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E: admin@engage-es.com.au

M: 0478 362 005

**ENGAGE
ENVIRONMENTAL
SERVICES**

ABN 13 629 353 662

**GROUNDWATER
MONITORING**

**SCONE WASTE
FACILITY
NOBLET ROAD
SCONE NSW**



DOCUMENT CONTROL INFORMATION

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OFFICE

1/545 Main Road
Glendale NSW 2285

Ph: 0478 362 005

Email: admin@engage-es.com.au

FIELD OFFICE

Unit 1, 104 George St
Singleton NSW 2330

Ph: 0478 364 588

Engage Environmental Services Pty Limited: ABN 13 629 353 662



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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 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 quarterly round of groundwater monitoring at the site. The quarterly groundwater monitoring was carried out on 28th March 2022.

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 quarterly groundwater monitoring is required at five locations on the site, monitoring wells A to E (MWA-MWE). 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	Sampling Frequency
			2013 and ANZW 2018 Fresh Water 95%	
IONS	Calcium	mg/L	NA	Quarterly
	Alkalinity (total)	mg/L	NA	Quarterly
	Chloride	mg/L	NA	Quarterly
	Fluoride	mg/L	NA	Quarterly
	Potassium¹	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
PHENOLS	Total phenolics	mg/L	0.32	Quarterly
OCP	Organochlorine Pesticide³ (OCP)	mg/L	0.00001	Quarterly
MISC. INORGANICS	pH	pH	6.5 – 8	Quarterly
	Sodium	mg/L	NA	Quarterly
	Ammonia²	mg/L	0.9	Quarterly
	Nitrate	mg/L	50	Quarterly
	Total organic carbon	mg/L	4	Quarterly
	Electrical conductivity	µS/cm	NA	Quarterly

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. 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 \pm 0.1 unit, electrical conductivity \pm 5%, temperature \pm 0.20, reduction-oxidation (redox) \pm 10%; and dissolved oxygen \pm 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 were sampled during the March 2022 sampling event, results are detailed in **Tables 2 to 6**. Comparisons have been made to the previous round of monitoring (December 2019). Refer to **Attachment 1** – NATA Accredited Laboratory Results and **Attachment 3** – Data Log.

There was one exceedance of the site criteria for March in MWA, TOC at a concentration of 20mg/L. Refer to Table 2.

Table 2 – Quarterly Groundwater Results and Comparison Dec 2021 – Mar 2022 (MWA)

	Analytes	Units	Site	MWA	MWA
			Criteria (mg/L)	Dec 2021	Mar 2022
IONS	Calcium	mg/L	NA	460	66
	Alkalinity (total)	mg/L	NA	610	610
	Chloride	mg/L	NA	2900	250
	Fluoride	mg/L	NA	<LOR	0.7
	Potassium¹	mg/L	410	2	1
	Magnesium	mg/L	NA	920	100
	Sulphate	mg/L	NA	66	29
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	0.016	0.01
Phenols	Total phenolics	mg/L	0.32	<LOR	<LOR
OCPs	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.2	7.6
	Sodium	mg/L	NA	1500	350
	Ammonia²	mg/L	0.9	<LOR	0.031
	Nitrate	mg/L	0.7	0.31	0.058
	Total Organic Carbon	mg/L	4	8	20
	EC	µS/cm	NA	8900	1600

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory Limit of reporting.

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.

There was one exceedance of the site criteria for March in MWB, TOC at a concentration of 6mg/L.
Refer to Table 3.

Table 3 – Quarterly Groundwater Results and Comparison Dec 2021 – Mar 2022 (MWB)

	Analytes	Units	Site Criteria (mg/L)	MWB Dec 2021	MWB Mar 2022
IONS	Calcium	mg/L	NA	470	420
	Alkalinity (total)	mg/L	NA	440	430
	Chloride	mg/L	NA	5000	4600
	Fluoride	mg/L	NA	0.3	0.2
	Potassium¹	mg/L	410	2	2
	Magnesium	mg/L	NA	640	620
	Sulphate	mg/L	NA	82	85
HEAVY METALS	Iron	mg/L	0.3	<LOR	0.04
	Manganese	mg/L	1.9	0.011	0.01
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.9	6.8
	Sodium	mg/L	NA	1300	1000
	Ammonia²	mg/L	0.9	<LOR	0.011
	Nitrate	mg/L	0.7	0.62	0.38
	Total Organic Carbon (TOC)	mg/L	4	5	6
	EC	µS/cm	NA	14000	13000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory Limit of reporting.

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.

There were two exceedances of the site criteria for March in MWC; Manganese, and TOC at concentrations of, 2.2mg/L and 8mg/L respectively. Refer to Table 4.

Table 4 – Quarterly Groundwater Results and Comparison Dec 2021 – Mar 2022 (MWC)

	Analytes	Units	Site Criteria (mg/L)	MWC Dec 2021	MWC Mar 2022
IONS	Calcium	mg/L	NA	310	370
	Alkalinity (total)	mg/L	NA	920	930
	Chloride	mg/L	NA	4200	4000
	Fluoride	mg/L	NA	0.3	0.2
	Potassium¹	mg/L	410	1	2
	Magnesium	mg/L	NA	450	440
	Sulphate	mg/L	NA	98	120
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	3	2.2
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7	6.9
	Sodium	mg/L	NA	1400	2000
	Ammonia²	mg/L	0.9	0.096	0.048
	Nitrate	mg/L	0.7	0.066	0.11
	Total Organic Carbon (TOC)	mg/L	4	8	8
	EC	µS/cm	NA	13000	11000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory Limit of reporting.

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.

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. Refer to Table 5.

Table 5 – Quarterly Groundwater Results and Comparison Dec 2021 – Mar 2022 (MWD)

	Analytes	Units	Site Criteria (mg/L)	MWD (leachate) Dec 2021	MWD (leachate) Mar 2022
IONS	Calcium	mg/L	NA	180	220
	Alkalinity (total)	mg/L	NA	950	1700
	Chloride	mg/L	NA	920	1700
	Fluoride	mg/L	NA	0.2	0.3
	Potassium¹	mg/L	410	46	79
	Magnesium	mg/L	NA	88	140
	Sulphate	mg/L	NA	98	49
HEAVY METALS	Iron	mg/L	0.3	0.44	0.65
	Manganese	mg/L	1.9	0.56	0.59
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.3	7.4
	Sodium	mg/L	NA	500	840
	Ammonia²	mg/L	0.9	67	130
	Nitrate	mg/L	0.7	0.23	0.02
	Total Organic Carbon (TOC)	mg/L	4	77	140
	EC	µS/cm	NA	4400	7300

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory Limit of reporting.

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.

There was one exceedance of the site criteria for March in MWE, TOC at concentrations of 6 mg/L.
Refer to Table 6.

Table 6 –Quarterly Groundwater Results and Comparison Dec 2021 – Mar 2022 (MWE)

	Analytes	Units	Threshold Criteria (mg/L)	MWE Dec 2021	MWE Mar 2022
IONS	Calcium	mg/L	NA	68	140
	Alkalinity (total)	mg/L	NA	1300	1200
	Chloride	mg/L	NA	370	990
	Fluoride	mg/L	NA	0.4	1.1
	Potassium¹	mg/L	410	1	1
	Magnesium	mg/L	NA	70	130
	Sulphate	mg/L	NA	96	200
HEAVY METALS	Iron	mg/L	0.3	1.9	0.03
	Manganese	mg/L	1.9	1.1	1.3
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.1	7.2
	Sodium	mg/L	NA	600	700
	Ammonia²	mg/L	0.9	0.021	0.036
	Nitrate	mg/L	0.7	<LOR	<LOR
	Total Organic Carbon (TOC)	mg/L	4	14	6
	EC	µS/c	NA	3300	4900

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory Limit of reporting.

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

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 following is a summary of the significant results for March 2022 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. There was one exceedance of the site criteria:

- The TOC has increased from 8mg/L to 20mg/L remaining above the site criteria of 4mg/L

The following changes have occurred in the water quality of MWA:

- Ammonia, and Fluoride increased from <LOR to 0.031mg/L and 0.7mg/L respectively;
- There was a significant decrease in Sodium from 1500mg/L to 350mg/L, Sulphate from 66mg/L to 29mg/L, Magnesium from 920mg/L to 100mg/L, Potassium from 2mg/L to 1mg/L, Nitrate from 0.31mg/L to 0.058mg/L, Chloride from 2900mg/L to 250mg/L, and Calcium from 460mg/L to 66mg/L.
- The EC decreased from 8900 $\mu\text{S}/\text{cm}$ to 1600 $\mu\text{S}/\text{cm}$.

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. There is one exceedance of the site criteria:

- The TOC concentration increased from 5mg/L to 6 mg/L remaining above the Site Criteria of 4 mg/L.

The following changes have occurred in the water quality of MWB:

- There has been a decreased of Nitrate from 0.62mg/L to 0.38mg/L, Calcium from 470mg/L to 420mg/L and Sodium from 1300mg/L to 1000mg/L.
- Ammonia and Iron increased from <LOR to 0.011mg/L, and 0.004 mg/L respectively.

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. There were two concentrations which exceeded the site criteria:

- A concentration of Manganese (2.2 mg/L) was reported in MWC a slight decrease compared to the previous concentrations reported in December 2021 (3 mg/L).
- A concentration of TOC (8 mg/L) was reported in MWC exceeding the Site Criteria (4 mg/L), remains steady from the previous reported concentration in December 2021 (8 mg/L).

The following changes have occurred in the water quality of MWC:

- There was an increase in Calcium from 310mg/L to 370mg/L, Sulphate from 98mg/L to 120mg/L, Sodium from 1400mg/L to 2000mg/L and Nitrate from 0.066mg/L to 0.11mg/L.
- Ammonia has decreased from 0.096mg/L to 0.04mg/L and remains below the site criteria.

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.

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

- Iron concentration increased from 0.44 mg/L in December to 0.65 mg/L
- There was an increased in Ammonia concentration from 67 mg/L to 130 mg/L, Calcium from 180 mg/L to 220 mg/L, Alkalinity from 950 mg/L to 1700 mg/L,

Chloride from 920 mg/L to 1700 mg/L, Potassium from 46 mg/L to 79 mg/L, Magnesium from 88 mg/L to 140 mg/L and Sodium from 500 mg/L to 840 mg/L

- The TOC has increased from 77 mg/L to a concentration of 140 mg/L.
- There was a decrease in Sulphate from 98 mg/L to 49 mg/L and Nitrate from 0.23 mg/L to 0.02 mg/L
- The EC has increased from 4400 $\mu\text{S}/\text{cm}$ to 7300 $\mu\text{S}/\text{cm}$.

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. There was one concentration which exceeded the site criteria The following changes have occurred in the water quality of MWC:

- The TOC concentration has decreased from 14 mg/L to 6 mg/L in comparison to December's report, persistently exceeding the site criteria.
- The Iron concentration has a significant decreased from 1.9 mg/L to 0.03 mg/L in comparison to December's report, to be below the site criteria.
- There was an increased in Calcium from 68 mg/L to 140 mg/L, Chloride from 370 mg/L to 990 mg/L, Fluoride from 0.4 mg/L to 1.1 mg/L, Magnesium from 70 mg/L to 130 mg/L, Sulphate from 96 mg/L to 200 mg/L, Sodium from 600 mg/L to 700 mg/L, Ammonia from 0.021 mg/L to 0.036 mg/L
- The EC has increased from 3300 $\mu\text{S}/\text{cm}$ to 4.900 $\mu\text{S}/\text{cm}$.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the March 2022 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWA, MWB, MWC and MWE, Iron and Manganese in MWC. Refer to **Attachment 3** – Data Log.

Site Maintenance

The leachate well remains broken off at the ground level. No immediate maintenance is required on the other wells.

6.0 CONCLUSIONS

There are seasonal fluctuations observed with regional groundwater conditions. The recent weather conditions of heavy rain and flooding 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 March 2022 quarterly sampling event displayed several ongoing exceedances of the Site Criteria from the previous monitoring period.

The following analytes exceeded the Site Criteria for the March 2022 sampling event; TOC in MWA, MWB, MWC and MWE, Iron and Ammonia in MWD and Manganese in MWC.

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

The next water sampling event will be an annual monitoring event which will be undertaken in June 2022.

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



Legend

● Monitoring Well Location

Image: Google Maps 2019



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 1
NATA ACCREDITED LABORATORY
RESULTS



CERTIFICATE OF ANALYSIS 292198

Client Details

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

Sample Details

Your Reference	<u>E04-0322-UHSC</u>
Number of Samples	4 water, 1 water-leachate
Date samples received	30/03/2022
Date completed instructions received	30/03/2022

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	06/04/2022
Date of Issue	06/04/2022

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Results Approved By

Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Jenny He, Chemist
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in Water						
Our Reference		292198-1	292198-2	292198-3	292198-4	292198-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		28/03/2022	28/03/2022	28/03/2022	28/03/2022	28/03/2022
Type of sample		water	water	water	water-leachate	water
Date extracted	-	04/04/2022	04/04/2022	04/04/2022	04/04/2022	04/04/2022
Date analysed	-	04/04/2022	04/04/2022	04/04/2022	04/04/2022	04/04/2022
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	%	74	72	77	66	76

Total Phenolics in Water						
Our Reference		292198-1	292198-2	292198-3	292198-4	292198-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		28/03/2022	28/03/2022	28/03/2022	28/03/2022	28/03/2022
Type of sample		water	water	water	water-leachate	water
Date extracted	-	31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Date analysed	-	31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference		292198-1	292198-2	292198-3	292198-4	292198-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		28/03/2022	28/03/2022	28/03/2022	28/03/2022	28/03/2022
Type of sample		water	water	water	water-leachate	water
Date prepared	-	31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Date analysed	-	31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Iron-Dissolved	µg/L	<10	40	<10	650	30
Manganese-Dissolved	µg/L	9	11	2,200	590	1,300

Ion Balance						
Our Reference		292198-1	292198-2	292198-3	292198-4	292198-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		28/03/2022	28/03/2022	28/03/2022	28/03/2022	28/03/2022
Type of sample		water	water	water	water-leachate	water
Date prepared	-	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Date analysed	-	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Calcium - Dissolved	mg/L	66	420	370	220	140
Potassium - Dissolved	mg/L	1	2	2	79	1
Sodium - Dissolved	mg/L	350	1,000	2,000	840	700
Magnesium - Dissolved	mg/L	100	620	440	140	130
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	610	430	930	1,700	1,200
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	610	430	930	1,700	1,200
Sulphate, SO ₄	mg/L	29	85	120	49	200
Chloride, Cl	mg/L	250	4,600	4,000	1,700	990
Ionic Balance	%	15	-10	3.0	-14	-7.0

Miscellaneous Inorganics						
Our Reference		292198-1	292198-2	292198-3	292198-4	292198-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		28/03/2022	28/03/2022	28/03/2022	28/03/2022	28/03/2022
Type of sample		water	water	water	water-leachate	water
Date prepared	-	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Date analysed	-	30/03/2022	30/03/2022	30/03/2022	30/03/2022	30/03/2022
Ammonia as N in water	mg/L	0.031	0.011	0.048	130	0.036
Fluoride, F	mg/L	0.7	0.2	0.2	0.3	1.1
Total Organic Carbon	mg/L	20	6	8	140	6
Nitrate as N in water	mg/L	0.058	0.38	0.11	0.02	<0.005
pH	pH Units	7.6	6.8	6.9	7.4	7.2
Electrical Conductivity	µS/cm	1,600	13,000	11,000	7,300	4,900

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-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-022	Determination of various metals by ICP-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Client Reference: E04-0322-UHSC

QUALITY CONTROL: Organochlorine Pesticides in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/04/2022	[NT]	[NT]	[NT]	[NT]	04/04/2022	[NT]
Date analysed	-			04/04/2022	[NT]	[NT]	[NT]	[NT]	04/04/2022	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	64	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	64	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	65	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	69	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	68	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	70	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	71	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	72	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	60	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	74	[NT]	[NT]	[NT]	[NT]	98	[NT]

Client Reference: E04-0322-UHSC

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	292198-2
Date extracted	-			31/03/2022	1	31/03/2022	31/03/2022		31/03/2022	31/03/2022
Date analysed	-			31/03/2022	1	31/03/2022	31/03/2022		31/03/2022	31/03/2022
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	101	96

Client Reference: E04-0322-UHSC

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	292198-4
Date prepared	-			31/03/2022	3	31/03/2022	31/03/2022		31/03/2022	31/03/2022
Date analysed	-			31/03/2022	3	31/03/2022	31/03/2022		31/03/2022	31/03/2022
Iron-Dissolved	µg/L	10	Metals-022	<10	3	<10	<10	0	96	#
Manganese-Dissolved	µg/L	5	Metals-022	<5	3	2200	2300	4	97	#

Client Reference: E04-0322-UHSC

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	292198-5
Date prepared	-			30/03/2022	1	30/03/2022	30/03/2022		30/03/2022	30/03/2022
Date analysed	-			30/03/2022	1	30/03/2022	30/03/2022		30/03/2022	30/03/2022
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	66	[NT]		93	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1	[NT]		88	99
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	350	[NT]		102	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	100	[NT]		95	#
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	610	610	0	[NT]	[NT]
Carbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	610	610	0	102	[NT]
Sulphate, SO ₄	mg/L	1	Inorg-081	<1	1	29	[NT]		116	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	250	[NT]		101	[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]	4	30/03/2022	30/03/2022		[NT]	[NT]
Date analysed	-			[NT]	4	30/03/2022	30/03/2022		[NT]	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	[NT]	4	220	210	5	[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	[NT]	4	79	78	1	[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	[NT]	4	840	830	1	[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	[NT]	4	140	140	0	[NT]	[NT]
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	5	Inorg-006	[NT]	4	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	[NT]	4	1700	[NT]		[NT]	[NT]
Carbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	[NT]	4	<5	[NT]		[NT]	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	Inorg-006	[NT]	4	1700	[NT]		[NT]	[NT]
Sulphate, SO ₄	mg/L	1	Inorg-081	[NT]	4	49	[NT]		[NT]	[NT]
Chloride, Cl	mg/L	1	Inorg-081	[NT]	4	1700	[NT]		[NT]	[NT]
Ionic Balance	%		Inorg-040	[NT]	4	-14	[NT]		[NT]	[NT]

Client Reference: E04-0322-UHSC

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate			Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/03/2022	1	30/03/2022	30/03/2022		30/03/2022	[NT]
Date analysed	-			30/03/2022	1	30/03/2022	30/03/2022		30/03/2022	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	0.031	[NT]		116	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	1	0.7	0.7	0	98	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	20	21	5	96	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.058	[NT]		96	[NT]
pH	pH Units		Inorg-001	[NT]	1	7.6	7.6	0	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	1600	1700	6	99	[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
Samples were out of the recommended holding time for this analysis.

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

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

ATTACHMENT 2
CALIBRATION CERTIFICATE

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
 Serial No. **20M101177**



Air-Met Scientific Pty Ltd
 1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		380833	pH 10.20
2. pH 7.00		pH 7.00		377339	pH 7.20
3. pH 4.00		pH 4.00		380327	pH 4.01
4. mV		229.6mV		365451/374424	229.4mV
5. EC		2.76mS		377099	2.76mS
6. D.O		0.00ppm		371864	0.02ppm
7. Temp		21.6 °C		MultiTherm	21.1°C

Calibrated by: _____ Gary Needs

Calibration date: **22/03/2022**

Next calibration due: **22/04/2022**

ATTACHMENT 3
DATALOG

ENGAGE ENVIRONMENTAL SERVICES			Threshold Criteria	NA	NA	NA	NA	0.3	NA	0.00001	NA	6.5-8	NA	0.9	0.7	NA	4	0.32	NA			
			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	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm
			Analytes	Calcium	Alkalinity	Chloride	Fluoride	Iron	Magnesium	Manganese	Organochlorine pesticides (OCP)	Potassium	pH	Sodium	Ammonia	Nitrate	Sulfate	Total organic carbon	Total phenolics	Electrical conductivity (EC)		
			Monitoring frequency	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	292198	30/03/2022	66	610	250	0.7	ND	100	0.009	ND	1	7.6	350	0.031	0.058	29	20	ND	1600			
MWB	292198	30/03/2022	420	430	4600	0.2	0.04	620	0.011	ND	2	6.8	1000	0.011	0.38	85	6	ND	13000			
MWC	292198	30/03/2022	370	930	4000	0.2	ND	440	2.2	ND	2	6.9	2000	0.048	0.11	120	8	ND	11000			
MWD	292198	30/03/2022	220	1700	1700	0.3	0.65	140	0.59	ND	79	7.4	840	130	0.02	49	140	ND	7300			
MWE	292198	30/03/2022	140	1200	990	1.1	0.03	130	1.3	ND	1	7.2	700	0.036	ND	200	6	ND	4900			