14	29/09/22	Water	X	X	X	X	X	X	X	X										1		2	2	2	1			
3	QC01	29/09/22	Water								X													1	2				
4	RB01	29/09/22	Water										X											1	2				
5	TB01	29/09/22	Water									X													2				
	Add Rows		Total Counts	2	2	2	2	2	2	2	3	1	1								2		4	6	10	2			

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

Name | Signature | Date | Time | Temperature: N/A

Laboratory Use Only — Received By: KTHOS — SYD | BNE | MEL | PER | ADL | NTL | DRW — Signature — Date: 29/09 — Time: 2:15pm — Report №: 927414

Received By — SYD | BNE | MEL | PER | ADL | NTL | DRW — Signature — Date — Time

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name:	Greencap NT P/L
Contact name:	Varun
Project name:	Groundwater Monitoring
Project ID:	J174436
Turnaround time:	5 Day
Date/Time received	Sep 29, 2022 2:15 PM
Eurofins reference	927414

Sample Information

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

Notes

Contact

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

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Varun**

Report **927414-W-V2**
Project name Groundwater Monitoring
Project ID J174436
Received Date Sep 29, 2022

Client Sample ID			**EMB13**	**EMB14**	**QC01**	**RB01**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**M22-Se0062417**	**M22-Se0062458**	**M22-Se0062459**	**M22-Se0062460**
Date Sampled			**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**	**Sep 29, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	103	102	102	102
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Se0062417	M22-Se0062458	M22-Se0062459	M22-Se0062460
Date Sampled			Sep 29, 2022	Sep 29, 2022	Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	60	106	60	-
p-Terphenyl-d14 (surr.)	1	%	56	64	115	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	-	-
Total PCB*	0.005	mg/L	< 0.005	< 0.005	-	-
Dibutylchlorendate (surr.)	1	%	95	132	-	-
Tetrachloro-m-xylene (surr.)	1	%	110	78	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	52	129	137	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Ammonia (as N)	0.01	mg/L	0.01	0.04	-	-
Chloride	1	mg/L	48	56	-	-
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	4.3	8.1	-	-
Phosphate total (as P)	0.01	mg/L	0.01	0.01	-	-
Sulphate (as SO4)	5	mg/L	< 5	11	-	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Se0062417	M22-Se0062458	M22-Se0062459	M22-Se0062460
Date Sampled			Sep 29, 2022	Sep 29, 2022	Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit				
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.4	1.3	-	-
Total Nitrogen (as N)*	0.2	mg/L	5.7	9.4	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20	48	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO3)	20	mg/L	< 20	48	-	-
Alkali Metals						
Calcium	0.5	mg/L	3.0	26	-	-
Magnesium	0.5	mg/L	0.7	1.8	-	-
Potassium	0.5	mg/L	1.0	3.8	-	-
Sodium	0.5	mg/L	17	13	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	1.2	0.35	-	-
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	6.7	1.2	-	-
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	4.1	0.74	-	-
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	1.9	0.69	-	-
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	1.4	0.19	-	-
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	0.05	0.14	-	-
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
13C4-PFBA (surr.)	1	%	56	65	-	-
13C5-PFPeA (surr.)	1	%	80	71	-	-
13C5-PFHxA (surr.)	1	%	52	86	-	-
13C4-PFHpA (surr.)	1	%	64	78	-	-
13C8-PFOA (surr.)	1	%	76	100	-	-
13C5-PFNA (surr.)	1	%	126	124	-	-
13C6-PFDA (surr.)	1	%	104	130	-	-
13C2-PFUnDA (surr.)	1	%	102	133	-	-
13C2-PFDoDA (surr.)	1	%	93	131	-	-
13C2-PFTeDA (surr.)	1	%	61	102	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
13C8-FOSA (surr.)	1	%	140	113	-	-
D3-N-MeFOSA (surr.)	1	%	111	114	-	-
D5-N-EtFOSA (surr.)	1	%	114	138	-	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Se0062417	M22-Se0062458	M22-Se0062459	M22-Se0062460
Date Sampled			Sep 29, 2022	Sep 29, 2022	Sep 29, 2022	Sep 29, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D7-N-MeFOSE (surr.)	1	%	78	79	-	-
D9-N-EtFOSE (surr.)	1	%	64	68	-	-
D5-N-EtFOSAA (surr.)	1	%	147	186	-	-
D3-N-MeFOSAA (surr.)	1	%	96	77	-	-
Perfluoroalkyl sulfonic acids (PFSAs)						
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
13C3-PFBS (surr.)	1	%	73	93	-	-
18O2-PFHxS (surr.)	1	%	94	101	-	-
13C8-PFOS (surr.)	1	%	110	105	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	0.04	< 0.01	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	49	0.10	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.97	0.02	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
13C2-4:2 FTSA (surr.)	1	%	76	77	-	-
13C2-6:2 FTSA (surr.)	1	%	51	138	-	-
13C2-8:2 FTSA (surr.)	1	%	77	117	-	-
13C2-10:2 FTSA (surr.)	1	%	200	142	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	1.4	0.19	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1.4	0.19	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	65.27	3.29	-	-
Sum of PFASs (n=30)*	0.1	ug/L	65.36	3.43	-	-

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M22-Se0062461
Date Sampled			Sep 29, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
Naphthalene[N02]	0.01	mg/L	< 0.01
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M22-Se0062461
Date Sampled			Sep 29, 2022
Test/Reference	LOR	Unit	
BTEX			
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	102

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Sep 30, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Sep 30, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Sep 30, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Sep 30, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Sep 30, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Sep 30, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Sep 30, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Sep 30, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Sep 29, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: Groundwater Monitoring
Project ID: J174436

Order No.: PO307870
Report #: 927414
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Sep 29, 2022 2:15 PM
Due: Oct 6, 2022
Priority: 5 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	EMB13	Sep 29, 2022		Water	M22-Se0062417	X	X	X			X	X	X	X	X
2	EMB14	Sep 29, 2022		Water	M22-Se0062458	X	X	X			X	X	X	X	X
3	QC01	Sep 29, 2022		Water	M22-Se0062459						X				
4	RB01	Sep 29, 2022		Water	M22-Se0062460				X	X					
5	TB01	Sep 29, 2022		Water	M22-Se0062461				X						
Test Counts						2	2	2	2	1	3	2	2	2	2

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

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QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	113			70-130	Pass	
TRH C10-C14	%	85			70-130	Pass	
Naphthalene	%	81			70-130	Pass	
TRH C6-C10	%	114			70-130	Pass	
TRH >C10-C16	%	86			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	101			70-130	Pass	
Toluene	%	98			70-130	Pass	
Ethylbenzene	%	98			70-130	Pass	
m&p-Xylenes	%	100			70-130	Pass	
Xylenes - Total*	%	100			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	116			70-130	Pass	
Acenaphthylene	%	78			70-130	Pass	
Anthracene	%	112			70-130	Pass	
Benz(a)anthracene	%	75			70-130	Pass	
Benzo(a)pyrene	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	%	99			70-130	Pass	
Benzo(g.h.i)perylene	%	83			70-130	Pass	
Benzo(k)fluoranthene	%	96			70-130	Pass	
Chrysene	%	93			70-130	Pass	
Dibenz(a.h)anthracene	%	76			70-130	Pass	
Fluoranthene	%	75			70-130	Pass	
Fluorene	%	71			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	73			70-130	Pass	
Naphthalene	%	72			70-130	Pass	
Phenanthrene	%	73			70-130	Pass	
Pyrene	%	70			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polychlorinated Biphenyls							
Aroclor-1260	%	126			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	64			25-140	Pass	
2.4-Dichlorophenol	%	62			25-140	Pass	
2.4.5-Trichlorophenol	%	62			25-140	Pass	
2.4.6-Trichlorophenol	%	62			25-140	Pass	
2.6-Dichlorophenol	%	65			25-140	Pass	
4-Chloro-3-methylphenol	%	71			25-140	Pass	
Pentachlorophenol	%	47			25-140	Pass	
Tetrachlorophenols - Total	%	54			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	66			25-140	Pass	
2-Methyl-4.6-dinitrophenol	%	66			25-140	Pass	
2-Nitrophenol	%	64			25-140	Pass	
2.4-Dimethylphenol	%	98			25-140	Pass	
2.4-Dinitrophenol	%	55			25-140	Pass	
2-Methylphenol (o-Cresol)	%	63			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	64			25-140	Pass	
4-Nitrophenol	%	65			25-140	Pass	
Dinoseb	%	68			25-140	Pass	
Phenol	%	41			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	102			70-130	Pass	
Chloride	%	115			70-130	Pass	
Cyanide (total)	%	73			70-130	Pass	
Nitrate & Nitrite (as N)	%	101			70-130	Pass	
Phosphate total (as P)	%	94			70-130	Pass	
Sulphate (as SO4)	%	113			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	80			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	87			70-130	Pass	
Total Alkalinity (as CaCO3)	%	108			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	97			80-120	Pass	
Magnesium	%	98			80-120	Pass	
Potassium	%	94			80-120	Pass	
Sodium	%	102			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	115			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	108			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	100			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	90			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	93			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	92			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	103			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	97			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	97			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	86			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorotetradecanoic acid (PFTeDA)	%	91			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	88			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	122			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	71			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	117			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	97			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	107			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	107			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	99			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	117			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	103			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	90			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	89			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	112			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	104			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	104			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	101			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	104			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	102			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	115			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M22-Se0062179	NCP	%	122			70-130	Pass	
TRH C10-C14	M22-Se0062520	NCP	%	118			70-130	Pass	
Naphthalene	M22-Se0062179	NCP	%	72			70-130	Pass	
TRH C6-C10	M22-Se0062179	NCP	%	122			70-130	Pass	
TRH >C10-C16	M22-Se0062520	NCP	%	121			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M22-Se0062179	NCP	%	97			70-130	Pass	
Toluene	M22-Se0062179	NCP	%	99			70-130	Pass	
Ethylbenzene	M22-Se0062179	NCP	%	105			70-130	Pass	
m&p-Xylenes	M22-Se0062179	NCP	%	106			70-130	Pass	
o-Xylene	M22-Se0062179	NCP	%	105			70-130	Pass	
Xylenes - Total*	M22-Se0062179	NCP	%	106			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B22-Se0057678	NCP	%	104			70-130	Pass	
Acenaphthylene	B22-Se0057678	NCP	%	103			70-130	Pass	
Anthracene	B22-Se0057678	NCP	%	81			70-130	Pass	
Benz(a)anthracene	B22-Se0057678	NCP	%	117			70-130	Pass	
Benzo(a)pyrene	B22-Se0057678	NCP	%	98			70-130	Pass	
Benzo(b&j)fluoranthene	B22-Se0057678	NCP	%	102			70-130	Pass	
Benzo(g.h.i)perylene	B22-Se0057678	NCP	%	108			70-130	Pass	
Benzo(k)fluoranthene	B22-Se0057678	NCP	%	106			70-130	Pass	
Chrysene	B22-Se0057678	NCP	%	98			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dibenz(a.h)anthracene	B22-Se0057678	NCP	%	98			70-130	Pass	
Fluoranthene	B22-Se0057678	NCP	%	112			70-130	Pass	
Fluorene	B22-Se0057678	NCP	%	97			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B22-Se0057678	NCP	%	108			70-130	Pass	
Naphthalene	B22-Se0057678	NCP	%	98			70-130	Pass	
Phenanthrene	B22-Se0057678	NCP	%	103			70-130	Pass	
Pyrene	B22-Se0057678	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	L22-Se0044717	NCP	%	102			70-130	Pass	
Aroclor-1260	L22-Se0044717	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	B22-Se0057678	NCP	%	85			30-130	Pass	
2.4-Dichlorophenol	B22-Se0057678	NCP	%	103			30-130	Pass	
2.4.5-Trichlorophenol	B22-Se0057678	NCP	%	92			30-130	Pass	
2.4.6-Trichlorophenol	B22-Se0057678	NCP	%	94			30-130	Pass	
2.6-Dichlorophenol	B22-Se0057678	NCP	%	100			30-130	Pass	
4-Chloro-3-methylphenol	B22-Se0057678	NCP	%	88			30-130	Pass	
Pentachlorophenol	B22-Se0057678	NCP	%	75			30-130	Pass	
Tetrachlorophenols - Total	B22-Se0057678	NCP	%	94			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	B22-Se0057678	NCP	%	82			30-130	Pass	
2-Methyl-4.6-dinitrophenol	B22-Se0057678	NCP	%	99			30-130	Pass	
2-Nitrophenol	B22-Se0057678	NCP	%	105			30-130	Pass	
2.4-Dimethylphenol	B22-Se0057678	NCP	%	118			30-130	Pass	
2.4-Dinitrophenol	B22-Se0057678	NCP	%	92			30-130	Pass	
2-Methylphenol (o-Cresol)	B22-Se0057678	NCP	%	61			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	B22-Se0057678	NCP	%	57			30-130	Pass	
4-Nitrophenol	B22-Se0057678	NCP	%	45			30-130	Pass	
Dinoseb	B22-Se0057678	NCP	%	107			30-130	Pass	
Phenol	B22-Se0057678	NCP	%	44			30-130	Pass	
Spike - % Recovery									
				Result 1					
Sulphate (as SO4)	M22-Se0065087	NCP	%	89			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	B22-Se0058832	NCP	%	83			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M22-Se0066404	NCP	%	100			75-125	Pass	
Magnesium	M22-Se0066404	NCP	%	99			75-125	Pass	
Potassium	M22-Se0066404	NCP	%	93			75-125	Pass	
Sodium	M22-Se0066404	NCP	%	109			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M22-Se0064828	NCP	%	104			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Oc0000220	NCP	%	96			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Se0064828	NCP	%	99			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Se0064828	NCP	%	91			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-Se0064828	NCP	%	96			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-Se0064828	NCP	%	92			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-Se0064828	NCP	%	102			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Se0064828	NCP	%	92			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorododecanoic acid (PFDoDA)	M22-Se0064828	NCP	%	88			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Se0064828	NCP	%	109			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Se0064828	NCP	%	86			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-Se0064828	NCP	%	93			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Se0064828	NCP	%	104			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Se0064828	NCP	%	128			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-Se0064828	NCP	%	105			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-Se0064828	NCP	%	96			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Se0064828	NCP	%	106			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Se0064828	NCP	%	116			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-Se0064828	NCP	%	99			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Se0064828	NCP	%	112			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Se0064828	NCP	%	105			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Se0064828	NCP	%	95			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Se0064828	NCP	%	95			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Se0064828	NCP	%	118			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Se0064828	NCP	%	104			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Se0064828	NCP	%	89			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Se0064828	NCP	%	102			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-Oc0000220	NCP	%	115			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Oc0000220	NCP	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Se0064828	NCP	%	97			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M22-Se0062521	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M22-Se0061988	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M22-Se0061988	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M22-Se0061988	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	M22-Se0062521	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C10	M22-Se0062521	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	M22-Se0061988	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M22-Se0061988	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M22-Se0061988	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M22-Se0062521	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M22-Se0062521	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M22-Se0062521	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M22-Se0062521	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M22-Se0062521	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M22-Se0062521	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M22-Oc0000578	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	M22-Se0047306	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dichlorophenol	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4.5-Trichlorophenol	M22-Oc0000578	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4.6-Trichlorophenol	M22-Oc0000578	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.6-Dichlorophenol	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	M22-Oc0000578	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M22-Oc0000578	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M22-Oc0000578	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	

Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M22-Oc0000578	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M22-Oc0000578	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	M22-Oc0000578	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4-Dimethylphenol	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dinitrophenol	M22-Oc0000578	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M22-Oc0000578	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	M22-Oc0000578	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	M22-Oc0000578	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	M22-Oc0000578	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-Oc0003237	NCP	mg/L	5.1	5.1	<1	30%	Pass	
Chloride	M22-Se0067308	NCP	mg/L	4.9	5.2	5.2	30%	Pass	
Cyanide (total)	L22-Oc0005984	NCP	mg/L	0.042	0.040	4.9	30%	Pass	
Nitrate & Nitrite (as N)	M22-Oc0003237	NCP	mg/L	3.9	3.8	1.7	30%	Pass	
Phosphate total (as P)	S22-Se0065716	NCP	mg/L	0.08	0.07	12	30%	Pass	
Sulphate (as SO4)	M22-Se0067308	NCP	mg/L	45	45	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-Se0063588	NCP	mg/L	44	37	17	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M22-Oc0000262	NCP	mg/L	16	16	<1	30%	Pass	
Magnesium	M22-Oc0000262	NCP	mg/L	10	10	<1	30%	Pass	
Potassium	M22-Oc0000262	NCP	mg/L	4.9	4.9	<1	30%	Pass	
Sodium	M22-Oc0000262	NCP	mg/L	20	20	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-Se0064827	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Se0065791	NCP	ug/L	0.90	0.90	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-Se0065791	NCP	ug/L	0.01	0.01	2.6	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Se0065791	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Se0065791	NCP	ug/L	0.25	0.20	22	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Se0064827	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-Se0059203	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Se0059203	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Se0065791	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

This report has been revised (V2) following repeat analysis. TRH results for sample EMB13 have now been replaced by the repeat results.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal
Vivian Wang	Senior Analyst-Volatile



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Chain of Custody - Greencap Adelaide
Ph. 8299 9955

GREENCAP
Going Further in Managing Risk

FREIGHT

Client	:	GRR	Date	:	29/09/2022
Project	:	Groundwater Monitoring	Sampled by	:	Varun Bhagwat
Project Manager	:	Varun Bhagwat	Sampler Mobile	:	0428 829 444
Job No.	:	J174436	Purchase Order	:	PO307871
Location	:	800 Berrimah Rd, East Arm	T/Around		***STANDARD TAT***
Please email results to:		Varun.Bhagwat@greencap.com.au			

Relinquished by: VB on 29/9/22	Recieved by: Caitlin (ALS)	Relinquished by:	Received by:
Signature & date	*Signature & date* 30/9/22 10:05	*Signature & date*	*Signature & date*

	Field ID	Depth	Sampled	Matrix (*Soil, Water, Vapour, etc*)	Sample Containers: 40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic	60ml Plastic Nturients (h_2SO4)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	Testing: S-4 : TRH, BTEXN	W3: NEPM Suite: 15 Metals	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P15/2 SA EPA Waste Screen Antimony (Sb)	S12 : OCP, OPP	S-18: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen	Hold
1	EMB13		29/09/2022	W		2		1							X	X		X					
2	EMB14		29/09/2022	W		2		1							X	X		X					
3	QC01A		29/09/2022	W	2		1										X						
	Totals				2	4	1	2	0	0	0	0	0	0	2	2	1	0	2	0	0	0	0	0

Environmental Division
Melbourne
Work Order Reference
EM2219178

Telephone : + 61-3-8549 9600

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2219178**

Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: varun.bhagwat@greencap.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9645
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: ----	Quote number	: EM2022ADEENV0004 (EN/111/22 (primary work only))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 800 Berrimah Rd, East Arm		
Sampler	: VB		

Dates

Date Samples Received	: 30-Sep-2022 10:05	Issue Date	: 01-Oct-2022
Client Requested Due Date	: 07-Oct-2022	Scheduled Reporting Date	: **07-Oct-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 5.3 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP067 Glycols analysis in water by GCMS
EM2219178-001	29-Oct-2022 00:00	EMB13	✓
EM2219178-002	29-Oct-2022 00:00	EMB14	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

VARUN BHAGWAT

- *AU Certificate of Analysis - NATA (COA)	Email	varun.bhagwat@greencap.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	varun.bhagwat@greencap.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Tax Invoice (INV)	Email	varun.bhagwat@greencap.com.au
- Chain of Custody (CoC) (COC)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ENMRG (ENMRG)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ESDAT (ESDAT)	Email	varun.bhagwat@greencap.com.au

QUALITY CONTROL REPORT

Work Order	: **EM2219178**	Page	: 1 of 3
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 30-Sep-2022
Order number	: ----	Date Analysis Commenced	: 07-Oct-2022
C-O-C number	: ----	Issue Date	: 07-Oct-2022
Sampler	: VB		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP067: Glycols (QC Lot: 4624207)									
EM2219178-001	EMB13	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP067: Glycols (QCLot: 4624207)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	108	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	104	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	106	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	106	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	106	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	106	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	112	69.0	142

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP067: Glycols (QCLot: 4624207)							
EM2219178-002	EMB14	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	71.3	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	79.3	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	85.6	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	87.3	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	85.7	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	89.8	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	79.8	32.2	156

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2219178**	Page	: 1 of 4
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Telephone	: +6138549 9645
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 30-Sep-2022
Site	: 800 Berrimah Rd, East Arm	Issue Date	: 07-Oct-2022
Sampler	: VB	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP067: Glycols						
VOC Vial - unpreserved						
EMB13, EMB14	07-Oct-2022	06-Oct-2022	**1**	07-Oct-2022	06-Oct-2022	**1**

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP067: Glycols							
VOC Vial - unpreserved (EP067)							
EMB13, EMB14	**29-Sep-2022**	**07-Oct-2022**	06-Oct-2022	×	**07-Oct-2022**	06-Oct-2022	×

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Glycols by GCMS	EP067	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Glycols by GCMS	EP067	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Glycols by GCMS	EP067	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Glycols by GCMS	EP067	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS

Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2219178**	Page	: 1 of 2
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 30-Sep-2022 10:05
Order number	: ----	Date Analysis Commenced	: 07-Oct-2022
C-O-C number	: ----	Issue Date	: 07-Oct-2022 16:24
Sampler	: VB		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 2		
No. of samples analysed	: 2		

ilac-MRA NATA
Accreditation No. 825
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ISO/IEC 17025 - Testing

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

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

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

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

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

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

- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**EMB13**	**EMB14**	**----**	**----**	**----**
			Sampling date / time	29-Sep-2022 00:00	29-Sep-2022 00:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2219178-001**	**EM2219178-002**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	**----**	**----**	**----**
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	**----**	**----**	**----**
Propylene glycol	57-55-6	2	mg/L	<2	<2	**----**	**----**	**----**
Ethylene glycol	107-21-1	2	mg/L	<2	<2	**----**	**----**	**----**
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	**----**	**----**	**----**
Diethylene glycol	111-46-6	2	mg/L	<2	<2	**----**	**----**	**----**
Triethylene glycol	112-27-6	2	mg/L	<2	<2	**----**	**----**	**----**

Chain of Custody - Greencap Adelaide
Ph. 8299 9955

GREENCAP

Client :	GRR	Date :	29/09/2022
Project :	Groundwater Monitoring	Sampled by :	Varun Bhagwat
Project Manager :	Varun Bhagwat	Sampler Mobile :	0428 829 444
Job No. :	J174436	Purchase Order :	PO307871
Location :	800 Berrimah Rd, East Arm	T/Around	***STANDARD TAT***
Please email results to:	Varun.Bhagwat@greencap.com.au		

Relinquished by: VB on 29/9/22	Recieved by:	Relinquished by:	Received by:
Signature & date	*Signature & date*	*Signature & date*	*Signature & date*

	Field ID	Depth	Sampled	Matrix (Soil, Water, Vapour, etc)	Sample Containers: 40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic	60ml Plastic Nturients (h_2SO4)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	Testing: S-4 : TRH, BTEXN	W3: NEPM Suite: 15 Metals	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P15/2 SA EPA Waste Screen	Antimony (Sb)	S12 : OCP, OPP	S-16: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen	Hold
1	EMB13		29/09/2022	W		2		1							X	X			X					
2	EMB14		29/09/2022	W		2		1							X	X			X					
3	QC01A		29/09/2022	W	2		1										X							
	Totals				2	4	1	2	0	0	0	0	0	0	2	2	1	0	2	0	0	0	0	0

Kim - ALS.
04.10.22
10:00am

Environmental Division
Sydney
Work Order Reference
ES2234929

Telephone : +61-2-8784 8555

Subcon / Forward Lab / Split WO
(Lab) Analysis: Melbourne
Organised By / Date: Glycols : - 2
Relinquished By / Date:
Connote / Courier:
WO No: ES2234929
Attach By PO / Internal Sheet:

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2234929**

Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: varun.bhagwat@greencap.com.au	E-mail	: Shane.Ellis@ALSGlobal.com
Telephone	: ----	Telephone	: +61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: PO307871	Quote number	: ES2020ADEENV0001 (EN/222 (secondary work only))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 800 Berrimah Rd. East Arm		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 04-Oct-2022 10:00	Issue Date	: 04-Oct-2022
Client Requested Due Date	: 11-Oct-2022	Scheduled Reporting Date	: **11-Oct-2022**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 19.7' C
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Glycols analysis will be conducted by ALS Melbourne.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EP067 Glycols analysis in water by GCMS	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-24 TRH/BTEXN/PAH/Phenols
ES2234929-001	29-Sep-2022 00:00	EMB13	✓	✓	✓	
ES2234929-002	29-Sep-2022 00:00	EMB14	✓	✓	✓	
ES2234929-003	29-Sep-2022 00:00	QC01A				✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL ACCOUNTS

- A4 - AU Tax Invoice (INV)	Email	ap@greencap.com.au

VARUN BHAGWAT

- *AU Certificate of Analysis - NATA (COA)	Email	varun.bhagwat@greencap.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	varun.bhagwat@greencap.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	varun.bhagwat@greencap.com.au
- Chain of Custody (CoC) (COC)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ENMRG (ENMRG)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ESDAT (ESDAT)	Email	varun.bhagwat@greencap.com.au

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2234929**	Page	: 1 of 6
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 04-Oct-2022
Order number	: PO307871	Date Analysis Commenced	: 06-Oct-2022
C-O-C number	: ----	Issue Date	: 12-Oct-2022
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd. East Arm		
Quote number	: EN/222 (secondary work only)		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, 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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4626600)									
ES2235388-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.043	0.043	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.008	0.007	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.046	0.046	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.042	0.042	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.08	44.9	No Limit
ES2235370-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.027	0.027	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4626600) - continued									
ES2235370-001	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.053	0.052	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.008	48.2	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4626603)									
ES2235153-010	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2235290-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4623746)									
ES2234929-003	QC01A	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2235185-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	30	30	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4623746)									
ES2234929-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2235185-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	20	20	0.0	No Limit
EP080: BTEXN (QC Lot: 4623746)									
ES2234929-003	QC01A	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2235185-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4626600)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	94.8	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.8	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	87.5	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.0	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.9	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.5	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.7	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.5	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.5	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.0	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	97.4	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.1	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	101	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4626603)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.1	83.0	105
EP075(SIM)A: Phenolic Compounds (QCLot: 4617858)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	38.2	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	69.6	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	68.5	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	66.5	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	75.3	48.0	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	71.3	49.0	99.0
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	77.4	53.0	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	85.6	57.0	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	74.6	53.0	99.0
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	77.6	50.0	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	82.5	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	36.2	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4617858)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	72.9	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	83.3	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	86.5	62.2	113

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4617858) - continued								
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	86.5	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	92.5	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	96.1	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	92.6	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	92.0	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	90.7	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	90.9	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	88.4	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	85.0	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	95.3	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	95.5	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	92.9	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	97.4	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4617857)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	73.4	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	81.1	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	82.0	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4623746)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	84.5	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4617857)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	68.5	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	91.3	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	92.2	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4623746)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	82.6	75.0	127
EP080: BTEXN (QCLot: 4623746)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	79.0	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	82.7	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	80.9	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	80.6	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	82.9	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	86.0	70.0	120

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4626600)							
ES2234929-001	EMB13	EG020A-F: Arsenic	7440-38-2	1 mg/L	90.4	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	88.4	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	91.3	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	92.6	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	96.4	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	89.9	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	92.5	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	94.6	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	96.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	89.8	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	94.1	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.6	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4626603)							
ES2234929-002	EMB14	EG035F: Mercury	7439-97-6	0.01 mg/L	83.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4623746)							
ES2234929-003	QC01A	EP080: C6 - C9 Fraction	----	325 µg/L	105	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4623746)							
ES2234929-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	103	70.0	130
EP080: BTEXN (QCLot: 4623746)							
ES2234929-003	QC01A	EP080: Benzene	71-43-2	25 µg/L	88.4	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	99.3	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	107	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	107	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.4	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2234929**	Page	: 1 of 5
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 04-Oct-2022
Site	: 800 Berrimah Rd. East Arm	Issue Date	: 12-Oct-2022
Sampler	: VARUN BHAGWAT	No. of samples received	: 3
Order number	: PO307871	No. of samples analysed	: 3

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	10	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	10	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
EMB13, EMB14	**29-Sep-2022**	**----**	----	----	**10-Oct-2022**	28-Mar-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F)							
EMB13, EMB14	**29-Sep-2022**	**----**	----	----	**10-Oct-2022**	27-Oct-2022	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC01A	**29-Sep-2022**	**06-Oct-2022**	06-Oct-2022	✓	**07-Oct-2022**	15-Nov-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC01A	**29-Sep-2022**	**06-Oct-2022**	06-Oct-2022	✓	**07-Oct-2022**	15-Nov-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC01A	**29-Sep-2022**	**06-Oct-2022**	06-Oct-2022	✓	**07-Oct-2022**	15-Nov-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**29-Sep-2022**	**10-Oct-2022**	13-Oct-2022	✓	**10-Oct-2022**	13-Oct-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC01A	**29-Sep-2022**	**06-Oct-2022**	06-Oct-2022	✓	**07-Oct-2022**	15-Nov-2022	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**29-Sep-2022**	**10-Oct-2022**	13-Oct-2022	✓	**10-Oct-2022**	13-Oct-2022	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**29-Sep-2022**	**10-Oct-2022**	13-Oct-2022	✓	**10-Oct-2022**	13-Oct-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	10	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	10	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	10	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	10	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2234929**	Page	: 1 of 6
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 04-Oct-2022 10:00
Order number	: PO307871	Date Analysis Commenced	: 06-Oct-2022
C-O-C number	: ----	Issue Date	: 12-Oct-2022 17:02
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd. East Arm		
Quote number	: EN/222 (secondary work only)		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB13	EMB14	QC01A	----	----
			Sampling date / time	29-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2234929-001	ES2234929-002	ES2234929-003	--------	--------
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.051**	**0.322**	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.003**	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.048**	**0.001**	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.002**	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.002**	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.010**	**0.262**	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	----	----	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	----	----	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L	----	----	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	----	----	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	----	----	<1.0	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	----	----	<1.0	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	----	----	<1.0	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L	----	----	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	----	----	<1.0	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	----	----	<1.0	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	----	----	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	----	----	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	----	----	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	----	----	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	----	----	<1.0	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	EMB13	EMB14	QC01A	----	----
				Sampling date / time	29-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2234929-001	ES2234929-002	ES2234929-003	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	1.0	µg/L		----	----	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L		----	----	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L		----	----	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L		----	----	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L		----	----	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		----	----	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L		----	----	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		----	----	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		----	----	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		----	----	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		----	----	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		----	----	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	----	----
C10 - C14 Fraction	----	50	µg/L		----	----	<50	----	----
C15 - C28 Fraction	----	100	µg/L		----	----	<100	----	----
C29 - C36 Fraction	----	50	µg/L		----	----	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	----	<20	----	----
>C10 - C16 Fraction	----	100	µg/L		----	----	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		----	----	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		----	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	----	<1	----	----
Toluene	108-88-3	2	µg/L		----	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	----	<2	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB13	EMB14	QC01A	----	----
			Sampling date / time	29-Sep-2022 00:00	29-Sep-2022 00:00	29-Sep-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2234929-001	ES2234929-002	ES2234929-003	--------	--------
				Result	Result	Result	----	----
EP080: BTEXN - Continued								
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<2	----	----
^ **Total Xylenes**	----	2	µg/L	----	----	<2	----	----
^ **Sum of BTEX**	----	1	µg/L	----	----	<1	----	----
Naphthalene	91-20-3	5	µg/L	----	----	<5	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	----	----	**20.3**	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	----	----	**53.0**	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%	----	----	**44.4**	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	----	----	**66.6**	----	----
Anthracene-d10	1719-06-8	1.0	%	----	----	**83.7**	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	----	----	**77.5**	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	**80.9**	----	----
Toluene-D8	2037-26-5	2	%	----	----	**95.0**	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	**100**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

2 November 2022

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Michael Rogers
Operations Manager
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Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (OCTOBER 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the October 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – October 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 26 October 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – October 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	26/10/2022	2.914	2.914	3.514	9.237
EMB12	26/10/2022	2.662	2.662	3.838	9.325
EMB13	26/10/2022	4.644	3.844	4.192	10.245
EMB14	26/10/2022	5.007	4.307	4.248	9.803
EMB15	26/10/2022	2.205	2.205	5.179	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – October 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.38	32.3	50.9	279.4	0.13	182.00	5.78	31.9
EMB14	5.71	34.3	47.5	286.9	0.13	167.50	6.67	18.7

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in November 2022.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
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Groundwater Monitoring Event – October 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – October 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No:	J174436
Project: GME		Gauged by:	VB
Location: East Arm, NT		Date:	26/10/2022

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1007	~~EMB7~~ EMB7	–	2.914	–	9.237	
1013	EMB15	–	2.208	–	9.314	
1018	EMB12	–	2.662	–	9.235	
1032	EMB13	–	4.644	–	10.245	
1105	EMB14	–	5.007	–	9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client: GRR	Job No: J74436	**Well ID**
Project: GME	Sampled by: VB	EMB13
Location: East Arm, NT	Date: 26/10/22	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	10.245	(m)	Device:	micropurge	peristaltic	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry		
Casing type:	PVC / steel / other		WQM Make:	YSI				
Depth to product	-	(m bTOC)	WL Meter:	interface	non-interface			
Depth to water:	4.644	(m bTOC)	Screen (from - to), m	7.245 - 10.245				
Product thickness	-	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc TDS mg/L / SAL PSU / TURB NTU
1044	INT	4814	32.4	3.25	273.0	11.3	46.4	174.45 0.13
1047	2	5.474	32.3	3.35	273.9	19.8	52.6	178.10 0.13
1050	4	5.864	32.3	3.36	278.4	24.7	53.5	181.35 0.13
1053	6	5.999	32.2	3.37	279.9	26.5	53.4	181.35 0.13
1056	8	6.197	32.3	3.38	278.1	30.4	53.5	180.70 0.13
1059	10	6.369	32.3	3.38	279.4	31.9	50.9	182.00 0.13 5.78
~~1102~~	~~12~~							

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED 10L

L-M TURB, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No:	J74436
Project:	GME	Sampled by:	VB
Location:	East Arm, NT	Date:	26/10/22

Well ID EMB1~~2~~4

WELL DETAILS			SAMPLING EQUIPMENT					*Other Sampling Equipment / Method
Well depth:	9.803	(m)	Device:	micropurge	~~peristaltic~~	footvalve	bailer	
Casing diameter:	50	(mm)	Method:	~~low-flow~~	4-well-volume	purged dry		
Casing type:	~~PVC~~ / steel / other		WQM Make:	YSI				
Depth to product	—	(m bTOC)	WL Meter:	~~interface~~	non-interface			
Depth to water:	5.007	(m bTOC)	Screen (from - to), m	6.803 - 9.803				
Product thickness	—	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

NUMEROUS IBCs full IBCs next to well

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond ~~µS/cm~~ / mS/cm	ORP mV	DO mg/L / ppm / ~~%~~	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L / SAL PSU / TURB NTU
1110	INT	5.218	34.1	5.71	371.5	440.8	50.3	24180 0.17
1113	2	5.967	34.0	5.72	281.4	21.4	41.1	168.30 0.13
1116	4	6.113	34.0	5.71	283.7	20.9	43.9	168.35 0.13
1119	6	6.429	34.0	5.70	286.1	19.7	49.6	167.20 0.13
1122	8	6.741	34.1	5.71	285.8	19.3	50.8	167.45 0.13
1125	10	6.997	34.0	5.71	281.2	18.9	49.2	167.15 0.13
1128	12	7.108	34.0	5.71	286.9	18.7	47.5	167.50 0.13 6.67

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED 12L

L-M TURB, NO SHEEN/ODOURS, L. BROWN

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

6 December 2022

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Michael Rogers
Operations Manager
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Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (NOVEMBER 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the November 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – November 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 30 November 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – November 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	30/11/2022	1.641	1.641	4.787	9.237
EMB12	30/11/2022	1.427	1.427	5.073	9.325
EMB13	30/11/2022	3.093	2.293	5.743	10.245
EMB14	30/11/2022	2.709	2.009	6.546	9.803
EMB15	30/11/2022	1.549	1.549	5.835	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – November 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.34	32.3	24.9	293.4	0.13	189.30	6.08	40.8
EMB14	5.92	32.8	60.8	338.4	0.16	221.65	6.93	11.8

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in December 2022.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – November 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – November 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 30/11/2022

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1405	EMB7	–	1.641	–	9.237	
1410	EMB12	–	1.427	–	9.235	
1415	EMB15	–	1.549	–	9.314	
1430	EMB13	–	3.093	–	10.245	
1455	EMB14	–	2.709	–	9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No:	J174436
Project:	GME	Sampled by:	VB
Location:	East Arm, NT	Date:	30/11/2022

Well ID: EMB13

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	10.245	(m)	Device:	micropurge	peristaltic	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry		
Casing type:	PVC / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	interface	non-interface			
Depth to water:	3.093	(m bTOC)	Screen (from - to), m	7.245 - 10.245				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc TDS mg/L SAL PSU TURB NTU
1432	INT	8.109	31.3	3.16	319.7	31.0	20.0	20150 0.14
1435	2	3.891	31.6	3.24	289.1	32.5	14.1	187.85 0.13
1438	4	4.466	32.0	3.27	288.9	34.8	15.3	187.20 0.13
1441	6	5.042	32.2	3.29	290.8	38.5	18.5	188.50 0.14
1444	8	5.613	32.3	3.31	292.1	39.9	21.6	188.50 0.13
1447	10	5.829	32.3	3.33	292.9	40.2	22.8	189.30 0.13
1450	12	6.114	32.3	3.34	293.4	40.8	24.9	189.30 0.13 6.08

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED 12L

LOW TURBIDITY, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID** EMB14
Project:	GME	Sampled by: VB	
Location:	East Arm, NT	Date: 30/11/	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.803	(m)	Device:	micropurge	peristaltic	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry		
Casing type:	PVC / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	interface	non-interface			
Depth to water:	2.709	(m bTOC)	Screen (from - to), m	6.803 - 9.803				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond ~~µS/cm~~ mS/cm	ORP mV	DO mg/L / ppm / ~~%~~	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L SAL PSU TURB NTU
1500	INT	2.856	32.2	5.15	370.2	48.9	89.6	241.80 0.12
1503	2	3.661	32.6	5.91	358.3	16.0	58.2	222.30 0.16
1506	4	3.894	32.7	5.92	343.5	14.6	62.6	221.65 0.16
1509	6	4.011	32.8	5.92	340.8	13.7	59.4	221.65 0.16
1512	8	4.221	32.8	5.92	334.1	10.2	61.3	221.60 0.16
1515	10	4.408	32.8	5.92	338.4	11.8	60.8	221.65 0.16 6.93

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

L-M TURB, NO SHEEN/ODOR

PURGED 10L

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

10 January 2023

11/14 Winnellie Central
Winnellie, NT 0820
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Michael Rogers
Operations Manger
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – QUARTERLY GROUNDWATER MONITORING EVENT (DECEMBER 2022)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken quarterly groundwater monitoring at the Site in accordance with the Northern Territory Environment Protection Authority (NT EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A. This report details the results of the December 2022 quarterly monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016.*

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of quarterly groundwater sampling from monitoring wells EMB13 and EMB14.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Monitoring Event

Previous quarterly monitoring events were conducted in September 2021, December 2021, June 2022 and September 2022. A comparison of analytical results above laboratory limits of reporting (LoRs) between the quarterly monitoring events is presented in Table 3.

2.0 Groundwater Quarterly Monitoring Event – December 2022

The quarterly monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in two monitoring bores (EMB13 and EMB14).
- Laboratory analytical testing of samples collected from EMB13 and EMB14, including:
  - Ø Major cations and anions
  - Ø Nutrients
  - Ø Heavy metals
  - Ø Hydrocarbon compounds
  - Ø Cyanide

- Ø Glycols
- Ø Polychlorinated Biphenyls (PCBs)
- Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

All groundwater wells were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and https://www.waterquality.gov.au/anz-guidelines. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odour, sheens and any other anomalies. The groundwater was generally clear, and no odours or sheens were noted from either bore during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – December 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	21/12/22	1.312	1.312	5.116	9.237
EMB12	21/12/22	1.628	1.628	4.872	9.325
EMB13	21/12/22	2.914	2.114	5.992	10.245
EMB14	21/12/22	2.416	1.716	6.839	9.803
EMB15	21/12/22	1.184	1.184	6.200	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Austalian Height Datum

Table 2 – December 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.47	33.3	12.8	275.9	0.13	179.4	5.82	125.2
EMB14	6.14	34.5	28.6	202.7	0.09	131.3	5.64	16.5

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Nutrients & Inorganics					
Total Phosphate (as P)	23/09/21	µg/L	10	<10	20
	17/12/21	µg/L		10	20
	30/06/22	µg/L		<10	<10
	29/09/22	µg/L		10	10
	21/12/22	µg/L		<10	<10
Total Nitrogen	23/09/21	µg/L	200	6,300	11,200
	17/12/21	µg/L		5,000	15,800
	30/06/22	µg/L		8,700	12,500
	29/09/22	µg/L		5,700	9,400
	21/12/22	µg/L		6,800	11,300
Kjeldahl Nitrogen Total	23/09/21	µg/L	200	500	1,500
	17/12/21	µg/L		<200	800
	30/06/22	µg/L		4,000	6,200
	29/09/22	µg/L		1,400	1,300
	21/12/22	µg/L		2,300	2,200
Oxides of Nitrogen	23/09/21	µg/L	50	5,000	9,700
	17/12/21	µg/L		5,000	15,000
	30/06/22	µg/L		4,700	6,300
	29/09/22	µg/L		4,300	8,100
	21/12/22	µg/L		4,500	9,100

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Ammonia (as N)	23/09/21	µg/L	10	90	90
	17/12/21	µg/L		30	<10
	30/06/22	µg/L		<10	240
	29/09/22	µg/L		10	40
	21/12/22	µg/L		<10	<50
Cyanide (total)	23/09/21	µg/L	5	6	<5
	17/12/21	µg/L		110	38
	30/06/22	µg/L		<5	<5
	29/09/22	µg/L		<5	<5
	21/12/22	µg/L		<5	<5
Anions					
Chloride	23/09/21	µg/L	1,000	77,000	67,000
	17/12/21	µg/L		45,000	6,100
	30/06/22	µg/L		45,000	19,000
	29/09/22	µg/L		48,000	56,000
	21/12/22	µg/L		42,000	6,100
Sulphate (as SO_4)	23/09/21	µg/L	5,000	<5,000	<5,000
	17/12/21	µg/L		5,300	14,000
	30/06/22	µg/L		<5,000	<5,000
	29/09/22	µg/L		<5,000	11,000
	21/12/22	µg/L		<5,000	15,000
Total Alkalinity (as $CaCO_3$)	23/09/21	µg/L	20,000	<20,000	<20,000
	17/12/21	µg/L		<20,000	26,000
	30/06/22	µg/L		<20,000	32,000
	29/09/22	µg/L		<20,000	48,000
	21/12/22	µg/L		<20,000	34,000
Cations					
Calcium	23/09/21	µg/L	500	1,000	12,000
	17/12/21	µg/L		1,000	28,000
	30/06/22	µg/L		1,200	14,000
	29/09/22	µg/L		3,000	26,000
	21/12/22	µg/L		800	23,000
Magnesium	23/09/21	µg/L	500	800	2,300

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
	17/12/21	µg/L		700	1,700
	30/06/22	µg/L		600	1,400
	29/09/22	µg/L		700	1,800
	21/12/22	µg/L		500	1,100
Potassium	23/09/21	µg/L	500	1,000	3,600
	17/12/21	µg/L		1,100	3,200
	30/06/22	µg/L		2,200	3,100
	29/09/22	µg/L		1,000	3,800
	21/12/22	µg/L		900	2,300
Sodium	23/09/21	µg/L	500	18,000	18,000
	17/12/21	µg/L		18,000	3,800
	30/06/22	µg/L		20,000	6,700
	29/09/22	µg/L		17,000	13,000
	23/12/22	µg/L		17,000	3,100
Heavy Metals (filtered)					
Arsenic	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	<1
	30/06/22	µg/L		1	<1
	29/09/22	µg/L		1	<1
	21/12/22	µg/L		<1	<1
Barium	23/09/21	µg/L	1	51	213
	17/12/21	µg/L		50	363
	30/06/22	µg/L		50	224
	29/09/22	µg/L		51	322
	21/12/22	µg/L		43	322
Boron	23/09/21	µg/L	50	<50	<50
	17/12/21	µg/L		50	<50
	30/06/22	µg/L		60	<50
	29/09/22	µg/L		<50	<50
	21/12/22	µg/L		<50	<50
Copper	23/09/21	µg/L	1	3	<1
	17/12/21	µg/L		3	4
	30/06/22	µg/L		3	<1

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
	29/09/22	µg/L		3	1
	21/12/22	µg/L		3	<1
Lead	23/09/21	µg/L	1	2	<1
	17/12/21	µg/L		<1	<1
	30/06/22	µg/L		2	<1
	29/09/22	µg/L		2	<1
	21/12/22	µg/L		2	<1
Manganese	23/09/21	µg/L	1	35	12
	17/12/21	µg/L		29	3
	30/06/22	µg/L		29	3
	29/09/22	µg/L		48	1
	21/12/22	µg/L		25	<1
Nickel	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	1
	30/06/22	µg/L		2	<1
	29/09/22	µg/L		2	<1
	21/12/22	µg/L		<1	1
Zinc	23/09/21	µg/L	5	30	109
	17/12/21	µg/L		30	799
	30/06/22	µg/L		15	250
	29/09/22	µg/L		10	262
	21/12/22	µg/L		30	701
PFAS					
Sum of PFAS (n=30)	23/09/21	µg/L	0.1	55.49	4.45
	17/12/21	µg/L		14.23	1.1
	30/06/22	µg/L		150.5	2.39
	29/09/22	µg/L		65.36	3.43
	21/12/22	µg/L		55.19	1.4

The results for the December 2022 quarterly monitoring event are summarised as follows:

- Heavy metals (antimony, arsenic, beryllium, boron, cadmium, chromium, cobalt, mercury, selenium and vanadium (all filtered)), cyanide, hydroxide alkalinity as $CaCO_3$, carbonate alkalinity as $CaCO_3$, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), phenols, glycols and organochlorine pesticides (OCP) were all reported to be below the LoRs for both monitoring bores.

- Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals (barium and zinc) were reported above the LoRs in both monitoring bores.
- Copper, lead and manganese were reported above LoRs in EMB13 and nickel, bicarbonate alkalinity as $CaCO_3$, total alkalinity as $CaCO_3$ and sulfate as SO_4 were reported above LoRs in EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a decrease in reported concentrations for the sum of PFAS in both monitoring bores between the September 2022 and December 2022 quarterly monitoring events.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN), TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

A rinsate blank sample (RB01) was collected on 21 December 2022 and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank sample was collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the sampling event and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blank was prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the monitoring event.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted a quarterly groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in December 2022. Physico-chemical groundwater parameters were measured in the field and samples were collected from two monitoring bores (EM13 and EMB14) and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, arsenic, beryllium, boron, cadmium, chromium, cobalt, mercury, selenium and vanadium), cyanide, hydroxide alkalinity (as $CaCO_3$), carbonate alkalinity (as $CaCO_3$), total recoverable hydrocarbons, benzene, toluene, ethylbenzene and xylenes, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, glycols and organochlorine pesticides were reported to be below the laboratory limits of reporting in both monitoring bores.

Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – barium and zinc were reported above the laboratory limits of reporting in both monitoring bores.

Copper, lead and manganese were reported above laboratory limits of reporting in EMB13 and bicarbonate alkalinity (as $CaCO_3$), total alkalinity (as $CaCO_3$) and sulfate (as SO_4) were reported above laboratory limits

of reporting in EMB14.

A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a decrease in reported concentrations for the sum of PFAS in both monitoring bores between the September 2022 and December 2022 quarterly monitoring events.

The next quarterly groundwater monitoring event is scheduled to occur in March 2023.

Attachments

1 Statements of Limitation
2 Field Record Sheets
3 Results Summary Tables (including QA/QC)

Appendices

A Environmental Protection Licence 229-01
B Laboratory Certificates of Analysis

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – December 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – December 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No:	J174436
Project: GME		Gauged by:	VB
Location: East Arm, NT		Date:	21/12/22

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1301	EMB7	–	1.312	–	9.237	WELL CAP NOT ON PROPERLY
1306	EMB12	–	1.628	–	9.235	
1310	EMB15	–	1.184	–	9.314	
1330	EMB13	–	2.914	–	10.245	
1333	EMB14	–	2.416	–	9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

~~TURBIDITY~~ SAMPLE TUBING REMOVED FROM EMB13 & EMB14

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No:	J174436
Project:	GME	Sampled by:	VB
Location:	East Arm, NT	Date:	21/12/22

Well ID: EMB13

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	10.245	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	(low-flow)	4-well-volume	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	2.914	(m bTOC)	Screen (from - to), m	7.245 - 10.245				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY | OVERCAST | SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm / mS/cm)	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc*		
								TDS mg/L	SAL PSU	TURB NTU
1429	INT	2.987	33.3	338	281.8	156.6	27.8	180.70	0.13	
1432	2	3.779	33.3	3.41	275.1	166.2	23.0	179.25	0.13	
1435	4	4.363	33.3	3.43	275.6	163.5	18.7	178.75	0.13	
1438	6	4.984	33.3	3.44	275.1	156.1	16.1	178.40	0.13	
1441	8	5.392	33.3	3.46	273.1	147.9	9.9	178.10	0.13	
1444	10	5.786	33.3	3.47	269.6	136.0	9.6	175.50	0.13	
1447	12	5.977	33.3	3.47	275.9	125.2	12.8	179.40	0.13	5.82

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 12 L PURGED

L-M TURB, PALE BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - **metals***	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) ~~Gen~~ GLYCOLS	2	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID QC01 - 1 AMBER 2 VIALS

Triplicate ID QC01A - "

Blanks

Rinsate ID RB01 - 1 AMBER, 2 VIALS

TB01 - 2 VIALS

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EM314
Location:	East Arm, NT	Date:	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.803	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	(low-flow)	4-well-volume	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	2.416	(m bTOC)	Screen (from - to), m	6.803 - 9.803				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

OVERCAST / MODERATE WINDS

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) / mS/cm	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L SAL psu TURB NTU
1524	INT	2.599	35.3	6.23	158.9	36.7	37.2	104.65 0.07
1527	2	2.826	35.3	6.51	159.3	33.5	35.3	131.30 0.08
1530	4	3.159	35.2	6.69	159.2	25.0	34.5	131.20 0.07
1533	6	3.231	34.8	6.78	167.9	22.2	31.4	132.10 0.09
1536	8	3.274	34.5	6.14	199.3	20.6	31.1	131.30 0.08
1539	10	3.291	34.5	6.13	211.4	19.8	31.7	131.40 0.09
1542	12	4.071	34.5	6.14	210.7	19.4	30.1	131.35 0.10
1545	14	4.667	34.5	6.13	206.5	17.1	29.6	131.25 0.10
1548	16	4.821	34.5	6.14	202.7	16.5	28.6	131.30 0.09 5.64

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 16L PURGED

L-M TURB

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - metals*	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOL	2	

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Other Comments

Groundwater Monitoring Event – December 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to December 2022

Greencap Project No.: J174436

				SWL	Field Parameters									Metals																	
				Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (filtered)	Beryllium (Filtered)	Boron (filtered)	Cadmium (Filtered)	Chromium (total) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)				
				mbgl	^{0}C	pH unit	(µS/cm)	PSU	mV	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				
EQL													1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5				
Monitoring Round	Field ID	Sampled Date	Lab Reports																													
Sep-21	EMB13	23/09/2021	827604 & ES2134300	5.803	36.8	7.24	281.3	0.13	-35.2	32.7	183.09	3.91	<1	<1	51	<1	<50	<0.2	<1	<1	3	2	35	<0.1	<1	1	<10	30				
	EMB14			6.465	33.3	5.41	377.6	0.18	93.2	18.4	250.26	6.09	<1	<1	213	<1	<50	<0.2	<1	<1	<1	<1	12	<0.1	<1	<1	<10	109				
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	3.276	33.4	3.75	272.4	0.13	99.4	22.1	176.8	4.75	<1	1	50	<1	50	<0.1	<1	<1	3	<1	29	<0.1	1	10	<10	30				
	EMB14			3.416	35.1	6.39	204.7	0.09	68	33	122.6	5.81	<1	<1	363	<1	<50	<0.1	<1	<1	4	<1	3	<0.1	1	10	<10	799				
Jun-22	EMB13	30/06/2022	901960 & ES2222495	4.572	32.1	3.54	291.5	0.14	68.5	72.6	190.45	6.14	<1	1	50	<1	60	<0.1	<1	<1	3	2	29	<0.1	2	<10	<10	15				
	EMB14			4.850	33.0	6.3	238.5	0.11	80.4	59.8	154.7	6.61	<1	<1	224	<1	<50	<0.1	<1	<1	<1	<1	3	<0.1	<1	<10	<10	250				
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	5.241	32.1	3.30	290.9	0.13	51.6	52	187.85	5.97	<1	1	51	<1	<50	<0.1	<1	<1	3	2	48	<0.1	2	<10	<10	10				
	EMB14			5.676	33.6	5.75	259.2	0.12	21.1	70.6	167.7	6.83	<1	<1	322	<1	<50	<0.1	<1	<1	<1	<1	1	<0.1	<1	<10	<10	262				
Dec-22	EMB13	21/12/2022	952686 & ES2246450	2.114	33.3	3.47	275.9	0.13	125.2	12.8	179.4	5.82	<1	<1	43	<1	<50	<0.1	<1	<1	3	2	25	<0.1	<1	<10	<10	30				
	EMB14			1.716	34.5	6.14	202.7	0.09	16.5	28.6	131.3	5.64	<1	<1	322	<1	<50	<0.1	<1	<1	<1	<1	<1	<0.1	1	<10	<10	701				

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to December 2022

				Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions					TRH - NEPM 2013 Fractions							
				Ammonium Ion (as N)	Nitrate + Nitrite (oxides of nitrogen) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CACO3)	Bicarbonate Alkalinity (as CACO3)	Hydroxide Alkalinity (as CACO3)	Total Alkalinity (as CACO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	Naphthalene	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less NAPTHALENE	C16-C34	C34-C40	C10 - C40 (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				10	50	200	200	10	5	1000	5000	10000	2000	20000	20000	500	500	500	500	20	50	100	100	100	1	20	20	50	50	100	100	100
Monitoring Round	Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	90	5800	6300	500	<10	6	77000	<5000	<10000	<20000	<20000	<20000	1000	800	1000	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			90	9700	11200	1500	20	<5	67000	<5000	<10000	<20000	<20000	<20000	12000	2300	3600	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	30	5000	5000	<200	10	110	45000	5300	<10000	<20000	<20000	<20000	1000	700	1100	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			<10	15000	15800	800	20	38	6100	14000	<10000	26000	<20000	26000	28000	1700	3200	3800	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<10	4700	8700	4000	<10	<5	45000	<5000	<10000	<20000	<20000	<20000	1200	600	2200	20000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			240	6300	12500	6200	<10	<5	19000	<5000	<10000	32000	<20000	32000	14000	1400	3100	6700	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	10	4300	5700	1400	10	<5	4800	<5000	<10000	<20000	<20000	<20000	3000	700	1000	17000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			40	8100	9400	1300	10	<5	5600	11000	<10000	48000	<20000	48000	26000	1800	3800	13000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Dec-22	EMB13	21/12/2022	952686 & ES2246450	<10	4500	6800	2300	<10	<5	42000	<5000	<10000	<20000	<20000	<20000	800	500	900	17000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			<50	9100	11300	2200	<10	<5	6100	15000	<10000	34000	<20000	34000	2300	1100	2300	3100	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to December 2022

				BTEXN						PAH																
				Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+j]fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Monitoring Round	Field ID	Sampled Date	Lab Reports																							
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dec-22	EMB13	21/12/2022	952686 & ES2246450	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	EMB14			<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to December 2022

				PCBs								Phenols (Halogenated)									Phenols (non-Halogenated)										Glycols			
				Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCB*	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Tetrachlorophenols - Total	Total Halogenated Phenol*	2-Cyclohexyl-4,6-dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol (o-Cresol)	2-Nitrophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	3&4-Methylphenol (m&p-Cresol)	4-Nitrophenol	Dinoseb	Phenol	Total Non-Halogenated Phenol*	Di-Ethylene Glycol	Ethylene glycol	Propylene glycol	Triethylene glycol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	3	3	10	10	3	10	10	30	10	100	30	3	10	3	30	6	30	100	3	100	20000	20000	20000	20000
Monitoring Round	Field ID	Sampled Date	Lab Reports																														
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Dec-22	EMB13	21/12/2022	952686 & ES2246450	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to December 2022

				PFAS - Perfluoroalkyl carboxylic acids (PFCAs)											PFAS - Perfluoroalkyl sulfonamido substances							PFAS - Perfluoroalkyl sulfonic acids (PFSAs)							
				Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	Perfluorooctane sulfonamide (FOSA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Monitoring Round	Field ID	Sampled Date	Lab Reports																										
Sep-21	EMB13	23/09/2021	827604 & ES2134300	1	5.5	5.4	1.7	1.2	0.04	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.56	1.4	1.1	1.0	0.29	0.1	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.8	4.5	3.8	1.4	0.97	0.03	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.17	0.28	0.21	0.27	0.09	0.08	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Jun-22	EMB13	30/06/2022	901960 & ES2222495	2.6	14	13	4.7	3.1	0.39	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.23	0.77	0.49	0.47	0.15	0.15	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	1.2	6.7	4.1	1.9	1.4	0.05	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.35	1.2	0.74	0.69	0.19	0.14	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Dec-22	EMB13	21/12/2022	952686 & ES2246450	1	4.6	4.8	1.7	1	0.05	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	EMB14			0.16	0.39	0.28	0.32	0.11	0.12	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01

				PFAS - n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				PFASs Summations				
				1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum (PFHxS + PFOS)	Sum of US EPA PFAS (PFOS + PFOA)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of WA DWER PFAS (n=10)	Sum of PFASs (n=30)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
Monitoring Round	Field ID	Sampled Date	Lab Reports									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	0.04	40	61	< 0.01	<0.01	1.2	1.2	55.41	55.49
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.29	0.29	4.35	4.45
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.03	1.6	1.1	< 0.01	<0.01	0.97	0.97	14.17	14.23
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.09	0.09	1.02	1.1
Jun-22	EMB13	30/06/2022	901960 & ES2222495	0.1	110	2.6	< 0.01	<0.01	3.1	3.1	150	150.49
	EMB14			<0.01	0.11	0.02	< 0.01	<0.01	0.15	0.15	2.24	2.39
Sep-22	EMB13	29/09/2022	927414, EM2219178 & ES2234929	0.04	49	0.97	< 0.01	<0.01	1.4	1.4	65.27	65.36
	EMB14			<0.01	0.1	0.02	< 0.01	<0.01	0.19	0.19	3.29	3.43
Dec-22	EMB13	21/12/2022	952686 & ES2246450	0.05	41	0.99	< 0.01	<0.01	1	1	55.09	55.19
	EMB14			<0.01	<0.05	0.02	< 0.01	<0.01	0.11	0.11	1.28	1.4

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GRR
Quarterly Groundwater Monitoring
Relative Percentage Duplicate Results Table
December 2022

Greencap Project No.: J174436

			Lab Report Number	952686	952686		952686	ES2246450	
			Field ID	EMB13	QC01	**RPD**	EMB13	QC01A	**RPD**
			Sampled Date/Time	21/12/2022	21/12/2022		21/12/2022	21/12/2022	
Chem_Group	**ChemName**	**Units**	**EQL**						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6 (Primary): 2 (Interlab)	<6.0	<6.0	0	<6.0	<2.0	0
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benz(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a) pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0		
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<5.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<5.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

GREENCAP
Going Further in Managing Risk

GRR
Quarterly Groundwater Monitoring
Blank Results Table
December 2022

Greencap Project No.: J174436

			Lab Report Number	952686	952686
			Field ID	RB01	TB01
			Sampled_Date/Time	21/12/2022	21/12/2022
			Sample Type	Rinsate	Trip_B
Chem_Group	**ChemName**	**Units**	**EQL**		
	Perfluorooctanoate	mg/l	0.00001		
BTEX	Benzene	µg/L	1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C6 - C9	µg/L	20	<20	<20
	C10 - C14	µg/l	50	<50	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/L	50	<100	
	C10 - C40 (Sum of total)	µg/L	100	<100	
	C6-C10	mg/l	0.02	<0.02	<0.02

Groundwater Monitoring Event – December 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01

ntepa Northern Territory Environment Protection Authority

ENVIRONMENT PROTECTION LICENCE

(Pursuant to section 34 of the *Waste Management and Pollution Control Act*)

Licensee	Smorgon Fuels Pty Ltd
Licence Number	**EPL229 - 01**
Registered Business Address	Smorgon Fuels Pty Ltd 644 Chapel Street South Yarra VIC 3141
ACN	094 541 723
ABN	84 094 541 723
Premises Address	Section 05783 Hundred of Bagot plan(s) S2005/171A 800 BERRIMAH RD, EAST ARM
Anniversary Date:	29 June
Commencement Date:	29/06/2020
Expiry Date:	28/06/2022
Scheduled Activity	Collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis, other than in or for the purpose of a sewage treatment plant. Operating **premises**, other than a sewage treatment plant, associated with collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis.
Description	Operation of a liquid waste treatment facility capable of treating, storing and recycling a variety of industrial liquid waste including the treatment of waste water and the recycling of ethylene glycol for the maritime, mining and oil and gas industries in the Darwin region.

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Chromium compounds that are hexavalent or trivalent	✗	✗	✓	✓	✗	✗
Cobalt compounds	✗	✗	✓	✓	✗	✗
Containers that are contaminated with residues of a listed waste	✗	✗	✓	✓	✗	✗
Copper compounds	✗	✗	✓	✓	✗	✗
Cyanides (inorganic)	✗	✗	✓	✓	✗	✗
Encapsulated, chemically fixed, solidified or polymerised wastes	✗	✗	✓	✓	✗	✗
Ethers	✗	✗	✓	✗	✗	✗
Filter cake	✗	✗	✓	✗	✗	✗
Fire debris and fire washwaters	✗	✗	✓	✓	✗	✗
Fly ash	✗	✗	✓	✓	✗	✗
Halogenated organic solvents	✗	✗	✓	✗	✗	✗
Highly odorous organic chemicals (including mercaptans and acrylates)	✗	✗	✓	✗	✗	✗
Inorganic fluorine compounds excluding calcium fluoride	✗	✗	✓	✓	✗	✗
Inorganic sulfides	✗	✗	✓	✓	✗	✗
Isocyanate compounds	✗	✗	✓	✗	✗	✗
Lead, lead compounds	✗	✗	✓	✓	✗	✗
Mercury, mercury compounds	✗	✗	✓	✓	✗	✗
Nickel compounds	✗	✗	✓	✓	✗	✗
Non-toxic salts	✗	✗	✓	✓	✗	✗
Organic phosphorus compounds	✗	✗	✓	✗	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Organic solvents excluding halogenated solvents	✗	✗	✓	✓	✓	✗
Organohalogen compounds that are not otherwise specified in this Schedule	✗	✗	✓	✗	✗	✗
Percholates	✗	✗	✓	✗	✗	✗
Phenols, phenol compounds including chlorophenols	✗	✗	✓	✗	✗	✗
Phosphorus compounds other than mineral phosphates	✗	✗	✓	✓	✗	✗
Residue from industrial waste treatment or disposal operations	✗	✗	✓	✓	✗	✗
Selenium, selenium compounds	✗	✗	✓	✓	✗	✗
Soils contaminated with a listed waste	✗	✗	✓	✗	✗	✗
Surface active agents (surfactants) that contain principally organic constituents and that may contain metals and inorganic materials	✗	✗	✓	✓	✗	✗
Vanadium compounds	✗	✗	✓	✓	✗	✗
Waste chemical substances arising from research and development or teaching activities, including those substances which are not identified and/or are new and the effects of which on human health and/or the environment are not known	✗	✗	✓	✓	✗	✗
Wastes containing peroxides other than hydrogen peroxide	✗	✗	✓	✓	✗	✗
Waste containing cyanides from heat treatment and tempering operations	✗	✗	✓	✗	✗	✗
Waste from the production, formulation and use of biocides and phytopharmaceuticals	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of organic solvents	✗	✗	✓	✓	✓	✗
Waste from the production, formulation and use of photographic chemicals and processing materials	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	✗	✗	✓	✓	✗	✗
Waste from the production and preparation of pharmaceutical products	✗	✗	✓	✓	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste mineral oils unfit for their original intended use	✗	✗	✓	✓	✓	✗
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✓	✓	✓	✗
Waste pharmaceuticals, waste drugs and waste medicines	✗	✗	✓	✗	✗	✗
Waste resulting from surface treatment of metals and plastics	✗	✗	✓	✓	✗	✗
Waste tarry residues arising from refining, distillation and any pryolytic treatment	✗	✗	✓	✗	✗	✗
Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs), polychlorinated nalthalenes (PCNs), polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBS)	✗	✗	✓	✗	✗	✗
Zinc compounds	✗	✗	✓	✓	✗	✗
Acidic solutions or acids in solid form	✗	✗	✓	✓	✓	✗
Antimony, antimony compounds	✗	✗	✓	✓	✗	✗
Arsenic, arsenic compounds	✗	✗	✓	✓	✗	✗
Barium compounds other than barium sulphate	✗	✗	✓	✓	✗	✗
Basic solutions or bases in solid form	✗	✗	✓	✓	✓	✗
Beryllium, beryllium compounds	✗	✗	✓	✓	✗	✗
Boron compounds	✗	✗	✓	✓	✗	✗
Cadmium, cadmium compounds	✗	✗	✓	✓	✗	✗
Chlorates	✗	✗	✓	✓	✗	✗

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 229 - 01

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ATTACHMENTS

1 Attachment A - Surface Water Monitoring
2 Attachment B - Groundwater Monitoring
3 Attachment C - Stack Emission Monitoring

INFORMATION ABOUT THIS LICENCE

- This licence does not in any way relieve the licence holder from its obligations to comply with the *Waste Management and Pollution Control Act* (WMPC Act), including the general environmental duty in section 12 of the WMPC Act and the duty to notify of incidents causing or threating to cause pollution under section 14 of the WMPC Act.

Duration of a licence (section 40, 43 and 45 of the WMPC Act)

- A licence will remain in force until its expiry date or until it is surrendered by the licensee or is suspended or cancelled in accordance with the WMPC Act.
- The licensee must notify the Northern Territory Environment Protection Authority (NT EPA) within 14 days after ceasing to conduct the activity.
- The licensee may, with the approval of the NT EPA, surrender the licence to the NT EPA.

Amendment or Revocation of a licence (section 37 of the WMPC Act)

- The licensee may apply to amend or revoke a condition of this licence.
- A fee applies and the application must be made using the designated form via NT EPA Online.
- The NT EPA may also amend or revoke a condition of this licence as set out in section 38 of the WMPC Act.

Transfer of a licence (section 46 of the WMPC Act)

- The licensee can apply to transfer their licence to another person.

Renewal of a licence (section 40 of the WMPC Act and section 3 of the Regulations)

- The licensee may apply for the renewal of their licence not earlier than 90 days, and not later than 30 days, before their licence expires.
- A fee applies and the application must be made via NT EPA Online.

Public Register

- A copy of environment protection licences and any plans for environmental management, reports, submissions or documents required as a condition of an environment protection licence, will be placed on a register in accordance with section 9 of the WMPC Act.
- A copy of the Annual Return will be placed on the register.
- The NT EPA makes this register freely available from the NT EPA website.

Environment Protection Objectives (Part 4 of the WMPC Act), and Water Quality Standards (section 73 of the *Water Act*)

- An Environment Protection Objective (EPO) is a statutory instrument to establish principles on which:
  a. environmental quality is to be maintained, enhanced, managed or protected;
  b. pollution, or environmental harm resulting from pollution, is to be assessed, prevented, reduced, controlled, rectified or cleaned up; and
  c. effective waste management is to be implemented or evaluated.
- In accordance with section 18 of the WMPC Act a beneficial use, quality standard, criteria or objective declared under section 73 of the *Water Act* and in force is an environment protection objective for the purposes of the WMPC Act.

- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
    - Declaration of Beneficial Uses and Objectives Darwin Harbour Region - surface water

Environmental Interests

- This section highlights sensitivity of the surrounding land use and environment associated with the location of the approved activity.
- Sites of Conservation Significance (SOCS) - Darwin Harbour Region. SOCS number 6
- Ramsar Wetland - none

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 39 of the WMPC Act, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In determining whether the licensee has committed an offence, the licensee may be liable for the conduct of its directors, employees or agents.
- The licensee should ensure that each of its directors, employees, contractors or agents are aware of, and comply with, this licence.
- In this licence, unless the contrary intention appears, words that are defined in the WMPC Act are intended to have the meaning given to them in that Act.

LICENCE CONDITIONS

GENERAL

1 The licensee must ensure the contact details recorded in NT EPA Online for this licence are correct at all times.

2 The licensee must at all times have a 24 hour emergency contact.

3 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 50 business days of the anniversary of the commencement date of this licence, for each year or part of a year that this licence is in force.

4 The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:

4.1 environment protection licence number issued under the WMPC Act; and

4.2 24 hour emergency contact details.

5 The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.

6 The licensee must ensure, at all times, that the activity is covered by a policy of insurance or other form of indemnity that will cover the likely costs or preventing, minimising or making good environmental damage that may result from the activity.

7 The licensee must provide to the NT EPA, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the NT EPA.

8 All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by uploading the document via NT EPA Online (or by emailing waste@nt.gov.au).

9 The licensee must maintain and implement the documents listed in Table 2.

Table 2 - Documents relating to this licence

Document Reference	Document Name
N/A	Environmental Management Plan - May 2020
N/A	Emergency Management Plan - May 2020
WI08-04-01	Bulk Truck Receival
WI08-04-02	Pre-acceptance Sampling
WI08-04-06	Bulk Wastewater Unloading
WI08-04-09	Packaged Waste Receival

10 Within 10 business days of any amendment being made to a document listed in Table 2 the licensee must provide the amended document to the NT EPA, along with:

10.1 a tabulated summary of the amendment(s) with document references;

10.2 reasons for the amendment(s); and

10.3 an assessment of environmental risk associated with the amendment(s).

11 The NT EPA may require the licensee to revise or amend and resubmit any amended document. Where the NT EPA requires a document to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

12 The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.

13 The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:

13.1 the person to whom the complaint was made;

13.2 the person responsible for managing the complaint;

13.3 the date and time the complaint was reported;

13.4 the date and time of the event(s) that led to the complaint;

13.5 the contact details of the complainant if known, or where no details are provided a note to that effect;

13.6 the nature of the complaint;

13.7 the nature of event(s) giving rise to the complaint;

13.8 prevailing weather conditions at the time (where relevant to the complaint)

13.9 the action taken in relation to the complaint, including any follow-up contact with the complainant; and

13.10 if no action was taken, why no action was taken.

14 The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

15 Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the NT EPA prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this licensee, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

16 The licensee must, without limiting any other condition of this licence, in conducting the licenced activity, do all things reasonable and practicable to ensure the licenced activity does not adversely affect the relevant Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:

- *Darwin Harbour Region - surface water - aquaculture, environment, cultural, rural stock and domestic*

17 The licensee must not collect, transport, store, recycle, treat or dispose of listed waste other than the listed waste specified in Table 1.

18 The licensee must ensure any plant and equipment used by the licensee in conducting the activity:

18.1 is reasonably fit for the purpose and use to which it is put;

18.2 is maintained;

18.3 is operated by a person trained to use the plant and equipment; and

18.4 is operated by, or operated by a person accompanied by, a person trained to handle, store or dispose of listed waste in connection with the activity.

19 The licensee must ensure that wastewater generated from washing plant and equipment associated with the activity does not cause pollution.

20 The licensee must segregate waste received at the premises in clearly designated areas for recycling, re-use or disposal.

21 The licensee must ensure that all materials that are likely to cause environmental harm are handled and stored in areas with a containment system in accordance with the relevant Australian Standard. Where no relevant Australian Standard exists, the containment system must be sized to contain 110% of the volume of the largest container within the area.

22 No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved in writing by the NT EPA.

23 The licensee must ensure that all listed waste being transported to and from the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.

24 The licensee must ensure that all listed waste is delivered to a premises licenced under section 30 of the WMPC Act to receive that listed waste.

25 The licensee must comply with the National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure.

DISCHARGES AND EMISSIONS

26 The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water which discharge has not been specifically authorised by another condition of this licence).

27 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.

28 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.

Discharges to water

29 This licence does not authorise the discharge of waste water resulting from the licenced activity through the storm water drain discharge point WMP1 identified in Attachment A.

30 The licensee must ensure that water discharged through the storm water drain at WMP1 identified in Attachment A, does not exceed the trigger values specified in Attachment A.

31 The licensee must ensure that the water discharged through the storm water drain at WMP1 identified in Attachment A does not:

31.1 consist of water from any other source than stormwater. Where stormwater has collected within bunded areas, then water quality analysis must confirm the stormwater pH and dissolved oxygen values are within the ranges specifiied in Attachment A and does not contain the nutrients, metals and metalloids, hydrocarbons, organic alcohols and other contaminants listed in Attachment A;

31.2 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;

31.3 cause or generate odours which would adversely affect the use of surrounding waters;

31.4 cause algal blooms in the receiving water;

31.5 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;

31.6 cause mortality of fish or other aquatic organisms; or

31.7 cause adverse impacts on plants.

Emissions to air

32 The licensee must ensure that the emissions from all emission events do not exceed the trigger values specified in Attachment C.

33 The licensee must install, operate and maintain pollution control equipment to minimise contaminants or waste in emissions to air.

34 The activity must not cause or release, beyond the boundary of the premises:

34.1 visible steam;

34.2 smoke;

34.3 offensive odour;

34.4 dust or particulates; or

34.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.

35 The licensee must comply with the National Environment Protection (Air Toxics) Measure.

Environmental Audit

36 The licensee must undertake, annually, and as prescribed by the conditions of this licence, an environmental audit by a qualified person to evaluate the:

36.1 extent to which compliance has been acheived with this licence; and

36.2 ability of management systems to manage waste and prevent environmental harm resulting from pollution.

37 The licensee must submit the proposed scope for the environmental audit no later than 20 business days prior to the proposed commencement date of the environmental audit (which must be specified when the proposed scope is submitted), to the NT EPA for review and approval.

38 The NT EPA may require the licensee to revise or amend and resubmit any proposed scope for an environmental audit. Where the NT EPA requires the environmental audit scope to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

39 The licensee must ensure that each environmental audit:

39.1 is not commenced until written approval of the environmental audit scope is received from the NT EPA; and

39.2 is undertaken in accordance with the approved scope.

40 The licensee must ensure that, for each environmental audit undertaken by the licensee:

40.1 a written report is prepared and signed by the qualified person who conducted the audit;

40.2 the written report is completed within 2 calendar months of the licensee's receipt of the NT EPA's approval of the environmental audit scope; and

40.3 the written report is provided in full to the NT EPA within 5 business days of being signed by the qualified person.

MONITORING

41 The licensee must conduct surface water monitoring in accordance with Attachment A

42 The licensee must conduct ground water monitoring in accordance with Attachment B.

43 The licensee must conduct Stack Emission Monitoring in accordance with Attachment C.

44 The licensee must, prior to the inital wet season release of storm water from the storm water collection pit as identified in Attachment A, ensure that the quality of the water is within the trigger values specified in Attachment A.

45 The licensee must conduct surface water monitoring for parameters listed in Attachment A in any bunded area where rainfall has collected and the licensee is considering transfer to the stormwater system.

46 The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.

47 The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).

48 The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.

49 The licensee must ensure any samples collected in accordance with the Attachment A, Attachment B and Attachment C or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.

50 The licensee must ensure that, for each sample collected in accordance with Attachment A, Attachment B and Attachment C or the activity the following information must be recorded and retained:

50.1 the date on which the sample was collected;

50.2 the time at which the sample was collected;

50.3 the location at which the sample was collected;

50.4 the name of the person who collected the sample;

50.5 the chain of custody forms relating to the sample;

50.6 the field measurements (if any) and analytical results (if any) relating to the sample; and

50.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

51 The licensee must keep records of all transfers of stormwater from bunded areas to the stormwater system including:

51.1 results of water quality analysis taken as required by condition 32.1 of this licence;

51.2 the date and time when the transfer began and ceased; and

51.3 the volume transferred to the stormwater system.

52 The licensee must keep and maintain records relating to the activity undertaken and the listed waste handled by the licensee in each successive 12 month period following the commencement of this licence, which include:

52.1 the date of collection;

52.2 the source of the listed waste;

52.3 the name of the transport company, if not the licensee;

52.4 the vehicle registration;

52.5 a description of the listed waste;

52.6 the quantity of the listed waste;

52.7 the final destination of the listed waste; and

52.8 whether the listed waste was stored, recycled, treated or disposed of.

53 The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.

54 The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.

55 The licensee must notify the NT EPA of any non-compliance with this licence by completing the Non-Compliance Notification via NT EPA Online (or by emailing waste@nt.gov.au), as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.

56 The licensee must include in the notification of non-compliance the following information:

56.1 when the non-compliance was detected and by whom;

56.2 the date and time of the non-compliance;

56.3 the actual and potential causes and contributing factors to the non-compliance;

56.4 the risk of environmental harm arising from the non-compliance;

56.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;

56.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur;

56.7 if no action was taken, why no action was taken; and

56.8 a date when an incident investigation report will be submitted to the NT EPA.

57 A non-compliance with this licence includes:

57.1 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on three consecutive sampling occasions;

57.2 subsequent consecutive exceedances of trigger values as described in condition 58.1; and

57.3 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on a single occasion where the parameter measures greater than or equal to three times the trigger value.

58 The licensee must notify the NT EPA of any exceedance of trigger value as specified in Attachment A, Attachment B and Attachment C as soon as practicable after (and in any case within 24 hours after) first becoming aware of the exceedance.

59 The licensee must keep records of all exceedances of trigger values specified in Attachment A, Attachment B and Attachment C. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.

60 The licensee must ensure that the notification of the trigger value exceedance includes the following information:

60.1 when the exceedance was detected and by whom;

60.2 the date and time of the exceedance;

60.3 the actual and potential causes and contributing factors to the exceedance;

60.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant trigger values as specified in Attachment A, Attachment B and Attachment C;

60.5 the action(s) that have or will be undertaken to address the exceedance and any resulting environmental harm; and

60.6 if no action was taken, why no action was taken.

61 The licensee must submit a completed Annual Return via NT EPA Online within 10 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.

62 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

63 The licensee must ensure that each Monitoring Report:

63.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';

63.2 reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;

63.3 includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;

63.4 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;

63.5 provides an assessment on groundwater levels, including groundwater contours and tidal influence;

63.6 reports on all exceedances and investigations undertaken for this licence; and

63.7 includes an assessment of environmental impact from the activity.

64 The NT EPA may require the licensee to revise or amend and resubmit any Monitoring Report. Where the NT EPA requires the Monitoring Report to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



Leonie Cooper
Director Environment Authorisations
Delegate of the Northern Territory
Environment Protection Authority
Dated: 10/08/2020

END NOTES

This licence is a renewal which supercedes EPL229 with an expiry date of 28 June 2022

EPL229 was issued on 21 December 2017 with an expiry date of 23 December 2019

DEFINITIONS

All terms in the Licence which are defined in the *Waste Management and Pollution Control Act* have the meaning given in that Act unless otherwise or further defined in this section.

DEFINITION	In this licence, unless a contrary intention appears:
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Scheduled activity as described on the covering page of this licence.
Air	includes any layer of the atmosphere.
Annual fee	yearly fee payable in respect of the activity as specified in the WMPC Act and the Regulations.
Annual Return	an NT EPA prescribed format for demonstrating and reporting compliance with the conditions of this licence and providing information on waste volumes for the preceding 12 month period.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting.
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: (a) noise, odour, heat and electromagnetic radiation; (b) a prescribed substance or prescribed class of substances; and (c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental audit	has the meaning given in section 47 of the WMPC Act.

Environmental harm	(a) any harm to or adverse effect on the environment; or (b) any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental nuisance	means: (a) an adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) an unsightly or offensive condition caused by contaminants or waste.
Incident	includes: (a) an accident, emergency or malfunction; and (b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.
Listed waste	a waste included under Schedule 2 of the Regulations.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: (a) is not trivial or negligible in nature; (b) consists of an environmental nuisance of a high impact or on a wide scale; (c) results, or is likely to result, in not more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of not more than $50,000 or the prescribed amount (whichever is greater).
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an NT EPA prescribed format for notifying the NT EPA of a non-compliance.
NT EPA Online	online system for Environment Protection Licence (EPL), Environment Protection Approval (EPA) and Waste Discharge Licence (WDL) lodgement and maintenance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	(a) emit, discharge, deposit, or disturb, directly or indirectly, a contaminant or waste; or (b) cause, permit, or fail to prevent, directly or indirectly, the emission, discharge, deposition, disturbance or escape of a contaminant or waste.
Pollution	(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or (b) a contaminant or waste, effect or phenomenon, that is present in the

	environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.
Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Regulations	*Waste Management and Pollution Control (Administration) Regulations*.
Rehabilitation Plan	a written plan to ensure that the objectives of rehabilitation are achieved as set out in the NT EPA Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) is irreversible or otherwise of a high impact or on a wide scale; (b) damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) results or is likely to result in more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of more than $50,000 or the prescribed amount (whichever is greater).
Stormwater	water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Trigger values	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Waste	(a) a solid, a liquid or a gas; or (b) a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	water that contains a contaminant or waste.
Water	includes: (a) surface water, ground water and tidal waters; (b) coastal waters of the Territory, within the meaning of the Coastal Waters (Northern Territory Powers) Act 1980 of the Commonwealth; and (c) water containing an impurity.
WMPC Act	the Northern Territory *Waste Management and Pollution Control Act*.

Groundwater Monitoring Event – December 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ **Sydney Laboratory** Unit F3 Bldg F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 6 Monterey Road Dandenong South VIC 3175 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Greencap NT P/L	Project No	J174436	Project Manager	Varun Bhagwat
Address	Unit 11 / 14 Winnellie Road Winnellie, NT 0820	Project Name	Groundwater Monitoring	EDD Format (Excel, Esdat etc)	Esdat
Contact Name	Varun Bhagwat			Facility Code	
Phone No	0428 829 444				
Special Directions					
Purchase Order	PO311485				
Quote ID No					

Sampler(s)	VB	
Handed over By	VB on 21/12/22	
Email for invoice	Varun.Bhagwat@greencap.com.au	
Email for Results	Varun.Bhagwat@greencap.com.au	

Analyses (Please specify Test Method if multiple tests apply to a single analyte. SUITE codes must be listed to ensure the correct analytes are reported.)

No	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil/S, Water/W)	B11C: Cation Suite	B11E: Anion Suite	B19A: Nutrient Suite	Ammonia	PCB	PFAS	Total Cyanide	B4A: TRH/BTEX/NPAH/Phenols	BTEXN	TRH/BTEXN										
1	EMB13	21/12/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
2	EMB14	21/12/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
3	QC01	21/12/22	Water								X												1	2				
4	RB01	21/12/22	Water										X										1	2				
5	TB01	21/12/22	Water									X												2				
	Add Rows		Total Counts	2	2	2	2	2	2	2	3	1	1							2		4	6	10	2			

Containers (Change container type & size if necessary): 500mL Plastic | 250mL Plastic | 125mL Plastic | 200mL Amber Glass | 40mL VOA vial | 500mL PFAS Bottle | Jar (Glass or HDPE) | Other (Asbestos AS4964, WA Guidelines)

Required Turnaround Time (TAT) (Default will be 5 days if no other selected)

♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

Sample Comments / Dangerous Goods Hazard Warning

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

Name	Signature	Date	Time

Laboratory Use Only						
Received By	Kristine Hood	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date 22/12/22	Time 09:00	Temperature 4°C
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Report № 952684

Eurofins Environment Testing Australia Pty Ltd

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request

10 DAY TAT OVER THE HOLIDAY PERIOD

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name:	Greencap NT P/L
Contact name:	Varun
Project name:	Groundwater Monitoring
Project ID:	J174436
Turnaround time:	10 Day
Date/Time received	Dec 21, 2022 10:00 AM
Eurofins reference	952686

Sample Information

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

Notes

Contact

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

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Varun**

Report **952686-W**
Project name Groundwater Monitoring
Project ID J174436
Received Date Dec 21, 2022

Client Sample ID			**EMB13**	**EMB14**	**QC01**	**RB01**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**M22-De0052480**	**M22-De0052481**	**M22-De0052482**	**M22-De0052483**
Date Sampled			**Dec 21, 2022**	**Dec 21, 2022**	**Dec 21, 2022**	**Dec 21, 2022**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	100	100	106	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-De0052480	M22-De0052481	M22-De0052482	M22-De0052483
Date Sampled			Dec 21, 2022	Dec 21, 2022	Dec 21, 2022	Dec 21, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	71	55	103	-
p-Terphenyl-d14 (surr.)	1	%	88	58	54	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	-	-
Total PCB*	0.005	mg/L	< 0.005	< 0.005	-	-
Dibutylchlorendate (surr.)	1	%	88	74	-	-
Tetrachloro-m-xylene (surr.)	1	%	92	69	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	110	62	78	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.05	-	-
Chloride	1	mg/L	42	6.1	-	-
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	4.5	9.1	-	-
Phosphate total (as P)	0.01	mg/L	< 0.01	< 0.01	-	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-De0052480	M22-De0052481	M22-De0052482	M22-De0052483
Date Sampled			Dec 21, 2022	Dec 21, 2022	Dec 21, 2022	Dec 21, 2022
Test/Reference	LOR	Unit				
Sulphate (as SO4)	5	mg/L	< 5	15	-	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.3	2.2	-	-
Total Nitrogen (as N)*	0.2	mg/L	6.8	11.3	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20	34	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO3)	20	mg/L	< 20	34	-	-
Alkali Metals						
Calcium	0.5	mg/L	0.8	23	-	-
Magnesium	0.5	mg/L	0.5	1.1	-	-
Potassium	0.5	mg/L	0.9	2.3	-	-
Sodium	0.5	mg/L	17	3.1	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	1.0	0.16	-	-
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	4.6	0.39	-	-
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	4.8	[N09]0.28	-	-
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	[N09]1.7	[N09]0.32	-	-
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	[N09]1.0	[N09]0.11	-	-
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	0.05	0.12	-	-
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
13C4-PFBA (surr.)	1	%	77	93	-	-
13C5-PFPeA (surr.)	1	%	132	86	-	-
13C5-PFHxA (surr.)	1	%	139	91	-	-
13C4-PFHpA (surr.)	1	%	127	89	-	-
13C8-PFOA (surr.)	1	%	124	94	-	-
13C5-PFNA (surr.)	1	%	93	95	-	-
13C6-PFDA (surr.)	1	%	93	99	-	-
13C2-PFUnDA (surr.)	1	%	109	113	-	-
13C2-PFDoDA (surr.)	1	%	101	112	-	-
13C2-PFTeDA (surr.)	1	%	99	105	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	-	-
13C8-FOSA (surr.)	1	%	90	108	-	-
D3-N-MeFOSA (surr.)	1	%	89	105	-	-

Client Sample ID			EMB13	EMB14	QC01	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-De0052480	M22-De0052481	M22-De0052482	M22-De0052483
Date Sampled			Dec 21, 2022	Dec 21, 2022	Dec 21, 2022	Dec 21, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D5-N-EtFOSA (surr.)	1	%	91	111	-	-
D7-N-MeFOSE (surr.)	1	%	102	105	-	-
D9-N-EtFOSE (surr.)	1	%	96	109	-	-
D5-N-EtFOSAA (surr.)	1	%	109	116	-	-
D3-N-MeFOSAA (surr.)	1	%	89	105	-	-
Perfluoroalkyl sulfonic acids (PFSAs)						
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	< 0.01	-	-
13C3-PFBS (surr.)	1	%	58	100	-	-
18O2-PFHxS (surr.)	1	%	91	104	-	-
13C8-PFOS (surr.)	1	%	93	100	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	0.05	< 0.01	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	41	< 0.05	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.99	0.02	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	-	-
13C2-4:2 FTSA (surr.)	1	%	142	61	-	-
13C2-6:2 FTSA (surr.)	1	%	66	99	-	-
13C2-8:2 FTSA (surr.)	1	%	110	118	-	-
13C2-10:2 FTSA (surr.)	1	%	98	109	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	1	0.11	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1	0.11	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	55.09	1.28	-	-
Sum of PFASs (n=30)*	0.1	ug/L	55.19	1.4	-	-

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M22-De0052484
Date Sampled			Dec 21, 2022
Test/Reference	LOR	Unit	
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001

Client Sample ID			TB01
Sample Matrix			**Water**
Eurofins Sample No.			**M22-De0052484**
Date Sampled			**Dec 21, 2022**
Test/Reference	LOR	Unit	
BTEX			
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	101
Volatile Organics			
Naphthalene[N02]	0.01	mg/L	< 0.01

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Jan 03, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Jan 03, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Dec 29, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Dec 29, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Dec 29, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Dec 29, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Dec 29, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 29, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Dec 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Dec 22, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: Groundwater Monitoring
Project ID: J174436

Order No.: PO311485
Report #: 952686
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Dec 21, 2022 10:00 AM
Due: Jan 9, 2023
Priority: 10 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	EMB13	Dec 21, 2022		Water	M22-De0052480	X	X	X			X	X	X	X	X
2	EMB14	Dec 21, 2022		Water	M22-De0052481	X	X	X			X	X	X	X	X
3	QC01	Dec 21, 2022		Water	M22-De0052482	X	X	X			X	X	X	X	X
4	RB01	Dec 21, 2022		Water	M22-De0052483				X	X					
5	TB01	Dec 21, 2022		Water	M22-De0052484				X						
Test Counts						3	3	3	2	1	3	3	3	3	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	115			70-130	Pass	
TRH C10-C14	%	120			70-130	Pass	
TRH C6-C10	%	115			70-130	Pass	
TRH >C10-C16	%	122			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	97			70-130	Pass	
Toluene	%	101			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
m&p-Xylenes	%	104			70-130	Pass	
Xylenes - Total*	%	103			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	94			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	94			70-130	Pass	
Acenaphthylene	%	128			70-130	Pass	
Anthracene	%	102			70-130	Pass	
Benz(a)anthracene	%	114			70-130	Pass	
Benzo(a)pyrene	%	128			70-130	Pass	
Benzo(b&j)fluoranthene	%	74			70-130	Pass	
Benzo(g.h.i)perylene	%	130			70-130	Pass	
Benzo(k)fluoranthene	%	122			70-130	Pass	
Chrysene	%	106			70-130	Pass	
Dibenz(a.h)anthracene	%	102			70-130	Pass	
Fluoranthene	%	84			70-130	Pass	
Fluorene	%	84			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	102			70-130	Pass	
Naphthalene	%	72			70-130	Pass	
Phenanthrene	%	108			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pyrene	%	108			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	76			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	68			25-140	Pass	
2.4-Dichlorophenol	%	100			25-140	Pass	
2.4.5-Trichlorophenol	%	34			25-140	Pass	
2.4.6-Trichlorophenol	%	105			25-140	Pass	
2.6-Dichlorophenol	%	84			25-140	Pass	
4-Chloro-3-methylphenol	%	112			25-140	Pass	
Pentachlorophenol	%	35			25-140	Pass	
Tetrachlorophenols - Total	%	31			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	54			25-140	Pass	
2-Methyl-4.6-dinitrophenol	%	32			25-140	Pass	
2-Nitrophenol	%	117			25-140	Pass	
2.4-Dimethylphenol	%	42			25-140	Pass	
2.4-Dinitrophenol	%	72			25-140	Pass	
2-Methylphenol (o-Cresol)	%	88			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	30			25-140	Pass	
4-Nitrophenol	%	59			25-140	Pass	
Dinoseb	%	35			25-140	Pass	
Phenol	%	64			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	95			70-130	Pass	
Cyanide (total)	%	95			70-130	Pass	
Nitrate & Nitrite (as N)	%	100			70-130	Pass	
Phosphate total (as P)	%	101			70-130	Pass	
Sulphate (as SO4)	%	117			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	116			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	77			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	86			80-120	Pass	
Magnesium	%	84			80-120	Pass	
Potassium	%	95			80-120	Pass	
Sodium	%	95			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	136			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	75			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	73			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	71			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	80			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	134			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	132			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	98			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	148			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	117			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorotetradecanoic acid (PFTeDA)	%	136			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	136			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	131			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	121			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	126			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	138			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	135			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	131			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	128			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	119			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	136			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	133			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	132			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	137			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	63			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	84			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	139			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	77			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	78			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	138			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M22-De0057797	NCP	%	112			70-130	Pass	
TRH >C10-C16	M22-De0057797	NCP	%	112			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M22-De0056850	NCP	%	101			70-130	Pass	
Nitrate & Nitrite (as N)	M22-De0056850	NCP	%	104			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M22-De0053547	NCP	%	95			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	B22-De0051693	NCP	%	86			75-125	Pass	
Magnesium	B22-De0051693	NCP	%	87			75-125	Pass	
Potassium	B22-De0051693	NCP	%	109			75-125	Pass	
Sodium	B22-De0051693	NCP	%	101			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M22-De0056794	NCP	%	83			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-De0057112	NCP	%	103			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-De0057112	NCP	%	94			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-De0057112	NCP	%	102			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-De0057112	NCP	%	92			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-De0056794	NCP	%	74			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-De0056794	NCP	%	73			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-De0056794	NCP	%	80			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorododecanoic acid (PFDoDA)	M22-De0056794	NCP	%	80			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-De0056794	NCP	%	99			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-De0056794	NCP	%	84			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-De0056794	NCP	%	70			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-De0056794	NCP	%	85			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-De0056794	NCP	%	65			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-De0056794	NCP	%	70			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-De0056794	NCP	%	96			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-De0056794	NCP	%	79			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-De0056794	NCP	%	70			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-De0056794	NCP	%	62			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-De0056794	NCP	%	62			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-De0056794	NCP	%	62			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-De0056794	NCP	%	72			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-De0056794	NCP	%	69			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-De0056794	NCP	%	79			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-De0056794	NCP	%	63			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-De0056794	NCP	%	51			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-De0056794	NCP	%	69			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-De0057112	NCP	%	84			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-De0057112	NCP	%	70			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-De0056794	NCP	%	87			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M22-De0056662	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M22-De0056662	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M22-De0056662	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	M22-De0056662	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dichlorophenol	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4.5-Trichlorophenol	M22-De0056662	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4.6-Trichlorophenol	M22-De0056662	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.6-Dichlorophenol	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	M22-De0056662	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M22-De0056662	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M22-De0056662	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M22-De0056662	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	M22-De0056662	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4-Dimethylphenol	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dinitrophenol	M22-De0056662	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M22-De0056662	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	M22-De0056662	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	M22-De0056662	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	M22-De0056662	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M22-De0056420	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Chloride	B22-De0051693	NCP	mg/L	5900	5700	2.9	30%	Pass	
Cyanide (total)	L22-De0037058	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nitrate & Nitrite (as N)	M22-De0056420	NCP	mg/L	2.9	3.1	6.6	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Phosphate total (as P)	L22-De0046419	NCP	mg/L	0.20	0.22	7.7	30%	Pass	
Sulphate (as SO4)	B22-De0051693	NCP	mg/L	170	170	1.9	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M22-De0053542	NCP	mg/L	1.6	2.1	29	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Carbonate Alkalinity (as CaCO3)	B22-De0057748	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	B22-De0057748	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	B22-De0051693	NCP	mg/L	32	34	5.8	30%	Pass	
Magnesium	B22-De0051693	NCP	mg/L	15	15	<1	30%	Pass	
Potassium	B22-De0051693	NCP	mg/L	2300	2300	2.0	30%	Pass	
Sodium	B22-De0055857	NCP	mg/L	5400	5200	5.1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-De0039714	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-De0057044	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-De0057044	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-De0057044	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-De0057044	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-De0056793	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluoroheptanesulfonic acid (PFHpS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-De0057044	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-De0057044	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-De0056793	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Emily Rosenberg	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Vivian Wang	Senior Analyst-Volatile



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Jordha 23/12/22 1030

Chain of Custody - Greencap Adelaide
Ph. 8299 9955

GREENCAP

Client	:	GRR	Date	:	21/12/2022
Project	:	Groundwater Monitoring	Sampled by	:	Varun Bhagwat
Project Manager	:	Varun Bhagwat	Sampler Mobile	:	0428 829 444
Job No.	:	J174436	Purchase Order	:	PO311486
Location	:	800 Berrimah Rd, East Arm	T/Around		***STANDARD TAT***

Please email results to: Varun.Bhagwat@greencap.com.au

Relinquished by: VB on 21/12/22	Recieved by:	Relinquished by:	Received by:
Signature & date	*Signature & date*	*Signature & date*	*Signature & date*

				Sample Containers									Testing										
Field ID	Depth	Sampled	Matrix *(Soil, Water, Vapour, etc)*	40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic	60ml Plastic Nturients (h_2SO4)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	S-4 : TRH, BTEXN	W3: NEPM Suite: 15 Metals	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P15/2 SA EPA Waste Screen Antimony (Sb)	S12 : OCP, OPP	S-18: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen	Hold
1 EMB13		21/12/2022	W		2		1							X	X		X					
2 EMB14		21/12/2022	W		2		1							X	X		X					
3 QC01A		21/12/2022	W	2		1										X						
Totals				2	4	1	2	0	0	0	0	0	0	2	2	1	0	2	0	0	0	0	0

Courier / Forwarding Agent / Depot etc
Lab / Analysis: ALS Melbourne
Organised By / Date: Glycol walk
Relinquished By / Date:
Connote / Courier: Glycol
WO No: ES2246450
Attach By PO / Internal Sheet:

Environmental Division
Sydney
Work Order Reference
ES2246450

Telephone : + 61-2-8784 8555

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2246450**

Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: varun.bhagwat@greencap.com.au	E-mail	: khaleda.ataei@alsglobal.com
Telephone	: ----	Telephone	: + 61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: PO311486	Quote number	: EM2022ADEENV0004 (EN/111/22 (primary work only))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 800 Berrimah Rd, East Arm		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 23-Dec-2022 10:30	Issue Date	: 23-Dec-2022
Client Requested Due Date	: 09-Jan-2023	Scheduled Reporting Date	: **09-Jan-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 11.8'C
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Glycol analysis will be conducted by ALS Melbourne.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EP067 Glycols analysis in water by GCMS	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-24 TRH/BTEXN/PAH/Phenols
ES2246450-001	21-Dec-2022 00:00	EMB13	✓	✓	✓	
ES2246450-002	21-Dec-2022 00:00	EMB14	✓	✓	✓	
ES2246450-003	21-Dec-2022 00:00	QC01A				✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

VARUN BHAGWAT

- *AU Certificate of Analysis - NATA (COA)	Email	varun.bhagwat@greencap.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	varun.bhagwat@greencap.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	varun.bhagwat@greencap.com.au
- A4 - AU Tax Invoice (INV)	Email	varun.bhagwat@greencap.com.au
- Chain of Custody (CoC) (COC)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ENMRG (ENMRG)	Email	varun.bhagwat@greencap.com.au
- EDI Format - ESDAT (ESDAT)	Email	varun.bhagwat@greencap.com.au

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2246450**	Page	: 1 of 7
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 23-Dec-2022
Order number	: PO311486	Date Analysis Commenced	: 28-Dec-2022
C-O-C number	: ----	Issue Date	: 09-Jan-2023
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics, Smithfield, NSW
Sanjay Parekh	LCMS Coordinator	Melbourne Organics, Springvale, VIC
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4799795)									
ES2246481-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.190	0.192	0.8	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.014	0.015	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	<0.05	0.0	No Limit
ES2246758-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.036	0.037	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.004	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4799795) - continued									
ES2246758-001	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.019	0.019	0.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.023	0.024	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.11	0.16	35.5	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4799796)									
ES2246481-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2246758-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP067: Glycols (QC Lot: 4796773)									
EM2225849-001	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	141	140	0.0	0% - 20%
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	50	51	2.2	0% - 20%
		EP067: Triethylene glycol	112-27-6	2	mg/L	3	2	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4796147)									
ES2246262-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2246386-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4796147)									
ES2246262-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2246386-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4796147)									
ES2246262-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2246386-003	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4799795)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	89.8	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	88.4	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	86.0	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.5	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.3	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	86.2	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	86.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	86.2	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.8	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.2	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	86.0	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	97.0	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	85.7	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	107	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4799796)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.4	83.0	105
EP067: Glycols (QCLot: 4796773)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	105	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	98.3	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	101	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	100	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	101	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	102	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	102	69.0	142
EP075(SIM)A: Phenolic Compounds (QCLot: 4791707)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	35.1	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	55.0	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	51.7	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	49.4	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	56.3	48.0	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	59.4	49.0	99.0
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	56.8	53.0	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	57.4	57.0	105

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 4791707) - continued								
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	54.7	53.0	99.0
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	59.5	50.0	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	58.0	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	53.2	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4791707)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	61.8	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	67.0	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	65.6	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	77.1	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	73.8	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	70.3	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	77.4	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	88.7	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	66.7	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	70.4	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	69.8	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	71.3	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	66.1	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	73.5	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	74.2	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	70.6	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4791708)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	77.0	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	91.3	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	91.1	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4796147)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	94.6	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4791708)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	68.4	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	99.6	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	84.0	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4796147)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	101	75.0	127
EP080: BTEXN (QCLot: 4796147)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.3	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.7	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.6	70.0	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080: BTEXN (QCLot: 4796147) - continued								
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	96.6	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	97.8	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.4	70.0	120

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4799795)							
ES2246450-002	EMB14	EG020A-F: Arsenic	7440-38-2	1 mg/L	88.2	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	86.5	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	90.6	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	95.4	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	96.0	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	92.4	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	91.0	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	91.9	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.8	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.4	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	96.2	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	92.3	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4799796)							
ES2246450-001	EMB13	EG035F: Mercury	7439-97-6	0.01 mg/L	85.3	70.0	130
EP067: Glycols (QCLot: 4796773)							
EM2225851-001	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	104	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	97.4	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	104	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	105	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	103	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	105	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	105	32.2	156
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4796147)							
ES2246262-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	96.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4796147)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4796147) - continued							
ES2246262-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	101	70.0	130
EP080: BTEXN (QCLot: 4796147)							
ES2246262-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	88.7	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	89.9	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.4	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	94.3	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	95.1	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.9	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2246450**	Page	: 1 of 5
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 23-Dec-2022
Site	: 800 Berrimah Rd, East Arm	Issue Date	: 09-Jan-2023
Sampler	: VARUN BHAGWAT	No. of samples received	: 3
Order number	: PO311486	No. of samples analysed	: 3

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP067: Glycols						
VOC Vial - unpreserved						
EMB13, EMB14	30-Dec-2022	28-Dec-2022	**2**	03-Jan-2023	28-Dec-2022	**6**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	11	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
EMB13, EMB14	**21-Dec-2022**	**----**	----	----	**04-Jan-2023**	19-Jun-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F)							
EMB13, EMB14	**21-Dec-2022**	**----**	----	----	**06-Jan-2023**	18-Jan-2023	✓
EP067: Glycols							
VOC Vial - unpreserved (EP067)							
EMB13, EMB14	**21-Dec-2022**	**30-Dec-2022**	28-Dec-2022	×	**03-Jan-2023**	28-Dec-2022	×
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC01A	**21-Dec-2022**	**28-Dec-2022**	28-Dec-2022	✓	**06-Jan-2023**	06-Feb-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC01A	**21-Dec-2022**	**28-Dec-2022**	28-Dec-2022	✓	**06-Jan-2023**	06-Feb-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC01A	**21-Dec-2022**	**28-Dec-2022**	28-Dec-2022	✓	**06-Jan-2023**	06-Feb-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**21-Dec-2022**	**04-Jan-2023**	04-Jan-2023	✓	**04-Jan-2023**	04-Jan-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC01A	**21-Dec-2022**	**28-Dec-2022**	28-Dec-2022	✓	**06-Jan-2023**	06-Feb-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**21-Dec-2022**	**04-Jan-2023**	04-Jan-2023	✓	**04-Jan-2023**	04-Jan-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC01A	**21-Dec-2022**	**04-Jan-2023**	04-Jan-2023	✓	**04-Jan-2023**	04-Jan-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	11	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	19	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	11	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	19	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2246450**	Page	: 1 of 6
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 23-Dec-2022 10:30
Order number	: PO311486	Date Analysis Commenced	: 28-Dec-2022
C-O-C number	: ----	Issue Date	: 09-Jan-2023 13:35
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics, Smithfield, NSW
Sanjay Parekh	LCMS Coordinator	Melbourne Organics, Springvale, VIC
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB13	EMB14	QC01A	----	----
			Sampling date / time	21-Dec-2022 00:00	21-Dec-2022 00:00	21-Dec-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2246450-001	ES2246450-002	ES2246450-003	--------	--------
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	----	----	----
Barium	7440-39-3	0.001	mg/L	**0.043**	**0.322**	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.003**	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	**0.025**	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	**0.001**	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.002**	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.030**	**0.701**	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	----	----	----
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	----	----	----
Propylene glycol	57-55-6	2	mg/L	<2	<2	----	----	----
Ethylene glycol	107-21-1	2	mg/L	<2	<2	----	----	----
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	----	----	----
Diethylene glycol	111-46-6	2	mg/L	<2	<2	----	----	----
Triethylene glycol	112-27-6	2	mg/L	<2	<2	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	----	----	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	----	----	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L	----	----	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	----	----	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	----	----	<1.0	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L	----	----	<1.0	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L	----	----	<1.0	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB13	EMB14	QC01A	----	----
			Sampling date / time	21-Dec-2022 00:00	21-Dec-2022 00:00	21-Dec-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2246450-001	ES2246450-002	ES2246450-003	--------	--------
				Result	Result	Result	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2.6-Dichlorophenol	87-65-0	1.0	µg/L	----	----	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	----	----	<1.0	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L	----	----	<1.0	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L	----	----	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	----	----	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	----	----	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	----	----	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	----	----	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	----	----	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	----	----	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	----	----	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	----	----	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	----	----	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	----	----	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	----	----	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	----	----	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	<20	----	----
C10 - C14 Fraction	----	50	µg/L	----	----	<50	----	----
C15 - C28 Fraction	----	100	µg/L	----	----	<100	----	----
C29 - C36 Fraction	----	50	µg/L	----	----	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	<20	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB13	EMB14	QC01A	----	----
			Sampling date / time	21-Dec-2022 00:00	21-Dec-2022 00:00	21-Dec-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2246450-001	ES2246450-002	ES2246450-003	--------	--------
				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C16 Fraction	----	100	µg/L	----	----	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	----	----	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	----	----	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	----	----	<100	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L	----	----	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	<1	----	----
Toluene	108-88-3	2	µg/L	----	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	----	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<2	----	----
^ **Total Xylenes**	----	2	µg/L	----	----	<2	----	----
^ **Sum of BTEX**	----	1	µg/L	----	----	<1	----	----
Naphthalene	91-20-3	5	µg/L	----	----	<5	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	----	----	**28.5**	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	----	----	**58.3**	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%	----	----	**54.9**	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	----	----	**64.3**	----	----
Anthracene-d10	1719-06-8	1.0	%	----	----	**75.8**	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	----	----	**77.3**	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	----	----	**118**	----	----
Toluene-D8	2037-26-5	2	%	----	----	**109**	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	**107**	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

Inter-Laboratory Testing

Analysis conducted by ALS Melbourne, NATA accreditation no. 825, site no. 13778 (Chemistry).

(WATER) EP067: Glycols

27 January 2023

11/14 Winnellie Central
Winnellie, NT 0820
P: (08) 7906 1300
www.greencap.com.au

Michael Rogers
Operations Manager
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (JANUARY 2023)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the January 2023 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – January 2023

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 25 January 2023 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – January 2023 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	25/01/2023	1.461	1.461	4.967	9.237
EMB12	25/01/2023	1.371	1.371	5.129	9.325
EMB13	25/01/2023	2.867	2.067	6.039	10.245
EMB14	25/01/2023	2.946	2.246	6.309	9.803
EMB15	25/01/2023	0.851	0.851	6.533	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – January 2023 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	4.48	32.7	21	167.8	0.07	106.60	5.72	-21.4
EMB14	6.43	33.3	16.8	154.9	0.07	101.40	5.66	-34.7

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in February 2023.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – January 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – January 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 25/1/23

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0933	EMB13	—	2.867		10.245	
1020	EMB14	—	2.946		9.803	
1110	EMB07	—	1.461		9.237	
1115	EMB12	—	1.371		9.325	
1120	EMB15	—	0.851		9.314	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SLIGHT WIND/RAIN, OVERCAST

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No:	J174436
Project:	GME	Sampled by:	VB
Location:	East Arm, NT	Date:	25/1/23

Well ID: EMB13

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	10.245	(m)	Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other		WQM Make:	Y81			
Depth to product	–	(m bTOC)	WL Meter:	interface	non-interface		
Depth to water:	2.867	(m bTOC)	Screen (from - to), m	7.245 - 10.245			
Product thickness	–	(m)	Pump Depth (m bTOC)	–			

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

OVERCAST / SETTLE LIGHT DRIZZLE

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc TDS mg/L	SAL PSU	TURB NTU
1000	INT	3.034	32.8	3.63	262.0	-5.4	22.0	169.00	0.12	
1003	2	3.878	33.0	3.65	253.6	-32.1	9.8	163.80	0.12	
1006	4	4.337	32.9	4.60	1475	-22.5	22.2	97.50	0.07	
1009	6	4.821	32.8	4.63	149.3	-20.2	21.7	96.2	0.07	
1012	8	5.192	32.7	4.52	157.1	-20.6	21.0	100.10	0.07	
1015	10	5.547	32.7	4.40	164.2	-22.1	21.0	106.60	0.08	
1018	12	5.983	32.7	4.48	167.8	-21.4	21.0	106.60	0.07	5.72

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

L-M TURB, NO SHEEN/ODOUR, PALE BROWN

PURGED 12L

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client: GRR	Job No: J174436	**Well ID** EMB14
Project: GME	Sampled by: VB	
Location: East Arm, NT	Date: 25/1/23	

WELL DETAILS		SAMPLING EQUIPMENT		*Other Sampling Equipment / Method
Well depth:	9.803 (m)	Device:	micropurge (peristaltic) footvalve bailer	
Casing diameter:	50 (mm)	Method:	(low-flow) 4-well-volume purged dry	
Casing type:	PVC / steel / other	WQM Make:	YSI	
Depth to product	— (m bTOC)	WL Meter:	(interface) non-interface	
Depth to water:	2.946 (m bTOC)	Screen (from - to), m		
Product thickness	— (m)	Pump Depth (m bTOC)	6.803 - 9.803	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

OVERCAST / ~~SUNNY~~ LIGHT RAIN

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L	SAL PSU	TURB NTU
1028	INT	3.113	32.9	6.37	156.7	-16.7	21.1	101.40	0.07	
1031	2	3.736	33.4	6.44	155.8	-26.8	19.2	100.75	0.07	
1034	4	4.321	33.5	6.45	155.6	-30.9	18.5	101.40	0.07	
1037	6	4.869	33.4	6.43	154.9	-31.5	18.0	101.40	0.07	
1040	8	5.629	33.3	6.43	156.0	-32.2	17.6	101.40	0.07	
1043	10	6.255	33.3	6.43	155.4	-33.6	17.0	101.40	0.07	
1046	12	6.842	33.3	6.43	154.9	-34.7	16.8	101.40	0.07	5.66

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

L-M TURB, PALE BROWN, NO SHEEN/ODOUR

PURGED 12L

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

1 March 2023

11/14 Winnellie Central
Winnellie, NT 0820
P: (08) 7906 1300
www.greencap.com.au

Michael Rogers
Operations Manager
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (FEBRUARY 2023)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the February 2023 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – February 2023

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 27 February 2023 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – February 2023 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	27/02/2023	0.603	0.603	5.825	9.237
EMB12	27/02/2023	0.913	0.913	5.587	9.325
EMB13	27/02/2023	1.732	0.932	7.714	10.245
EMB14	27/02/2023	1.391	0.691	7.864	9.803
EMB15	27/02/2023	0.523	0.523	6.861	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – February 2023 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.75	32.7	25.9	248.1	0.11	161.20	6.12	-44.7
EMB14	6.34	33.2	21.8	171.1	0.09	150.35	6.23	47.3

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in March 2023.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@greencap.com.au

Groundwater Monitoring Event – February 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – February 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRA		Job No: J174436	
Project: GME		Gauged by: VB	
Location: EAST ALM, NT		Date: 27/2/23	

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1447	EMB13	-	1.732	-	10.245	
1517	EMB14	-	1.391	-	9.803	
1601	EMB7	-	0.603	-	9.237	
1606	EMB12	-	0.913	-	9.325	
1610	EMB15	-	0.523	-	9.314	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

PARTLY SUNNY/CLOUDY
WINDY

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client: ~~GAL GAR~~	Job No: J174436	**Well ID**
Project: GME	Sampled by: VB	~~MW~~ EMB13
Location: EAST ARM, NT	Date: 27/2/23	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	10.245	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	(low-flow)	4-well-volume	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	1.732	(m bTOC)	Screen (from - to), m	7.245 - 10.245				
Product thickness	–	(m)	Pump Depth (m bTOC)	–				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
OVERCAST & MODERATE WINDS

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond ~~uS/cm~~ mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* ~~NTUs~~ TDS mg/L	SAL PSU	T-UB NTU
1449	INT	2.208	32.3	3.64	274.0	-67.9	78.4	178.10	0.13	
1452	2	2.571	32.7	3.62	273.7	-33.8	47.8	176.80	0.13	
1455	4	3.176	32.7	3.73	252.4	-40.8	35.8	164.15	0.12	
1458	6	3.514	32.7	3.75	248.5	-45.7	31.1	161.20	0.12	
1501	8	3.817	32.7	3.75	247.0	-44.4	28.4	161.20	0.11	
1504	10	4.017	32.7	3.75	247.4	-45.1	26.1	161.20	0.11	
1507	12	4.343	32.7	3.75	248.1	-44.7	25.9	161.20	0.11	6.12

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
~~OVERCAST, MODERATE WIND~~
~~SAT~~ PURGED 12L, L-M TURB, PALE YELLOW, NO SHEEN / ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, **CrVI***		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates
Duplicate ID
Triplicate ID

Blanks
Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No:	J174436
Project:	GME	Sampled by:	VB
Location:	EAST ARM, NT	Date:	27/2/23

Well ID: EMB14

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	9.803 (m)		Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50 (mm)		Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other		WQM Make:	YSI			
Depth to product	— (m bTOC)		WL Meter:	interface	non-interface		
Depth to water:	1.391 (m bTOC)		Screen (from - to), m	6.803 - 9.803			
Product thickness	— (m)		Pump Depth (m bTOC)				

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

OVERCAST & MODERATE WINDS

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc TDS mg/L / SAL PSU / TURB NTU
1521	INT	1.627	32.8	6.38	153.2	43.7	20.1	~~0.09~~ 152.10 0.09
1524	2	1.994	33.1	6.31	157.8	48.1	17.8	155.40 0.09
1527	4	2.301	33.2	6.36	159.9	44.2	19.1	150.35 0.09
1530	6	2.667	33.2	6.36	163.3	46.3	21.4	150.35 0.09
1533	8	2.972	33.2	6.34	167.2	51.8	22.6	150.35 0.09
1536	10	3.115	33.2	6.34	169.5	49.6	20.9	150.35 0.09
1539	12	3.328	33.2	6.34	171.1	47.3	21.8	150.35 0.09 6.23

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

12 L PURGED, L-M TURB, NO SHEENS/ODOURS, PALE BROWN

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, **CrVI***		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

12 April 2023

WSP Australia Pty Limited
Level 5, 37 Woods Street
Darwin, 0800
wsp.com/en-au

Michael Rogers
Operations Manager
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – ANNUAL GROUNDWATER MONITORING EVENT (MARCH 2023)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken an annual groundwater monitoring at the Site in accordance with the Northern Territory (NT) Environment Protection Authority (EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A.

This report details the results of the March 2023 annual monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016.*

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of annual groundwater sampling from monitoring bores EMB7, EMB12, EMB13, EMB14 and EMB15.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Annual Monitoring Events

Previous annual monitoring events were conducted in March 2021 (by EcOz Environmental Consulting) and March 2022 (by Greencap). A comparison of analytical results above laboratory limits of reporting (LoRs) between the three annual monitoring events are presented in Table 3.

2.0 Groundwater Annual Monitoring Event – March 2023

The annual monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Laboratory analytical testing of samples collected from EMB7, EMB12, EMB13, EMB14 and EMB15, including:
  - Major cations and anions
  - Nutrients

- Heavy metals
- Hydrocarbon compounds
- Cyanide
- Glycols
- Polychlorinated Biphenyls (PCBs)
- Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

All groundwater monitoring bores were sampled using a four well-volume technique using a dedicated bailer in accordance with the methodology presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odours, sheens and any other anomalies. The groundwater had a light brown to brown colour and no odours or sheens were noted from any of the bores during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – March 2023 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	24/03/23	1.128	1.128	5.3	9.237
EMB12	24/03/23	1.181	1.181	5.397	9.325
EMB13	24/03/23	2.486	1.686	6.96	10.245
EMB14	24/03/23	2.457	1.757	6.798	9.803
EMB15	24/03/23	0.682	0.682	6.702	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – March 2023 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB7	6.04	32.7	53.4	210.6	0.10	938	9.91	114.1
EMB12	6.49	36.1	54.3	388.4	0.12	914	9.32	102.8
EMB13	4.03	34.8	21.4	266.7	0.12	962	9.41	101.3
EMB14	5.39	34.9	40.6	242.8	0.14	951	9.02	109.4
EMB15	4.14	37.1	75.2	219.1	0.83	941.9	9.67	193.6

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised below in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	*EMB12*	*EMB13*	*EMB14*	*EMB15*
Nutrients & Inorganics								
Total Phosphate (as P)	24/03/21	µg/L	10	<10	<10	<10	<10	<10
	25/03/22	µg/L		40	20	30	30	60
	24/03/23	µg/L		40	40	40	80	50
Total Nitrogen	24/03/21	µg/L	200	1,800	200	5,800	6,400	800
	25/03/22	µg/L		2,200	330	5,100	8,100	1,500
	24/03/23	µg/L		2,330	820	5,400	4,200	2,350
Kjeldahl Nitrogen Total	24/03/21	µg/L	200	1,200	<100	500	600	100
	25/03/22	µg/L		1,000	<200	400	2,300	200
	24/03/23	µg/L		1,500	700	1,500	1,000	1,500
Oxides of Nitrogen	24/03/21	µg/L	50	600	170	5,300	5,780	720
	25/03/22	µg/L		1,200	330	4,700	5,800	1,300
	24/03/22	µg/L		830	120	3,900	3,200	850
Ammonia (as N)	24/03/21	µg/L	10	1,320	30	40	30	30
	25/03/22	µg/L		1,000	100	80	60	70
	24/03/22	µg/L		1,000	<10	30	<10	<10

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	*EMB12*	*EMB13*	*EMB14*	*EMB15*
Anions								
Chloride	24/03/21	µg/L	1,000	43,000	119,000	68,000	23,000	442,000
	25/03/22	µg/L		42,000	9,200	41,000	46,000	380,000
	24/03/23	µg/L		61,000	87,000	50,000	6,300	440,000
Bicarbonate Alkalinity as $CaCO_3$	24/03/21	µg/L	20,000	3,000	14,000	<1,000	52,000	<1,000
	25/03/22	µg/L		150,000	98,000	<20,000	41,000	<20,000
	24/03/23	µg/L		<20,000	20,000	<20,000	32,000	<20,000
Total Alkalinity as $CaCO_3$	24/03/21	µg/L	20,000	3,000	14,000	<1,000	52,000	<1,000
	25/03/22	µg/L		150,000	98,000	<20,000	41,000	<20,000
	24/03/23	µg/L		<20,000	20,000	<20,000	32,000	<20,000
Cations								
Calcium	24/03/21	µg/L	500	2,000	11,000	1,000	29,000	6,000
	25/03/22	µg/L		8,800	8,300	2,000	17,000	12,000
	24/03/23	µg/L		1,400	10,000	800	17,000	4,000
Magnesium	24/03/21	µg/L	500	1,000	6,000	<1,000	2,000	26,000
	25/03/22	µg/L		900	1,000	700	1,500	21,000
	24/03/23	µg/L		700	3,700	600	900	2,100
Potassium	24/03/21	µg/L	500	2,000	4,000	<1,000	3,000	2,000
	25/03/22	µg/L		2,000	6,200	1,300	2,900	1,400
	24/03/23	µg/L		2,200	3,500	800	2,100	1,400
Sodium	24/03/21	µg/L	500	21,000	68,000	19,000	18,000	250,000
	25/03/22	µg/L		22,000	6,600	21,000	3,200	240,000
	24/03/23	µg/L		27,000	38,000	17,000	3,800	220,000
Heavy Metals (filtered)								
Arsenic	24/03/21	µg/L	1	<1	1	1	<1	2
	25/03/22	µg/L		<1	<1	2	<1	1
	24/03/23	µg/L		<1	<1	<1	<1	1
Barium	24/03/21	µg/L	1	107	364	59	321	98
	25/03/22	µg/L		182	255	188	357	122
	24/03/24	µg/L		95	199	41	288	39
Beryllium	24/03/21	µg/L	1	<1	<1	<1	<1	<1
	25/03/22	µg/L		<1	<1	<1	<1	<1
	24/03/24	µg/L		1	<1	<1	<1	<1
Boron	24/03/21	µg/L	50	<50	<50	<50	<50	<50
	25/03/22	µg/L		530	530	720	590	730
	24/03/23	µg/L		<50	<50	<50	<50	<50

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	*EMB12*	*EMB13*	*EMB14*	*EMB15*
Cadmium	24/03/21	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	0.1
	25/03/22	µg/L		<0.1	<0.1	<0.1	<0.1	0.1
	24/03/23	µg/L		0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	24/03/21	µg/L	1	3	3	<1	<1	8
	25/03/22	µg/L		3	<1	<1	<1	6
	24/03/23	µg/L		3	1	<1	<1	6
Copper	24/03/21	µg/L	1	3	3	<1	<1	8
	25/03/22	µg/L		1	<1	2	<1	11
	24/03/23	µg/L		<1	<1	<1	<1	13
Lead	24/03/21	µg/L	1	4	<1	5	<1	25
	25/03/22	µg/L		<1	<1	1	<1	2
	24/03/23	µg/L		2	<1	2	<1	3
Manganese	24/03/21	µg/L	1	389	1,600	48	20	2,430
	25/03/22	µg/L		311	1	27	1	2,000
	24/03/23	µg/L		385	690	30	<1	2,150
Nickel	24/03/21	µg/L	1	2	3	1	<1	6
	25/03/22	µg/L		1	3	1	1	5
	24/03/23	µg/L		2	<1	1	1	5
Zinc	24/03/21	µg/L	5	22	63	55	275	23
	25/03/22	µg/L		15	<5	13	420	31
	24/03/23	µg/L		21	<5	22	516	16
Total Recoverable Hydrocarbons								
$>C_{10}$-C_{16}	24/03/21	µg/L	50	<100	<100	<100	<100	<100
	25/03/22	µg/L		<100	<100	<100	<100	<100
	24/03/23	µg/L		50	<50	<50	<50	<50
$>C_{10}$-C_{16} (less naphthalene)	24/03/21	µg/L	50	<100	<100	<100	<100	<100
	25/03/22	µg/L		<100	<100	<100	<100	<100
	24/03/23	µg/L		50	<50	<50	<50	<50
$>C_{16}$-C_{34}	24/03/21	µg/L	100	<100	<100	<100	<100	<100
	25/03/22	µg/L		<100	<100	<100	<100	<100
	24/03/23	µg/L		100	<100	<100	100	<100
$>C_{10}$-C_{40}	24/03/21	µg/L	100	<100	<100	<100	<100	<100
	25/03/22	µg/L		<100	<100	<100	<100	<100
	24/03/23	µg/L		150	<100	<100	100	<100
PFAS								
Sum of PFAS	24/03/21	µg/L	0.1	96.6	1.7	22.7	3.65	0.19

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	*EMB12*	*EMB13*	*EMB14*	*EMB15*
(n=30)	25/03/22	µg/L		40.07	0.22	47.56	1.02	0.3
	24/03/23	µg/L		148.94	<0.1	99.46	1.13	0.29

The results for the March 2023 annual monitoring event are summarised as follows:

- Antimony, boron, chromium, mercury, selenium and vanadium (all filtered), hydroxide alkalinity as $CaCO_3$, carbonate alkalinity as $CaCO_3$, benzene, ethylbenzene, toluene, xylene, naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), total cyanides, glycols, phenols, polychlorinated biphenyls (PCBs) were all reported to be below the LoRs for all monitoring bores.
- Several nutrients and inorganics, anions and cations and one filtered heavy metal (barium) was reported above the LoRs in all monitoring bores.
- Ammonia (as N) was reported above LoRs in EMB7 and EMB13.
- Bicarbonate and total alkalinity as $CaCO_3$ were reported above LoRs in EMB12 and EMB14.
- Arsenic and copper were reported above LoRs in EMB15.
- Beryllium and cadmium were reported above LoRs in EMB7.
- Cobalt was reported above LoRs in EMB7, EMB12 and EMB15.
- Lead was reported above LoRs in EMB7, EMB13 and EMB15.
- Manganese was reported above LoRs in all monitoring bores with the exception of EMB14.
- Nickel and zinc were reported above LoRs in all monitoring bores with the exception of EMB12.
- TRH fractions – TRH >C_{10}-C_{16}, TRH >C_{10}-C_{16} less naphthalene were reported above LoRs in EMB7 and TRH >C_{16}-C_{34} was reported above LoRs in EMB7 and EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in all monitoring bores.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

Rinsate blank samples (RB01) was collected on 24 March 2023 and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the GME.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted an annual groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in March 2023. Physico-chemical groundwater parameters were measured in the field and samples were collected from all monitoring bores and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, boron, chromium, mercury, selenium and vanadium), hydroxide alkalinity as $CaCO_3$, carbonate alkalinity as $CaCO_3$, benzene, ethylbenzene, toluene, xylene, naphthalene, polycyclic aromatic hydrocarbons, total cyanides, glycols, phenols and polychlorinated biphenyls were all reported to be below the LoRs for all monitoring bores.

Several nutrients and inorganics, anions and cations and one filtered heavy metal (barium) were reported above the LoRs in all monitoring bores.

Filtered metals (arsenic, beryllium, cadmium, cobalt, copper, lead, manganese, nickel and zinc), ammonia (as N), bicarbonate and total alkalinity as $CaCO_3$ and total recoverable hydrocarbons were reported in some of the monitoring bores.

A range of Per- and Polyfluoroalkyl Substances (PFAS) compounds were detected in all monitoring bores.

The next annual groundwater monitoring event is scheduled to occur in March 2024.

Attachments

1 Statements of Limitation
2 Field Record Sheets
3 Results Summary Tables (including QA/QC)

Appendices

A Environmental Protection Licence 229-01
B Laboratory Certificates of Analysis

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
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E: Varun.Bhagwat@wsp.com.au

Groundwater Monitoring Event – March 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – March 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No:	J174436
Project: GME		Gauged by:	VB
Location: East Arm, NT		Date:	24/3/23

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0842	EMB13	-	2.486	-	10.245	
1129	EMB14	-	2.457	-	9.803	
1318	EMB7	-	1.128	-	9.237	
1432	EMB12	-	1.181	-	9.325	
1527	EMB15	-	0.682	-	9.314	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

HOT | SUNNY

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB7
Location:	East Arm, NT	Date: 24/3/22	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.237	(m)	Device:	micropurge	peristaltic	footvalve	(bailer)	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	(4-well-volume)	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	1.128	(m bTOC)	Screen (from - to), m	6.237 - 9.237				
Product thickness	–	(m)	Pump Depth (m bTOC)	–				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm / mS/cm)	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L / SAL PSU / Turb NTU
1320	10	1.317	27.9	5.87	189.1	108.9	51.7	938.05 0.10
1326	20	1.771	29.4	5.91	193.7	109.8	52.9	937.95 0.10
1333	30	2.006	31.2	5.99	197.9	109.2	53.3	937.80 0.10
1340	40	2.411	32.6	6.01	203.4	110.7	54.1	937.85 0.10
1345	50	2.763	32.8	6.05	208.8	111.2	53.9	937.80 0.10
1352	60	3.003	32.5	6.03	210.9	114.6	52.7	937.85 0.10
1355	65	3.391	32.7	6.04	210.6	114.1	53.4	937.85 0.10 9.91
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

USED BAILER BECAUSE PERISTALTIC NOT WORKING PROPERLY.
SAMPLED AFTER 65L PURGED, MED-H TURB, L.BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - metals*	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOLS	2	

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB12
Location:	East Arm, NT	Date: 24/3/23	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	9.325	(m)	Device:	micropurge	peristaltic	footvalve	(bailer)
Casing diameter:	50	(mm)	Method:	low-flow	(4-well-volume)	purged dry	
Casing type:	(PVC) / steel / other		WQM Make:	YSI			
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	1.181	(m bTOC)	Screen (from - to), m	6.325 – 9.325			
Product thickness	–	(m)	Pump Depth (m bTOC)				

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) / mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L; SAL PSU; Turb NTU
1434	10	~~1.~~ 2.031	34.3	6.37	399.1	100.4	58.7	912.85 0.12
1440	20	2.313	35.7	6.42	393.1	105.1	51.1	912.95 0.12
1447	30	2.709	36.4	6.44	391.7	110.1	54.8	913.55 0.12
1453	40	3.009	36.4	6.48	389.8	107.6	59.2	913.65 0.12
1500	50	3.421	36.3	6.53	386.1	101.3	60.3	913.70 0.12
1505	60	3.809	36.3	6.51	387.3	100.4	55.6	913.70 0.12
1508	65	4.010	36.1	6.49	388.4	102.8	54.3	913.70 0.12 9.32
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 65L PURGED
M-H TURB, BROWN, NO SHEENS/ODOURS

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - **metals***	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) NYLON	2	

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No: J174436	**Well ID**
Project: GME		Sampled by: VB	EMB13
Location: East Arm, NT		Date: 24/3/22	

WELL DETAILS			SAMPLING EQUIPMENT		
Well depth:	10.245	(m)	Device: micropurge / ~~peristaltic~~ / footvalve / (bailer)		*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method: ~~low-flow~~ / (4-well-volume) / purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI	
Depth to product	—	(m bTOC)	WL Meter: (interface) / non-interface		
Depth to water:	2.486	(m bTOC)	Screen (from - to), m	7.245 – 10.245	
Product thickness	—	(m)	Pump Depth (m bTOC)		

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

HOT / SUNNY

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L SAL PSU TURB NTU
1000	10	5.556	30.7	6.16	278.1	88.4	33.1	~~LOW TURB, CLEAR~~, NO SHEEN/ODOUR
1008	20	6.602	31.4	6.02	284.3	71.7	31.8	960.15 0.12
1015	30	7.581	32.8	5.92	279.6	69.2	28.6	961.55 0.12
1023	40	8.844	33.6	4.45	274.7	76.2	24.6	961.75 0.12
1031	50	9.017	34.7	4.21	270.2	81.9	25.4	961.75 0.12
1044	60	9.334	34.1	4.11	269.9	92.4	20.9	961.75 0.12
1050	70	9.618	34.6	4.06	264.5	97.5	21.7	961.75 0.12
1100	80	9.996	34.8	4.03	266.7	101.3	21.4	961.75 0.12 9.41
			SAMPLED ~~AFTER~~ ~~EOL~~					

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER EOL PURGED

M-H TURB, L. BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - **metals***	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOLS	2	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID QC01 1 x AMBER 2 x VIAL

Triplicate ID QC01A

Blanks

Rinsate ID

RB01 – 1 AMB / 2 VIAL

TB01 – 2 VIAL

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

J174436

Client: ~~ORA~~ ~~ORICA~~ GRR	Job No: ~~J168829~~ ~~J174315~~	**Well ID**
Project: ~~Diesel Spill~~ GME	Sampled by: ~~VB~~ VB	EMB14
Location: ~~ORA Berrimah~~ ~~HIDDEN VALLEY, NT~~ EAST ARM, NT	Date: 24/3/22	

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.803	(m)	Device:	micropurge	peristaltic	footvalve	(bailer)	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	(4-well-volume)	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	–	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	2.457	(m bTOC)	Screen (from - to), m	6.803 – 9.803				
Product thickness	–	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY / SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* SAL PSU	TDS mg/L	TURB NTU
1132	10	3.003	36.6	6.38	277.4	149.1	51.1	0.14	951.10	
1140	28	3.517	37.1	6.14	281.6	138.3	49.9	0.14	951.10	
1150	30	4.011	36.3	5.99	266.2	124.6	56.3	0.14	951.10	
1200	40	4.663	35.4	5.47	251.5	112.4	59.7	0.14	951.10	
1210	50	5.134	34.3	5.51	247.3	106.9	48.2	0.14	951.10	
1220	60	~~34.9~~ 5.781	34.9	5.39	242.8	109.4	40.6	0.14	951.10	9.02
				SAMPLED						

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

M-H TURBIDITY, RED/BROWN, NO SHEEN/ODOUR

SAMPLED AFTER 60L PURGED

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - **metals***	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOLS	2	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

J174436

Client: ~~ORA~~ ~~OLICA~~ GAR	Job No: ~~J168829~~ ~~J174315~~	**Well ID**	
Project: ~~Diesel Spill~~ GME	Sampled by: VB	EMB15	
Location: ~~ORA Berrimah~~ ~~HIDDEN VALLEY, NT~~ EAST ARM, NT	Date: 24/3/23		

WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	9.314	(m)	Device:	micropurge	peristaltic	footvalve	(bailer)	*Other Sampling Equipment / Method
Casing diameter:	50	(mm)	Method:	low-flow	(4-well-volume)	purged dry		
Casing type:	(PVC) / steel / other		WQM Make:	YSI				
Depth to product	—	(m bTOC)	WL Meter:	(interface)	non-interface			
Depth to water:	0.682	(m bTOC)	Screen (from - to), m	6.314 - 9.314				
Product thickness	—	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY / SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L	SAL PSU	TURB NTU
1530	10	1.012	36.8	5.19	266.3	261.3	99.1	961.8	0.81	
1537	20	1.623	37.6	5.08	271.4	255.7	104.3	955.7	0.84	
1541	30	2.004	38.1	5.21	251.6	251.3	84.1	959.1	0.91	
1550	40	2.314	37.7	4.79	223.2	233.9	79.3	953.4	0.87	
1556	50	2.621	37.9	4.32	216.7	212.1	69.4	952.3	0.84	
1602	60	2.884	36.8	4.09	227.1	199.4	70.7	947.2	0.82	
1610	70	3.004	37.1	4.14	219.1	193.6	75.2	941.9	0.83	9.67
				SAMPLED						

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 70L PURGED

M-H TURB, L.BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	2	HCl
Plastic (60mL) - metals*	1	HNO3
Plastic (60mL) - cyanide, CrVI*	1	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) GLYCOLS	2	

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Other Comments

Groundwater Monitoring Event – March 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

			SWL	Field Parameters								Metals																
			Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (Filtered)	Beryllium (Filtered)	Boron (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)
			mgbl	°C	pH unit	(µS/cm)	PSU	mV %	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL												1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5
Monitoring Round	Field ID	Sample Date																										
Mar-21	EMB7	24/03/2021	1.2	30.2	4.67	182.6	-	202.9	41.7	119	-	<1	<1	107	<1	<50	<0.1	<1	3	17	4	389	<0.1	2	<10	<10	22
	EMB12		1.23	33.2	5.46	480.3	-	119.1	74.6	312	-	<1	1	364	<1	<50	<0.1	<1	3	2	<1	1600	<0.1	3	<10	<10	63
	EMB13		1.61	31.5	3.78	246.8	-	222.6	43.9	160	-	<1	1	0.059	<1	50	<0.1	<1	<1	7	5	48	<0.1	1	<10	<10	55
	EMB14		1.53	32.2	6.48	263.6	-	128.6	85.3	171	-	<1	<1	0.321	<1	<50	<0.1	<1	<1	<1	<1	2	<0.1	<1	<10	<10	275
	EMB15		0.73	33.7	4.21	1446	-	216.7	55.9	940	-	<1	2	98	<1	<50	<0.1	<1	8	25	13	2430	<0.1	6	<10	<10	23
Mar-22	EMB7	25/03/2022	1.298	32.9	5.93	8.9	0	108.3	45.6	5.85	4.73	<1	<1	182	<1	530	<0.1	<1	3	1	<1	311	<0.1	1	<10	<10	15
	EMB12		1.242	36.5	6.44	8.2	0	94.2	48.1	5.26	6.01	<1	<1	255	<1	550	<0.1	<1	<1	<1	<1	1	<0.1	3	<10	<10	<5
	EMB13		1.889	22.4	4	246.1	0.11	82.5	26.8	159.96	5.18	<1	2	188	<1	720	<0.1	<1	<1	2	1	27	<0.1	1	<10	<10	13
	EMB14		1.965	35.5	5.45	6.9	0	118.8	35.6	4.55	5.73	<1	<1	357	<1	580	<0.1	<1	<1	<1	<1	1	<0.1	1	<10	<10	420
	EMB15		0.794	35.5	4.29	201.3	0.71	172.8	64.7	932.3	9.33	<1	1	122	<1	730	0.1	<1	6	11	2	2000	<0.1	5	<10	<10	31
Mar-23	EMB7	24/03/2023	1.128	32.7	6.04	210.6	0.1	114.1	53.4	937.85	9.91	<1	<1	95	1	<50	0.1	<1	3	<1	2	385	<0.1	2	<10	<10	21
	EMB12		1.181	36.1	6.49	388.4	0.12	102.8	54.3	913.7	9.32	<1	<1	199	<1	<50	<0.1	<1	1	<1	<1	690	<0.1	<1	<10	<10	<5
	EMB13		2.486	34.8	4.03	266.7	0.12	101.3	21.4	961.75	9.41	<1	<1	41	<1	<50	<0.1	<1	<1	<1	2	30	<0.1	1	<10	<10	22
	EMB14		2.457	34.9	5.39	242.8	0.14	109.4	40.6	951.1	9.02	<1	<1	288	<1	<50	<0.1	<1	<1	<1	<1	<1	<0.1	1	<10	<10	516
	EMB15		0.682	37.1	4.14	219.1	0.83	193.6	75.2	941.9	9.67	<1	1	39	<1	<50	<0.1	<1	6	13	3	2150	<0.1	5	<10	<10	16

			Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions					TRH - NEPM 2013 Fractions							BTEX					
			Ammonia as N	Nitrite + Nitrate (oxides of nitrogen) (as N)	Nitrogen (Total)	Total Kjeldahl Nitrogen	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less Naphthalene (F2)	C16-C34	C34-C40	C10 - C40 (Sum of total)	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			10	50	200	200	10	5	1000	5000	10000	20000	20000	20000	500	500	500	500	20	50	100	100	100	20	20	50	50	100	100	100	1	1	1	2	1	2
Monitoring Round	Field ID	Sample Date																																		
Mar-21	EMB7	24/03/2021	1320	600	1800	1200	<10	<4	43000	<1000	<1000	3000	<1000	3000	2000	1000	2000	21000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB12		30	170	200	<100	<10	<4	119000	7000	<1000	14000	<1000	14000	11000	6000	4000	68000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB13		40	5300	5800	500	<10	<4	68000	<1000	<1000	<1000	<1000	<1000	1000	<1000	<1000	19000	-	-	-	-	-	<20	<20	<50	<50	100	<100	100	<1	<1	<1	<2	<1	<2
	EMB14		30	5780	6400	600	<10	<4	23000	14000	<1000	52000	<1000	52000	29000	2000	3000	18000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB15		30	720	800	100	<10	<4	442000	63000	<1000	<1000	<1000	<1000	6000	26000	2000	250000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
Mar-22	EMB7	25/03/2022	1000	1200	2200	1000	40	<5	42000	30000	<10000	150000	<20000	15000	8800	900	2000	22000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB12		100	330	330	<200	20	<5	9200	6100	<10000	98000	<20000	98000	8300	1000	6200	6600	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB13		80	4700	5100	400	30	<5	41000	1600	<10000	<20000	<20000	<20000	2000	700	1300	21000	<20	<50	<100	<100	<100	<20	<20	<50	<50	100	<100	100	<1	<1	<1	<2	<1	<2
	EMB14		60	5800	8100	2300	30	<5	46000	2300	<10000	41000	<20000	41000	17000	1500	2900	3200	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB15		70	1300	1500	200	60	<5	380000	6100	<10000	<20000	<20000	<20000	12000	21000	1400	240000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
Mar-23	EMB7	24/03/2023	1000	830	2330	1500	40	<5	61000	<5000	<10000	<20000	<20000	<20000	1400	700	2200	27000	<20	<50	<100	<100	<100	<20	<20	50	50	100	<100	150	<1	<1	<1	<2	<1	<2
	EMB12		<10	120	820	700	40	<5	87000	5600	<10000	20000	<20000	20000	10000	3700	3500	38000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB13		30	3900	5400	1500	40	<5	50000	<5000	<10000	<20000	<20000	<20000	800	600	800	17000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2
	EMB14		<10	3200	4200	1000	80	<5	6300	18000	<10000	32000	<20000	32000	17000	900	2100	3800	<20	<50	<100	<100	<100	<20	<20	<50	<50	100	<100	100	<1	<1	<1	<2	<1	<2
	EMB15		<10	850	2350	1500	50	<5	440000	74000	<10000	<20000	<20000	<20000	4000	21000	1400	220000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2

			PAH																																Phenolics			Halogenated Phenols							Polychlorinated Biphenyls								Herbicides
			2,4-dimethylphenol	2,4-dinitrophenol	2-methylphenol	2-nitrophenol	3&4-methylphenol	4,6-Dinitro-2-methylphenol	4-chloro-3-methylphenol	4-nitrophenol	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzo(b+j)fluoranthene	Chrysene	Cresol Total	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Phenol	Pyrene	4,6-Dinitro-o-cyclohexyl phenol	Phenols (Total Halogenated)	Phenols (Total Non Halogenated)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol	Tetrachlorophenols	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Dinoseb
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			3	3	1	10	6	30	1	30	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	3	1	100	10	100	10	10	3	3	3	10	30	5	5	5	5	5	5	5	5	100
Monitoring Round	Field ID	Sample Date																																															
Mar-21	EMB7	24/03/2021	<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	-	<1	-	<1	<1	<1	<1	<1	<2	-	-	-	-	-	-	-	-	<1	-
	EMB12		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	-	<1	-	<1	<1	<1	<1	<1	<2	-	-	-	-	-	-	-	-	<1	-
	EMB13		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	-	<1	-	<1	<1	<1	<1	<1	<2	-	-	-	-	-	-	-	-	<1	-
	EMB14		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	-	<1	-	<1	<1	<1	<1	<1	<2	-	-	-	-	-	-	-	-	<1	-
	EMB15		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	-	<1	-	<1	<1	<1	<1	<1	<2	-	-	-	-	-	-	-	-	<1	-
Mar-22	EMB7	25/03/2022	<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB12		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB13		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB14		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB15		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
Mar-23	EMB7	24/03/2023	<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB12		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB13		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB14		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100
	EMB15		<3	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<3	<1	<100	<10	<100	<10	<10	<3	<3	<3	<10	<30	<5	<5	<5	<5	<5	<5	<5	<5	<100

			PFAS																																				Glycols						
			(8:2 FTSA)	(6:2 FTSA)	(10:2 FTSA)	(4:2 FTSA)	(N-EtFOSE)	(N-MeFOSE)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl perfluorooctanesulfonamidoacetic acid	Sum of PFASs (n=30)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of WA DWER PFAS (n=10)*	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid	Perfluorooctanoic acid (PFOA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorobutanoic acid (PFBA)	Perfluorodecanesulfonic acid (PFDS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluorononanesulfonic acid (PFNS)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (FOSA)	Perfluorooctanesulfonic acid (PFOS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluoropentanoic acid (PFPeA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Sum (PFHxS + PFOS)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	2-butoxyethanol	2-Ethoxyethanol acetate	Diethylene glycol	Diethylene glycol, monobutyl ether	Ethylene glycol	Propylene glycol	Triethylene Glycol
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			0.01	0.05	0.01	0.01	0.05	0.05	0.05	0.05	0.1	0.01	0.05	0.05	0.05	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	2000	2000	2000	2000	2000	2000	2000
Monitoring Round	Field ID	Sample Date																																											
Mar-21	EMB7	24/03/2021	-	68.1	<0.05	0.4	<0.05	<0.05	<0.05	<0.05	96.6	<0.01	96.2	<0.05	<0.05	4.44	<0.02	1.9	<0.02	<0.02	<0.02	<0.02	2.07	<0.02	13.6	-	0.07	<0.02	<0.01	<0.02	5.82	<0.02	<0.05	<0.02	<0.02	<0.01	-	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB12		-	0.61	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.7	<0.01	1.7	<0.05	<0.05	0.06	<0.02	0.1	<0.02	<0.02	<0.02	<0.02	0.22	<0.02	0.32	-	<0.02	<0.02	<0.01	<0.02	0.39	<0.02	<0.05	<0.02	<0.02	<0.01	-	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB13		-	14.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	22.7	<0.01	22.7	<0.05	<0.05	0.62	<0.02	0.5	<0.02	<0.02	<0.02	<0.02	1.02	<0.02	2.59	-	0.02	<0.02	<0.01	<0.02	2.38	<0.02	<0.05	<0.02	<0.02	<0.01	-	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB14		-	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	3.84	<0.01	3.65	<0.05	<0.05	0.24	<0.02	0.4	<0.02	<0.02	<0.02	<0.02	0.85	<0.02	0.86	-	0.19	<0.02	<0.01	<0.02	1.23	<0.02	<0.05	<0.02	<0.02	<0.01	-	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB15		-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.19	<0.01	0.19	<0.05	<0.05	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.05	-	<0.02	<0.02	<0.01	<0.02	0.08	<0.02	<0.05	<0.02	<0.02	<0.01	-	<2000	<2000	<2000	<2000	<2000	<2000	<2000
Mar-22	EMB7	25/03/2022	0.14	16	<0.01	0.4	<0.05	<0.05	<0.05	<0.05	40.07	3	39.64	<0.05	<0.05	3	<0.01	1.9	<0.01	<0.01	<0.01	<0.01	1.3	<0.01	12	<0.01	0.03	<0.05	<0.01	<0.01	5.3	<0.01	<0.01	<0.01	<0.01	<0.01	3	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB12		<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	0.22	<0.01	0.22	<0.05	<0.05	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.04	<0.01	<0.01	<0.05	<0.01	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB13		0.7	16	<0.01	0.1	<0.05	<0.05	<0.05	<0.05	47.56	2.2	47.4	<0.05	<0.05	2.2	<0.01	2.1	<0.01	<0.01	<0.01	<0.01	3.4	<0.01	11	<0.01	0.06	<0.05	<0.01	<0.01	12	<0.01	<0.01	<0.01	<0.01	<0.01	2.2	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB14		<0.01	<0.5	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	1.02	0.08	0.94	<0.05	<0.05	0.08	<0.01	0.18	<0.01	<0.01	<0.01	<0.01	0.21	<0.01	0.19	<0.01	0.08	<0.05	<0.01	<0.01	0.28	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB15		<0.01	<0.5	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	0.3	<0.01	0.3	<0.05	<0.05	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	0.05	<0.01	0.06	<0.01	<0.01	<0.05	<0.01	<0.01	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<2000	<2000	<2000	<2000	<2000	<2000	<2000
Mar-23	EMB7	24/03/2023	0.42	120	<0.01	0.39	<0.05	<0.05	<0.05	<0.05	148.9	5.42	148.5	<0.05	<0.05	5.4	<0.01	2.2	<0.01	<0.01	<0.01	<0.01	2.1	0.01	12	<0.01	0.08	<0.05	<0.01	<0.01	12	<0.01	<0.01	<0.01	<0.01	<0.01	2.4	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB12		<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.1	<0.01	0.09	<0.05	<0.05	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.03	<0.01	0.09	<0.05	<0.01	<0.01	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB13		1.6	66	<0.01	0.08	<0.05	<0.05	<0.05	<0.05	99.46	2.4	99.3	<0.05	<0.05	2.4	<0.01	2.2	<0.01	<0.01	<0.01	<0.01	4.1	<0.01	11	<0.01	0.1	<0.05	0.02	<0.01	6.3	<0.01	<0.01	<0.01	<0.01	0.03	5.43	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB14		0.01	0.13	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	1.13	0.08	1.04	<0.05	<0.05	0.08	<0.01	0.1	<0.01	<0.01	<0.01	<0.01	0.23	<0.01	0.2	<0.01	<0.01	<0.05	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<2000	<2000	<2000	<2000	<2000	<2000	<2000
	EMB15		<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	0.29	0.02	0.29	<0.05	<0.05	0.02	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	0.07	<0.01	0.08	<0.01	<0.01	<0.05	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<2000	<2000	<2000	<2000	<2000	<2000	<2000

GREENCAP

Groundwater Monitoring
Results Percentage Duplicate Table
March 2023

J174436

			SDG Field ID Sampled Date/Time	3-Apr-23 EMB13 24/03/2022	3-Apr-23 QC01 24/03/2022	RPD	3-Apr-23 EMB13 24/03/2022	ALSE-Sydney 4-Apr-23 QC01A 24/03/2022	RPD
Chem_Group	**ChemName**	**Units**	**EQL**						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6	<6.0	<6.0	0	<6.0		
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benz(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a) pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<1.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

			SDG	3-Apr-23	3-Apr-23
			Field ID	RB01	TB01
			Sampled_Date/Time	24/03/2023	24/03/2023
			Sample Type	Rinsate	Trip_B
Chem_Group	**ChemName**	**Units**	**EQL**		
BTEX	Benzene	µg/l	1	<1	<1
	Ethylbenzene	µg/l	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	C6 - C9	µg/L	20	<20	
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	
	C10 - C14	µg/l	50	<50	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/l	50	<100	
	C10 - C40 (Sum of total)	µg/l	100	<100	
	C6-C10	mg/l	0.02	<0.02	

Groundwater Monitoring Event – March 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01

ntepa Northern Territory Environment Protection Authority

ENVIRONMENT PROTECTION LICENCE

(Pursuant to section 34 of the *Waste Management and Pollution Control Act*)

Licensee	Smorgon Fuels Pty Ltd
Licence Number	**EPL229 - 01**
Registered Business Address	Smorgon Fuels Pty Ltd 644 Chapel Street South Yarra VIC 3141
ACN	094 541 723
ABN	84 094 541 723
Premises Address	Section 05783 Hundred of Bagot plan(s) S2005/171A 800 BERRIMAH RD, EAST ARM
Anniversary Date:	29 June
Commencement Date:	29/06/2020
Expiry Date:	28/06/2022
Scheduled Activity	Collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis, other than in or for the purpose of a sewage treatment plant. Operating **premises**, other than a sewage treatment plant, associated with collecting, transporting, storing, re-cycling, treating or disposing of a **listed waste** (as per Table 1) on a commercial or fee for service basis.
Description	Operation of a liquid waste treatment facility capable of treating, storing and recycling a variety of industrial liquid waste including the treatment of waste water and the recycling of ethylene glycol for the maritime, mining and oil and gas industries in the Darwin region.

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Chromium compounds that are hexavalent or trivalent	✗	✗	✓	✓	✗	✗
Cobalt compounds	✗	✗	✓	✓	✗	✗
Containers that are contaminated with residues of a listed waste	✗	✗	✓	✓	✗	✗
Copper compounds	✗	✗	✓	✓	✗	✗
Cyanides (inorganic)	✗	✗	✓	✓	✗	✗
Encapsulated, chemically fixed, solidified or polymerised wastes	✗	✗	✓	✓	✗	✗
Ethers	✗	✗	✓	✗	✗	✗
Filter cake	✗	✗	✓	✗	✗	✗
Fire debris and fire washwaters	✗	✗	✓	✓	✗	✗
Fly ash	✗	✗	✓	✓	✗	✗
Halogenated organic solvents	✗	✗	✓	✗	✗	✗
Highly odorous organic chemicals (including mercaptans and acrylates)	✗	✗	✓	✗	✗	✗
Inorganic fluorine compounds excluding calcium fluoride	✗	✗	✓	✓	✗	✗
Inorganic sulfides	✗	✗	✓	✓	✗	✗
Isocyanate compounds	✗	✗	✓	✗	✗	✗
Lead, lead compounds	✗	✗	✓	✓	✗	✗
Mercury, mercury compounds	✗	✗	✓	✓	✗	✗
Nickel compounds	✗	✗	✓	✓	✗	✗
Non-toxic salts	✗	✗	✓	✓	✗	✗
Organic phosphorus compounds	✗	✗	✓	✗	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Organic solvents excluding halogenated solvents	✗	✗	✓	✓	✓	✗
Organohalogen compounds that are not otherwise specified in this Schedule	✗	✗	✓	✗	✗	✗
Percholates	✗	✗	✓	✗	✗	✗
Phenols, phenol compounds including chlorophenols	✗	✗	✓	✗	✗	✗
Phosphorus compounds other than mineral phosphates	✗	✗	✓	✓	✗	✗
Residue from industrial waste treatment or disposal operations	✗	✗	✓	✓	✗	✗
Selenium, selenium compounds	✗	✗	✓	✓	✗	✗
Soils contaminated with a listed waste	✗	✗	✓	✗	✗	✗
Surface active agents (surfactants) that contain principally organic constituents and that may contain metals and inorganic materials	✗	✗	✓	✓	✗	✗
Vanadium compounds	✗	✗	✓	✓	✗	✗
Waste chemical substances arising from research and development or teaching activities, including those substances which are not identified and/or are new and the effects of which on human health and/or the environment are not known	✗	✗	✓	✓	✗	✗
Wastes containing peroxides other than hydrogen peroxide	✗	✗	✓	✓	✗	✗
Waste containing cyanides from heat treatment and tempering operations	✗	✗	✓	✗	✗	✗
Waste from the production, formulation and use of biocides and phytopharmaceuticals	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of organic solvents	✗	✗	✓	✓	✓	✗
Waste from the production, formulation and use of photographic chemicals and processing materials	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	✗	✗	✓	✓	✗	✗
Waste from the production and preparation of pharmaceutical products	✗	✗	✓	✓	✗	✗

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste mineral oils unfit for their original intended use	✗	✗	✓	✓	✓	✗
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✓	✓	✓	✗
Waste pharmaceuticals, waste drugs and waste medicines	✗	✗	✓	✗	✗	✗
Waste resulting from surface treatment of metals and plastics	✗	✗	✓	✓	✗	✗
Waste tarry residues arising from refining, distillation and any pryolytic treatment	✗	✗	✓	✗	✗	✗
Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs), polychlorinated nalthalenes (PCNs), polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBS)	✗	✗	✓	✗	✗	✗
Zinc compounds	✗	✗	✓	✓	✗	✗
Acidic solutions or acids in solid form	✗	✗	✓	✓	✓	✗
Antimony, antimony compounds	✗	✗	✓	✓	✗	✗
Arsenic, arsenic compounds	✗	✗	✓	✓	✗	✗
Barium compounds other than barium sulphate	✗	✗	✓	✓	✗	✗
Basic solutions or bases in solid form	✗	✗	✓	✓	✓	✗
Beryllium, beryllium compounds	✗	✗	✓	✓	✗	✗
Boron compounds	✗	✗	✓	✓	✗	✗
Cadmium, cadmium compounds	✗	✗	✓	✓	✗	✗
Chlorates	✗	✗	✓	✓	✗	✗

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 229 - 01

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ATTACHMENTS

1 Attachment A - Surface Water Monitoring
2 Attachment B - Groundwater Monitoring
3 Attachment C - Stack Emission Monitoring

INFORMATION ABOUT THIS LICENCE

- This licence does not in any way relieve the licence holder from its obligations to comply with the *Waste Management and Pollution Control Act* (WMPC Act), including the general environmental duty in section 12 of the WMPC Act and the duty to notify of incidents causing or threating to cause pollution under section 14 of the WMPC Act.

Duration of a licence (section 40, 43 and 45 of the WMPC Act)

- A licence will remain in force until its expiry date or until it is surrendered by the licensee or is suspended or cancelled in accordance with the WMPC Act.
- The licensee must notify the Northern Territory Environment Protection Authority (NT EPA) within 14 days after ceasing to conduct the activity.
- The licensee may, with the approval of the NT EPA, surrender the licence to the NT EPA.

Amendment or Revocation of a licence (section 37 of the WMPC Act)

- The licensee may apply to amend or revoke a condition of this licence.
- A fee applies and the application must be made using the designated form via NT EPA Online.
- The NT EPA may also amend or revoke a condition of this licence as set out in section 38 of the WMPC Act.

Transfer of a licence (section 46 of the WMPC Act)

- The licensee can apply to transfer their licence to another person.

Renewal of a licence (section 40 of the WMPC Act and section 3 of the Regulations)

- The licensee may apply for the renewal of their licence not earlier than 90 days, and not later than 30 days, before their licence expires.
- A fee applies and the application must be made via NT EPA Online.

Public Register

- A copy of environment protection licences and any plans for environmental management, reports, submissions or documents required as a condition of an environment protection licence, will be placed on a register in accordance with section 9 of the WMPC Act.
- A copy of the Annual Return will be placed on the register.
- The NT EPA makes this register freely available from the NT EPA website.

Environment Protection Objectives (Part 4 of the WMPC Act), and Water Quality Standards (section 73 of the *Water Act*)

- An Environment Protection Objective (EPO) is a statutory instrument to establish principles on which:
  a. environmental quality is to be maintained, enhanced, managed or protected;
  b. pollution, or environmental harm resulting from pollution, is to be assessed, prevented, reduced, controlled, rectified or cleaned up; and
  c. effective waste management is to be implemented or evaluated.
- In accordance with section 18 of the WMPC Act a beneficial use, quality standard, criteria or objective declared under section 73 of the *Water Act* and in force is an environment protection objective for the purposes of the WMPC Act.

- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
    - Declaration of Beneficial Uses and Objectives Darwin Harbour Region - surface water

Environmental Interests

- This section highlights sensitivity of the surrounding land use and environment associated with the location of the approved activity.
- Sites of Conservation Significance (SOCS) - Darwin Harbour Region. SOCS number 6
- Ramsar Wetland - none

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 39 of the WMPC Act, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In determining whether the licensee has committed an offence, the licensee may be liable for the conduct of its directors, employees or agents.
- The licensee should ensure that each of its directors, employees, contractors or agents are aware of, and comply with, this licence.
- In this licence, unless the contrary intention appears, words that are defined in the WMPC Act are intended to have the meaning given to them in that Act.

LICENCE CONDITIONS

GENERAL

1 The licensee must ensure the contact details recorded in NT EPA Online for this licence are correct at all times.

2 The licensee must at all times have a 24 hour emergency contact.

3 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 50 business days of the anniversary of the commencement date of this licence, for each year or part of a year that this licence is in force.

4 The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:

4.1 environment protection licence number issued under the WMPC Act; and

4.2 24 hour emergency contact details.

5 The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.

6 The licensee must ensure, at all times, that the activity is covered by a policy of insurance or other form of indemnity that will cover the likely costs or preventing, minimising or making good environmental damage that may result from the activity.

7 The licensee must provide to the NT EPA, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the NT EPA.

8 All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by uploading the document via NT EPA Online (or by emailing waste@nt.gov.au).

9 The licensee must maintain and implement the documents listed in Table 2.

Table 2 - Documents relating to this licence

Document Reference	Document Name
N/A	Environmental Management Plan - May 2020
N/A	Emergency Management Plan - May 2020
WI08-04-01	Bulk Truck Receival
WI08-04-02	Pre-acceptance Sampling
WI08-04-06	Bulk Wastewater Unloading
WI08-04-09	Packaged Waste Receival

10 Within 10 business days of any amendment being made to a document listed in Table 2 the licensee must provide the amended document to the NT EPA, along with:

10.1 a tabulated summary of the amendment(s) with document references;

10.2 reasons for the amendment(s); and

10.3 an assessment of environmental risk associated with the amendment(s).

11 The NT EPA may require the licensee to revise or amend and resubmit any amended document. Where the NT EPA requires a document to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

12 The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.

13 The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:

13.1 the person to whom the complaint was made;

13.2 the person responsible for managing the complaint;

13.3 the date and time the complaint was reported;

13.4 the date and time of the event(s) that led to the complaint;

13.5 the contact details of the complainant if known, or where no details are provided a note to that effect;

13.6 the nature of the complaint;

13.7 the nature of event(s) giving rise to the complaint;

13.8 prevailing weather conditions at the time (where relevant to the complaint)

13.9 the action taken in relation to the complaint, including any follow-up contact with the complainant; and

13.10 if no action was taken, why no action was taken.

14 The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

15 Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the NT EPA prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this licensee, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

16 The licensee must, without limiting any other condition of this licence, in conducting the licenced activity, do all things reasonable and practicable to ensure the licenced activity does not adversely affect the relevant Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:

- *Darwin Harbour Region - surface water - aquaculture, environment, cultural, rural stock and domestic*

17 The licensee must not collect, transport, store, recycle, treat or dispose of listed waste other than the listed waste specified in Table 1.

18 The licensee must ensure any plant and equipment used by the licensee in conducting the activity:

18.1 is reasonably fit for the purpose and use to which it is put;

18.2 is maintained;

18.3 is operated by a person trained to use the plant and equipment; and

18.4 is operated by, or operated by a person accompanied by, a person trained to handle, store or dispose of listed waste in connection with the activity.

19 The licensee must ensure that wastewater generated from washing plant and equipment associated with the activity does not cause pollution.

20 The licensee must segregate waste received at the premises in clearly designated areas for recycling, re-use or disposal.

21 The licensee must ensure that all materials that are likely to cause environmental harm are handled and stored in areas with a containment system in accordance with the relevant Australian Standard. Where no relevant Australian Standard exists, the containment system must be sized to contain 110% of the volume of the largest container within the area.

22 No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved in writing by the NT EPA.

23 The licensee must ensure that all listed waste being transported to and from the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.

24 The licensee must ensure that all listed waste is delivered to a premises licenced under section 30 of the WMPC Act to receive that listed waste.

25 The licensee must comply with the National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure.

DISCHARGES AND EMISSIONS

26 The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water which discharge has not been specifically authorised by another condition of this licence).

27 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.

28 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.

Discharges to water

29 This licence does not authorise the discharge of waste water resulting from the licenced activity through the storm water drain discharge point WMP1 identified in Attachment A.

30 The licensee must ensure that water discharged through the storm water drain at WMP1 identified in Attachment A, does not exceed the trigger values specified in Attachment A.

31 The licensee must ensure that the water discharged through the storm water drain at WMP1 identified in Attachment A does not:

31.1 consist of water from any other source than stormwater. Where stormwater has collected within bunded areas, then water quality analysis must confirm the stormwater pH and dissolved oxygen values are within the ranges specifiied in Attachment A and does not contain the nutrients, metals and metalloids, hydrocarbons, organic alcohols and other contaminants listed in Attachment A;

31.2 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;

31.3 cause or generate odours which would adversely affect the use of surrounding waters;

31.4 cause algal blooms in the receiving water;

31.5 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;

31.6 cause mortality of fish or other aquatic organisms; or

31.7 cause adverse impacts on plants.

Emissions to air

32 The licensee must ensure that the emissions from all emission events do not exceed the trigger values specified in Attachment C.

33 The licensee must install, operate and maintain pollution control equipment to minimise contaminants or waste in emissions to air.

34 The activity must not cause or release, beyond the boundary of the premises:

34.1 visible steam;

34.2 smoke;

34.3 offensive odour;

34.4 dust or particulates; or

34.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.

35 The licensee must comply with the National Environment Protection (Air Toxics) Measure.

Environmental Audit

36 The licensee must undertake, annually, and as prescribed by the conditions of this licence, an environmental audit by a qualified person to evaluate the:

36.1 extent to which compliance has been acheived with this licence; and

36.2 ability of management systems to manage waste and prevent environmental harm resulting from pollution.

37 The licensee must submit the proposed scope for the environmental audit no later than 20 business days prior to the proposed commencement date of the environmental audit (which must be specified when the proposed scope is submitted), to the NT EPA for review and approval.

38 The NT EPA may require the licensee to revise or amend and resubmit any proposed scope for an environmental audit. Where the NT EPA requires the environmental audit scope to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

39 The licensee must ensure that each environmental audit:

39.1 is not commenced until written approval of the environmental audit scope is received from the NT EPA; and

39.2 is undertaken in accordance with the approved scope.

40 The licensee must ensure that, for each environmental audit undertaken by the licensee:

40.1 a written report is prepared and signed by the qualified person who conducted the audit;

40.2 the written report is completed within 2 calendar months of the licensee's receipt of the NT EPA's approval of the environmental audit scope; and

40.3 the written report is provided in full to the NT EPA within 5 business days of being signed by the qualified person.

MONITORING

41 The licensee must conduct surface water monitoring in accordance with Attachment A

42 The licensee must conduct ground water monitoring in accordance with Attachment B.

43 The licensee must conduct Stack Emission Monitoring in accordance with Attachment C.

44 The licensee must, prior to the inital wet season release of storm water from the storm water collection pit as identified in Attachment A, ensure that the quality of the water is within the trigger values specified in Attachment A.

45 The licensee must conduct surface water monitoring for parameters listed in Attachment A in any bunded area where rainfall has collected and the licensee is considering transfer to the stormwater system.

46 The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.

47 The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).

48 The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.

49 The licensee must ensure any samples collected in accordance with the Attachment A, Attachment B and Attachment C or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.

50 The licensee must ensure that, for each sample collected in accordance with Attachment A, Attachment B and Attachment C or the activity the following information must be recorded and retained:

50.1 the date on which the sample was collected;

50.2 the time at which the sample was collected;

50.3 the location at which the sample was collected;

50.4 the name of the person who collected the sample;

50.5 the chain of custody forms relating to the sample;

50.6 the field measurements (if any) and analytical results (if any) relating to the sample; and

50.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

51 The licensee must keep records of all transfers of stormwater from bunded areas to the stormwater system including:

51.1 results of water quality analysis taken as required by condition 32.1 of this licence;

51.2 the date and time when the transfer began and ceased; and

51.3 the volume transferred to the stormwater system.

52 The licensee must keep and maintain records relating to the activity undertaken and the listed waste handled by the licensee in each successive 12 month period following the commencement of this licence, which include:

52.1 the date of collection;

52.2 the source of the listed waste;

52.3 the name of the transport company, if not the licensee;

52.4 the vehicle registration;

52.5 a description of the listed waste;

52.6 the quantity of the listed waste;

52.7 the final destination of the listed waste; and

52.8 whether the listed waste was stored, recycled, treated or disposed of.

53 The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.

54 The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.

55 The licensee must notify the NT EPA of any non-compliance with this licence by completing the Non-Compliance Notification via NT EPA Online (or by emailing waste@nt.gov.au), as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.

56 The licensee must include in the notification of non-compliance the following information:

56.1 when the non-compliance was detected and by whom;

56.2 the date and time of the non-compliance;

56.3 the actual and potential causes and contributing factors to the non-compliance;

56.4 the risk of environmental harm arising from the non-compliance;

56.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;

56.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur;

56.7 if no action was taken, why no action was taken; and

56.8 a date when an incident investigation report will be submitted to the NT EPA.

57 A non-compliance with this licence includes:

57.1 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on three consecutive sampling occasions;

57.2 subsequent consecutive exceedances of trigger values as described in condition 58.1; and

57.3 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on a single occasion where the parameter measures greater than or equal to three times the trigger value.

58 The licensee must notify the NT EPA of any exceedance of trigger value as specified in Attachment A, Attachment B and Attachment C as soon as practicable after (and in any case within 24 hours after) first becoming aware of the exceedance.

59 The licensee must keep records of all exceedances of trigger values specified in Attachment A, Attachment B and Attachment C. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.

60 The licensee must ensure that the notification of the trigger value exceedance includes the following information:

60.1 when the exceedance was detected and by whom;

60.2 the date and time of the exceedance;

60.3 the actual and potential causes and contributing factors to the exceedance;

60.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant trigger values as specified in Attachment A, Attachment B and Attachment C;

60.5 the action(s) that have or will be undertaken to address the exceedance and any resulting environmental harm; and

60.6 if no action was taken, why no action was taken.

61 The licensee must submit a completed Annual Return via NT EPA Online within 10 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.

62 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

63 The licensee must ensure that each Monitoring Report:

63.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';

63.2 reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;

63.3 includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;

63.4 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;

63.5 provides an assessment on groundwater levels, including groundwater contours and tidal influence;

63.6 reports on all exceedances and investigations undertaken for this licence; and

63.7 includes an assessment of environmental impact from the activity.

64 The NT EPA may require the licensee to revise or amend and resubmit any Monitoring Report. Where the NT EPA requires the Monitoring Report to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



Leonie Cooper
Director Environment Authorisations
Delegate of the Northern Territory
Environment Protection Authority
Dated: 10/08/2020

END NOTES

This licence is a renewal which supercedes EPL229 with an expiry date of 28 June 2022

EPL229 was issued on 21 December 2017 with an expiry date of 23 December 2019

DEFINITIONS

All terms in the Licence which are defined in the *Waste Management and Pollution Control Act* have the meaning given in that Act unless otherwise or further defined in this section.

DEFINITION	In this licence, unless a contrary intention appears:
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Scheduled activity as described on the covering page of this licence.
Air	includes any layer of the atmosphere.
Annual fee	yearly fee payable in respect of the activity as specified in the WMPC Act and the Regulations.
Annual Return	an NT EPA prescribed format for demonstrating and reporting compliance with the conditions of this licence and providing information on waste volumes for the preceding 12 month period.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting.
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: (a) noise, odour, heat and electromagnetic radiation; (b) a prescribed substance or prescribed class of substances; and (c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental audit	has the meaning given in section 47 of the WMPC Act.

Environmental harm	(a) any harm to or adverse effect on the environment; or (b) any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental nuisance	means: (a) an adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) an unsightly or offensive condition caused by contaminants or waste.
Incident	includes: (a) an accident, emergency or malfunction; and (b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.
Listed waste	a waste included under Schedule 2 of the Regulations.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: (a) is not trivial or negligible in nature; (b) consists of an environmental nuisance of a high impact or on a wide scale; (c) results, or is likely to result, in not more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of not more than $50,000 or the prescribed amount (whichever is greater).
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an NT EPA prescribed format for notifying the NT EPA of a non-compliance.
NT EPA Online	online system for Environment Protection Licence (EPL), Environment Protection Approval (EPA) and Waste Discharge Licence (WDL) lodgement and maintenance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	(a) emit, discharge, deposit, or disturb, directly or indirectly, a contaminant or waste; or (b) cause, permit, or fail to prevent, directly or indirectly, the emission, discharge, deposition, disturbance or escape of a contaminant or waste.
Pollution	(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or (b) a contaminant or waste, effect or phenomenon, that is present in the

	environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.
Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Regulations	*Waste Management and Pollution Control (Administration) Regulations*.
Rehabilitation Plan	a written plan to ensure that the objectives of rehabilitation are achieved as set out in the NT EPA Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) is irreversible or otherwise of a high impact or on a wide scale; (b) damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) results or is likely to result in more than $50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of more than $50,000 or the prescribed amount (whichever is greater).
Stormwater	water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Trigger values	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Waste	(a) a solid, a liquid or a gas; or (b) a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	water that contains a contaminant or waste.
Water	includes: (a) surface water, ground water and tidal waters; (b) coastal waters of the Territory, within the meaning of the Coastal Waters (Northern Territory Powers) Act 1980 of the Commonwealth; and (c) water containing an impurity.
WMPC Act	the Northern Territory *Waste Management and Pollution Control Act*.

Groundwater Monitoring Event – March 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ **Sydney Laboratory** Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 6 Monterey Road Dandenong South VIC 3175 03 8564 5000 EnviroSampleVic@eurofins.com

Company	WSP	Project №	J174436	Project Manager	Varun Bhagwat	Sampler(s)	VB
Address	Level 5, 37 Woods St, Darwin City, NT 0800	Project Name	GME	EDD Format (Esdat, EQuIS etc)	Esdat	Facility Code	Handed over by: VB on 24/3/22
Contact Name	Varun Bhagwat						Email for Invoice: Varun.Bhagwat@wsp.com.au
Phone №	0428 829 444						Email for Results: Varun.Bhagwat@wsp.com.au
Special Directions							
Purchase Order	TBA						
Quote ID №							

Analyses (Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to affect SUITE pricing)

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	B11C: Cation Suite	B11E: Anion Suite	B19A: Nutrient Suite	Ammonia	PCB	PFAS	Total Cyanide	B4A: TRH/BTEXN/PAH/Phenols	BTEXN	TRH/BTEXN							Containers (Change container type & size if necessary): 500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	EMB13	24/03/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
2	EMB14	24/03/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
	EMB7	24/03/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
	EMB12	24/03/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
	EMB15	24/03/22	Water	X	X	X	X	X	X	X	X									1		2	2	2	1			
3	QC01	24/03/22	Water								X												1	1				
4	RB01	24/03/22	Water										X										1	2				
5	TB01	24/03/22	Water									X												2				
	Add Rows		Total Counts	5	5	5	5	5	5	5	6	1	1							5		10	12	15	5			

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name	Signature	Date	Time
Laboratory Use Only	Received By: [illegible]	SYD | BNE | MEL | PER | ADL | NTL | DRW (DRW circled)	Signature: [signature]	Date: 27/03	Time: 9:20 AM	Temperature: 4.0°C	
	Received By:	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Report №: 975502	

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West NSW 2304
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name:	WSP Australia P/L NT
Contact name:	Varun Bhagwat
Project name:	GME
Project ID:	J174436
Turnaround time:	5 Day
Date/Time received	Mar 27, 2023 9:00 AM
Eurofins reference	975502

Sample Information

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

Notes

Contact

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

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun Bhagwat - Varun.Bhagwat@wsp.com.

Note: A copy of these results will also be delivered to the general WSP Australia P/L NT email address.

WSP Australia P/L NT
Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Varun Bhagwat**

Report **975502-W-V2**
Project name GME
Project ID J174436
Received Date Mar 27, 2023

Client Sample ID			**EMB13**	**EMB14**	**EMB7**	**EMB12**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**M23-Ma0061915**	**M23-Ma0061916**	**M23-Ma0061917**	**M23-Ma0061919**
Date Sampled			**Mar 24, 2023**	**Mar 24, 2023**	**Mar 24, 2023**	**Mar 24, 2023**
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	95	110	101	102
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	0.1	0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	0.1	0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	0.1	0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	0.1	0.15	< 0.1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			EMB13	EMB14	EMB7	EMB12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061915	M23-Ma0061916	M23-Ma0061917	M23-Ma0061919
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	60	97	64	92
p-Terphenyl-d14 (surr.)	1	%	80	80	55	95
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Total PCB*	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Dibutylchlorendate (surr.)	1	%	85	75	65	93
Tetrachloro-m-xylene (surr.)	1	%	65	53	85	66
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	33	30	45	37
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	0.03	< 0.01	1.0	< 0.01
Chloride	1	mg/L	50	6.3	61	87
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	3.9	3.2	0.83	0.12
Phosphate total (as P)	0.01	mg/L	0.04	0.08	0.04	0.04

Client Sample ID			EMB13	EMB14	EMB7	EMB12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061915	M23-Ma0061916	M23-Ma0061917	M23-Ma0061919
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
Sulphate (as SO4)	5	mg/L	< 5	17	< 5	5.6
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.5	1.0	1.5	0.7
Total Nitrogen (as N)*	0.2	mg/L	5.4	4.2	2.33	0.82
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20	32	< 20	20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	< 10	< 10	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	< 20	< 20	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20	32	< 20	20
Alkali Metals						
Calcium	0.5	mg/L	0.8	17	1.4	10
Magnesium	0.5	mg/L	0.6	0.9	0.7	3.7
Potassium	0.5	mg/L	0.8	2.1	2.2	3.5
Sodium	0.5	mg/L	17	3.8	27	38
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	2.2	0.10	2.2	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	12	0.29	6.3	0.04
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	11	0.20	12	0.03
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	4.1	0.23	2.1	0.02
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	2.4	0.08	5.4	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	0.08	0.09	0.10	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	73	94	56	98
13C5-PFPeA (surr.)	1	%	81	115	59	127
13C5-PFHxA (surr.)	1	%	91	106	69	114
13C4-PFHpA (surr.)	1	%	74	124	58	141
13C8-PFOA (surr.)	1	%	72	107	53	116
13C5-PFNA (surr.)	1	%	106	114	121	125
13C6-PFDA (surr.)	1	%	83	82	94	91
13C2-PFUnDA (surr.)	1	%	76	81	131	104
13C2-PFDoDA (surr.)	1	%	73	89	106	106
13C2-PFTeDA (surr.)	1	%	64	65	171	76
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	91	82	82	93
D3-N-MeFOSA (surr.)	1	%	48	38	58	50

Client Sample ID			EMB13	EMB14	EMB7	EMB12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061915	M23-Ma0061916	M23-Ma0061917	M23-Ma0061919
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D5-N-EtFOSA (surr.)	1	%	49	38	61	56
D7-N-MeFOSE (surr.)	1	%	80	66	99	67
D9-N-EtFOSE (surr.)	1	%	76	64	80	69
D5-N-EtFOSAA (surr.)	1	%	76	98	105	113
D3-N-MeFOSAA (surr.)	1	%	89	88	136	117
Perfluoroalkyl sulfonic acids (PFSAs)						
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01	< 0.01	[N09]0.01	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01	< 0.01	[N09]0.02	< 0.01
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	93	109	81	118
18O2-PFHxS (surr.)	1	%	109	109	109	120
13C8-PFOS (surr.)	1	%	111	109	135	117
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	0.08	< 0.01	0.39	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	66	0.13	120	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	1.6	0.01	0.42	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	99	102	130	101
13C2-6:2 FTSA (surr.)	1	%	105	141	109	142
13C2-8:2 FTSA (surr.)	1	%	93	120	141	112
13C2-10:2 FTSA (surr.)	1	%	97	100	114	121
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	0.03	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	2.4	0.08	5.42	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	2.4	0.08	5.43	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	99.3	1.04	148.45	0.09
Sum of PFASs (n=30)*	0.1	ug/L	99.46	1.13	148.94	< 0.1

Client Sample ID			EMB15	QC01	QC01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061920	M23-Ma0061921	M23-Ma0061922	M23-Ma0061923
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			EMB15	QC01	QC01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061920	M23-Ma0061921	M23-Ma0061922	M23-Ma0061923
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
BTEX						
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	108	125	110	96
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	-	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	-	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	67	79	-	-
p-Terphenyl-d14 (surr.)	1	%	63	78	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	-	-	-
Aroclor-1221	0.005	mg/L	< 0.005	-	-	-
Aroclor-1232	0.005	mg/L	< 0.005	-	-	-
Aroclor-1242	0.005	mg/L	< 0.005	-	-	-
Aroclor-1248	0.005	mg/L	< 0.005	-	-	-
Aroclor-1254	0.005	mg/L	< 0.005	-	-	-
Aroclor-1260	0.005	mg/L	< 0.005	-	-	-
Total PCB*	0.005	mg/L	< 0.005	-	-	-
Dibutylchlorendate (surr.)	1	%	60	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	93	-	-	-

Client Sample ID			EMB15	QC01	QC01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061920	M23-Ma0061921	M23-Ma0061922	M23-Ma0061923
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	-	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	-	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	-	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	-	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	-	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	-	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	-	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	-	-
Phenol	0.003	mg/L	< 0.003	< 0.003	-	-
Phenol-d6 (surr.)	1	%	51	70	-	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	-	-
Ammonia (as N)	0.01	mg/L	< 0.01	-	-	-
Chloride	1	mg/L	440	-	-	-
Cyanide (total)	0.005	mg/L	< 0.005	-	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	0.85	-	-	-
Phosphate total (as P)	0.01	mg/L	0.05	-	-	-
Sulphate (as SO4)	5	mg/L	74	-	-	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.5	-	-	-
Total Nitrogen (as N)*	0.2	mg/L	2.35	-	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	-	-	-
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Total Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Alkali Metals						
Calcium	0.5	mg/L	4.0	-	-	-
Magnesium	0.5	mg/L	21	-	-	-
Potassium	0.5	mg/L	1.4	-	-	-
Sodium	0.5	mg/L	220	-	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05	-	-	-
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.12	-	-	-
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.08	-	-	-
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	0.07	-	-	-
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	0.02	-	-	-

Client Sample ID			EMB15	QC01	QC01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061920	M23-Ma0061921	M23-Ma0061922	M23-Ma0061923
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	-	-	-
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	-	-	-
13C4-PFBA (surr.)	1	%	91	-	-	-
13C5-PFPeA (surr.)	1	%	109	-	-	-
13C5-PFHxA (surr.)	1	%	102	-	-	-
13C4-PFHpA (surr.)	1	%	108	-	-	-
13C8-PFOA (surr.)	1	%	102	-	-	-
13C5-PFNA (surr.)	1	%	96	-	-	-
13C6-PFDA (surr.)	1	%	68	-	-	-
13C2-PFUnDA (surr.)	1	%	62	-	-	-
13C2-PFDoDA (surr.)	1	%	52	-	-	-
13C2-PFTeDA (surr.)	1	%	56	-	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	-	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	-	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	-	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	-	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	-	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	-	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	-	-	-
13C8-FOSA (surr.)	1	%	73	-	-	-
D3-N-MeFOSA (surr.)	1	%	22	-	-	-
D5-N-EtFOSA (surr.)	1	%	23	-	-	-
D7-N-MeFOSE (surr.)	1	%	57	-	-	-
D9-N-EtFOSE (surr.)	1	%	46	-	-	-
D5-N-EtFOSAA (surr.)	1	%	55	-	-	-
D3-N-MeFOSAA (surr.)	1	%	60	-	-	-
Perfluoroalkyl sulfonic acids (PFSAs)						
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	-	-	-
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	-	-	-
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	-	-	-
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	-	-	-
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01	-	-	-
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	-	-	-
13C3-PFBS (surr.)	1	%	102	-	-	-
18O2-PFHxS (surr.)	1	%	106	-	-	-
13C8-PFOS (surr.)	1	%	99	-	-	-

Client Sample ID			EMB15	QC01	QC01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0061920	M23-Ma0061921	M23-Ma0061922	M23-Ma0061923
Date Sampled			Mar 24, 2023	Mar 24, 2023	Mar 24, 2023	Mar 24, 2023
Test/Reference	LOR	Unit				
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01	-	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	< 0.05	-	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	< 0.01	-	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	-	-	-
13C2-4:2 FTSA (surr.)	1	%	109	-	-	-
13C2-6:2 FTSA (surr.)	1	%	110	-	-	-
13C2-8:2 FTSA (surr.)	1	%	92	-	-	-
13C2-10:2 FTSA (surr.)	1	%	55	-	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	-	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.02	-	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.02	-	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.29	-	-	-
Sum of PFASs (n=30)*	0.1	ug/L	0.29	-	-	-
Volatile Organics						
Naphthalene[N02]	0.01	mg/L	-	-	-	< 0.01

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
BTEX	Melbourne	Mar 28, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Mar 28, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Mar 28, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Mar 28, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Mar 28, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Mar 28, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 28, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Mar 28, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Mar 27, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

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Received: Mar 27, 2023 9:00 AM
Due: Apr 3, 2023
Priority: 5 Day
Contact Name: Varun Bhagwat

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	EMB13	Mar 24, 2023		Water	M23-Ma0061915	X	X	X			X	X	X	X	X
2	EMB14	Mar 24, 2023		Water	M23-Ma0061916	X	X	X			X	X	X	X	X
3	EMB7	Mar 24, 2023		Water	M23-Ma0061917	X	X	X			X	X	X	X	X
4	EMB12	Mar 24, 2023		Water	M23-Ma0061919	X	X	X			X	X	X	X	X
5	EMB15	Mar 24, 2023		Water	M23-Ma0061920	X	X	X			X	X	X	X	X
6	QC01	Mar 24, 2023		Water	M23-Ma0061921						X				
7	QC01	Mar 24, 2023		Water	M23-Ma0061922				X	X					
8	TB01	Mar 24, 2023		Water	M23-Ma0061923				X						
Test Counts						5	5	5	2	1	6	5	5	5	5

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	85			70-130	Pass	
Toluene	%	87			70-130	Pass	
Ethylbenzene	%	85			70-130	Pass	
m&p-Xylenes	%	86			70-130	Pass	
Xylenes - Total*	%	87			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	89			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	101			70-130	Pass	
TRH C10-C14	%	77			70-130	Pass	
TRH C6-C10	%	102			70-130	Pass	
TRH >C10-C16	%	78			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	92			70-130	Pass	
Acenaphthylene	%	72			70-130	Pass	
Anthracene	%	98			70-130	Pass	
Benz(a)anthracene	%	100			70-130	Pass	
Benzo(a)pyrene	%	81			70-130	Pass	
Benzo(b&j)fluoranthene	%	82			70-130	Pass	
Benzo(g.h.i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	98			70-130	Pass	
Dibenz(a.h)anthracene	%	77			70-130	Pass	
Fluoranthene	%	93			70-130	Pass	
Fluorene	%	73			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	73			70-130	Pass	
Naphthalene	%	70			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenanthrene	%	78			70-130	Pass	
Pyrene	%	85			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	58			25-140	Pass	
2.4-Dichlorophenol	%	48			25-140	Pass	
2.4.5-Trichlorophenol	%	55			25-140	Pass	
2.4.6-Trichlorophenol	%	57			25-140	Pass	
2.6-Dichlorophenol	%	50			25-140	Pass	
4-Chloro-3-methylphenol	%	57			25-140	Pass	
Pentachlorophenol	%	38			25-140	Pass	
Tetrachlorophenols - Total	%	41			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	40			25-140	Pass	
2-Methyl-4.6-dinitrophenol	%	49			25-140	Pass	
2-Nitrophenol	%	54			25-140	Pass	
2.4-Dimethylphenol	%	39			25-140	Pass	
2.4-Dinitrophenol	%	38			25-140	Pass	
2-Methylphenol (o-Cresol)	%	50			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	49			25-140	Pass	
4-Nitrophenol	%	34			25-140	Pass	
Dinoseb	%	57			25-140	Pass	
Phenol	%	32			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	101			70-130	Pass	
Chloride	%	93			70-130	Pass	
Nitrate & Nitrite (as N)	%	80			70-130	Pass	
Phosphate total (as P)	%	82			70-130	Pass	
Sulphate (as SO4)	%	121			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	81			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	78			70-130	Pass	
Total Alkalinity (as CaCO3)	%	85			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	95			80-120	Pass	
Potassium	%	93			80-120	Pass	
Sodium	%	100			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	114			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	116			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	122			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	117			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	97			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	112			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	105			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	126			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	129			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	128			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	123			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	123			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	120			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	116			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	113			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	112			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	119			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	115			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	108			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	122			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	121			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	107			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	115			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	108			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	121			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	101			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	116			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	108			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	103			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	115			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
BTEX				Result 1					
Benzene	M23-Ma0064149	NCP	%	88			70-130	Pass	
Toluene	M23-Ma0064149	NCP	%	98			70-130	Pass	
Ethylbenzene	M23-Ma0064149	NCP	%	93			70-130	Pass	
m&p-Xylenes	M23-Ma0064149	NCP	%	89			70-130	Pass	
o-Xylene	M23-Ma0064149	NCP	%	91			70-130	Pass	
Xylenes - Total*	M23-Ma0064149	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M23-Ma0064149	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M23-Ma0064149	NCP	%	87			70-130	Pass	
TRH C10-C14	M23-Ma0070609	NCP	%	88			70-130	Pass	
TRH C6-C10	M23-Ma0064149	NCP	%	86			70-130	Pass	
TRH >C10-C16	M23-Ma0070609	NCP	%	90			70-130	Pass	
Spike - % Recovery									
				Result 1					
Sulphate (as SO4)	M23-Ma0060509	NCP	%	103			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Ma0065953	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M23-Ma0061916	CP	%	94			75-125	Pass	
Magnesium	M23-Ma0061916	CP	%	101			75-125	Pass	
Potassium	M23-Ma0061916	CP	%	99			75-125	Pass	
Sodium	M23-Ma0061916	CP	%	100			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M23-Ma0061916	CP	%	123			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ma0061916	CP	%	144			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ma0061916	CP	%	146			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ma0061916	CP	%	106			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ma0061916	CP	%	110			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-Ma0061916	CP	%	127			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ma0061916	CP	%	108			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ma0061916	CP	%	162			50-150	Fail	Q08
Perfluorododecanoic acid (PFDoDA)	M23-Ma0061916	CP	%	118			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ma0061916	CP	%	138			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ma0061916	CP	%	116			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-Ma0061916	CP	%	109			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ma0061916	CP	%	122			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ma0061916	CP	%	108			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ma0061916	CP	%	114			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ma0061916	CP	%	110			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ma0061916	CP	%	128			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ma0061916	CP	%	121			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Ma0061916	CP	%	104			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ma0061916	CP	%	107			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ma0061916	CP	%	117			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ma0061916	CP	%	107			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ma0061916	CP	%	109			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ma0061916	CP	%	106			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ma0061916	CP	%	108			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ma0061916	CP	%	89			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ma0061916	CP	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ma0061916	CP	%	87			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ma0061916	CP	%	108			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ma0061916	CP	%	116			50-150	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M23-Ma0061917	CP	%	97			70-130	Pass	
Nitrate & Nitrite (as N)	M23-Ma0061917	CP	%	78			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	M23-Ma0061919	CP	%	98			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M23-Ma0069693	NCP	mg/L	1.4	1.6	15	30%	Pass	
TRH C15-C28	M23-Ma0069693	NCP	mg/L	5.9	6.5	16	30%	Pass	
TRH C29-C36	M23-Ma0069693	NCP	mg/L	1.2	1.1	15	30%	Pass	
TRH >C10-C16	M23-Ma0069693	NCP	mg/L	2.1	2.5	18	30%	Pass	
TRH >C16-C34	M23-Ma0069693	NCP	mg/L	6.5	7.1	14	30%	Pass	
TRH >C34-C40	M23-Ma0069693	NCP	mg/L	0.4	0.5	10	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M23-Ma0066462	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	M23-Ma0066462	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dichlorophenol	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4.5-Trichlorophenol	M23-Ma0066462	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4.6-Trichlorophenol	M23-Ma0066462	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.6-Dichlorophenol	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	M23-Ma0066462	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M23-Ma0066462	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M23-Ma0066462	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M23-Ma0066462	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M23-Ma0066462	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Nitrophenol	M23-Ma0066462	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2.4-Dimethylphenol	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2.4-Dinitrophenol	M23-Ma0066462	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M23-Ma0066462	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass	
4-Nitrophenol	M23-Ma0066462	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	
Dinoseb	M23-Ma0066462	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Phenol	M23-Ma0066462	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	M23-Ma0061915	CP	mg/L	50	50	<1	30%	Pass	
Phosphate total (as P)	B23-Ma0061234	NCP	mg/L	0.58	0.59	1.6	30%	Pass	
Sulphate (as SO4)	M23-Ma0061915	CP	mg/L	< 5	< 5	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Ma0061915	CP	mg/L	1.5	1.5	4.1	30%	Pass	
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	M23-Ma0069817	NCP	mg/L	220	280	24	30%	Pass	
Carbonate Alkalinity (as CaCO3)	M23-Ma0069817	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	M23-Ma0069817	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	M23-Ma0069817	NCP	mg/L	220	280	24	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Magnesium	M23-Ma0066063	NCP	mg/L	1.3	1.1	15	30%	Pass	
Potassium	M23-Ma0066070	NCP	mg/L	1.0	1.3	18	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Ma0067247	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ma0067247	NCP	ug/L	< 0.01	0.01	16	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ma0067247	NCP	ug/L	0.02	0.02	3.3	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ma0067247	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ma0067247	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Ma0061915	CP	ug/L	0.08	0.08	8.7	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ma0061915	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ma0061915	CP	ug/L	0.08	0.08	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ma0067247	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ma0061915	CP	ug/L	1.6	1.2	31	30%	Fail	Q15
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ma0061915	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S23-Ma0062374	NCP	mg/L	8.4	8.8	4.4	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M23-Ma0061916	CP	mg/L	17	17	5.2	30%	Pass	
Sodium	M23-Ma0061916	CP	mg/L	3.8	4.1	7.2	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Nitrate & Nitrite (as N)	B23-Ma0059065	NCP	mg/L	0.07	0.07	6.1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Ma0061917	CP	mg/L	1.5	1.9	23	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M23-Ma0061920	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M23-Ma0061920	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M23-Ma0061920	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M23-Ma0061920	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M23-Ma0061920	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M23-Ma0061920	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M23-Ma0061920	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M23-Ma0061920	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	M23-Ma0061920	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	M23-Ma0061920	CP	mg/L	440	440	<1	30%	Pass	
Sulphate (as SO4)	M23-Ma0061920	CP	mg/L	74	75	<1	30%	Pass	

Comments

This report has been revised (V2) following repeat analysis. Chloride results for sample EMB14 have now been replaced by the repeat results.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Michael Morrison	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Chain of Custody - Greencap Adelaide
Ph. 8299 9955

Jonathan 28/3/23 0820

GREENCAP
Going Further in Managing Risk

Client	:	GRR	Date	:	24/03/2023
Project	:	Groundwater Monitoring	Sampled by	:	Varun Bhagwat
Project Manager	:	Varun Bhagwat	Sampler Mobile	:	0428 829 444
Job No.	:	J174436	Purchase Order	:	TBA
Location	:	800 Berrimah Rd, East Arm	T/Around		***STANDARD TAT***
Please email results to:		Varun.Bhagwat@wsp.com.au			

Relinquished by: VB on 24/03/23	Recieved by:	Relinquished by:	Received by:
Signature & date	*Signature & date*	*Signature & date*	*Signature & date*

	Field ID	Depth	Sampled	Matrix *(Soil, Water, Vapour, etc)*	Sample Containers: 40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic (Nitric Acid Preserved)	60ml Plastic Nturients (h_2SO4)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	Testing: S-4 : TRH, BTEXN	Antimony (Sb)	W3: NEPM Suite: 15 Metals	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P15/2 SA EPA Waste Screen		S12 : OCP, OPP	S-18: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen	Hold
1	EMB7		24/03/2023	W		2		1							X	X	X								
2	EMB12		24/03/2023	W		2		1							X	X	X								
3	EMB13		24/03/2023	W		2		1							X	X	X								
4	EMB14		24/03/2023	W		2		1							X	X	X								
5	EMB15		24/03/2023	W		2		1							X	X	X								
6	QC01A		24/03/2023	W	2		1											X							
	Totals				2	10	1	5	0	0	0	0	0	0	5	5	5	1	0	0	0	0	0	0	0

Environmental Division
Sydney
Work Order Reference
ES2310003

Telephone : +61-2-8784 8555

LAB OF ORIGIN:
DARWIN

Subcon / Forward Lab / Split WO
Lab / Analysis: ALS Melbourne
Organised By / Date:
Relinquished By / Date:
Connote / Courier: Glycols
WO No: ES2310003
Attach By PO / Internal Sheet:

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2310003**

Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: varun.bhagwat@wsp.com.au	E-mail	: khaleda.ataei@alsglobal.com
Telephone	: ----	Telephone	: + 61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: ----	Quote number	: EM2022ADEENV0004 (EN/111/22 (primary work only))
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 28-Mar-2023 08:30	Issue Date	: 28-Mar-2023
Client Requested Due Date	: 04-Apr-2023	Scheduled Reporting Date	: **04-Apr-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 24.2'C
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Glycol analysis will be conducted by ALS Melbourne.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EP067 Glycols analysis in water by GCMS	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-24 TRH/BTEXN/PAH/Phenols
ES2310003-001	24-Mar-2023 00:00	EMB7	✓	✓	✓	
ES2310003-002	24-Mar-2023 00:00	EMB12	✓	✓	✓	
ES2310003-003	24-Mar-2023 00:00	EMB13	✓	✓	✓	
ES2310003-004	24-Mar-2023 00:00	EMB14	✓	✓	✓	
ES2310003-005	24-Mar-2023 00:00	EMB15	✓	✓	✓	
ES2310003-006	24-Mar-2023 00:00	QC01A				✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

VARUN BHAGWAT

- *AU Certificate of Analysis - NATA (COA)	Email	varun.bhagwat@wsp.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	varun.bhagwat@wsp.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	varun.bhagwat@wsp.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	varun.bhagwat@wsp.com.au
- A4 - AU Tax Invoice (INV)	Email	varun.bhagwat@wsp.com.au
- Chain of Custody (CoC) (COC)	Email	varun.bhagwat@wsp.com.au
- EDI Format - ENMRG (ENMRG)	Email	varun.bhagwat@wsp.com.au
- EDI Format - ESDAT (ESDAT)	Email	varun.bhagwat@wsp.com.au

QUALITY CONTROL REPORT

Work Order	: **ES2310003**	Page	: 1 of 7
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 28-Mar-2023
Order number	: ----	Date Analysis Commenced	: 29-Mar-2023
C-O-C number	: ----	Issue Date	: 04-Apr-2023
Sampler	: VARUN BHAGWAT		
Site	: ----		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4960930)									
ES2310002-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.017	0.017	0.0	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.080	0.080	0.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.026	136	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2310228-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	45.3	45.4	0.3	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4960930) - continued									
ES2310228-003	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.228	0.223	2.2	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.015	0.015	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4960931)									
ES2310002-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2310228-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP067: Glycols (QC Lot: 4966094)									
ES2310003-001	EMB7	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4963103)									
CA2301962-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2310085-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4963103)									
CA2301962-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2310085-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4963103)									
CA2301962-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2310085-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4960930)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	92.8	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.9	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	90.0	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.4	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.0	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.0	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.4	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.2	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.9	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.0	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	91.7	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	117	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	87.8	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4960931)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.5	83.0	105
EP067: Glycols (QCLot: 4966094)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	105	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	108	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	113	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	119	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	106	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	122	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	119	69.0	142
EP075(SIM)A: Phenolic Compounds (QCLot: 4959609)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	28.6	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	55.2	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	54.2	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	50.5	44.0	88.0

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Acceptable Limits (%)
				Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 4959609) - continued								
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	67.0	48.0	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	51.2	49.0	99.0
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	66.8	53.0	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	60.0	57.0	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	63.9	53.0	99.0
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	69.6	50.0	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	70.6	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	86.0	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4959609)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	61.3	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	79.8	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	72.0	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	80.7	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	84.3	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	76.0	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	87.8	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	87.4	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	83.2	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	86.3	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	86.8	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	84.2	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	89.1	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	87.0	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	88.0	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	85.5	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4959612)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	73.9	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	87.9	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	105	58.3	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4963103)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	81.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4959612)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	66.2	53.9	95.5

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4959612) - continued								
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	73.1	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	87.5	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4963103)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	85.3	75.0	127
EP080: BTEXN (QCLot: 4963103)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	82.7	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	92.4	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.6	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	91.4	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	90.5	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	95.7	75.5	124

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4960930)							
ES2310003-001	EMB7	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.3	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	95.0	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	95.2	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	98.7	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	95.6	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	94.6	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	99.2	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	93.3	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	98.3	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.4	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	95.3	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	96.1	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4960931)							
ES2310002-002	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	91.8	70.0	130
EP067: Glycols (QCLot: 4966094)							
ES2310003-002	EMB12	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	138	37.5	146

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP067: Glycols (QCLot: 4966094) - continued							
ES2310003-002	EMB12	EP067: 2-Butoxyethanol	111-76-2	100 mg/L	114	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	113	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	116	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	112	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	116	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	114	32.2	156
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4963103)							
CA2301962-011	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	90.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4963103)							
CA2301962-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	88.2	70.0	130
EP080: BTEXN (QCLot: 4963103)							
CA2301962-011	Anonymous	EP080: Benzene	71-43-2	25 µg/L	81.8	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	88.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	87.4	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	84.6	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	84.2	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	82.5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2310003**	Page	: 1 of 5
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 28-Mar-2023
Site	: ----	Issue Date	: 04-Apr-2023
Sampler	: VARUN BHAGWAT	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 6

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP067: Glycols						
VOC Vial - unpreserved						
EMB15	----	----	----	01-Apr-2023	31-Mar-2023	**1**
VOC Vial - unpreserved						
EMB14	----	----	----	03-Apr-2023	31-Mar-2023	**3**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	5	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)							
EMB7, EMB12, EMB13, EMB14, EMB15	**24-Mar-2023**	**----**	----	----	**29-Mar-2023**	20-Sep-2023	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F)							
EMB7, EMB12, EMB13, EMB14, EMB15	**24-Mar-2023**	**----**	----	----	**31-Mar-2023**	21-Apr-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP067: Glycols							
VOC Vial - unpreserved (EP067) EMB7, EMB12, EMB13	**24-Mar-2023**	**31-Mar-2023**	31-Mar-2023	✓	**31-Mar-2023**	31-Mar-2023	✓
VOC Vial - unpreserved (EP067) EMB15	**24-Mar-2023**	**31-Mar-2023**	31-Mar-2023	✓	**01-Apr-2023**	31-Mar-2023	×
VOC Vial - unpreserved (EP067) EMB14	**24-Mar-2023**	**31-Mar-2023**	31-Mar-2023	✓	**03-Apr-2023**	31-Mar-2023	×
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	**24-Mar-2023**	**29-Mar-2023**	31-Mar-2023	✓	**03-Apr-2023**	08-May-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	**24-Mar-2023**	**29-Mar-2023**	31-Mar-2023	✓	**03-Apr-2023**	08-May-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC01A	**24-Mar-2023**	**29-Mar-2023**	31-Mar-2023	✓	**03-Apr-2023**	08-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC01A	**24-Mar-2023**	**30-Mar-2023**	07-Apr-2023	✓	**31-Mar-2023**	07-Apr-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC01A	**24-Mar-2023**	**29-Mar-2023**	31-Mar-2023	✓	**03-Apr-2023**	08-May-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) QC01A	**24-Mar-2023**	**30-Mar-2023**	07-Apr-2023	✓	**31-Mar-2023**	07-Apr-2023	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) QC01A	**24-Mar-2023**	**30-Mar-2023**	07-Apr-2023	✓	**31-Mar-2023**	07-Apr-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CERTIFICATE OF ANALYSIS

Work Order	: **ES2310003**	Page	: 1 of 6
Client	: **GREENCAP-NAA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Khaleda Ataei
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 28-Mar-2023 08:30
Order number	: ----	Date Analysis Commenced	: 29-Mar-2023
C-O-C number	: ----	Issue Date	: 04-Apr-2023 14:22
Sampler	: VARUN BHAGWAT		
Site	: ----		
Quote number	: EN/111/22 (primary work only)		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

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

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

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

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

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

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EMB7	EMB12	EMB13	EMB14	EMB15
			Sampling date / time	24-Mar-2023 00:00	24-Mar-2023 00:00	24-Mar-2023 00:00	24-Mar-2023 00:00	24-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ES2310003-001	ES2310003-002	ES2310003-003	ES2310003-004	ES2310003-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**0.001**
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	**0.095**	**0.199**	**0.041**	**0.288**	**0.039**
Beryllium	7440-41-7	0.001	mg/L	**0.001**	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	**0.0001**	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	7440-48-4	0.001	mg/L	**0.003**	**0.001**	<0.001	<0.001	**0.006**
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	**0.013**
Manganese	7439-96-5	0.001	mg/L	**0.385**	**0.690**	**0.030**	<0.001	**2.15**
Nickel	7440-02-0	0.001	mg/L	**0.002**	<0.001	**0.001**	**0.001**	**0.005**
Lead	7439-92-1	0.001	mg/L	**0.002**	<0.001	**0.002**	<0.001	**0.003**
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	**0.021**	<0.005	**0.022**	**0.516**	**0.016**
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	<2	<2	<2
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	<2	<2	<2
Propylene glycol	57-55-6	2	mg/L	<2	<2	<2	<2	<2
Ethylene glycol	107-21-1	2	mg/L	<2	<2	<2	<2	<2
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	<2	<2	<2
Diethylene glycol	111-46-6	2	mg/L	<2	<2	<2	<2	<2
Triethylene glycol	112-27-6	2	mg/L	<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC01A	----	----	----	----
				Sampling date / time	24-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2310003-006	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC01A	----	----	----	----
				Sampling date / time	24-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2310003-006	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	----	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**25.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**54.9**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**54.1**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**67.3**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**76.4**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**82.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**104**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**118**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**101**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137

Inter-Laboratory Testing

Analysis conducted by ALS Melbourne, NATA accreditation no. 825, site no. 13778 (Chemistry).

(WATER) EP067: Glycols

8 May 2023

WSP Australia Pty Limited
Level 5, 37 Woods Street
Darwin, 0800
wsp.com/en-au

Michael Rogers
Operations Manager
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (APRIL 2023)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the April 2023 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – April 2023

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 27 April 2023 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – April 2023 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	27/04/2023	1.438	1.438	4.99	9.237
EMB12	27/04/2023	1.372	1.372	5.206	9.325
EMB13	27/04/2023	2.981	2.181	6.465	10.245
EMB14	27/04/2023	3.003	2.303	6.243	9.803
EMB15	27/04/2023	0.912	0.912	6.472	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – April 2023 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.89	33.1	21.3	291.7	0.14	170.15	5.73	39.3
EMB14	6.42	32.9	30.1	226.3	0.12	144.85	6.43	-4.3

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in May 2023.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@wsp.com

Groundwater Monitoring Event – April 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – April 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 27/4/23

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1410	EMB7	–	1.438	–	9.237	
1415	EMB12	–	1.372	–	9.325	
1420	EMB15	–	0.912	–	9.314	
1440	EMB13	–	2.981	–	10.245	
1510	EMB14	–	3.0003	–	9.803	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY / MODERATE WINDS

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB13
Location:	East Arm, NT	Date: 27/4/23	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	10.245	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer
Casing diameter:	50	(mm)	Method:	~~low-flow~~	4-well-volume	purged dry	
Casing type:	(PVC) / steel / other		WQM Make:	YSI			
Depth to product	—	(m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	2.981	(m bTOC)	Screen (from - to), m	7.245 - 10.245			
Product thickness	—	(m)	Pump Depth (m bTOC)	—			

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY/ MODERATE WINDS

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm)/ mS/cm	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L	SAL NTU	TURB PSU
1441	INT	3.714	32.7	4.08	323.4	50.4	30.4	174.25	0.13	
1444	2	4.431	32.9	4.02	331.1	46.2	32.3	176.35	0.14	
1447	4	5.103	33.0	3.92	314.6	41.7	31.7	171.15	0.14	
1450	6	5.782	33.2	3.90	288.7	48.1	27.1	170.15	0.14	
1453	8	6.398	33.1	3.91	281.5	42.4	23.9	170.25	0.14	
1457	10	7.013	33.2	3.89	273.8	38.1	26.4	170.15	0.14	
1500	12	7.626	33.1	3.89	291.7	39.3	21.3	170.15	0.14	5.73

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED 12L
SLOW RECHARGE
L-M TURBIDITY, NO SHEEN/ODOURS, CLEAR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - **metals***		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates
Duplicate ID
Triplicate ID
Blanks
Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB14
Location:	East Arm, NT	Date: 25/4/2023	

WELL DETAILS		SAMPLING EQUIPMENT				
Well depth:	9.803 (m)	Device:	micropurge	(peristaltic)	footvalve	bailer
Casing diameter:	50 (mm)	Method:	(low-flow)	4-well-volume	purged dry	
Casing type:	(PVC) / steel / other	WQM Make:	YSI			
Depth to product	– (m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	3.003 ~~2.457~~ (m bTOC)	Screen (from - to), m	6.803 - 9.803			
Product thickness	– (m)	Pump Depth (m bTOC)	–			

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY / MODERATE WINDS

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* TDS mg/L / SAL NTU / TURB PSU
1510	INT	3.814	33.2	5.99	214.8	29.7	24.7	145.15 0.10
1513	2	4.528	32.8	6.23	218.3	6.5	31.1	145.25 0.11
1516	4	5.002	32.7	6.37	229.9	-1.3	33.8	144.85 0.12
1519	6	5.553	32.9	6.41	221.7	-2.9	34.3	144.85 0.12
1521	8	6.021	32.9	6.40	230.4	-3.9	31.7	144.80 0.12
1524	10	6.448	32.9	6.42	226.3	-4.3	30.1	144.85 0.12 6.43

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED 10L
SLOW RECHARGE
L-M TURBIDITY, NO SHEENS/ODOURS, CLEAR

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)	2	none
Glass vial (40mL)	3	HCl
Plastic (60mL) - **metals***	4	HNO3
Plastic (60mL) - cyanide, CrVI*	4	NaOH
Plastic (60mL) - nutrients	1	H2SO4
Plastic (500mL) - inorganics	1	none
Plastic ( ) PFAS	1	
Plastic ( ) Glycol	2	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

2 June 2023

WSP Australia Pty Limited
Level 5, 37 Woods Street
Darwin, 0800
wsp.com/en-au

Michael Rogers
Operations Manager
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (MAY 2023)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the May 2023 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – May 2023

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 30 May 2023 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – May 2023 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	30/05/2023	2.188	2.188	4.24	9.237
EMB12	30/05/2023	2.032	2.032	4.546	9.325
EMB13	30/05/2023	3.787	2.987	5.659	10.245
EMB14	30/05/2023	4.007	3.307	5.239	9.803
EMB15	30/05/2023	1.648	1.648	5.736	9.314

mBTOC – metres below top of casing
mBGL – metres below ground level
mAHD – metres Austalian Height Datum

Table 2 – May 2023 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.67	32.4	15.7	257.9	0.12	171.6	5.97	-35.6
EMB14	6.39	33.6	21.7	237.1	0.12	163.1	7.04	-11.9

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in June 2023.

Attachments

1 Statements of Limitation
2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
T: 0428 829 444
E: Varun.Bhagwat@wsp.com

Groundwater Monitoring Event – May 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: https://www.greencap.com.au/terms-conditions Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at https://www.greencap.com.au/terms-conditions

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.

Groundwater Monitoring Event – May 2023

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 30/5/23

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
1400	~~MW~~ EMB13	–	3.787	—	10.245	
1449	EMB14	—	4.007	—	9.803	
1546	~~EBB~~EMB7	—	2.188	—	9.237	
1549	EMB12	—	2.032	—	9.325	
1553	EMB15	–	1.648	—	9.314	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client:	GRR	Job No: J174436	**Well ID**
Project:	GME	Sampled by: VB	EMB13
Location:	East Arm, NT	Date: 30/5/23	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	10.245	(m)	Device:	micropurge	peristaltic	footvalve	bailer
Casing diameter:	50	(mm)	Method:	low-flow	4-well-volume	purged dry	
Casing type:	PVC / steel / other		WQM Make:	YSI			
Depth to product	–	(m bTOC)	WL Meter:	interface	non-interface		
Depth to water:	3.787	(m bTOC)	Screen (from - to), m	7.245 - 10.245			
Product thickness	–	(m)	Pump Depth (m bTOC)	✓			

*Other Sampling Equipment / Method

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	*Turbidity, Colour, Odour, Sheen, etc* SAL PSU	TDS mg/L	TURB NTU
1428	INT	3.864	32.3	3.71	295.6	-7.2	93.2	0.13	176.15	
1431	2	4.511	32.4	3.65	263.6	-23.4	20.6	0.12	171.60	
1434	4	4.989	32.4	3.66	264.3	-29.9	17.5	0.12	171.60	
1437	6	5.492	32.4	3.67	262.4	-33.1	16.9	0.12	171.60	
1440	8	5.796	32.4	3.66	260.1	-34.8	16.3	0.12	171.60	
1443	10	6.038	32.4	3.67	2579	-35.6	15.7	0.12	171.66	5.917

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

PURGED L

L-M TURB, NO SHEEN/ODOUR, PALE BROWN

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

GREENCAP
Going Further in Managing Risk

Client: GRR		Job No: J174436	**Well ID**
Project: GME		Sampled by: VB	EMB14
Location: East Arm, NT		Date: 30/5/23	

WELL DETAILS			SAMPLING EQUIPMENT				
Well depth:	9.803	(m)	Device:	micropurge	(peristaltic)	footvalve	bailer
Casing diameter:	50	(mm)	Method:	(low-flow)	4-well-volume	purged dry	
Casing type:	(PVC) / steel / other		WQM Make:	YSI			
Depth to product	—	(m bTOC)	WL Meter:	(interface)	non-interface		
Depth to water:	4.007	(m bTOC)	Screen (from - to), m	6.803 - 9.803			
Product thickness	—	(m)	Pump Depth (m bTOC)				

***Other Sampling Equipment / Method**

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY / SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm / mS/cm)	ORP mV	DO mg/L / ppm / (%)	*Turbidity, Colour, Odour, Sheen, etc* SAL PSU / TDS mg/L / Turb NTU
1459	INT	4.128	33.4	6.36	228.4	-4.7	51.1	0.12 161.20
1502	2	4.991	33.6	6.38	230.1	-8.3	44.5	0.12 162.50
1505	4	5.727	33.5	6.37	233.9	-10.1	38.4	0.12 163.20
1508	6	6.262	33.6	6.39	235.3	-13.8	29.9	0.12 163.10
1511	8	6.776	33.6	6.39	237.6	-12.6	25.4	0.12 163.10
1514	10	7.152	33.6	6.39	237.1	-11.9	21.7	0.12 163.10 7.04

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

10 L PURGED

L-M TURB, NO SHEEN/ODOR, PALE BROWN

Container Volume (L)	No of containers	Preservative
Glass amber (100-250ml)		none
Glass vial (40mL)		HCl
Plastic (60mL) - metals*		HNO3
Plastic (60mL) - cyanide, CrVI*		NaOH
Plastic (60mL) - nutrients		H2SO4
Plastic (500mL) - inorganics		none
Plastic ( )		
Plastic ( )		

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Duplicates

Duplicate ID

Triplicate ID

Blanks

Rinsate ID

Other Comments

Appendix D Groundwater Data 2022/2023

Site ID	Sampling R	Date	SWL3	pH	Temp	ORP	EC	TDS	DO	NH3 (EMB	Nox (EMB7	TKN	TN (EMB7)	TP (EMB7)	Hydroxide	Carbonate	Bicarbonat	Total Alkali	Sulfate as S	Chloride	Ca	Mg	K	Na	Sb	As
			mAHD		°C	mV	µS/cm	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	µg/L	µg/L
EMB 12	Quarterly	30/06/2022	3.907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	30/06/2022	4.264	3.54	32.1	68.5	291.5	190.45	72.6	0.01	4.7	4	8.7	0.01	<20	<10	<20	<20	<5	45	1.2	0.6	2.2	20	1	1
EMB 14	Quarterly	30/06/2022	4.405	6.3	33	80.4	238.5	154.7	59.8	0.24	6.3	6.2	12.5	0.01	<20	<10	32	32	<5	19	14	1.4	3.1	6.7	1	1
EMB 15	Quarterly	30/06/2022	5.265	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	30/06/2022	3.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/07/2022	3.497	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/07/2022	3.785	3.52	32.5	4.7	292.7	191.75	49.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/07/2022	4.028	6.22	33.6	23.5	253	164.45	58.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/07/2022	5.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/07/2022	3.109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	19/08/2022	2.997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	19/08/2022	3.366	3.38	31.8	46.6	294.8	192.4	46.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	19/08/2022	3.46	5.85	33.3	3.7	249.2	162.5	75.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	19/08/2022	4.685	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	19/08/2022	2.618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	29/09/2022	2.514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	29/09/2022	2.795	3.3	32.1	51.6	290.9	187.85	52	0.01	4.3	1.4	5.7	0.01	<20	<10	<20	<20	<5	48	3	0.7	1	17	1	1
EMB 14	Quarterly	29/09/2022	2.879	5.75	33.6	21.1	259.2	167.7	70.6	0.04	8.1	1.3	9.4	0.01	<20	<10	48	48	11	56	26	1.8	3.8	13	1	1
EMB 15	Quarterly	29/09/2022	4.341	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	29/09/2022	2.254	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	26/10/2022	3.838	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	26/10/2022	4.192	3.38	32.3	31.9	279.4	182	50.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	26/10/2022	4.248	5.71	34.3	18.7	286.9	167.5	47.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	26/10/2022	5.179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	26/10/2022	3.514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2022	5.073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2022	5.743	3.34	32.3	40.8	293.4	189.3	24.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2022	6.546	5.92	32.8	11.8	338.4	221.65	60.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2022	5.835	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	4.787	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	4.872	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	21/12/2022	5.992	3.47	33.3	125.2	275.9	179.4	12.8	0.01	4.5	2.3	6.8	0.01	<20	<10	<20	<20	<5	42	0.8	0.5	0.9	17	1	1
EMB 14	Quarterly	21/12/2022	6.839	6.14	34.5	16.5	202.7	131.3	28.6	0.05	9.1	2.2	11.3	0.01	<20	<10	34	34	15	6.1	23	1.1	2.3	3.1	1	1
EMB 15	Quarterly	21/12/2022	6.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	21/12/2022	5.116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/01/2023	5.129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/01/2023	6.039	4.48	32.7	-21.4	167.8	106.6	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/01/2023	6.309	6.43	33.3	-34.7	154.9	101.4	16.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	25/01/2023	6.533	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/01/2023	4.967	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	27/02/2023	5.587	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	27/02/2023	7.714	3.75	32.7	-44.7	248.1	161.2	25.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	27/02/2023	7.864	6.34	33.2	47.3	171.1	150.35	21.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	27/02/2023	6.861	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	27/02/2023	5.825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Annual	24/03/2023	5.397	6.49	36.1	102.8	388.4	313.7	54.3	0.01	0.12	0.7	0.82	0.04	< 20	< 10	20	20	5.6	87	10	3.7	3.5	38	1	1
EMB 13	Annual	24/03/2023	6.96	4.03	34.8	101.3	266.7	961.75	21.4	0.03	3.9	1.5	5.4	0.04	< 20	< 10	<20	<20	<5	50	0.8	0.6	0.8	17	1	1
EMB 14	Annual	24/03/2023	6.798	5.39	34.9	109.4	242.8	951.1	40.6	0.01	3.2	1	4.2	0.08	< 20	< 10	32	32	18	6.3	17	0.9	2.1	3.8	1	1
EMB 15	Annual	24/03/2023	6.702	4.14	37.1	193.6	219.1	941.9	75.2	0.01	0.85	-	2.35	0.05	< 20	< 10	<20	<20	74	440	4	21	1.4	220	1	1
EMB 7	Annual	24/03/2023	5.3	6.04	32.7	114.1	210.6	137.85	53.4	1	0.83	1.5	2.33	0.04	< 20	< 10	<20	<20	<5	61	1.4	0.7	2.2	27	1	1
EMB 12	Monthly	28/04/2023	5.206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/04/2023	6.465	3.89	33.1	39.3	291.7	170.15	21.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/04/2023	6.243	6.42	32.9	-4.3	226.3	144.85	30.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	28/04/2023	6.472	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	28/04/2023	4.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/05/2023	4.546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/05/2023	5.659	3.67	32.4	-35.6	257.9	171.6	-35.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/05/2023	5.239	6.39	33.6	-11.9	237.1	163.1	21.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/05/2023	5.736	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/05/2023	4.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site ID	Sampling R	Date	Ba	Be	Bo	Cd	Cr	Co	Cu	Pb	Mn	Ni	Se	V	Zn	Hg	C6 - C10 Fr	C6 - C10 Fr	>C10 - C16	>C16 - C34	>C34 - C40	>C10 - C40	>C10 - C16	Benzene	Ethylbenze	Sum of BTE
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EMB 12	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	30/06/2022	50	1	60	0.1	1	1	3	2	30	2	10	10	20	0.1	<20	<20	<100	<100	<100	100	100	<1	<2	<1
EMB 14	Quarterly	30/06/2022	224	1	50	0.1	1	1	1	1	3	1	10	10	250	0.1	<20	<20	<100	<100	<100	100	<100	<1	<2	<1
EMB 15	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	29/09/2022	50	1	50	0.1	1	1	3	2	50	2	10	10	10	0.1	<20	<20	<100	<100	<100	100	100	<1	<2	<1
EMB 14	Quarterly	29/09/2022	322	1	50	0.1	1	1	1	1	1	1	10	10	262	0.1	<20	<20	<100	<100	<100	100	<100	<1	<2	<1
EMB 15	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	21/12/2022	40	1	50	0.1	1	1	3	2	30	1	10	10	30	0.1	<20	<20	<100	<100	<100	100	100	<1	<2	<1
EMB 14	Quarterly	21/12/2022	322	1	50	0.1	1	1	1	1	1	1	10	10	701	0.1	<20	<20	<100	<100	<100	100	<100	<1	<2	<1
EMB 15	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Annual	24/03/2023	0.199	<0.001	<0.05	<0.0001	1	1	1	1	0.69	<0.001	<0.01	<0.01	<0.005	<0.0001	<20	<20	<50	<100	<100	100	<50	<1	<2	<1
EMB 13	Annual	24/03/2023	40	1	50	0.1	1	1	1	2	30	1	10	10	20	0.1	<20	<20	<50	<100	<100	100	50	<1	<2	<1
EMB 14	Annual	24/03/2023	288	1	50	0.1	1	1	1	1	1	1	10	10	516	0.1	<20	<20	<50	100	<100	100	<50	<1	<2	<1
EMB 15	Annual	24/03/2023	39	1	50	0.1	1	6	13	3	2.15	0.005	<0.01	<0.01	0.016	<0.0001	<20	<20	<50	<100	<100	100	<50	<1	<2	<1
EMB 7	Annual	24/03/2023	0.095	0.001	<0.05	0.0001	1	3	1	2	0.385	0.002	<0.01	<0.01	0.021	<0.0001	<20	<20	50	100	<100	150	50	<1	<2	<1
EMB 12	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site ID	Sampling R	Date	Toluene	Total Xylen	meta- & pa	ortho-Xyle	Naphthaler	Acenaphth	Acenaphth	Fluorene	Phenanthr	Anthracen	Fluoranthe	Pyrene	Benz(a)ant	Chrysene	Benzo(b+j)	Benzo(k)flu	Benzo(a)py	Indeno(1.2	Dibenz(a.h	Benzo(g.h.	Sum of PAI	Benzo(a)py	PFBS	PFPeS
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EMB 12	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	30/06/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 14	Quarterly	30/06/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 15	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	29/09/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 14	Quarterly	29/09/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 15	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	21/12/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 14	Quarterly	21/12/2022	<2	<2	<2	<2	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<0.01	<0.01
EMB 15	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Annual	24/03/2023	<2	<3	<2	<2	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01	<0.01
EMB 13	Annual	24/03/2023	<2	<3	<2	<2	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01	<0.01
EMB 14	Annual	24/03/2023	<2	<3	<2	<2	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01	<0.01
EMB 15	Annual	24/03/2023	<2	<3	<2	<2	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01	<0.01
EMB 7	Annual	24/03/2023	<2	<3	<2	<2	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.01	<0.01
EMB 12	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site ID	Sampling R	Date	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EMB 12	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	30/06/2022	<0.01	<0.01	<0.01	<0.01	2.6	14	13	4.7	3.1	0.39	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	110
EMB 14	Quarterly	30/06/2022	<0.01	<0.01	<0.01	<0.01	0.23	0.77	0.49	0.47	0.15	0.15	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.11
EMB 15	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	29/09/2022	<0.01	<0.01	<0.01	<0.01	1.2	6.7	4.1	1.9	1.4	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	49
EMB 14	Quarterly	29/09/2022	<0.01	<0.01	<0.01	<0.01	0.35	1.2	0.74	0.69	0.19	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.1
EMB 15	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	21/12/2022	<0.01	<0.01	<0.01	<0.01	1	4.6	4.8	1.7	1	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	41
EMB 14	Quarterly	21/12/2022	<0.01	<0.01	<0.01	<0.01	0.16	0.39	0.28	0.32	0.11	0.12	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05
EMB 15	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Annual	24/03/2023	<0.01	<0.01	<0.01	<0.01	<0.05	0.04	0.03	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.01	< 0.05
EMB 13	Annual	24/03/2023	<0.01	<0.01	<0.01	<0.01	2.2	12	11	4.1	2.4	0.08	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	66
EMB 14	Annual	24/03/2023	<0.01	<0.01	<0.01	<0.01	0.1	0.29	0.2	0.23	0.08	0.09	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.01	0.13
EMB 15	Annual	24/03/2023	<0.01	<0.01	<0.01	<0.01	<0.05	0.12	0.08	0.07	0.02	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.01	< 0.05
EMB 7	Annual	24/03/2023	0.01	<0.01	0.02	<0.01	2.2	6.3	12	2.1	5.4	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.39	120
EMB 12	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site ID	Sampling R	Date	8:2 FTS	10:2 FTS	Sum of PFA	Sum of PFH	Sum of PFA	Phenol	2-Chloroph	2-Methylp	3- & 4-Met	2-Nitrophe	2.4-Dimeth	2.4-Dichlor	2.6-Dichlor	4-Chloro-3	2.4.6-Trich	2.4.5-Trich	Pentachlor	2-Ethoxyet	2-Butoxyet	Propylene	Ethylene g	Diethylene	Diethylene	Triethylene
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EMB 12	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	30/06/2022	2.6	<0.01	150.49	<0.01	150	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 14	Quarterly	30/06/2022	0.02	<0.01	2.39	<0.01	2.24	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 15	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	30/06/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/07/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	19/08/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	29/09/2022	0.97	<0.01	65.36	<0.01	65.27	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 14	Quarterly	29/09/2022	0.02	<0.01	3.43	<0.01	3.29	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 15	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	29/09/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	26/10/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	21/12/2022	0.99	<0.01	55.19	1	55.09	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 14	Quarterly	21/12/2022	0.02	<0.01	1.4	0.11	1.28	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EMB 15	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	21/12/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/01/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	27/02/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Annual	24/03/2023	< 0.01	< 0.01	0.1	< 0.01	0.09	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<2000	<2000	<2000	<2000	<2000	<2000	<2000
EMB 13	Annual	24/03/2023	1.6	< 0.01	99.46	< 0.01	99.3	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<2000	<2000	<2000	<2000	<2000	<2000	<2000
EMB 14	Annual	24/03/2023	0.01	< 0.01	1.13	< 0.01	1.04	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<2000	<2000	<2000	<2000	<2000	<2000	<2000
EMB 15	Annual	24/03/2023	< 0.01	< 0.01	0.29	< 0.01	0.29	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<2000	<2000	<2000	<2000	<2000	<2000	<2000
EMB 7	Annual	24/03/2023	0.42	< 0.01	148.94	0.03	148.45	3	<3	<3	<6	<10	<3	<3	<3	<10	<10	<10	<10	<2000	<2000	<2000	<2000	<2000	<2000	<2000
EMB 12	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	28/04/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site ID	Sampling R	Date	Total PCBs	Total Cyani
			µg/L	µg/L
EMB 12	Quarterly	30/06/2022	-	-
EMB 13	Quarterly	30/06/2022	<5	5
EMB 14	Quarterly	30/06/2022	<5	5
EMB 15	Quarterly	30/06/2022	-	-
EMB 7	Quarterly	30/06/2022	-	-
EMB 12	Monthly	21/07/2022	-	-
EMB 13	Monthly	21/07/2022	-	-
EMB 14	Monthly	21/07/2022	-	-
EMB 15	Monthly	21/07/2022	-	-
EMB 7	Monthly	21/07/2022	-	-
EMB 12	Monthly	19/08/2022	-	-
EMB 13	Monthly	19/08/2022	-	-
EMB 14	Monthly	19/08/2022	-	-
EMB 15	Monthly	19/08/2022	-	-
EMB 7	Monthly	19/08/2022	-	-
EMB 12	Quarterly	29/09/2022	-	-
EMB 13	Quarterly	29/09/2022	<5	5
EMB 14	Quarterly	29/09/2022	<5	5
EMB 15	Quarterly	29/09/2022	-	-
EMB 7	Quarterly	29/09/2022	-	-
EMB 12	Monthly	26/10/2022	-	-
EMB 13	Monthly	26/10/2022	-	-
EMB 14	Monthly	26/10/2022	-	-
EMB 15	Monthly	26/10/2022	-	-
EMB 7	Monthly	26/10/2022	-	-
EMB 12	Monthly	30/11/2022	-	-
EMB 13	Monthly	30/11/2022	-	-
EMB 14	Monthly	30/11/2022	-	-
EMB 15	Monthly	30/11/2022	-	-
EMB 7	Monthly	30/11/2022	-	-
EMB 12	Quarterly	21/12/2022	-	-
EMB 13	Quarterly	21/12/2022	<5	5
EMB 14	Quarterly	21/12/2022	<5	5
EMB 15	Quarterly	21/12/2022	-	-
EMB 7	Quarterly	21/12/2022	-	-
EMB 12	Monthly	25/01/2023	-	-
EMB 13	Monthly	25/01/2023	-	-
EMB 14	Monthly	25/01/2023	-	-
EMB 15	Monthly	25/01/2023	-	-
EMB 7	Monthly	25/01/2023	-	-
EMB 12	Monthly	27/02/2023	-	-
EMB 13	Monthly	27/02/2023	-	-
EMB 14	Monthly	27/02/2023	-	-
EMB 15	Monthly	27/02/2023	-	-
EMB 7	Monthly	27/02/2023	-	-
EMB 12	Annual	24/03/2023	<5	0.005
EMB 13	Annual	24/03/2023	<5	5
EMB 14	Annual	24/03/2023	<5	5
EMB 15	Annual	24/03/2023	<5	0.005
EMB 7	Annual	24/03/2023	<5	0.005
EMB 12	Monthly	28/04/2023	-	-
EMB 13	Monthly	28/04/2023	-	-
EMB 14	Monthly	28/04/2023	-	-
EMB 15	Monthly	28/04/2023	-	-
EMB 7	Monthly	28/04/2023	-	-
EMB 12	Monthly	30/05/2023	-	-
EMB 13	Monthly	30/05/2023	-	-
EMB 14	Monthly	30/05/2023	-	-
EMB 15	Monthly	30/05/2023	-	-
EMB 7	Monthly	30/05/2023	-	-

Appendix E Stormwater Procedure

Storm Water Assessment, Monitoring and Discharge Procedure

1 Purpose

To ensure contaminated storm water is not released to the Darwin Harbour environment and to set the framework for monitoring and record keeping to maintain compliance with EPA Licence obligations.

2 Risk Analysis (use Procedure 6.3 Risk Analysis)

2.1 Environmental Aspects and Impacts

INPUT	ASPECT	IMPACT	RISK		OUTPUT	ASPECT	IMPACT	RISK
Rain	Leak /Spill	Contaminated Storm water	7		Storm water	Release to Environment (28)	Contaminated Storm water	7

2.2 Workplace Health and Safety Requirements

Risk	Consequence	Likelihood	Risk Score	Mitigation	Consequence	Likelihood	Residual Risk Score
Exposure to waste materials	Minor	Possible	9	Use of correct sampling equipment & PPE	Minor	Unlikely	5
Fall into stormwater pit	Major	Could happen at some time	17	Barriers around the stormwater system and appropriate sampling equipment	Major	May happen, only in exceptional circumstances	6

2.3 Business and Quality

Risk	Consequence	Residual Risk Score
Release of contaminated storm water to environment (28)	Breach of EPA license	7
Release of contaminated storm water to environment (28)	Impact Vopak license compliance & damage relationship with Vopak	7

2.4 Risk Control (Business, WH&S and Environmental)

Waste storage and production areas are bunded. All storage and production bunds are kept isolated from the storm water system unless approved for discharge. All storm water collected on site is directed to a baffled discharge pit. This pit discharges through a single, lockable gate valve. This gate valve is left closed to prevent the accidental discharge of waste or contaminated water to environment in the case of a spill or incident that has released material into the site storm water drainage system.

Following rain, storm water in bunds and in the storm water system is to be assessed to ensure that it is fit for discharge before it is transferred or discharged to environment.

The storm water pit has been built to minimise the risk of accidental entry. Minimum PPE requirements have been set to reduce the risk of accidental/incidental exposure to waste materials. Sampling protocols and equipment have been put in place to minimise expose to waste materials and reduce risk of exposure.

3 Process

Following rain, storm water is to be checked and analysed to ensure that it is not contaminated before it is moved onsite or discharged to environment.

3.1 Beginning of wet season

Following the first rains of the wet season, and before any discharge to environment, water in the stormwater pit is to be visually inspected for the presence of floating debris, oil or petroleum sheen, litter or any other objectionable matter, and sampled for testing by Eurofins for the full suite of tests prior to any release. The water must be retained on site until results are received that demonstrate that it does not exceed any of the trigger values in Table 1 below and is therefore suitable for discharge to environment.

1. Inspect the water in the pit. If there is any visible sign of contamination, such as an oil sheen, foaming, floating matter or any odour or other foreign matter, use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer. Once the pit is empty, any foreign material should be removed and appropriately disposed of. If there is no visible sign of contamination:
2. Collect a sample of water from the final chamber of the stormwater pit and use this water to fill the required sample bottles. Label bottles appropriately and send to Eurofins for the full suite of analysis as listed in Table 1.
3. If results show that any trigger values are exceeded – DO NOT RELEASE WATER TO ENVIRONMENT – use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer.
4. If results show that the water does not exceed any trigger values:
    a. enter the results into the Monitoring spreadsheet *(Add hyperlink to file once procedure and spreadsheet are finalised)*
    b. Complete a stormwater sampling and discharge form (*https://globalresourcerecovery.sharepoint.com/:w:/g/EcCIdmrOhVRLqlhKjQfZofoB9Q9psYm0Ns3ORXolD48kQA?e=kibMPb*)
    c. Notify Vopak of the impending release and provide them with a copy of the analysis results, and;
5. Open the valve to discharge the water to environment

Table 1 – Surface Water Monitoring Parameters from Attachment A of EPA licence EPL 229-01

Parameter	Unit	Trigger Value
Major Ions		
Calcium	mg/L	-
Magnesium	mg/L	-
Sodium	mg/L	-
Potassium	mg/L	-
Carbonate	mg/L	-
Bicarbonate	mg/L	-
Chloride	mg/L	-
Sulphate	mg/L	-
Nutrients		
Total Phosphorous	µg/L	20
Total Nitrogen	µg/L	270
Oxides of Nitrogen	µg/L	20
Ammonium	µg/L	20
Metals and Metalloids (total and filtered)		
Antimony	µg/L	270
Arsenic	µg/L	4.5
Barium	µg/L	-
Beryllium	µg/L	-
Boron	µg/L	5100
Cadmium	µg/L	5.5
Chromium	µg/L	4.4

Cobalt	µg/L	1
Copper	µg/L	1.3
Lead	µg/L	4.4
Manganese	µg/L	80
Mercury (inorganic)	µg/L	0.4
Nickel	µg/L	70
Selenium	µg/L	3
Vanadium	µg/L	100
Zinc	µg/L	15
Hydrocarbons		
BTEXN (benzene, toluene, ethylbenzene, xylene and napthalene)	µg/L	700 (benzene) 180 (toluene) 70 (naphthalene)
Polycyclic aromatic hydrocarbons (PAHs)	µg/L	-
Total Recoverable Hydrocarbons (TRH)	µg/L	-
Organic Alcohols		
Monoethylene Glycol	µg/L	-
Triethylene Glycol	µg/L	-
Other		
PFAS (per and poly-fluoroalkyl substances)	µg/L	0.13 (PFOS) 220 (PFAS)
Polychlorinated Biphenyls (PCBs)	µg/L	-
Total Cyanide	µg/L	4
Phenols	µg/L	400 (Phenol)
Total Suspended Solids (TSS)	mg/L	10
Total Dissolved Solids (TDS)	mg/L	-

3.2 Daily

Following the initial discharge of the wet season, daily field monitoring of the water in the pit is to be undertaken using the portable pH/DO meter. This monitoring must also be undertaken before any discharge of stormwater occurs.

Following any rain event the water level in the storm water pit should be checked, and if the level is above the base of the gate valve consideration should be given to discharging the water to maximise retention capacity.

1. Check with other staff and supervisors to confirm that there have been no spills that may have impacted on the stormwater. If there have been any events of concern – DO NOT RELEASE WATER TO ENVIRONMENT – use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer.
2. Inspect the water in the pit. If there is any visible sign of contamination, such as an oil sheen, foaming, floating matter or any odour or other foreign matter, use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer. Once the pit is empty, any foreign material should be removed and appropriately disposed of. If there is no visible sign of contamination:
3. Collect a sample of water from the final chamber of the stormwater pit, place the probe of the pH/DO meter into the water so the sensors are completely submerged and wait a minute for the readings to stabilise.

4. If results show that any trigger value in Table 2 are exceeded – DO NOT RELEASE WATER TO ENVIRONMENT – use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer.
5. If results show that the water does not exceed any trigger values:
    a. Enter the results into the Monitoring spreadsheet *(Add hyperlink to file once procedure and spreadsheet are finalised)*
    b. Complete a stormwater sampling and discharge form *(Add hyperlink to file once procedure and spreadsheet are finalised)*
    c. Notify Vopak of the impending release and provide them with a copy of the analysis results, and;
6. Open the valve to discharge the water to environment

Table 2: Field measurements for Surface Water Monitoring

Parameter	Unit	Trigger Value
Temperature	ºC	-
pH	pH units	7.0 – 8.5
Electrical Conductivity	µS/cm	-
Dissolved Oxygen	% saturation	80 - 100

Throughout the wet season the rain gauge must also be checked, field parameters measured and the data recorded on a daily basis. This must be completed to provide baseline data against which the water in the stormwater pit can be compared. This is particularly important in the case of pH, as GRR's discharge limits are very narrow, and it is quite common for rainwater in Darwin to have a pH below 7, and in some cases can be as low pH 4.5.

Parameters to be monitored from the rain gauge and recorded in the monitoring spreadsheet are:

1. Rainfall (mm)
2. pH (pH units)
3. Electrical conductivity (uS/cm)
4. Temperature (°C)
5. Dissolved Oxygen (%)

3.3 Monthly

During months of discharge to environment a monthly sample must also be collected and sent to Eurofins for analysis of the parameters in Table 1 to demonstrate compliance with license requirements.

1. Following daily or discharge analysis, use the water collected from the pit to fill the required sample bottles. Label bottles appropriately and send to Eurofins for the full suite of analysis as listed in Table 1.
2. When results are received enter the results into the Monitoring spreadsheet (Add hyperlink to file once procedure and spreadsheet are finalised)

3.4 Transfer from bunds to stormwater

Storm water collected in the bunds surrounding storage and operational areas of the plant is more likely to be contaminated than storm water from non-operational areas of the plant. As a result, more stringent testing requirements are in place before water can be transferred from bunds to the stormwater system. Following rain events, check the levels of water in the bunds. Where significant volumes of water have been retained within the bund, consider discharging and/or transferring it to the WWTP for treatment to maximise storage capacity within each bund.

1. Check with other staff and supervisors to confirm that there have been no spills that may have impacted on the stormwater. If there have been any events of concern – DO NOT RELEASE WATER TO STORM WATER – use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer.
2. Inspect the water in the bund. If there is any visible sign of contamination, such as an oil sheen, foaming, floating matter or any odour or other foreign matter, use a portable pump to move the water into a treatment tank so it

can be treated through the WWTP and discharged to sewer. Once the bund is empty, any foreign material should be removed and appropriately disposed of. If there is no visible sign of contamination:

3. Collect a sample of water from the bund and use this water to fill the required sample bottles. Label bottles appropriately and send to Eurofins for the full suite of analysis as listed in Table 1.
4. If results show that any trigger values are exceeded – DO NOT RELEASE WATER TO STORM WATER – use a portable pump to move the water into a treatment tank so it can be treated through the WWTP and discharged to sewer.
5. If results show that the water does not exceed any trigger values: complete a Bund sampling and discharge form *(Add hyperlink to file once procedure and spreadsheet are finalised)*
6. Open the valve to transfer the water to the stormwater system

4 Skill Requirements

Samples must be collected by, or under the supervision of, a qualified sampler.

5 Records

Record	Where Stored	Responsibility	Retention	Disposal
Stormwater Release Record	Paper at lab/ Electronic on network	General Manager	5 years	Trash
Bund Sampling and Discharge	Paper at lab/ Electronic on network	General Manager	5 years	Trash

6 Current Revision Status

Issue #	Changes	Authorisation	Date
1	New	James Macdonald	6/3/2018
1.1	Minor changes	George Hatzimihalis	1/4/2020
2	Significant Revision to incorporate new license criteria and requirements	James Macdonald	1/9/2021

Appendix F Calibration Records (GRR)

Weekly Lab Conductivity Meter Calibration Log
Created By: Ann Norton
Date Created: 06/11/2020
Approved By: Reviewed By: AN Review Date: 04/01/2021

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Weekly Laboratory Conductivity Meter Calibration Log

Date	Conductivity Meter UIN	Ref Standard 0.0 (µs/cm) Actual Reading	Air Temp °C	Ref Standard 1413 (µs/cm) Actual Reading	Ref Std Temp °C	Ref Standard 5000 (µs/cm) Actual Reading	Ref Std Temp °C	Recalibrated Y/N	Analyst	Entered into Template	COMMENTS
~~PRACTICAL~~											
16·5	pHCM-01			1213	24·5			✓			
23·5	"			1102	23·5			✓			
31·5	"			1452	24·0			✓			
6·6	"			1381	21·3			✓			
14·6	"			1373	22·5			✓			
22·6	"			1378	22·2			✓			
27·6	"			1379	22·4			✓			
4·7	"			1358	22·2			✓			
13·7	"			1353	22·3			✓			
18·7	"			1332	22·7			✓			
25·7				1351	22·8			✓			
2·8	"			1292	22·8			✓			
8·8	"			1382	21·8			✓			
22·8	"			1419	22·8			✓			
29·8				1363	24·0			✓			
5·9	"			1304	25·5			✓			
19·9	"			1247	24·7			✓			
26·9	"			1451	24·6			✓			
3·10				1351	25·1			✓			
10·10	"			1350	25·7			✓			
17·10	"			1366	26·4			✓			
11·11	"			1394 ~~1423~~	25·5			✓			
28·11				1394	~~24~~ 25			✓			
14·12				1390	26·0			✓			
7·3·23				1391	22			✓			
20·3·				1445	21·8			✓			
18·4·23	"			1500				✓			

Weekly Lab Conductivity Meter Calibration Log
Created By: Ann Norton
Date Created: 06/11/2020
Approved By: Reviewed By: AN Review Date: 04/01/2021

Weekly Laboratory Conductivity Meter Calibration Log

Date	Conductivity Meter UIN	Ref Standard 0.0 (µs/cm) Actual Reading	Air Temp °C	Ref Standard 1413 (µs/cm) Actual Reading	Ref Std Temp °C	Ref Standard 5000 (µs/cm) Actual Reading	Ref Std Temp °C	Recalibrated Y/N	Analyst	Entered into Template	COMMENTS
24.4.23	"			1386	28.6			✓	MH		
11.5.23	"			1460	23.8			✓	[illegible]		
29.5	"			1468	26.2			✓	[illegible]		
13.6	"			1438	26.4			✓	[illegible]		
26.6	"			1443	25.7			✓	[illegible]		
10.7	"			1434	25.9			✓	[illegible]		

Daily Lab pH Meter Calibration Log
Created By: Ann Norton
Date Created: 06/10/2020
Approved By: Reviewed By: AN Review Date: 29/12/2020

Daily Laboratory pH Meter Calibration Log

Date	pH Meter UIN	Ref Buffer 4.0 Actual Reading	Ref Buffer 7.0 Actual Reading	Ref Buffer 10.0 Actual Reading	Calibrated Y/N	Analyst	Entered	COMMENTS
2/8/22	PHCM-01	3.76	7.01	9.97	✓			
9/8	↓	4.01	6.97	9.89	✓			
16/8		3.96	6.89	10.01	✓			
23/8		3.98	6.97	10.01	✓			
30/8		3.86	6.89	9.87	✓			
6/9		4.00	7.01	9.86	✓			
13/9		3.98	6.98	9.80	✓			
20/9		3.94	6.93	9.94	✓			
27/9		3.99	6.99	10.01	✓			
3/10		3.98	6.98	10.02	✓			
11/10		4.10	6.75	9.83	✓			
19/10		4.00	6.91	9.80	✓	EZ		
25/10		4.00	6.95	9.95	✓	EZ		
01/11		4.01	6.97	10.08	✓	EZ		
8/11		3.97	6.86	9.94	✓	EZ		
15/11		3.86	6.79	10.00	✓			
22/11		3.79	6.86	9.86	✓			
29/11		3.84	6.91	10.15	✓			
6/12		4.33	6.30	9.98	✓			
13/12		4.24	6.27	9.84	✓			
21.12		4.30	6.17	10.07	✓			
27.12		4.25	6.20	10.06	✓			
4.1.23		4.16	6.35	9.82	✓			
10.1		4.26	6.20	9.88	✓			
17.1		4.25	6.19	9.96	✓			
24.1		4.26	6.15	10.02	✓			
31.1		4.23	7.29	10.22	✓			
8.2		4.40	6.03	10.18	✓			
14.2		4.39	5.90	9.96	✓			
21.2		4.32	6.22	10.03	✓			
1.3		4.30	6.36	10.02	✓			
8.3		4.23	6.42	9.90	✓			
15.3		4.26	6.25	10.00	✓			
21.3		4.31	6.05	9.98	✓			

Weekly Lab pH Meter Calibration Log
Created By: Ann Norton
Date Created: 06/10/2020
Approved By: Reviewed By: AN Review Date: 29/12/2020

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Weekly Laboratory pH Meter Calibration Log

2nd. 1st 3rd.

Date	pH Meter UIN	Ref Buffer 4.0 Actual Reading	Ref Buffer 7.0 Actual Reading	Ref Buffer 10.0 Actual Reading	Calibrated Y/N	Analyst	Entered	COMMENTS
24.4	" "	4.08	7.07	10.16	✓	MH.		
11.5	" "	4.19.	6.60.	10.05	✓	[illegible]		
29.5	" "	4.16	6.60	10.06.	✓	[illegible]		
13.6	" "	4.09.	6.72.	9.81	✓	[illegible]		
19.6	"	4.06.	6.85	9.82.	✓	[illegible]		
26.6	"	4.09	6.80	9.85	✓	[illegible]		
10.7	"	4.06	6.80.	9.83	✓	[illegible]		

Monthly Lab Spectrophotometer Calibration Log
Created By: Ann Norton
Date Created: 24/11/2020
Approved By: Reviewed By: Review Date:

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Monthly Lab Spectrophotometer Calibration Log

Date	Spectro Meter UIN	SYSTEM CHECK	LAMP CHECK	WAVE LENGTH CHECK	BLANK CHECK	Calibrated Y/N	Analyst	Entered	COMMENTS
		PASS (YES/NO)							
5·12	SPM-01	✓	✓	✓	0·02	✓	[illegible]		
29/5/23	"	✓	✓	✓	0·01	✓	[illegible]		
14·6	"	✓	✓	✓	0·02.	✓	[illegible]		
26·6	"	✓	✓	✓	0·02	✓	[illegible]		
2·7	"	✓	✓	✓	0·02	✓	[illegible]		
10·7	"	✓	✓	✓	0·01	✓	[illegible]		

Date	Multi Meter UIN	DO Reference STD 100.0 %	pH Buffer 7 + Temp	pH Buffer 4 + Temp	pH Buffer 10 + Temp	Conductivity STD 1413 / 12880
12.5	4198194	151.0	7.08 24.7	4.25 24.8	9.67 24.8	1070.
16.5	"	96.8.	7.12 25.8.	4.23 25.7	9.67. 25.8	1318.
23.5	"	94.0	7.12 23.5	4.26 23.3.	9.67 23.3	1826.
30.5	"	98.0	7.19 24.5	4.32. 24.3.	9.65 24.5	1799.
6.6	"	108.9.	7.18. 23.2	4.33. 23.3.	9.75. 23.1.	1616.
23.6.	"	121.8.	7.16 23.1.	4.26. 22.9	9.66. 22.9	1905.
28.6	"	82.9.	7.14 22.9	4.26 22.9	9.67. 22.8	1779.
2.8	"	93.9	7.12 24.0	4.26 23.9	9.63. 23.9.	1666.
1.9.22.	"	110.3	7.12. 24.1	4.60 24.1	9.69. 24.2	1800.
29.9.22	"	90.5.	7.11 25.3.	4.29. 25.1.	9.66. 25.1	1775.
3.10.	"	90.8	7.12 25.2	4.29 25.3.	9.69 25.2	1283.
9.10	"	98.2	7.06 26.0	4.14 26.2	9.86 26.0	1460.
17.10.	"	104.6	7.12. 25.5	4.26 25.8	9.63. 25.5	1460
15.11	"	84.9.	7.15 27.3	4.24 27.1	9.47 27.2	1347 / 12490.
21.11	"	96.3.	7.08 24.8	4.35 24.8	9.50 24.5	1350 / 12830
28.11	"	88.5.	7.09. 25.4	4.18 24.3.	9.74 24.7.	1458 / 12540.
5.12	"	107.	7.13. 27.5	4.28 27.5	9.93 27.4	1420 / 11860
14.12.	"	101.9.	7.10 26.3	4.30 26.3	9.82. 26.2	1380 / 11360
13.6.23	"	71.8	7.15 29.0	4.19 29.1	9.66 29.4	932. / 10250
26.6.23	"	89.5	7.12 27.0	4.18 26.8	9.79 27.8	1430
2.7.	"	95.5	7.08 26.5	4.08 26.0	9.90 26.8	1432
10.7	"	96.8	7.05 27.0	4.10 27.1	9.95 27.2	1430

Appendix G Surface Water Laboratory Results

Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **930828-W**
Project name Processing DWN
Project ID GRR DARWIN
Received Date Oct 12, 2022

Client Sample ID			**SWMP**
Sample Matrix			**Water**
Eurofins Sample No.			**M22-Oc0020406**
Date Sampled			**Oct 09, 2022**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	0.05
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	0.05
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	0.05
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	110
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Oc0020406
Date Sampled			Oct 09, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	104
p-Terphenyl-d14 (surr.)	1	%	98
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	130
Tetrachloro-m-xylene (surr.)	1	%	93
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	124
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Oc0020406
Date Sampled			Oct 09, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.01
Chloride	1	mg/L	100
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.06
Sulphate (as SO4)	5	mg/L	6.6
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	250
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.0
Total Nitrogen (as N)*	0.2	mg/L	2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	44
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	75
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	75
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.003
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium	0.02	mg/L	0.10
Barium (filtered)	0.02	mg/L	0.10
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	[G01]< 0.5
Boron (filtered)	0.05	mg/L	[G01]< 0.5
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	0.001
Cobalt (filtered)	0.001	mg/L	0.001
Copper	0.001	mg/L	0.003
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.29
Manganese (filtered)	0.005	mg/L	0.29
Mercury	0.0001	mg/L	0.0001
Mercury (filtered)	0.0001	mg/L	0.0002
Nickel	0.001	mg/L	0.009
Nickel (filtered)	0.001	mg/L	0.009
Selenium	0.001	mg/L	0.005
Selenium (filtered)	0.001	mg/L	0.013
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.87
Zinc (filtered)	0.005	mg/L	0.17

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Oc0020406
Date Sampled			Oct 09, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	21
Magnesium	0.5	mg/L	0.9
Potassium	0.5	mg/L	5.0
Sodium	0.5	mg/L	81
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.11
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.06
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	0.02
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	63
13C5-PFPeA (surr.)	1	%	98
13C5-PFHxA (surr.)	1	%	119
13C4-PFHpA (surr.)	1	%	78
13C8-PFOA (surr.)	1	%	82
13C5-PFNA (surr.)	1	%	87
13C6-PFDA (surr.)	1	%	78
13C2-PFUnDA (surr.)	1	%	89
13C2-PFDoDA (surr.)	1	%	79
13C2-PFTeDA (surr.)	1	%	47
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	75
D3-N-MeFOSA (surr.)	1	%	45
D5-N-EtFOSA (surr.)	1	%	45
D7-N-MeFOSE (surr.)	1	%	51
D9-N-EtFOSE (surr.)	1	%	51
D5-N-EtFOSAA (surr.)	1	%	103
D3-N-MeFOSAA (surr.)	1	%	92

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Oc0020406
Date Sampled			Oct 09, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	0.02
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	0.02
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	0.03
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	0.08
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	70
18O2-PFHxS (surr.)	1	%	69
13C8-PFOS (surr.)	1	%	71
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	0.42
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.06
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	170
13C2-6:2 FTSA (surr.)	1	%	79
13C2-8:2 FTSA (surr.)	1	%	73
13C2-10:2 FTSA (surr.)	1	%	139
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.11
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.09
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.12
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.81
Sum of PFASs (n=30)*	0.1	ug/L	0.83

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Oct 14, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Oct 14, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Oct 14, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Oct 14, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Oct 14, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Oct 14, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Oct 14, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Oct 14, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 14, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Oct 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Oct 12, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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IANZ# 1290

Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Processing DWN
Project ID: GRR DARWIN

Order No.:
Report #: 930828
Phone: 03 9369 4545
Fax:

Received: Oct 12, 2022 10:30 AM
Due: Oct 19, 2022
Priority: 5 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail	Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																										
No / **Sample ID** / **Sample Date** / **Sampling Time** / **Matrix** / **LAB ID**																																										
1 SWMP Oct 09, 2022 Water M22-Oc0020406	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

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QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **943246-W**
Project name Global Resource Recovery
Project ID Processing DWN
Received Date Nov 22, 2022

Client Sample ID			[G01] **SWMP**
Sample Matrix			**Water**
Eurofins Sample No.			**M22-No0051417**
Date Sampled			**Nov 22, 2022**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	0.06
TRH C15-C28	0.1	mg/L	0.7
TRH C29-C36	0.1	mg/L	0.5
TRH C10-C36 (Total)	0.1	mg/L	1.26
Naphthalene[N02]	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	0.09
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 1
TRH >C16-C34	0.1	mg/L	1.0
TRH >C34-C40	0.1	mg/L	0.3
TRH >C10-C40 (total)*	0.1	mg/L	1.39
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	145
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-No0051417
Date Sampled			Nov 22, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	60
p-Terphenyl-d14 (surr.)	1	%	99
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	89
Tetrachloro-m-xylene (surr.)	1	%	54
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	104
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-No0051417
Date Sampled			Nov 22, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.01
Chloride	1	mg/L	8.0
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.03
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	74
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.8
Total Nitrogen (as N)*	0.2	mg/L	0.8
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	11
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.002
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium	0.02	mg/L	0.04
Barium (filtered)	0.02	mg/L	0.03
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	0.07
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.003
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.11
Manganese (filtered)	0.005	mg/L	0.096
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.004
Nickel (filtered)	0.001	mg/L	0.003
Selenium	0.001	mg/L	0.002
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	1.2
Zinc (filtered)	0.005	mg/L	0.95

Client Sample ID			[G01]SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-No0051417
Date Sampled			Nov 22, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	3.6
Magnesium	0.5	mg/L	< 0.5
Potassium	0.5	mg/L	1.1
Sodium	0.5	mg/L	5.7
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.01
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.01
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	101
13C5-PFPeA (surr.)	1	%	105
13C5-PFHxA (surr.)	1	%	110
13C4-PFHpA (surr.)	1	%	118
13C8-PFOA (surr.)	1	%	123
13C5-PFNA (surr.)	1	%	116
13C6-PFDA (surr.)	1	%	106
13C2-PFUnDA (surr.)	1	%	126
13C2-PFDoDA (surr.)	1	%	124
13C2-PFTeDA (surr.)	1	%	111
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	71
D3-N-MeFOSA (surr.)	1	%	66
D5-N-EtFOSA (surr.)	1	%	62
D7-N-MeFOSE (surr.)	1	%	69
D9-N-EtFOSE (surr.)	1	%	65
D5-N-EtFOSAA (surr.)	1	%	86
D3-N-MeFOSAA (surr.)	1	%	85

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-No0051417
Date Sampled			Nov 22, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) N11	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) N15	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) N15	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) N15	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) N11	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) N15	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) N11	0.01	ug/L	0.01
Perfluorodecanesulfonic acid (PFDS) N15	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	106
18O2-PFHxS (surr.)	1	%	108
13C8-PFOS (surr.)	1	%	107
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) N11	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) N11	0.05	ug/L	0.07
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) N11	0.01	ug/L	0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) N11	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	132
13C2-6:2 FTSA (surr.)	1	%	127
13C2-8:2 FTSA (surr.)	1	%	100
13C2-10:2 FTSA (surr.)	1	%	93
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.11
Sum of PFASs (n=30)*	0.1	ug/L	0.11

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Nov 23, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Nov 23, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Nov 23, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Nov 23, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Nov 23, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Nov 23, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Nov 23, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Nov 23, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Nov 23, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Nov 23, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Nov 22, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global Resource Recovery
Project ID: Processing DWN

Order No.:
Report #: 943246
Phone: 03 9369 4545
Fax:

Received: Nov 22, 2022 10:30 AM
Due: Nov 29, 2022
Priority: 5 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail	Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																										
No / **Sample ID** / **Sample Date** / **Sampling Time** / **Matrix** / **LAB ID**																																										
1 SWMP Nov 22, 2022 8:00AM Water M22-No0051417	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **950770-W**
Project name Global Resource Recovery
Project ID Processing DWN
Received Date Dec 15, 2022

Client Sample ID			[G01] **SWMP**
Sample Matrix			**Water**
Eurofins Sample No.			**M22-De0036512**
Date Sampled			**Dec 15, 2022**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	110
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-De0036512
Date Sampled			Dec 15, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	128
p-Terphenyl-d14 (surr.)	1	%	130
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 200
Ethylene glycol*	20	mg/L	< 200
Propylene glycol*	20	mg/L	< 200
Triethylene glycol*	20	mg/L	< 200
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	123
Tetrachloro-m-xylene (surr.)	1	%	107
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	82
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-De0036512
Date Sampled			Dec 15, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.14
Chloride	1	mg/L	17
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.03
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	150
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2
Total Nitrogen (as N)*	0.2	mg/L	< 0.2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	8.4
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	110
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	110
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.001
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium	0.02	mg/L	0.12
Barium (filtered)	0.02	mg/L	0.12
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	0.13
Boron (filtered)	0.05	mg/L	0.13
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.021
Manganese (filtered)	0.005	mg/L	0.019
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.003
Nickel (filtered)	0.001	mg/L	0.003
Selenium	0.001	mg/L	0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.28
Zinc (filtered)	0.005	mg/L	0.26

Client Sample ID			[G01]SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-De0036512
Date Sampled			Dec 15, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	8.3
Magnesium	0.5	mg/L	< 0.5
Potassium	0.5	mg/L	2.0
Sodium	0.5	mg/L	15
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.05
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.08
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	[N09]0.02
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	58
13C5-PFPeA (surr.)	1	%	81
13C5-PFHxA (surr.)	1	%	90
13C4-PFHpA (surr.)	1	%	80
13C8-PFOA (surr.)	1	%	83
13C5-PFNA (surr.)	1	%	83
13C6-PFDA (surr.)	1	%	70
13C2-PFUnDA (surr.)	1	%	38
13C2-PFDoDA (surr.)	1	%	21
13C2-PFTeDA (surr.)	1	%	60
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	61
D3-N-MeFOSA (surr.)	1	%	105
D5-N-EtFOSA (surr.)	1	%	149
D7-N-MeFOSE (surr.)	1	%	68
D9-N-EtFOSE (surr.)	1	%	87
D5-N-EtFOSAA (surr.)	1	%	37
D3-N-MeFOSAA (surr.)	1	%	48

Client Sample ID			[G01]SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-De0036512
Date Sampled			Dec 15, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	[N09]0.05
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	81
18O2-PFHxS (surr.)	1	%	68
13C8-PFOS (surr.)	1	%	69
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	1.0
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.02
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	148
13C2-6:2 FTSA (surr.)	1	%	116
13C2-8:2 FTSA (surr.)	1	%	75
13C2-10:2 FTSA (surr.)	1	%	39
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.05
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.05
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.05
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	1.22
Sum of PFASs (n=30)*	0.1	ug/L	1.22

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Dec 19, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Dec 19, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Dec 19, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Dec 19, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Dec 19, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Dec 19, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Dec 19, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Dec 19, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 19, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Dec 19, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Dec 15, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global Resource Recovery
Project ID: Processing DWN

Order No.: GRR DARWIN
Report #: 950770
Phone: 03 9369 4545
Fax:

Received: Dec 15, 2022 12:00 PM
Due: Dec 20, 2022
Priority: 3 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																																									
1	SWMP	Dec 15, 2022		Water	M22-De0036512	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-PFAS
Scott Beddoes	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
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VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **959638-W**
Project name Global Resource Recovery
Project ID Processing DWN
Received Date Feb 01, 2023

Client Sample ID			[G01] **SWMP 2022301313**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0001318**
Date Sampled			**Jan 31, 2023**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001

Client Sample ID			G01 SWMP 2022301313
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0001318
Date Sampled			Jan 31, 2023
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	78
p-Terphenyl-d14 (surr.)	1	%	85
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	68
Tetrachloro-m-xylene (surr.)	1	%	83
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	61
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			G01 SWMP 2022301313
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0001318
Date Sampled			Jan 31, 2023
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.01
Chloride	1	mg/L	9.6
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.02
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	< 10
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.6
Total Nitrogen (as N)*	0.2	mg/L	0.6
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.003
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium	0.02	mg/L	0.09
Barium (filtered)	0.02	mg/L	0.09
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.004
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.079
Manganese (filtered)	0.005	mg/L	0.068
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.002
Nickel (filtered)	0.001	mg/L	0.002
Selenium	0.001	mg/L	0.003
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.50
Zinc (filtered)	0.005	mg/L	0.41

Client Sample ID			[G01]SWMP 2022301313
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0001318**
Date Sampled			**Jan 31, 2023**
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	4.5
Magnesium	0.5	mg/L	< 0.5
Potassium	0.5	mg/L	1.5
Sodium	0.5	mg/L	9.1
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.06
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.03
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	[N09]0.02
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	81
13C5-PFPeA (surr.)	1	%	83
13C5-PFHxA (surr.)	1	%	117
13C4-PFHpA (surr.)	1	%	123
13C8-PFOA (surr.)	1	%	113
13C5-PFNA (surr.)	1	%	128
13C6-PFDA (surr.)	1	%	138
13C2-PFUnDA (surr.)	1	%	109
13C2-PFDoDA (surr.)	1	%	126
13C2-PFTeDA (surr.)	1	%	104
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	125
D3-N-MeFOSA (surr.)	1	%	86
D5-N-EtFOSA (surr.)	1	%	87
D7-N-MeFOSE (surr.)	1	%	85
D9-N-EtFOSE (surr.)	1	%	91
D5-N-EtFOSAA (surr.)	1	%	103
D3-N-MeFOSAA (surr.)	1	%	113

Client Sample ID			G01 SWMP 2022301313
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0001318**
Date Sampled			**Jan 31, 2023**
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) N11	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) N15	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) N15	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) N15	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) N11	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) N15	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) N11	0.01	ug/L	< 0.01
Perfluorodecanesulfonic acid (PFDS) N15	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	117
18O2-PFHxS (surr.)	1	%	102
13C8-PFOS (surr.)	1	%	108
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) N11	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) N11	0.05	ug/L	0.10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) N11	0.01	ug/L	0.02
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) N11	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	142
13C2-6:2 FTSA (surr.)	1	%	107
13C2-8:2 FTSA (surr.)	1	%	120
13C2-10:2 FTSA (surr.)	1	%	141
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.23
Sum of PFASs (n=30)*	0.1	ug/L	0.23

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Feb 02, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Feb 02, 2023	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Feb 02, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Feb 02, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Feb 02, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Feb 02, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Feb 02, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Feb 02, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 02, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Feb 02, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Feb 01, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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Christchurch 7675
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IANZ# 1290

Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global Resource Recovery
Project ID: Processing DWN

Order No.: GRR DARWIN
Report #: 959638
Phone: 03 9369 4545
Fax:

Received: Feb 1, 2023 12:30 PM
Due: Feb 6, 2023
Priority: 3 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																																										
1	SWMP 2022301313	Jan 31, 2023		Water	M23-Fe0001318	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Michael Morrison	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic
Vivian Wang	Senior Analyst-Volatile



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

Attention: **Darwin Operation**

Report **964309-W**
Project name Global Resource Recovery
Project ID Processing DWN
Received Date Feb 16, 2023

Client Sample ID			**SWMP**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Fe0037306**
Date Sampled			**Feb 16, 2023**
Test/Reference	LOR	Unit	
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	124
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 1
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	0.5
TRH C29-C36	0.1	mg/L	0.4
TRH C10-C36 (Total)	0.1	mg/L	0.9
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	0.07
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 1
TRH >C16-C34	0.1	mg/L	0.7
TRH >C34-C40	0.1	mg/L	0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.87
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0037306
Date Sampled			Feb 16, 2023
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	76
p-Terphenyl-d14 (surr.)	1	%	98
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	66
Tetrachloro-m-xylene (surr.)	1	%	54
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	66
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0037306
Date Sampled			Feb 16, 2023
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	
Chloride	1	mg/L	8.5
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.04
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	43
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.4
Total Nitrogen (as N)*	0.2	mg/L	2.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	8.6
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	27
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	27
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.002
Arsenic (filtered)	0.001	mg/L	0.001
Barium	0.02	mg/L	0.08
Barium (filtered)	0.02	mg/L	0.06
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.002
Copper (filtered)	0.001	mg/L	0.002
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.035
Manganese (filtered)	0.005	mg/L	0.037
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.002
Nickel (filtered)	0.001	mg/L	0.002
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.23
Zinc (filtered)	0.005	mg/L	0.23

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0037306
Date Sampled			Feb 16, 2023
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	4.8
Magnesium	0.5	mg/L	< 0.5
Potassium	0.5	mg/L	1.4
Sodium	0.5	mg/L	7.3
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.02
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.02
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	80
13C5-PFPeA (surr.)	1	%	112
13C5-PFHxA (surr.)	1	%	110
13C4-PFHpA (surr.)	1	%	115
13C8-PFOA (surr.)	1	%	127
13C5-PFNA (surr.)	1	%	122
13C6-PFDA (surr.)	1	%	119
13C2-PFUnDA (surr.)	1	%	100
13C2-PFDoDA (surr.)	1	%	92
13C2-PFTeDA (surr.)	1	%	87
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	106
D3-N-MeFOSA (surr.)	1	%	61
D5-N-EtFOSA (surr.)	1	%	55
D7-N-MeFOSE (surr.)	1	%	84
D9-N-EtFOSE (surr.)	1	%	88
D5-N-EtFOSAA (surr.)	1	%	111
D3-N-MeFOSAA (surr.)	1	%	117

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-Fe0037306
Date Sampled			Feb 16, 2023
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	[N09]0.04
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	106
18O2-PFHxS (surr.)	1	%	101
13C8-PFOS (surr.)	1	%	113
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.03
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	136
13C2-6:2 FTSA (surr.)	1	%	98
13C2-8:2 FTSA (surr.)	1	%	83
13C2-10:2 FTSA (surr.)	1	%	109
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.04
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.04
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.04
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.16
Sum of PFASs (n=30)*	0.1	ug/L	0.16

DRAFT

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
BTEX	Melbourne	Feb 17, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Feb 18, 2023	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Feb 27, 2023	28 Days
- Method: LTM-INO-4200 Ammonia by Discrete Analyser			
Cyanide (total)	Melbourne	Feb 17, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Feb 17, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Feb 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Feb 20, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury	Melbourne	Feb 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury (filtered)	Melbourne	Feb 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Feb 20, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Feb 17, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 17, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Feb 17, 2023	28 Days

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Description	Testing Site	Extracted	Holding Time
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Feb 17, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Feb 16, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

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Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global Resource Recovery
Project ID: Processing DWN

Order No.: GRR Darwin
Report #: 964309
Phone: 03 9369 4545
Fax:

Received: Feb 16, 2023 2:50 PM
Due: Feb 23, 2023
Priority: 5 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonium	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Perth Laboratory - NATA # 2377 Site # 2370						X																																									
External Laboratory																																															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																																										
1	SWMP	Feb 16, 2023		Water	M23-Fe0037306	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Carroll Lee	Senior Analyst-Volatile
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal

Glenn Jackson
General Manager

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- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **978422-W**
Project name Global Resource Recovery
Project ID Processing DWN
Received Date Apr 05, 2023

Client Sample ID			**SWMP 20230403**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Ap0008884**
Date Sampled			**Apr 03, 2023**
Test/Reference	LOR	Unit	
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	80
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	0.05
TRH C15-C28	0.1	mg/L	0.7
TRH C29-C36	0.1	mg/L	0.6
TRH C10-C36 (Total)	0.1	mg/L	1.37
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	0.08
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.08
TRH >C16-C34	0.1	mg/L	1.2
TRH >C34-C40	0.1	mg/L	0.4
TRH >C10-C40 (total)*	0.1	mg/L	1.68
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001

Client Sample ID			SWMP 20230403
Sample Matrix			Water
Eurofins Sample No.			M23-Ap0008884
Date Sampled			Apr 03, 2023
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	92
p-Terphenyl-d14 (surr.)	1	%	77
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	83
Tetrachloro-m-xylene (surr.)	1	%	70
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	56
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP 20230403
Sample Matrix			Water
Eurofins Sample No.			M23-Ap0008884
Date Sampled			Apr 03, 2023
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.01
Chloride	1	mg/L	4.6
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	< 0.01
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	50
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.1
Total Nitrogen (as N)*	0.2	mg/L	2.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	15
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	< 20
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.002
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium	0.02	mg/L	0.07
Barium (filtered)	0.02	mg/L	0.06
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.5
Boron (filtered)	0.05	mg/L	< 0.5
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.004
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.046
Manganese (filtered)	0.005	mg/L	0.034
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.005
Nickel (filtered)	0.001	mg/L	0.004
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	0.009
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.23
Zinc (filtered)	0.005	mg/L	0.16

Client Sample ID			SWMP 20230403
Sample Matrix			Water
Eurofins Sample No.			M23-Ap0008884
Date Sampled			Apr 03, 2023
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	3.1
Magnesium	0.5	mg/L	< 0.5
Potassium	0.5	mg/L	1.2
Sodium	0.5	mg/L	6.1
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.01
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.01
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	68
13C5-PFPeA (surr.)	1	%	98
13C5-PFHxA (surr.)	1	%	101
13C4-PFHpA (surr.)	1	%	84
13C8-PFOA (surr.)	1	%	67
13C5-PFNA (surr.)	1	%	64
13C6-PFDA (surr.)	1	%	62
13C2-PFUnDA (surr.)	1	%	67
13C2-PFDoDA (surr.)	1	%	44
13C2-PFTeDA (surr.)	1	%	88
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	56
D3-N-MeFOSA (surr.)	1	%	44
D5-N-EtFOSA (surr.)	1	%	40
D7-N-MeFOSE (surr.)	1	%	37
D9-N-EtFOSE (surr.)	1	%	34
D5-N-EtFOSAA (surr.)	1	%	41
D3-N-MeFOSAA (surr.)	1	%	50

Client Sample ID			SWMP 20230403
Sample Matrix			**Water**
Eurofins Sample No.			**M23-Ap0008884**
Date Sampled			**Apr 03, 2023**
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	107
18O2-PFHxS (surr.)	1	%	79
13C8-PFOS (surr.)	1	%	68
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	88
13C2-6:2 FTSA (surr.)	1	%	65
13C2-8:2 FTSA (surr.)	1	%	59
13C2-10:2 FTSA (surr.)	1	%	50
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
BTEX	Melbourne	Apr 06, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Apr 06, 2023	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Apr 06, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Apr 06, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	Apr 06, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Apr 06, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury (filtered)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Apr 06, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Apr 06, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Apr 06, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Apr 06, 2023	28 Days

Description	Testing Site	Extracted	Holding Time
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 06, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 05, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1290

Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global Resource Recovery
Project ID: Processing DWN

Order No.: GRR Darwin
Report #: 978422
Phone: 03 9369 4545
Fax:

Received: Apr 5, 2023 10:15 AM
Due: Apr 14, 2023
Priority: 5 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																																										
1	SWMP 20230403	Apr 03, 2023		Water	M23-Ap0008884	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Metal
Carroll Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Darwin Operation**

Report **985997-W**
Project name Global resource recovery
Project ID Processing Darwin
Received Date May 03, 2023

Client Sample ID			[G01] **SWMP**
Sample Matrix			**Water**
Eurofins Sample No.			**M23-My0006911**
Date Sampled			**May 03, 2023**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.1
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
TRH C6-C10	0.02	mg/L	< 0.1
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.1
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.005
Toluene	0.001	mg/L	< 0.005
Ethylbenzene	0.001	mg/L	< 0.005
m&p-Xylenes	0.002	mg/L	< 0.01
o-Xylene	0.001	mg/L	< 0.005
Xylenes - Total*	0.003	mg/L	< 0.015
4-Bromofluorobenzene (surr.)	1	%	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.05
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-My0006911
Date Sampled			May 03, 2023
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	53
p-Terphenyl-d14 (surr.)	1	%	56
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	73
Tetrachloro-m-xylene (surr.)	1	%	72
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	20
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			G01 SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-My0006911
Date Sampled			May 03, 2023
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.20
Chloride	1	mg/L	19
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	0.06
Nitrate (as N)	0.02	mg/L	0.05
Nitrite (as N)	0.02	mg/L	< 0.02
Phosphate total (as P)	0.01	mg/L	8.1
Sulphate (as SO4)	5	mg/L	< 5
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	96
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.5
Total Nitrogen (as N)*	0.2	mg/L	0.56
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	51
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20
Total Alkalinity (as CaCO3)	20	mg/L	51
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.003
Arsenic (filtered)	0.001	mg/L	0.002
Barium	0.02	mg/L	0.12
Barium (filtered)	0.02	mg/L	0.12
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	0.08
Boron (filtered)	0.05	mg/L	0.08
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.002
Copper (filtered)	0.001	mg/L	0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.039
Manganese (filtered)	0.005	mg/L	< 0.005
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.003
Nickel (filtered)	0.001	mg/L	0.003
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.28
Zinc (filtered)	0.005	mg/L	0.19

Client Sample ID			[G01]SWMP
Sample Matrix			Water
Eurofins Sample No.			M23-My0006911
Date Sampled			May 03, 2023
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	11
Magnesium	0.5	mg/L	0.7
Potassium	0.5	mg/L	2.9
Sodium	0.5	mg/L	19
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	0.06
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.06
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	0.03
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	0.02
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	106
13C5-PFPeA (surr.)	1	%	118
13C5-PFHxA (surr.)	1	%	137
13C4-PFHpA (surr.)	1	%	135
13C8-PFOA (surr.)	1	%	141
13C5-PFNA (surr.)	1	%	132
13C6-PFDA (surr.)	1	%	110
13C2-PFUnDA (surr.)	1	%	96
13C2-PFDoDA (surr.)	1	%	88
13C2-PFTeDA (surr.)	1	%	86
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.1
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.1
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	147
D3-N-MeFOSA (surr.)	1	%	164
D5-N-EtFOSA (surr.)	1	%	168
D7-N-MeFOSE (surr.)	1	%	65
D9-N-EtFOSE (surr.)	1	%	66
D5-N-EtFOSAA (surr.)	1	%	85
D3-N-MeFOSAA (surr.)	1	%	87

Client Sample ID			[G01]SWMP
Sample Matrix			**Water**
Eurofins Sample No.			**M23-My0006911**
Date Sampled			**May 03, 2023**
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	[N09]0.02
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	128
18O2-PFHxS (surr.)	1	%	132
13C8-PFOS (surr.)	1	%	117
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	0.30
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	0.08
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	147
13C2-6:2 FTSA (surr.)	1	%	99
13C2-8:2 FTSA (surr.)	1	%	93
13C2-10:2 FTSA (surr.)	1	%	102
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.02
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.04
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.04
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.57
Sum of PFASs (n=30)*	0.1	ug/L	0.57

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	May 04, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	May 04, 2023	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	May 04, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	May 04, 2023	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	May 04, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103 °C to 105 °C	Melbourne	May 04, 2023	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	May 04, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	May 04, 2023	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	May 04, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	May 04, 2023	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	May 04, 2023	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	May 04, 2023	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	May 04, 2023	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	May 04, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	May 04, 2023	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	May 04, 2023	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	May 04, 2023	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	May 04, 2023	28 Days

Description	Testing Site	Extracted	Holding Time
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180 °C ± 2 °C	Melbourne	May 04, 2023	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	May 04, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	May 04, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	May 04, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	May 04, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	May 03, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1290

Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: Global resource recovery
Project ID: Processing Darwin

Order No.: GRR DARWIN
Report #: 985997
Phone: 03 9369 4545
Fax:

Received: May 3, 2023 3:08 PM
Due: May 10, 2023
Priority: 5 Day
Contact Name: Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at 103 °C to	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx),	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																																															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																																										
1	SWMP	May 03, 2023		Water	M23-My0006911	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

QC Data General Comments

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

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Mele Singh	Senior Analyst-Volatile



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Appendix H Surface Water Data 2022/2023

PARAMETER	UNITS	Default Guideline Value	October	November	December	January	February	March	April	May
			Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point
		Sample Date	9/10/22	22/11/22	15/12/22	31/01/2023	16/02/2023	14/03/2023	03-April-2023	
		Report Number	M22-Oct20406	M22-No51417	M22-De0036512	M23-Fe0001318	M23-Fe0037306	M23-Ma0033110	M23-Ap0008884	
		Name of person collecting sample	Sue McWhirter	Sue McWhirter	Sue McWhirter	Madhan Krishnan	Makeisha Hunter	Makeisha Hunter	Madhan Krishnan	
			Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Major Ions										
Calcium	mg/L	-	21	3.6	8.3	4.5	4.8	11	3.1	
Magnesium	mg/L	-	0.9	0.5	0.5	0.5	0.5	0.7	0.5	
Sodium	mg/L	-	81	5.7	15	9.1	7.3	24	6.1	
Potassium	mg/L	-	5	1.1	2	1.5	1.4	2.9	1.2	
Carbonate	mg/L	-	<10	<10	<10	<10	<10	<10	<10	
Bicarbonate	mg/L	-	75	20	110	20	27	36	20	
Chloride	mg/L	-	100	8	17	9.6	8.5	29	4.6	
Sulphate	mg/L	-	6.6	5	5	5	5	5.3	5	
Nutrients										
Total Phosphorous	mg/L	0.02	0.06	0.03	0.03	0.02	0.04	0.03	0.01	
Total Nitrogen	mg/L	0.27	2	0.8	0.2	0.6	2.4	6.2	2.1	
Oxides of Nitrogen	mg/L	0.02	0.05							
Ammonium	mg/L	0.02	0.01	0.01	0.14	0.01	0.01	0.01	0.01	
Metals and Metalloids										
Antimony	mg/L	0.27	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Antimony (filtered)	mg/L	0.27	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Arsenic	mg/L	0.0045	0.003	0.002	0.001	0.003	0.002	0.009	0.002	
Arsenic (filtered)	mg/L	0.0045	0.001	0.001	0.001	0.001	0.001	0.005	0.001	
Barium	mg/L	-	0.1	0.04	0.12	0.09	0.08	0.32	0.07	
Barium (filtered)	mg/L	-	0.1	0.03	0.12	0.09	0.06	0.3	0.06	
Beryllium	mg/L	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Beryllium (filtered)	mg/L	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Boron	mg/L	5.1	0.5	0.07	0.13	0.05	0.05	0.1	0.5	
Boron (filtered)	mg/L	5.1	0.5	0.05	0.13	0.05	0.05	0.1	0.5	
Cadmium	mg/L	0.0055	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Cadmium (filtered)	mg/L	0.0055	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	
Chromium IV	mg/L	0.0044	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Chromium IV (filtered)	mg/L	0.0044	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Cobalt	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	
Cobalt (filtered)	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	
Copper	mg/L	0.0013	0.003	0.003	0.001	0.004	0.002	0.004	0.004	
Copper (filtered)	mg/L	0.0013	0.001	0.001	0.001	0.001	0.002	0.003	0.001	
Lead	mg/L	0.0044	0.001	0.001	0.001	0.001	0.001	0.001	0.001	

Lead (filtered)	mg/L	0.0044	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Manganese	mg/L	0.08	0.29	0.11	0.021	0.079	0.035	0.22	0.046	
Manganese (filtered)	mg/L	0.08	0.29	0.096	0.019	0.068	0.037	0.2	0.034	
Mercury (inorganic)	mg/L	0.0004	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Mercury (inorganic) (filtered)	mg/L	0.0004	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Nickel	mg/L	0.07	0.009	0.004	0.003	0.002	0.002	0.008	0.005	
Nickel (filtered)	mg/L	0.07	0.009	0.003	0.003	0.002	0.002	0.007	0.004	
Selenium	mg/L	0.003	0.005	0.002	0.001	0.003	0.001	0.001	0.001	
Selenium (filtered)	mg/L	0.003	0.013	0.001	0.001	0.001	0.001	0.001	0.001	
Vanadium	mg/L	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.009	
Vanadium (filtered)	mg/L	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Zinc	mg/L	0.015	0.87	1.2	0.28	0.5	0.23	1.8	0.23	
Zinc (filtered)	mg/L	0.015	0.17	0.95	0.26	0.41	0.23	1.7	0.16	
Hydrocarbons										
Benzene	mg/L	0.7	0.001	0.1	0.1	0.1	0.1	0.001	0.001	
Toluene	mg/L	0.18	0.001	0.1	0.1	0.1	0.1	0.001	0.001	
Ethylbenzene	mg/L	-	0.001	0.1	0.1	0.1	0.1	0.001	0.001	
Xylene Total	mg/L	-	0.003	0.1	0.3	0.3	0.1	0.003	0.002	
Naphthalene	mg/L	0.07	0.01	1	1	1	1	0.01	0.01	
Polycyclic Aromatic Hydrocarbons (PAHs)	mg/L	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Total Recoverable Hydrocarbons (TRH)	mg/L	-	0.1	2	0.1	0.1		2.92	1.68	
Organic Alcohols										
Monoethlylene Glycol	mg/L	-	20	20	200	20	20	20	20	
Triethylene Glycol	mg/L	-	20	20	200	20	20	20	20	
Other										
PFOS	µg/L	0.13	0.11	0.01	0.01	0.01	0.04	0.05	0.01	
PFAS	µg/L	220	0.83	0.11	1.22	0.23	0.16	0.16	0.1	
Polychlorinated Biphenyls (PCBs)	mg/L	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Total Cyanide	mg/L	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Phenols Halogenated	mg/L	0.4	0.01	0.01	0.01	0.01	0.01	0.01	0.03	
Phenols Non Halogenated	mg/L	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Total Suspended Solids (TSS)	mg/L	10	44	11	8.4	5	8.6	24	15	
Total Dissolved Solids (TDS)	mg/L	-	250	74	150	10	43	200	50	
Compliant?										