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GROUNDWATER MONITORING

SCONE WASTE FACILITY
NOBLET ROAD
SCONE NSW

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ABBREVIATIONS

The following is a list of common abbreviations used in the Contamination Sector within environmental reports.

B(a)P	Benzo(a)Pyrene
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
CLM	Contaminated Land Management
CSM	Conceptual Site Model
DA	Development Application
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	Environment Protection Authority (NSW)
EPL	Environmental Protection License
ESL	Ecological Screening Level
LOR	Limit of Reporting
LOT	Allotment
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environmental and Heritage
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCOC	Potential Contaminant of Concern
PCB	Polychlorinated Biphenyls
QA/QC	Quality Assurance and Quality Control
SAC	Site Acceptance Criteria
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UHSC	Upper Hunter Shire Council
VOC	Volatile Organic Compounds
WHS	Work Health Safety

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1.0 INTRODUCTION

General

Under the requirements of the NSW EPA Environmental Protection Licence (EPL) 5863, Upper Hunter Shire Council (UHSC) is required to conduct quarterly and annual groundwater monitoring of the Scone Waste Facility located on Noblet Road, Scone, NSW, 2337.

The Quarterly Groundwater Monitoring Report provides a snapshot of the groundwater conditions at the Site in relation to the current Site Criteria and satisfies the groundwater monitoring requirements of the EPL. The Annual Groundwater Monitoring Report analyses an additional set of groundwater parameters and also provides a trending analysis of the recent quarterly groundwater monitoring reports.

The Scone Waste Facility is an active landfill, it has the potential to be a polluting activity or to adversely impact the groundwater within the immediate vicinity and down hydraulic gradient of the site if there was a leak within the landfill.

Engage Environmental Services (Engage) was commissioned by UHSC to undertake this Annual round of groundwater monitoring at the site. The groundwater monitoring was carried out on 10th December 2020.

This report has been prepared utilising information supplied by the client, publicly accessible information, information obtained as part of the onsite fieldwork and analysis, information from Government bodies and from experience, knowledge, and current industry practice.

Briefing

The briefing provided by Upper Hunter Shire Council and contained within EPL 5863 indicates that groundwater monitoring is required at five locations on the site, monitoring wells A to E (MWA-MWE). As well as a dam located onsite. Monitoring Well D is located within the landfill and the monitoring well accesses the perched water table (leachate) within the landfill. Comparisons against established criteria and historical data allow for trending of data. Trending of data can highlight seasonal variations, increases in analyte concentrations, decreases in analyte concentrations and fluctuations within the dataset. Over a time period the dataset can reveal increasing/decreasing trends highlighting potential site issues.

Refer to **Figure 1:** *Site Layout with Sample Locations*

2.0 SITE CRITERIA AND SAMPLING FREQUENCY

The groundwater analytical suite and sampling frequency were provided by UHSC and the EPL. Each of the wells have the same sampling regime and analytical suite for sample analysis. The site criterion are sourced from the Australian and New Zealand guidelines for fresh and marine water quality (ANZW 2018) 95% trigger values and National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 2013, unless otherwise stated.

Table 1: Analytes, Site Criteria and Sampling Frequency for Groundwater Monitoring Wells - Quarterly.

	Analytes/Pollutant	Units	Site Criteria NEPM 2013 and ANZW 2018 Fresh Water 95%	Sampling Frequency
IONS	**Calcium**	mg/L	NA	Quarterly
	Alkalinity (total)	mg/L	NA	Quarterly
	Chloride	mg/L	NA	Quarterly
	Fluoride	mg/L	NA	Quarterly
	Potassium[1]	mg/L	410	Quarterly
	Magnesium	mg/L	NA	Quarterly
	Sulphate	mg/L	NA	Quarterly
HEAVY METALS	**Iron**	mg/L	0.3	Quarterly
	Manganese	mg/L	1.9	Quarterly
	Arsenic III & V	mg/L	0.024 (III), 0.013 (V)	Yearly
	Aluminium	mg/L	0.055 (pH> 6.5)	Yearly
	Barium	mg/L	NA	Yearly
	Cadmium	mg/L	0.0002	Yearly
	Cobalt	mg/L	0.001	Yearly
	Copper	mg/L	0.0014	Yearly
	Chromium VI	mg/L	0.001	Yearly
	Chromium III	mg/L	27	Yearly
	Lead	mg/L	0.0034	Yearly
	Mercury	mg/L	0.0006	Yearly
	Zinc	mg/L	0.008	Yearly
PHENO	**Total phenolics**	mg/L	0.32	Quarterly
OCP	**Organochlorine Pesticide**[3] **(OCP)**	mg/L	0.00001	Quarterly
OPP	**OPPs**	mg/L	0.006	Yearly

PCB	**PCBs**	mg/L	0.00001	Yearly
Hydrocarbons	**TRH**	mg/L	0.26	Yearly
	Benzene	mg/L	0.95	Yearly
	Toluene	mg/L	0.18	Yearly
	Ethylbenzene	mg/L	0.3	Yearly
	Xylene (o+p)	mg/l	0.35	Yearly
	PAHs	mg/L	0.016	Yearly
CVCs/ VOCCs	**- Total**	mg/L	NA	Yearly
	Tetrachlorethene (TCE)	mg/L	NA	Yearly
	1,1,2-Trichloroethan e (TCA)	mg/L	6.5	Yearly
	Tetrachloroethene (PCE)	mg/L	0.05	Yearly
	1, 1-Dichloroethene	mg/L	0.03	Yearly
	Vinyl Chloride	mg/L	0.0003	Yearly
MISC. INORGANICS	**pH**	pH	6.5 – 8	Quarterly
	Sodium	mg/L	NA	Quarterly
	Ammonia[2]	mg/L	0.9	Quarterly
	Nitrate	mg/L	50	Quarterly
	Total organic carbon	mg/L	4	Quarterly
	Electrical conductivity (EC)	µS/cm	NA	Quarterly
	Total dissolved solids	mg/L	NA	Yearly
	Biochemical Oxygen Demand	mg/L	NA	Yearly
	Phosphate	mg/L	0.015	Yearly

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.
2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.
3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

3.0 SAMPLING METHODOLOGY

Groundwater Sampling

The five well locations were identified on the site as well as the onsite dam. The site map was cross-referenced to the markings on the monitoring wells to ensure the correct wells were being sampled. Purging and sampling of monitoring wells was conducted in accordance with the NEPM (NEPC, 2013) and the *Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DECC, 2007).

Purging is the process of removing stagnant water from a well, immediately prior to sampling, causing its replacement by groundwater from the adjacent formation that is representative of actual aquifer conditions. In order to determine when a well has been adequately purged, the physical parameters (pH ± 0.1 unit, electrical conductivity ± 5%, temperature ± 0.20, reduction-oxidation (redox) ± 10%; and dissolved oxygen ± 10%.) are monitored while the groundwater is removed during purging.

The physical parameters were measured at regular intervals using a YSI Quatro Pro Plus Water Quality Meter. Stable conditions were indicated by monitoring for three consecutive readings of the physical parameters.

Collection of samples were direct into laboratory issued sampling containers for specific analytes. Samples were obtained using a disposable bailer. Care was taken so the bailer did not contact the sample container. All samples were collected and filled into the correct sample containers, a meniscus was formed on each sampling container prior to sealing to reduce or eliminate head space. The samples were placed immediately into a chilled esky to prevent the loss of potential volatile components.

Decontamination procedures between sampling events and sampling locations was undertaken. Sampling equipment was cleaned before and after sampling to prevent cross contamination. The cleaning procedure included:

- New nitrile disposable gloves for each well;
- Washing and wipe down with phosphate free laboratory grade detergent;
- Rinsing of brush before using brush on equipment;
- Using a brush on equipment if necessary;
- Rinsing with deionised water and wipe down with new wipe if necessary; and,
- New disposable bailer used for each well.

Appropriate decontamination procedures were appropriate during groundwater sampling.

4.0 RESULTS

The five groundwater monitoring wells and dam were sampled during the December 2020 sampling event, results are detailed in **Tables 2** to **13**. Comparisons have been made to the previous round of monitoring (September 2020). Refer to **Attachment 1** – NATA Accredited Laboratory Results and **Attachment 3** – Data Log.

Table 2 – Quarterly Analytes Groundwater Results and Comparison (MWA)

	Analytes	Units	Site Criteria (mg/L)	MWA March 2020	MWA June 2020	MWA Sept 2019	MWA Dec 2020
IONS	Calcium	mg/L	NA	570	440	570	600
	Alkalinity (total)	mg/L	NA	500	500	520	480
	Chloride	mg/L	NA	7700	6700	7000	7200
	Fluoride	mg/L	NA	0.1	0.1	<0.1	<0.1
	Potassium[1]	mg/L	410	2.4	2.8	3.0	2.8
	Magnesium	mg/L	NA	1100	940	1100	1200
	Sulphate	mg/L	NA	47	42	47	110
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR	<LOR	<LOR
	Manganese	mg/L	1.9	0.01	0.024	0.037	0.011
Phenols	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR
OCPs	OCP[3]	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.7	6.8	6.7	6.7
	Sodium	mg/L	NA	2000	1700	1900	1900
	Ammonia[2]	mg/L	0.9	<LOR	<LOR	0.079	<LOR
	Nitrate	mg/L	0.7	0.56	0.57	0.014	0.49
	Total Organic	mg/L	4	4	4	2	4
	EC	µS/cm	NA	19000	19000	19000	19000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 3 – Yearly Analytes Groundwater Results and Comparison Dec 2019-Dec 2020 (MWA)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWA Dec 2019	MWA Dec 2020
Total dissolved solids	mg/L	NA	13000	12000
Biochemical Oxygen Demand (BOD)	mg/L	NA	16	<LOR
Phosphate	mg/L	0.015	**0.064**	**0.063**
Arsenic III & V	mg/L	0.024 (III), 0.013 (V)	0.001	0.001
Aluminium	mg/L	0.055 (pH> 6.5)	<LOR	<LOR
Barium	mg/L	NA	0.57	0.49
Cadmium	mg/L	0.0002	<LOR	<LOR
Cobalt	mg/L	0.09	<LOR	<LOR
Copper	mg/L	0.0014	<LOR	0.001
Chromium VI	mg/L	0.001	<LOR	0.001
Chromium III	mg/L	27	0.002	0.001
Lead	mg/L	0.0034	<LOR	<LOR
Mercury	mg/L	0.0006	0.00006	<LOR
Zinc	mg/L	0.008	**0.016**	**0.014**
TPH	mg/L	0.6	<LOR	<LOR
Benzene	mg/L	0.95	<LOR	<LOR
Toluene	mg/L	0.18	<LOR	<LOR
Ethylbenzene	mg/L	0.08	<LOR	<LOR
Xylene			<LOR	<LOR
CVCs/VOCCs:				
- **Total**	mg/L	NA	<LOR	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR	<LOR
- **1,1,2-Trichloroethane (TCA)**	mg/L	6.500	<LOR	<LOR
- **Tetrachloroethene (PCE)**	mg/L	0.05	<LOR	<LOR
- **1,1-Dichloroethene**	mg/L	0.03	<LOR	<LOR
- **Vinyl Chloride**		0.0003	<LOR	<LOR
PCBs	mg/L	0.00003	<LOR	<LOR
PAHs	mg/L	0.016	<LOR	<LOR
OPPs	mg/L	0.00002	<LOR	<LOR

Table 4 – Quarterly Groundwater Results and Comparison (MWB)

	Analytes	Units	Site Criteria (mg/L)	MWA March 2020	MWA June 2020	MWA Sept 2019	MWA Dec 2020
IONS	Calcium	mg/L	NA	520	390	520	520
	Alkalinity (total)	mg/L	NA	420	410	430	420
	Chloride	mg/L	NA	5700	4800	5500	4900
	Fluoride	mg/L	NA	0.3	0.2	0.3	0.2
	Potassium[1]	mg/L	410	2	2.3	2.6	2.3
	Magnesium	mg/L	NA	670	560	650	720
	Sulphate	mg/L	NA	88	72	83	85
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR	<LOR	<LOR
	Manganese	mg/L	1.9	0.01	0.01	0.007	0.008
OCP	OCP[3]	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.9	7	6.8	7
	Sodium	mg/L	NA	1500	1200	1400	1400
	Ammonia[2]	mg/L	0.9	0.015	0.016	<LOR	<LOR
	Nitrate	mg/L	0.7	0.51	0.55	<LOR	0.53
	Total Organic	mg/L	4	**6**	**5**	4	4
	EC	µS/cm	NA	14000	14000	14000	14000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 5 – Yearly Analytes Groundwater Results and Comparison Dec 2019-Dec 2020 (MWB)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWB Dec 2019	MWB Dec 2020
Total dissolved solids	mg/L	NA	11000	9300
Biochemical Oxygen Demand	mg/L	NA	19	7
Phosphate	mg/L	0.015	<LOR	**0.02**
Arsenic III & V	mg/L	0.024 (III), 0.013	0.001	<LOR
Aluminium	mg/L	0.055 (pH> 6.5)	<LOR	<LOR
Barium	mg/L	NA	0.42	0.37
Cadmium	mg/L	0.0002	<LOR	<LOR
Cobalt	mg/L	0.09	<LOR	<LOR
Copper	mg/L	0.0014	<LOR	<LOR
Chromium VI	mg/L	0.001	<LOR	<LOR
Chromium III	mg/L	27	0.003	0.003
Lead	mg/L	0.0034	<LOR	<LOR
Mercury	mg/L	0.0006	<LOR	<LOR
Zinc	mg/L	0.008	**0.023**	**0.009**
TPH	mg/L	0.6	**0.681**	<LOR
Benzene	mg/L	0.95	<LOR	<LOR
Toluene	mg/L	0.18	<LOR	<LOR
Ethylbenzene	mg/L	0.08	<LOR	<LOR
Xylene			<LOR	<LOR
CVCs/VOCCs:				
- **Total**	mg/L	NA	<LOR	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR	<LOR
- **1,1,2-Trichloroethane**	mg/L	6500 (1,1,2 TCA)	<LOR	<LOR
- **Tetrachloroethene (PCE)**	mg/L	0.05	<LOR	<LOR
- **1,1-Dichloroethene**	mg/L	0.03	<LOR	<LOR
- **Vinyl Chloride**		0.0003	<LOR	<LOR
PCBs	mg/L	0.00003	<LOR	<LOR
PAHs	mg/L	0.016	<LOR	<LOR
OPPs	mg/L	0.00002	<LOR	<LOR

Table 6 – Quarterly Groundwater Results and Comparison (MWC)

	Analytes	Units	Site Criteria (mg/L)	MWC Mar 2020	MWC June 2020	MWC Sept 2020	MWC Dec 2020
IONS	**Calcium**	mg/L	NA	390	300	410	390
	Alkalinity (total)	mg/L	NA	680	750	820	810
	Chloride	mg/L	NA	5200	4400	4400	5700
	Fluoride	mg/L	NA	0.2	0.2	0.2	0.1
	Potassium[1]	mg/L	410	1.8	2	2.2	2
	Magnesium	mg/L	NA	570	470	550	600
	Sulphate	mg/L	NA	150	110	120	120
HEAVY METALS	**Iron**	mg/L	0.3	<LOR	<LOR	<LOR	<LOR
	Manganese	mg/L	1.9	**6**	**2.9**	**2.4**	**3.3**
PHENOLS	**Total phenolics**	mg/L	0.32	<LOR	<LOR	<LOR	<LOR
OCP	**OCP[3]**	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	**pH**	pH	6.5 – 8	6.8	6.8	6.9	7.1
	Sodium	mg/L	NA	1700	1400	1600	1700
	Ammonia[2]	mg/L	0.9	0.018	<LOR	<LOR	0.018
	Nitrate	mg/L	0.7	**1.2**	0.67	<LOR	0.23
	Total Organic	mg/L	4	**8**	**8**	**6**	**7**
	EC	µS/c	NA	13000	14000	14000	14000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 7 – Yearly Analytes Groundwater Results and Comparison (MWC)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWC Dec 2019	MWC Dec 2020
Total dissolved solids	mg/L	NA	9800	7500
Biochemical Oxygen Demand	mg/L	NA	20	33
Phosphate	mg/L	0.015	**0.02**	**0.04**
Arsenic III & V	mg/L	0.024	<LOR	<LOR
Aluminium	mg/L	0.055	<LOR	<LOR
Barium	mg/L	NA	0.41	0.31
Cadmium	mg/L	0.0002	<LOR	<LOR
Cobalt	mg/L	0.09	0.006	0.004
Copper	mg/L	0.0014	<LOR	0.001
Chromium VI	mg/L	0.001	<LOR	<LOR
Chromium (total)	mg/L	0.001	<LOR	<LOR
Lead	mg/L	0.0034	<LOR	<LOR
Mercury	mg/L	0.0006	<LOR	<LOR
Zinc	mg/L	0.008	0.007	**0.014**
TPH	mg/L	0.6	<LOR	<LOR
Benzene	mg/L	0.95	<LOR	<LOR
Toluene	mg/L	0.18	<LOR	<LOR
Ethylbenzene	mg/L	0.08	<LOR	<LOR
Xylene			<LOR	<LOR
CVCs/VOCCs:				
- **Total**	mg/L	NA	<LOR	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR	<LOR
- **1,1,2-Trichloroethane**	mg/L	6500	<LOR	<LOR
- **Tetrachloroethene**	mg/L	0.05	<LOR	<LOR
- **1,1-Dichloroethene**	mg/L	0.03	<LOR	<LOR
- **Vinyl Chloride**		0.0003	<LOR	<LOR
PCBs	mg/L	0.00003	<LOR	<LOR
PAHs	mg/L	0.016	<LOR	<LOR
OPPs	mg/L	0.00002	<LOR	<LOR

MWD is a leachate monitoring well which provides access to the perched landfill leachate water table. The Site Criteria for this particular well is only used as a general indicator of the leachate water quality.

Table 8 – Quarterly Groundwater Results and Comparison (MWD)

	Analytes	Units	Site Criteria (mg/L)	MWD (leachate) March 2020	MWD (leachate) June 2020	MWD (leachate) Sept 2020	MWD (leachate) Dec 2020
IONS	**Calcium**	mg/L	NA	130	94	99	120
	Alkalinity (total)	mg/L	NA	2300	2800	2600	2200
	Chloride	mg/L	NA	2600	240	2900	2400
	Fluoride	mg/L	NA	0.3	0.3	0.2	0.2
	Potassium[1]	mg/L	410	160	150	180	160
	Magnesium	mg/L	NA	250	220	240	210
	Sulphate	mg/L	NA	160	3	12	38
HEAVY METALS	**Iron**	mg/L	0.3	**1.5**	**1**	**1.1**	0.19
	Manganese	mg/L	1.9	0.25	0.17	0.18	0.22
PHENOLS	**Total phenolics**	mg/L	0.32	<LOR	<LOR	<LOR	<LOR
OCP	**OCP[3]**	mg/L	0.000	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.5	7.6	7.6	7.7
	Sodium	mg/L	NA	1500	1200	1800	1200
	Ammonia[2]	mg/L	0.9	**260**	**250**	**290**	**260**
	Nitrate	mg/L	0.7	<LOR	<LOR	<LOR	0.058
	Total Organic	mg/L	4	**250**	**270**	**250**	**190**
	EC	µS/c	NA	11000	11000	13000	9800

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 9 – Yearly Analytes Groundwater Results and Comparison (MWD)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWD (leachate) Dec 2019	MWD (leachate) Dec 2020
Total dissolved solids	mg/L	NA	8000	5200
Biochemical Oxygen Demand	mg/L	NA	<LOR	81
Phosphate	mg/L	0.015	0.61	0.78
Arsenic III & V	mg/L	0.024 (III),	0.012	0.01
Aluminium	mg/L	0.055 (pH> 6.5)	<LOR	0.03
Barium	mg/L	NA	1.1	0.88
Cadmium	mg/L	0.0002	<LOR	<LOR
Cobalt	mg/L	0.09	0.026	0.015
Copper	mg/L	0.0014	<LOR	<LOR
Chromium VI	mg/L	0.001	<LOR	<LOR
Chromium (total)	mg/L	27	0.036	0.034
Lead	mg/L	0.0034	<LOR	<LOR
Mercury	mg/L	0.0006	<LOR	<LOR
Zinc	mg/L	0.008	**0.015**	0.003
TPH	mg/L	0.6	**10.24**	0.013
Benzene	mg/L	0.95	0.005	0.004
Toluene	mg/L	0.18	<LOR	<LOR
Ethylbenzene	mg/L	0.08	0.013	0.017
Xylene			0.001	0.001
CVCs/VOCCs:				
- **Total**	mg/L	NA	<LOR	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR	<LOR
- **1,1,2-Trichloroethane**	mg/L	6.5	<LOR	<LOR
- **Tetrachloroethene (PCE)**	mg/L	0.05	<LOR	<LOR
- **1,1-Dichloroethene**	mg/L	0.03	<LOR	<LOR
- **Vinyl Chloride**		0.0003	<LOR	<LOR
PCBs	mg/L	0.00003	<LOR	<LOR
PAHs	mg/L	0.016	**0.057**	**0.092**
OPPs	mg/L	0.00002	<LOR	<LOR

Table 10 –Quarterly Groundwater Results and Comparison (MWE)

	Analytes	Units	Threshold Criteria (mg/L)	MWE Mar 2020	MWE June 2020	MWE Sept 2020	MWE Dec 2020
IONS	**Calcium**	mg/	NA	60	57	63	79
	Alkalinity (total)	mg/	NA	1100	1000	1300	1100
	Chloride	mg/	NA	520	640	550	670
	Fluoride	mg/	NA	0.5	0.5	0.4	0.4
	Potassium[1]	mg/	410	0.6	0.6	0.6	0.8
	Magnesium	mg/	NA	63	65	71	89
	Sulphate	mg/	NA	130	130	120	150
HEAVY METALS	**Iron**	mg/	0.3	0.018	<LOR	<LOR	0.069
	Manganese	mg/	1.9	0.24	0.32	0.21	0.089
PHENOLS	**Total phenolics**	mg/	0.32	<LOR	<LOR	<LOR	<LOR
OCP	**OCP[3]**	mg/	0.00001	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.3	7.2	7.2	7.4
	Sodium	mg/	NA	720	700	740	710
	Ammonia[2]	mg/	0.9	<LOR	0.018	0.084	0.063
	Nitrate	mg/	0.7	0.006	<LOR	<LOR	<LOR
	Total Organic	mg/	4	**6**	**5**	**5**	**8**
	EC	µS/	NA	3400	3800	3500	3700

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs

Table 11 – Yearly Analytes Groundwater Results and Comparison (MWE)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWE Dec 2019	MWE Dec 2020
Total dissolved solids	mg/L	NA	2100	2300
Biochemical Oxygen Demand	mg/L	NA	16	9
Phosphate	mg/L	0.015	**0.1**	**0.084**
Arsenic III & V	mg/L	0.024 (III), 0.013	0.004	0.004
Aluminium	mg/L	0.055 (pH> 6.5)	<LOR	0.02
Barium	mg/L	NA	0.048	0.053
Cadmium	mg/L	0.0002	<LOR	<LOR
Cobalt	mg/L	0.09	0.004	0.005
Copper	mg/L	0.0014	<LOR	<LOR
Chromium VI	mg/L	0.001	<LOR	<LOR
Chromium (total)	mg/L	0.001	<LOR	<LOR
Lead	mg/L	0.0034	<LOR	<LOR
Mercury	mg/L	0.0006	<LOR	<LOR
Zinc	mg/L	0.008	0.004	**0.009**
TPH	mg/L	0.6	<LOR	<LOR
Benzene	mg/L	0.95	<LOR	<LOR
Toluene	mg/L	0.18	<LOR	<LOR
Ethylbenzene	mg/L	0.08	<LOR	<LOR
Xylene			<LOR	<LOR
CVCs/VOCCs:				
- **Total**	mg/L	NA	<LOR	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR	<LOR
- **1,1,2-Trichloroethane**	mg/L	6.5	<LOR	<LOR
- **Tetrachloroethene (PCE)**	mg/L	0.05	<LOR	<LOR
- **1,1-Dichloroethene**	mg/L	0.03	<LOR	<LOR
- **Vinyl Chloride**		0.0003	<LOR	<LOR
PCBs	mg/L	0.00003	<LOR	<LOR
PAHs	mg/L	0.016	<LOR	<LOR
OPPs	mg/L	0.00002	<LOR	<LOR

Table 12 –Quarterly Groundwater Results and Comparison (DAM)

	Analytes	Units	Threshold Criteria (mg/L)	DAM Sept 2020	DAM Dec 2020
IONS	**Calcium**	mg/L	NA	49	41
	Alkalinity (total)	mg/L	NA	110	100
	Chloride	mg/L	NA	95	120
	Potassium[1]	mg/L	410	17	20
	Magnesium	mg/L	NA	26	27
	Sulphate	mg/L	NA	160	130
HEAVY METALS	**Iron**	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	<LOR	0.027
PHENOLS	**Total phenolics**	mg/L	0.32	<LOR	<LOR
OCP	**OCP[3]**	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.8	**8.2**
	Sodium	mg/L	NA	71	79
	Ammonia[2]	mg/L	0.9	0.04	0.055
	Nitrate	mg/L	0.7	<LOR	**0.97**
	Total Organic	mg/L	4	**14**	**17**
	EC	µS/c	NA	890	850

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs

Table 13 – Yearly Analytes Groundwater Results (DAM)

Sampling Parameter	Units	Threshold Criteria (mg/L)	DAM Dec 2020
Total dissolved solids	mg/L	NA	660
Biochemical Oxygen Demand	mg/L	NA	<LOR
Phosphate	mg/L	0.015[G]	**0.02**
Arsenic III & V	mg/L	0.024 (III), 0.013	0.001
Aluminium	mg/L	0.055 (pH> 6.5)	<LOR
Barium	mg/L	NA	0.027
Cadmium	mg/L	0.0002	<LOR
Cobalt	mg/L	0.09[M]	<LOR
Copper	mg/L	0.0014	0.001
Chromium VI	mg/L	0.001[D]	<LOR
Chromium (total)	mg/L	0.001	<LOR
Lead	mg/L	0.0034	<LOR
Mercury	mg/L	0.0006	<LOR
Zinc	mg/L	0.008[D]	0.004
TPH	mg/L	0.6[I]	<LOR
Benzene	mg/L	0.95	<LOR
Toluene	mg/L	0.18[L]	<LOR
Ethylbenzene	mg/L	0.08[L]	<LOR
Xylene			<LOR
CVCs/VOCCs:			
- **Total**	mg/L	NA	<LOR
- **Tetrachlorethene (TCE)**	mg/L	NA	<LOR
- **1,1,2-Trichloroethane**	mg/L	6.5	<LOR
- **Tetrachloroethene (PCE)**	mg/L	0.05[N]	<LOR
- **1,1-Dichloroethene**	mg/L	0.03[P]	<LOR
- **Vinyl Chloride**		0.0003[N]	<LOR
PCBs	mg/L	0.00003[A]	<LOR
PAHs	mg/L	0.016[B]	<LOR
OPPs	mg/L	0.00002[C]	<LOR

5.0 DISCUSSION

The inferred hydraulic gradient for the site is a down gradient towards Parsons Gully to the west. The location of the four wells surrounding the landfill place wells MWA, MWB and MWC down-hydraulic gradient and well MWE up-hydraulic gradient of the landfill. Well MWD is located within the perched landfill water table, this enables access to the leachate within the landfill. The Dam is located above MWC.

The following is a summary of the significant results for December 2020 in relation to the Site Criteria. Key increasing trends, decreasing trends and exceedances of the threshold criteria are indicated.

MWA

MWA is located in the north west section of the site and is considered to be a down-hydraulic gradient monitoring well. There is farmland adjoining to the north and west of this location. The following changes have occurred in the water quality of MWA:

- Total Organic Carbon has increased from 3mg/L (June 2019) to 6mg/L (September 2019 and now remains above the site criteria (4mg/L) at 5mg/L (December 2019); and,
- Sulphate has increased from 47mg/L, 42mg/L and 47mg/L (March, June, September respectively) to 110mg/L, no site criteria.
- Phosphate has remained relatively stable at 0.063mg/L still above the criteria of 0.015mgL
- Zinc has decreased slightly from 0.016mg/L to 0.014mg/L, still above the site criteria of 0.008mg/L

All other analytes reported concentrations consistent with previous monitoring data.

MWB

MWB is located in the south west section of the site and is considered to be a down-hydraulic gradient monitoring well. There is farmland to the south and west of this location. The well has remained relatively stable. There are two exceedances of the site criteria:

- The concentration of TOC has steadily decreased from 6mg/L (March 2020) to be steady at 4mg/L (since September) on the site criteria of 4 mg/L);
- Phosphate has increased from non detection to 0.02mg/L;
- Hydrocarbons have decreased to below the adopted site criteria;
- Zinc concentration has decreased 0.023mg/L to 0.009mg/L which is still above the site criteria of 0.008mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWC

MWC is located on the southern boundary of the site, down hydraulic gradient of the landfill and onsite dam. There is farmland to the south of well, along with a stand of vegetation immediately south of the well. This well has shown increasing turbidity with sedimentation in observations from the field. There were two concentrations which exceeded the site criteria. The following changes have occurred in the water quality of MWC:

- Concentration of Manganese has fluctuated throughout the last 4 sampling periods with all four concentrations above site criteria (1.9mg/L). The concentration of the March sampling event (6mg/L) was the highest with the September sampling event being the lowest (2.4mg/L).
- The concentration of TOC throughout the 4 sampling events were, 8mg/L, 8mg/L, 6mg/L and 7mg/L (March, June, September and December respectively) above the site criteria of 4mg/L;
- The concentration of Nitrate fluctuation throughout the 4 sampling events with 1.2mg/L being the highest in March;
- A concentration of Phosphate was detected at 0.04mg/L which is an increase from December 2019 of 0.02mg/L, and is still above the site criteria of 0.015mg/L;
- Zinc concentration has increased from 0.007mg/L to 0.014mg/L, which is above the site criteria of 0.008mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWD

The water collected and analysed from well MWD is landfill leachate and as such the Site Criteria is not used to compare the results against. The results of MWD are used as an indicator of current conditions within the landfill with trends and seasonal variations apparent. MWD is also to be used as a comparison to the external monitoring wells.

Well MWD was reported to contain no detection of Nitrate, giving no indication that the Nitrate in the affected wells is sourced from the landfill being as this well is located in the perched leachate water table. The Nitrate may be migrating onto the site from the farmland to the north through the local ground water.

The following changes occurred in the water quality of the landfill leachate well MWD:

- Ammonia has remained relatively steady at a concentration of 2600 mg/L;
- Iron concentration has fluctuated throughout the year. The December concentration is 0.19mg/L.
- TOC has decreased to 190 mg/L from 270mg/L in June;
- Zinc has decreased to below site criteria in December 2020 (0.003mg/L) with a concentration of 0.015mg/L;
- There was a decrease in TPH from 10.24mg/L to 0.013mg/L; and,
- PAHs increased from 0.057mg/L to 0.092mg/L in December 2020.

MWE

MWE is located on the eastern boundary of the site and is considered to be an up-gradient groundwater monitoring well. There are a series of dams to the east of the well. The following changes have occurred in the water quality of MWC:

- A concentration of TOC (8 mg/L) was reported in MWE similar to the previous round of monitoring in September (8mg/L) and similar to the March and June concentrations, all above the site criteria of 4mg/L;
- Zinc has increased from 0.004mg/L to 0.009mg/L above the site criteria of 0.008mg/L; and,
- Phosphate is still above the site criteria (0.015mg/L), reducing from 0.1mg/L in December 2019 to 0.084mg/L in December 2020.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the December 2020 sampling event, excluding the Leachate Monitoring well (MWD); Manganese in MWC, Phosphate in MWA, MWB, MWC and MWE, Zinc in MWA, MWB, MWC and MWE, TOC in MWB, MWC and MWE, and Nitrate in MWA and MWC. Refer to **Attachment 3** – Data Log.

DAM

The sedimentation dam located on the site. Has been tested in September and December 2020.
The following changes have occurred in the water quality of the Dam:

- A concentration of TOC (17 mg/L) was reported in Dam elevated from the September result of 14mg/L;
- Nitrate has increased from below the limit of reporting in September to 0.97mg/L in December;
- Manganese has increased from below the limit of reporting to 0.027mg/L;
- pH has increase slightly to be 8.2pH.

Site and Maintenance

The area has been in drought for some time and may be factors influencing the groundwater concentrations of some analytes in wells.

The weather conditions (drought and rain events) and surrounding land uses are likely impacting the local groundwater conditions. The apparent anomalies in the June round of monitoring may have been influenced by the rain event preceding that sampling event. The area has been in significant drought for some time now.

The longevity of the drought means that the clay soils may be losing soil moisture at a greater depth.

Across the December sampling event there were increases in the upgradient wells as along with the down gradient wells for Zinc and Phosphate. These increases could be a result of seasonal farming activities or associated with the return of rainfall.

The concrete surrounding the base of several of the wells have been repaired in this round of monitoring. This will increase the barrier for surface water migration into the groundwater.

6.0 CONCLUSIONS

There are seasonal fluctuations observed with regional groundwater conditions. The recent change in weather conditions from drought to some rainfall may have influenced the groundwater conditions. Trending of these analytes over time may indicate a seasonal fluctuation, an anomaly or highlight an issue on the site (or surrounding area). The trending of analytes occurs in the annual groundwater monitoring report with a running comparison in the quarterly monitoring reports.

The results and discussion of the laboratory sample analysis from the Scone Waste Facility during the December 2020 sampling event displayed several ongoing exceedances of the Site Criteria.

The following analytes exceeded the Threshold Criteria during the December 2020 sampling event, excluding the Leachate Monitoring well (MWD); Manganese in MWC, Phosphate in MWA, MWB, MWC and MWE, Zinc in MWA, MWB, MWC and MWE, TOC in MWB, MWC and MWE, and Nitrate in MWA and MWC.

The well concrete bases have been repaired.

Continued sampling and data collection will allow robust trending and statistical analysis of data to occur.

The next water sampling event will be a quarterly monitoring event which will be undertaken in March 2021.

REFERENCES

- *Australian and New Zealand Guidelines for the Management of Contaminated Sites* (ANZECC/NHMRC 1992);
- *Australia and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZW, 2018);
- *Australian Drinking Water Guidelines, National Water Quality Management Strategy* 2011;
- *Contaminated Land Management Act 1997* (NSW);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA 2011);
- *Contaminated Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997* (NSW DECC, 2009);
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DEC, 2007);
- *Contaminated Sites: Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (NSW EPA 1999);
- *Contaminated Sites: Sampling Design Guidelines* (NSW EPA 1995);
- *Environmental Guidelines: Solid Waste Landfills* (NSW EPA, 1996);
- *Environmental Guidelines Solid Waste Landfills* Second edition, (NSW EPA 2016);
- *Health - Based Soil Investigation Levels,* Imray, P & Langley, A*, National Environmental Health Forum Monographs, Soil Series No. 2 (2nd Ed), South Australian Health Commission* (NEHF 1998);
- *National Environment Protection (Assessment of Site Contamination) Measure (No.1)* (NEPM, 2013) as amended;
- *Storage and Handling of Dangerous Goods Code of Practice 2005*;
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

FIGURE

SITE LAYOUT

Legend

Monitoring Well Location

Image: Google Maps 2019

N

ENGAGE Environmental Services Pty Limited
113 Reservoir Rd
Glendale NSW 2285
0478 362005

Title: Figure 1 - Site Layout and Well Locations

Client	Project No.	Figure No	Date
UHSC	E04-0619	1	17/6/2019
admin@engage-es.com.au	Scale: NA	Compiled: SC	Revision: 3

ATTACHMENT A

NATA ACCREDITED LABORATORY RESULTS

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 258101

Client Details

Client	Engage Environmental Services
Attention	Stephen Challinor
Address	113 Reservoir Rd, GLENDALE, NSW, 2285

Sample Details

Your Reference	**E04-1220-UHSC**
Number of Samples	6 water
Date samples received	11/12/2020
Date completed instructions received	11/12/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	21/12/2020
Date of Issue	21/12/2020

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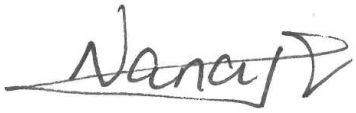
Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

VHC's in water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1

VHC's in water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	4	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	107	106	109	110	110
Surrogate toluene-d8	%	97	96	96	98	97
Surrogate 4-BFB	%	97	97	97	98	99

VHC's in water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	15/12/2020
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Carbon tetrachloride	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Bromoform	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Bromobenzene	µg/L	<1

VHC's in water		
Our Reference	UNITS	258101-6
Your Reference		DAM
Date Sampled		10/12/2020
Type of sample		water
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	97
Surrogate 4-BFB	%	93

vTRH(C6-C10)/BTEXN in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
TRH C_6 - C_9	µg/L	34	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	35	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	13	<10	<10	<10	<10
Benzene	µg/L	4	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	17	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1	<1
Naphthalene	µg/L	10	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	107	106	109	110	110
Surrogate toluene-d8	%	97	96	96	98	97
Surrogate 4-BFB	%	97	97	97	98	99

vTRH(C6-C10)/BTEXN in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	15/12/2020
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	97
Surrogate 4-BFB	%	93

svTRH (C10-C40) in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
TRH C_{10} - C_{14}	µg/L	1,200	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	4,400	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	1,100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	1,600	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	1,600	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	4,900	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	450	<100	<100	<100	<100
Surrogate o-Terphenyl	%	139	79	101	97	92

svTRH (C10-C40) in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	15/12/2020
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Surrogate o-Terphenyl	%	99

PAHs in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Naphthalene	µg/L	8	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	8.4	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	70	92	71	80	72

PAHs in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	14/12/2020
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	71

Organochlorine Pesticides in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
alpha-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
HCB	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	79	73	80	70	73

Organochlorine Pesticides in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	14/12/2020
alpha-BHC	µg/L	<0.2
HCB	µg/L	<0.2
beta-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Surrogate TCMX	%	72

OP Pesticides in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Dichlorvos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	79	73	80	70	73

OP Pesticides in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	14/12/2020
Dichlorvos	µg/L	<0.2
Dimethoate	µg/L	<0.2
Diazinon	µg/L	<0.2
Chlorpyriphos-methyl	µg/L	<0.2
Ronnel	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.2
Chlorpyriphos	µg/L	<0.2
Parathion	µg/L	<0.2
Bromophos ethyl	µg/L	<0.2
Ethion	µg/L	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.2
Surrogate TCMX	%	72

PCBs in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Aroclor 1016	µg/L	<2	<2	<2	<2	<2
Aroclor 1221	µg/L	<2	<2	<2	<2	<2
Aroclor 1232	µg/L	<2	<2	<2	<2	<2
Aroclor 1242	µg/L	<2	<2	<2	<2	<2
Aroclor 1248	µg/L	<2	<2	<2	<2	<2
Aroclor 1254	µg/L	<2	<2	<2	<2	<2
Aroclor 1260	µg/L	<2	<2	<2	<2	<2
Surrogate TCMX	%	79	73	80	70	73

PCBs in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	14/12/2020
Date analysed	-	14/12/2020
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate TCMX	%	72

Total Phenolics in Water						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date extracted	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
Date analysed	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Total Phenolics in Water		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date extracted	-	15/12/2020
Date analysed	-	15/12/2020
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date prepared	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
Date analysed	-	15/12/2020	15/12/2020	15/12/2020	15/12/2020	15/12/2020
Aluminium-Dissolved	µg/L	30	20	<10	<10	<10
Barium-Dissolved	µg/L	880	53	490	370	310
Iron-Dissolved	µg/L	190	69	<10	<10	<10
Arsenic-Dissolved	µg/L	10	4	1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt-Dissolved	µg/L	15	5	<1	<1	4
Chromium-Dissolved	µg/L	34	<1	1	3	<1
Copper-Dissolved	µg/L	<1	<1	1	<1	1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Manganese-Dissolved	µg/L	220	490	11	8	3,300
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc-Dissolved	µg/L	3	9	14	9	14

HM in water - dissolved		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date prepared	-	15/12/2020
Date analysed	-	15/12/2020
Aluminium-Dissolved	µg/L	<10
Barium-Dissolved	µg/L	27
Iron-Dissolved	µg/L	<10
Arsenic-Dissolved	µg/L	6
Cadmium-Dissolved	µg/L	<0.1
Cobalt-Dissolved	µg/L	<1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	1
Lead-Dissolved	µg/L	<1
Manganese-Dissolved	µg/L	<5
Mercury-Dissolved	µg/L	<0.05
Zinc-Dissolved	µg/L	4

Miscellaneous Inorganics						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date prepared	-	11/12/2020	11/12/2020	11/12/2020	11/12/2020	11/12/2020
Date analysed	-	11/12/2020	11/12/2020	11/12/2020	11/12/2020	11/12/2020
Hexavalent Chromium, Cr^{6+}	mg/L	<0.01	<0.005	<0.005	<0.01	<0.005
Ammonia as N in water	mg/L	260	0.063	<0.005	<0.005	0.018
BOD	mg/L	81	9	<5	7	33
Fluoride, F	mg/L	0.2	0.4	<0.1	0.2	0.1
Total Organic Carbon	mg/L	190	8	4	4	7
Total Dissolved Solids (grav)	mg/L	5,200	2,300	12,000	9,300	7,500
Phosphate as P in water	mg/L	0.78	0.084	0.063	0.02	0.04
Nitrate as N in water	mg/L	0.058	<0.005	0.49	0.53	0.23
pH	pH Units	7.7	7.4	6.7	7.0	7.1
Electrical Conductivity	µS/cm	9,800	3,700	19,000	14,000	14,000

Miscellaneous Inorganics		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date prepared	-	11/12/2020
Date analysed	-	11/12/2020
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005
Ammonia as N in water	mg/L	0.055
BOD	mg/L	<5
Fluoride, F	mg/L	0.2
Total Organic Carbon	mg/L	17
Total Dissolved Solids (grav)	mg/L	660
Phosphate as P in water	mg/L	0.02
Nitrate as N in water	mg/L	0.97
pH	pH Units	8.2
Electrical Conductivity	µS/cm	850

Ion Balance						
Our Reference		258101-1	258101-2	258101-3	258101-4	258101-5
Your Reference	UNITS	MWD	MWE	MWA	MWB	MWC
Date Sampled		10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020
Type of sample		water	water	water	water	water
Date prepared	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-	14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Calcium - Dissolved	mg/L	120	79	600	520	390
Potassium - Dissolved	mg/L	160	0.8	2.8	2.3	2.0
Sodium - Dissolved	mg/L	1,200	710	1,900	1,400	1,700
Magnesium - Dissolved	mg/L	210	89	1,200	720	600
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	2,200	1,100	480	420	810
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	2,200	1,100	480	420	810
Sulphate, SO4	mg/L	38	150	110	85	120
Chloride, Cl	mg/L	2,400	670	7,200	4,900	5,700
Ionic Balance	%	-15	-1.0	-2.0	-1.0	-12

Ion Balance		
Our Reference		258101-6
Your Reference	UNITS	DAM
Date Sampled		10/12/2020
Type of sample		water
Date prepared	-	14/12/2020
Date analysed	-	14/12/2020
Calcium - Dissolved	mg/L	41
Potassium - Dissolved	mg/L	20
Sodium - Dissolved	mg/L	79
Magnesium - Dissolved	mg/L	27
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	100
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	100
Sulphate, SO4	mg/L	130
Chloride, Cl	mg/L	120
Ionic Balance	%	0

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-060	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Inorg-091	BOD - Analysed in accordance with APHA latest edition 5210 D and in house INORG-091.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VHC's in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	[NT]
Date analysed	-			15/12/2020	1	15/12/2020	15/12/2020		15/12/2020	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	78	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	1	<1	<1	0	79	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	78	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	78	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	79	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	79	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	1	<1	<1	0	77	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	1	<1	<1	0	78	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	1	4	5	22	[NT]	[NT]

QUALITY CONTROL: VHC's in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	105	1	107	107	0	101	[NT]
Surrogate toluene-d8	%		Org-023	98	1	97	100	3	96	[NT]
Surrogate 4-BFB	%		Org-023	96	1	97	101	4	93	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	[NT]
Date analysed	-			15/12/2020	1	15/12/2020	15/12/2020		15/12/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	34	37	8	78	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	35	46	27	78	[NT]
Benzene	µg/L	1	Org-023	<1	1	4	4	0	79	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	1	0	79	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	17	10	52	78	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	77	[NT]
o-xylene	µg/L	1	Org-023	<1	1	1	1	0	78	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	10	15	40	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	105	1	107	107	0	101	[NT]
Surrogate toluene-d8	%		Org-023	98	1	97	100	3	96	[NT]
Surrogate 4-BFB	%		Org-023	96	1	97	101	4	93	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	[NT]
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	[NT]
Date analysed	-			15/12/2020	1	15/12/2020	15/12/2020		15/12/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	1200	1000	18	111	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	4400	3800	15	105	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	1100	1000	10	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	1600	1300	21	111	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	4900	4200	15	105	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	450	420	7	92	[NT]
Surrogate o-Terphenyl	%		Org-020	86	1	139	124	11	86	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	258101-2
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Naphthalene	µg/L	1	Org-022/025	<1	1	8	8	0	104	70
Acenaphthylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	122	72
Fluorene	µg/L	1	Org-022/025	<1	1	<1	<1	0	124	73
Phenanthrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	98	64
Anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	114	76
Pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	114	72
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	1	<1	<1	0	128	88
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	116	80
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	72	1	70	84	18	101	70

QUALITY CONTROL: Organochlorine Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	258101-2
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	78	79
HCB	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	70
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	72
delta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	76	70
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	72
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	76
Dieldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	72
Endrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	86	104
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	72
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	73	86
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	74	1	79	73	8	70	79

QUALITY CONTROL: OP Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	258101-2
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Dichlorvos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	106	124
Dimethoate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Diazinon	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Chlorpyriphos-methyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ronnel	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	82
Fenitrothion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	80	82
Malathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	88	100
Chlorpyriphos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	70	75
Parathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	75	73
Bromophos ethyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ethion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	74	88
Azinphos-methyl (Guthion)	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	74	1	79	73	8	70	79

QUALITY CONTROL: PCBs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W6	258101-2
Date extracted	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Aroclor 1016	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-021	<2	1	<2	<2	0	70	80
Aroclor 1260	µg/L	2	Org-021	<2	1	<2	<2	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	74	1	79	73	8	70	79

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	258101-2
Date extracted	-			15/12/2020	1	15/12/2020	15/12/2020		15/12/2020	15/12/2020
Date analysed	-			15/12/2020	1	15/12/2020	15/12/2020		15/12/2020	15/12/2020
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	101	91

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	258101-4
Date prepared	-			15/12/2020	3	15/12/2020	15/12/2020		15/12/2020	15/12/2020
Date analysed	-			15/12/2020	3	15/12/2020	15/12/2020		15/12/2020	15/12/2020
Aluminium-Dissolved	µg/L	10	Metals-022	<10	3	<10	<10	0	95	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	3	490	500	2	91	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	3	<10	<10	0	105	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	3	1	1	0	92	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	3	<0.1	<0.1	0	90	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	104	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	3	1	1	0	94	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	3	1	1	0	111	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	103	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	3	11	11	0	93	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	3	<0.05	<0.05	0	100	91
Zinc-Dissolved	µg/L	1	Metals-022	<1	3	14	14	0	92	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			11/12/2020	1	11/12/2020	11/12/2020		11/12/2020	[NT]
Date analysed	-			11/12/2020	1	11/12/2020	11/12/2020		11/12/2020	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	1	<0.01	[NT]		102	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	260	[NT]		104	[NT]
BOD	mg/L	5	Inorg-091	<5	1	81	[NT]		92	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	1	0.2	[NT]		95	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	190	[NT]		90	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	1	5200	5300	2	95	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	1	0.78	[NT]		96	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.058	[NT]		100	[NT]
pH	pH Units		Inorg-001	[NT]	1	7.7	[NT]		101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	9800	[NT]		103	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	3	11/12/2020	11/12/2020		[NT]	[NT]
Date analysed	-			[NT]	3	11/12/2020	11/12/2020		[NT]	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	[NT]	3	<0.005	[NT]		[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	[NT]	3	<0.005	[NT]		[NT]	[NT]
BOD	mg/L	5	Inorg-091	[NT]	3	<5	[NT]		[NT]	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	[NT]	3	<0.1	<0.1	0	[NT]	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	[NT]	3	4	[NT]		[NT]	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	[NT]	3	12000	[NT]		[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	[NT]	3	0.063	[NT]		[NT]	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	[NT]	3	0.49	[NT]		[NT]	[NT]
pH	pH Units		Inorg-001	[NT]	3	6.7	[NT]		[NT]	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	[NT]	3	19000	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	[NT]
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	120	[NT]		106	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	160	[NT]		98	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1200	[NT]		90	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	210	[NT]		107	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	2200	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	2200	[NT]		105	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	38	35	8	110	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	2400	2200	9	99	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-15	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	3	14/12/2020	14/12/2020		[NT]	[NT]
Date analysed	-			[NT]	3	14/12/2020	14/12/2020		[NT]	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	[NT]	3	600	590	2	[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	[NT]	3	2.8	2.8	0	[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	[NT]	3	1900	1800	5	[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	[NT]	3	1200	1200	0	[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	[NT]	3	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	3	480	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	3	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	3	480	[NT]		[NT]	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	[NT]	3	110	[NT]		[NT]	[NT]
Chloride, Cl	mg/L	1	Inorg-081	[NT]	3	7200	[NT]		[NT]	[NT]
Ionic Balance	%		Inorg-040	[NT]	3	-2.0	[NT]		[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

pH - out of recommended holding time
Samples received in good order: Holding time exceedance

MISC_INORG:Hexavalent Cr PQL has been raised due to matrix interferences from analytes (other than those being tested) in the sample/s. Samples were diluted and reanalysed however same results were achieved.

ATTACHMENT B
DATALOG

ENGAGE ENVIRONMENTAL SERVICES			Threshold Criteria	NA	NA	NA	NA	0.3	NA	1.9	0.00001	NA	6.5–8	NA	0.9	0.7
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH	mg/L	mg/L	mg/L
			Analytes	Calcium	Alkalinity	Chloride	Fluoride	Iron	Magnesium	Manganese	Organochlorine pesticides (OCP)	Potassium	pH	Sodium	Ammonia	Nitrate
			Monitoring frequency	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	258101	10.12.20		600	480	7200	<0.1	<0.01	1200	0.011	<0.0002	2.8	6.7	1900	<0.005	0.49
MWB	258101	10.12.20		520	420	4900	0.2	<0.01	720	0.008	<0.0002	2.3	7	1400	<0.005	0.53
MWC	258101	10.12.20		390	810	5700	0.1	<0.01	600	3.3	<0.0002	2	7.1	1700	0.018	0.23
MWD	258101	10.12.20		120	2200	2400	0.2	0.19	210	0.22	<0.0002	160	7.7	1200	260	0.058
MWE	258101	10.12.20		79	1100	670	0.4	0.069	89	0.089	<0.0002	0.8	7.4	710	0.063	<0.005
DAM	258101	10.12.20		41	100	120	0.2	<0.01	27	0.027	<0.0002	20	8.2	79	0.055	0.97

	Threshold Criteria	NA	4	0.32	NA	NA	NA	0.015	0.024 (III) 0.013 (V)	0.055 (pH> 6.5)	NA	0.0002	0.09	0.0014	0.001	NA
	Units	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Analytes	Sulfate	Total organic carbon	Total phenolics	Electrical conductivity (EC)	Total dissolved solids	Biochemical oxygen demand	Phosphate	Arsenic III & V	Aluminium	Barium	Cadmium	Cobalt	Copper	Chromium VI	Chromium (total)
	Monitoring frequency	Quarterly	Quarterly	Quarterly	Quarterly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
MWA		110	4	<0.05	19000	12000	<5	0.063	0.001	<0.01	0.49	<0.001	<0.001	0.001	0.001	0.001
MWB		85	4	<0.05	14000	9300	7	0.02	<0.001	<0.01	0.37	<0.001	<0.001	<0.001	0.003	0.003
MWC		120	7	<0.05	14000	7500	33	0.04	<0.001	<0.01	0.31	<0.001	0.004	0.001	<0.001	<0.001
MWD		38	190	<0.05	9800	5200	81	0.78	0.01	0.03	0.88	<0.001	0.015	<0.001	0.034	0.034
MWE		150	8	<0.05	3700	2300	9	0.084	0.004	0.02	0.053	<0.001	0.005	<0.001	<0.001	<0.001
DAM		130	17	<0.05	850	660	<5	0.02	0.001	<0.01	0.027	<0.001	<0.001	0.001	<0.001	<0.001

	Threshold Criteria	0.0034	0.0006	0.008	0.016	0.26	0.95	0.18	0.08	0.35	NA	6500	0.05	0.03	0.0003	0.00003	0.00002
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Analytes	Lead	Mercury	Zinc	PAHs	TRH F1	Benzene	Toluene	Ethylbenzene	total xylene	Tetrachlorothene (TCE)	1,1,1-Trichloroethane (TCA)	Tetrachloroethene (PCE)	1,2-Dichloroethene	Vinyl Chloride	PCBs	OPPs
	Monitoring frequency	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
MWA		<0.001	<0.0005	0.014	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002
MWB		<0.001	<0.0005	0.009	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002
MWC		<0.001	<0.0005	0.014	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002
MWD		<0.001	<0.0005	0.003	0.092	0.013	0.004	<0.001	0.017	0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002
MWE		<0.001	<0.0005	0.009	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002
DAM		<0.001	<0.0005	0.004	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002