ENGAGE ENVIRONMENTAL SERVICES
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QUARTERLY GROUNDWATER MONITORING

SCONE WASTE FACILITY
NOBLET ROAD
SCONE NSW

PROJECT NUMBER – E2424-0624
JUNE 2024

Document Control Number – B0282

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DOCUMENT CONTROL INFORMATION

Project Name – Groundwater Monitoring – Scone Waste Facility –Quarterly Monitoring Round

Client - Upper Hunter Shire Council

Project Number – E2424-0624

Prepared – DB

Reviewed By and Approved for Release By – STC

Document Control Number – B0282

Comments – Final Copy

Date – 21/06/2024

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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

ENGAGE ENVIRONMENTAL Services

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

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 11th June 2024.

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 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
PHENOLS	Total phenolics	mg/L	0.32	Quarterly
OCP	Organochlorine Pesticide[3] (OCP)	mg/L	0.00001	Quarterly
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	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 ± 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 portable cooler 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 June 2024 sampling event, results are detailed in **Tables 2** to **6**. Comparisons have been made to the previous rounds of monitoring (June 2023 – June 2024). Refer to **Attachment 1** – NATA Accredited Laboratory Results and **Attachment 3** – Data Log.

There were no exceedances of the site criteria for June in MWA.

Table 2 – Quarterly Groundwater Results and Comparison June 2023 – June 2024 (MWA)

	Analytes	Units	Site Criteria (mg/L)	MWA June 2023	MWA Sept 2023	MWA Jan 2024	MWA Mar 2024	MWA June 2024
IONS	Calcium	mg/L	NA	540	570	570	570	540
	Alkalinity (total)	mg/L	NA	520	540	560	530	490
	Chloride	mg/L	NA	6300	8000	7200	6500	7300
	Fluoride	mg/L	NA	0.1	0.1	0.1	0.2	0.2
	Potassium[1]	mg/L	410	4	4	4	3	3
	Magnesium	mg/L	NA	1000	1100	1200	1100	1000
	Sulphate	mg/L	NA	66	62	100	62	53
HEAVY METALS	Iron	mg/L	0.3	<LOR	0.01	<LOR	<LOR	<LOR
	Manganese	mg/L	1.9	0.012	0.07	0.038	0.006	0.028
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
OCP	OCP[3]	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.6	6.9	7.0	7.3	6.9
	Sodium	mg/L	NA	2100	2000	2000	2200	1800
	Ammonia[2]	mg/L	0.9	0.007	0.043	0.066	0.26	0.16
	Nitrate	mg/L	0.7	0.63	0.59	0.6	0.55	0.54
	Total Organic Carbon	mg/L	4	3	**5**	**9**	**5**	4
	EC	µS/c	NA	19000	20000	19000	19000	19000

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 June in MWB, TOC at a concentration of 7mg/L.

Table 3 – Quarterly Groundwater Results and Comparison June 2023 – June 2024 (MWB)

	Analytes	Units	Site Criteria (mg/L)	MWB June 2023	MWB Sept 2023	MWB Jan 2024	MWB Mar 2024	MWB June 2024
IONS	Calcium	mg/L	NA	470	470	480	470	410
	Alkalinity (total)	mg/L	NA	450	440	470	450	460
	Chloride	mg/L	NA	4200	5200	4700	4300	4600
	Fluoride	mg/L	NA	0.3	0.2	0.3	0.3	0.3
	Potassium[1]	mg/L	410	3	4	3	2	3
	Magnesium	mg/L	NA	600	630	640	620	520
	Sulphate	mg/L	NA	91	110	100	93	91
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR	<LOR	<LOR	<LOR
	Manganese	mg/L	1.9	0.017	0.016	0.013	0.014	0.008
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
OCP	OCP[3]	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.9	6.9	7.1	7.5	7.1
	Sodium	mg/L	NA	1500	1400	1400	1600	1300
	Ammonia[2]	mg/L	0.9	0.073	0.037	0.03	0.033	<LOR
	Nitrate	mg/L	0.7	0.38	0.26	0.26	0.19	0.19
	Total Organic Carbon	mg/L	4	**9**	**9**	**14**	**7**	**7**
	EC	µS/cm	NA	14000	14000	13000	13000	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 was one exceedance of the site criteria for June in MWC, TOC at a concentration of 18mg/L.

Table 4 – Quarterly Groundwater Results and Comparison June 2023 – June 2024 (MWC)

	Analytes	Units	Site Criteria (mg/L)	MWC June 2023	MWC Sept 2023	MWC Jan 2024	MWC Mar 2024	MWC June 2024
IONS	Calcium	mg/L	NA	380	390	420	420	390
	Alkalinity (total)	mg/L	NA	990	880	890	840	860
	Chloride	mg/L	NA	4000	5500	5300	4600	4500
	Fluoride	mg/L	NA	0.2	0.2	0.2	0.2	0.2
	Potassium[1]	mg/L	410	2	3	2	2	2
	Magnesium	mg/L	NA	500	550	600	600	510
	Sulphate	mg/L	NA	87	91	98	83	71
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR	<LOR	0.04	0.18
	Manganese	mg/L	1.9	1.4	1.9	1.5	1.8	1.8
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
OCP	OCP[3]	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.8	6.9	7.0	7.4	6.9
	Sodium	mg/L	NA	1900	1800	1900	2300	1700
	Ammonia[2]	mg/L	0.9	<LOR	<LOR	<LOR	0.021	<LOR
	Nitrate	mg/L	0.7	0.05	0.068	0.03	0.03	0.02
	Total Organic Carbon	mg/L	4	**8**	**8**	**14**	**10**	**18**
	EC	µS/c	NA	14000	15000	15000	15000	15000

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.

Table 5 – Quarterly Groundwater Results and Comparison June 2023 – June 2024 (MWD) Leachate Well

	Analytes	Units	Site Criteria (mg/L)	MWD June 2023	MWD Sept 2023	MWD Jan 2024	MWD Mar 2024	MWD June 2024
IONS	Calcium	mg/L	NA	160	160	160	150	170
	Alkalinity (total)	mg/L	NA	2300	1900	2000	1200	1300
	Chloride	mg/L	NA	2200	3400	2200	1100	940
	Fluoride	mg/L	NA	0.3	0.2	0.3	0.3	0.3
	Potassium[1]	mg/L	410	130	110	120	76	67
	Magnesium	mg/L	NA	270	280	230	130	110
	Sulphate	mg/L	NA	62	51	32	100	100
HEAVY METALS	Iron	mg/L	0.3	**0.87**	**0.88**	**1.1**	**0.4**	0.28
	Manganese	mg/L	1.9	0.38	0.39	0.47	0.62	0.66
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
OCP	OCP[3]	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.4	7.8	7.6	7.8	7.4
	Sodium	mg/L	NA	1600	1500	1400	750	590
	Ammonia[2]	mg/L	0.9	**220**	**200**	**190**	**130**	**100**
	Nitrate	mg/L	0.7	<LOR	<LOR	<LOR	<LOR	<LOR
	Total Organic Carbon	mg/L	4	**220**	**240**	**270**	**89**	**100**
	EC	µS/c	NA	11000	3600	9700	5600	5600

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 June in MWE, TOC at a concentration of 44mg/L.

Table 6 –Quarterly Groundwater Results and Comparison June 2023 – June 2024 (MWE)

	Analytes	Units	Threshold Criteria (mg/L)	MWE June 2023	MWE Sept 2023	MWE Jan 2024	MWE Mar 2024	MWE June 2024
IONS	**Calcium**	mg/L	NA	130	130	110	82	39
	Alkalinity (total)	mg/L	NA	1200	1100	1100	1400	980
	Chloride	mg/L	NA	940	1300	1300	440	240
	Fluoride	mg/L	NA	0.5	0.4	0.4	0.5	0.4
	Potassium[1]	mg/L	410	0.9	1	0.9	<LOR	0.8
	Magnesium	mg/L	NA	130	140	130	91	46
	Sulphate	mg/L	NA	180	240	210	120	60
HEAVY METALS	**Iron**	mg/L	0.3	<LOR	0.02	<LOR	0.010	0.09
	Manganese	mg/L	1.9	0.66	1.1	0.9	0.65	0.71
PHENOLS	**Total phenolics**	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
OCP	**OCP[3]**	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.2	7.4	7.3	7.7	7.1
	Sodium	mg/L	NA	730	760	830	720	440
	Ammonia[2]	mg/L	0.9	0.039	0.12	0.015	<LOR	0.081
	Nitrate	mg/L	0.7	0.007	0.01	<LOR	<LOR	0.008
	Total Organic Carbon	mg/L	4	**5**	**5**	**19**	**9**	**44**
	EC	µS/cm	NA	5100	5500	5800	3700	2400

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 monitoring 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 June 2024 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 northwest 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 are no exceedances of the site criteria in this round of monitoring.

The following changes have occurred in the water quality of MWA since the previous monitoring period in March 2024:

- Ammonia concentration decreased from 0.26 mg/L to 0.16mg/L;
- Chloride concentration increased from 6500 mg/L to 7300 mg/L;
- Sodium concentration decreased from 2200mg/L to 1800 mg/L;
- TOC concentration decreased from 5 mg/L to 4 mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWB

MWB is located in the southwest 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 remained consistent between the March and June 2024 at 7 mg/L, remaining above site Criteria of 4 mg/L.

There were no significant changes in the water quality of MWB since the previous monitoring period.

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 was one concentration which exceeded the site criteria:

- The TOC concentration increased from 10 mg/L to 18 mg/L, remaining above site Criteria of 4 mg/L.

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

- Ammonia concentration has decreased from 0.021 mg/L in March 2024 to no detection;
- Iron concentration has increased from 0.04 mg/L to 0.18 mg/L;
- Sodium concentration decreased from 2300 mg/L to 1700mg/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.

The following changes occurred in the water quality of the landfill leachate well MWD since the previous monitoring period:

- Ammonia concentration decreased from 130mg/L to 100mg/L.
- Chloride concentration decreased from 1100 mg/L to 940 mg/L;
- Sodium concentration decreased from 750 mg/L to 590 mg/L;
- The TOC concentration increased from 89mg/L to 100 mg/L.

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 MWE the previous monitoring period:

- The TOC concentration increased from 9mg/L to 44 mg/L, above the site criteria of 4mg/L.

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

- Ammonia concentration increased from no detection to 0.081 mg/L;
- Calcium concentration decreased from 82 mg/L to 39 mg/L;
- Chloride concentration decreased from 440 mg/L to 240 mg/L;
- Iron concentration increased from 0.01 mg/L to 0.09 mg/L;
- Magnesium concentration decreased from 91 mg/L to 46 mg/L;
- Sodium concentration decreased from 720 mg/L to 440 mg/L;
- Sulphate concentration decreased from 120 mg/L to 60 mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the June 2024 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWB, MWC and MWE. Refer to **Attachment 3** – Data Log.

Site Maintenance

The leachate well remains broken off at the ground level. The monument lids in Wells A and B has rusted through, the monument stand and well remain intact. No immediate maintenance is required on the other wells.

6.0 CONCLUSIONS

There are seasonal fluctuations and localised weather events which would have impacted the local and regional groundwater conditions. Trending of the analytes sampled 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 June 2024 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 June 2024 sampling event; TOC in MWB, MWC and MWE. TOC concentration in MWA has decreased to below the site criteria

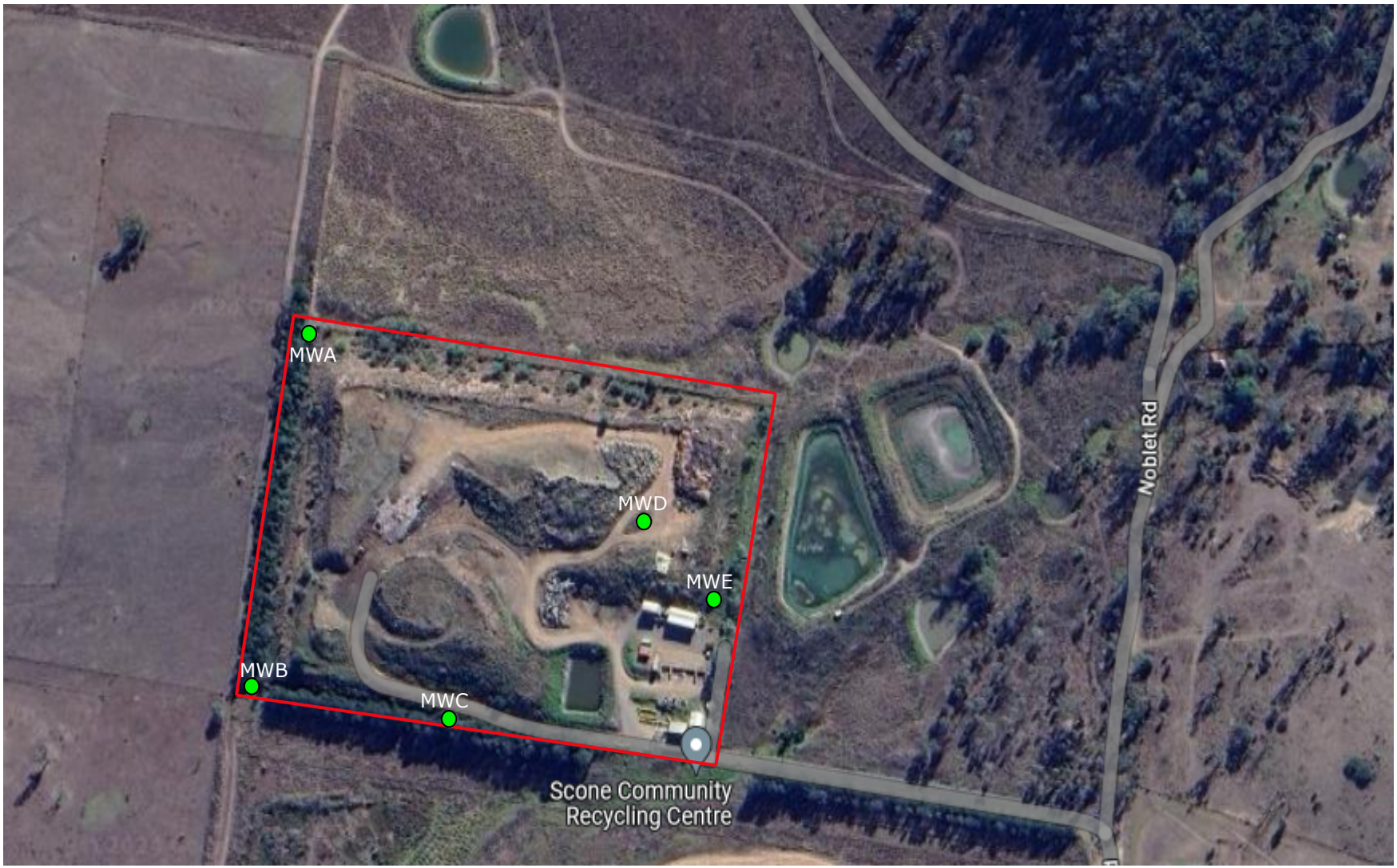
Continued sampling and data collection will allow robust trending and statistical analysis of data to occur.

The next water sampling event will be the annual monitoring event which will be undertaken in September 2024.

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 6* 2011, updated Nov 2018;
- *Contaminated Land Management Act 1997* (NSW);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA 2011);
- *Contaminated Sites: Consultants reporting on Contaminated Lands (NSW EPA 2020)*
- *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 land sampling design guidelines part 1 – application (NSW EPA 2022)*
- *Contaminated land sampling design guidelines part 2 – interpretation (NSW EPA 2022)*
- *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;
- *State Environmental Planning Policy (Resilience and Hazards) 2021;*
- *Storage and Handling of Dangerous Goods Code of Practice 2005*;
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

FIGURE
SITE LAYOUT



Legend

Sample Location

Site boundary

Image: SiX Maps NSW Gov.

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Title: Sampling Locations Noblet Road, Scone

Client	Project No.	Figure No	Date
UHSC	E2424	1	1/02/2024
	Scale	Compiled	Revision
	NA	DB	1

ATTACHMENT A

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	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)
Well Id	Lab Report	Date	Monitoring frequency	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	353863	11/06/2024	Quarterly	540	490	7300	0.2	<LOR	1000	0.028	<LOR	3	6.9	1800	0.16	0.54	53	4	<LOR	19000
MWB	353863	11/06/2024	Quarterly	410	460	4600	0.3	<LOR	520	0.008	<LOR	3	7.1	1300	<LOR	0.19	91	**7**	<LOR	13000
MWC	353863	11/06/2024	Quarterly	390	860	4500	0.2	0.18	510	1.8	<LOR	2	6.9	1700	<LOR	0.02	71	**18**	<LOR	15000
MWD	353863	11/06/2024	Quarterly	170	1300	940	0.3	0.28	110	0.66	<LOR	67	7.4	590	**100**	<LOR	100	**100**	<LOR	5600
MWE	353863	11/06/2024	Quarterly	39	980	240	0.4	0.09	46	0.71	<LOR	0.8	7.1	440	0.081	0.008	60	**44**	<LOR	2400

ATTACHMENT B

NATA ACCREDITED LABORATORY RESULTS

Envirolab Services Pty Ltd
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customerservice@envirolab.com.au
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CERTIFICATE OF ANALYSIS 353863

Client Details

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

Sample Details

Your Reference	**E2424-0624 - UHSC**
Number of Samples	5 Water
Date samples received	14/06/2024
Date completed instructions received	14/06/2024

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	21/06/2024
Date of Issue	21/06/2024

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Inorganics Supervisor
Giovanni Agosti, Group Technical Manager
Liam Timmins, Organics Supervisor

Authorised By
Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in Water						
Our Reference		353863-1	353863-2	353863-3	353863-4	353863-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		11/06/2024	11/06/2024	11/06/2024	11/06/2024	11/06/2024
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	18/06/2024	18/06/2024	18/06/2024	18/06/2024	18/06/2024
Date analysed	-	18/06/2024	18/06/2024	18/06/2024	18/06/2024	18/06/2024
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 4-Chloro-3-NBTF	%	98	100	91	92	96

Total Phenolics in Water						
Our Reference		353863-1	353863-2	353863-3	353863-4	353863-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		11/06/2024	11/06/2024	11/06/2024	11/06/2024	11/06/2024
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	17/06/2024	17/06/2024	17/06/2024	17/06/2024	17/06/2024
Date analysed	-	17/06/2024	17/06/2024	17/06/2024	17/06/2024	17/06/2024
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference		353863-1	353863-2	353863-3	353863-4	353863-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		11/06/2024	11/06/2024	11/06/2024	11/06/2024	11/06/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/06/2024	17/06/2024	17/06/2024	17/06/2024	17/06/2024
Date analysed	-	17/06/2024	17/06/2024	17/06/2024	17/06/2024	17/06/2024
Iron-Dissolved	µg/L	<10	<10	180	280	90
Manganese-Dissolved	µg/L	28	8	1,800	660	710

Ion Balance						
Our Reference		353863-1	353863-2	353863-3	353863-4	353863-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		11/06/2024	11/06/2024	11/06/2024	11/06/2024	11/06/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
Date analysed	-	14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
Calcium - Dissolved	mg/L	540	410	390	170	39
Potassium - Dissolved	mg/L	3	3	2	67	0.8
Sodium - Dissolved	mg/L	1,800	1,300	1,700	590	440
Magnesium - Dissolved	mg/L	1,000	520	510	110	46
Hardness (calc) equivalent $CaCO_3$	mg/L	5,600	3,200	3,100	890	280
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	490	460	860	1,300	980
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	490	460	860	1,300	980
Sulphate, SO4	mg/L	53	91	71	100	60
Chloride, Cl	mg/L	7,300	4,600	4,500	940	240
Ionic Balance	%	-6.0	-9.0	-3.0	-10	-5.0

Miscellaneous Inorganics						
Our Reference	UNITS	353863-1	353863-2	353863-3	353863-4	353863-5
Your Reference		MWA	MWB	MWC	MWD	MWE
Date Sampled		11/06/2024	11/06/2024	11/06/2024	11/06/2024	11/06/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
Date analysed	-	14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
pH	pH Units	6.9	7.1	6.9	7.4	7.1
Electrical Conductivity	µS/cm	19,000	13,000	15,000	5,600	2,400
Ammonia as N in water	mg/L	0.16	<0.005	<0.005	100	0.081
Fluoride, F	mg/L	0.2	0.3	0.2	0.3	0.4
Total Organic Carbon	mg/L	4	7	18	100	44
Nitrate as N in water	mg/L	0.54	0.19	0.02	<0.005	0.008

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. 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.
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. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms (e.g. FeO, PbO, ZnO) are determined stoichiometrically from the base metal concentration.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: Organochlorine Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	353863-2
Date extracted	-			18/06/2024	1	18/06/2024	18/06/2024		18/06/2024	18/06/2024
Date analysed	-			18/06/2024	1	18/06/2024	18/06/2024		18/06/2024	18/06/2024
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	92	103
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	111	98
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	103	111
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	103	110
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	98	110
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	94	105
Dieldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	96	105
Endrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	101	102
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	107	105
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	107	74
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	97	1	98	99	1	87	95

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	353863-2
Date extracted	-			17/06/2024	1	17/06/2024	17/06/2024		17/06/2024	17/06/2024
Date analysed	-			17/06/2024	1	17/06/2024	17/06/2024		17/06/2024	17/06/2024
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	101	85

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	353863-2
Date prepared	-			17/06/2024	1	17/06/2024	17/06/2024		17/06/2024	17/06/2024
Date analysed	-			17/06/2024	1	17/06/2024	17/06/2024		17/06/2024	17/06/2024
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	92	104
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	28	31	10	94	114

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	353863-2
Date prepared	-			14/06/2024	1	14/06/2024	14/06/2024		14/06/2024	14/06/2024
Date analysed	-			14/06/2024	1	14/06/2024	14/06/2024		14/06/2024	14/06/2024
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	540	500	8	93	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	3	3	0	87	101
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1800	1700	6	87	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1000	930	7	92	#
Hardness (calc) equivalent $CaCO_3$	mg/L	3	Metals-020	[NT]	1	5600	5100	9	[NT]	[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	490	[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	490	[NT]		114	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	53	[NT]		117	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	7300	[NT]		101	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-6.0	[NT]		[NT]	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			14/06/2024	[NT]	[NT]	[NT]	[NT]	14/06/2024	[NT]
Date analysed	-			14/06/2024	[NT]	[NT]	[NT]	[NT]	14/06/2024	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	95	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	96	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

Dissolved Metals: #2,4 no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

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.

Samples were out of the recommended holding time for this analysis. pH

ATTACHMENT C
CALIBRATION CERTIFICATE

Electrode Quality Certificate

Electrode:	Parameter:	SN:	Recommended for:
HI7698194-3	EC	J88036	HI98194

Description: EC sensor with screw type connector

Hanna Instruments certifies that this electrode has been produced, calibrated and tested to meet all applicable Hanna Instruments Procedures, using standards and reference instruments, the accuracy of which is traceable to the National Institute of Standards (NIST) in the USA or to internationally acceptable national physical standards. The standards and reference instruments used in calibration and testing are supported by a calibration system which meets requirements of ISO 9001.

Standard Reference Materials: EC: SRM 999 [NIST]

Tests performed using reference devices:

EC (@ 25 °C):	Offset (air) [µS/cm]:	0	
	Tolerance [µS/cm]:	+1	
	Reading [µS/cm]:	0	*Passed*
	EC (standard) [mS/cm]:	12.88	
	Tolerance [mS/cm]:	10.30 - 15.46	
	Reading [mS/cm]:	12.61	*Passed*
EC response time (12.88 mS/cm → 5.00 mS/cm)*:	Standard time [s]:	<5	*Passed*
	Tolerance [s]:	+1	

**) Evaluated for 90 % of step; NP = not performed.*

Quality control and testing criteria have been met.

Date: 2023.06.26 QC Inspector: Szigyarto N. / Engineer
[Name / Title of Signatory]

Signature:

EQC_HI7698194-3_rev.0.1_December 2018

Instrument Quality Certificate

Instrument:	Serial Number:	SW version, Meter:	Bluetooth version:
HI98494	M04200028111	1.05	1.00

Description: Multiparameter Bluetooth Portable pH/ORP/EC/opdo Waterproof Meter

Hanna Instruments certifies that this instrument has been produced, calibrated and tested to meet all applicable Hanna Instruments procedures, using standards and reference instruments, the accuracy of which is traceable to the National Institute of Standards (NIST) in the USA or to internationally acceptable national physical standards. The standards and reference instruments used in calibration and testing are supported by a calibration system which meets requirements of ISO 9001.
The following tests have been performed according with the reference from the QC Procedure of the meter.

The results are listed below:

A. Functionality tests	Reference	*Result*
A.1. Switch On/Off test	8.3	*Passed*
A.2. LCD test	8.3	*Passed*
A.3. Sound test	8.3	*Passed*
A.4. Keyboard test	8.3	*Passed*
A.5. Real time clock test	8.3	*Passed*
A.6. Eeprom test	8.3	*Passed*
A.7. Measurement test (pH, ORP, EC, opdo, T)	8.4	*Passed*
A.8. PC connection test USB	8.5	*Passed*
A.9. PC connection test Bluetooth	8.5	*Passed*
A.10. Log download test	8.5	*Passed*
A.11. Factory calibration test	8.5	*Passed*
B. Aesthetic Control	**Reference**	***Result***
B.1. Visual Inspection	8.1	*Passed*
B.2. Labeling and Marking	8.2	*Passed*

Calibration, functionality test, aesthetic control and packing have been met.

Date: 2023.06.29 QC Inspector: Tudor Coman / Engineer
[Name / Title of Signatory]

Signature:

IQC_HI98494_rev.0.1_September 2020

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ATTACHMENT D
FIELD DATA SHEETS

GROUNDWATER MONITORING FIELD DATA SHEET

Project: E2424-0624 Scone	**Sample ID: MWA**
Client: UHSC	**Sampler: SC**
Site Address: Noblet Road Scone	**Date:**11.6.24

Well Information

Monument damaged: Rusty	YES / **NO** / N/A	Well ID visible:	**YES** / NO / N/A
Locked well casing:	YES / **NO** / N/A	Cap on PVC casing:	**YES** / NO / N/A
Cement footing damaged:	YES / **NO** / N/A	Water in monument casing:	YES / **NO** / N/A
Standing water, vegetation around monument:	YES / **NO** / N/A	Internal obstruction in casing:	YES / **NO** / N/A
Well Damaged:	YES / **NO** / N/A	Odours from groundwater:	YES / **NO** / N/A
Casing above ground: .....0.77.....	m agl	**Weather Conditions**:	
Standing water level: ..... 6.6.....	m bgl	Temperature >15 X	15-20 ☐
Total well depth: 15.66	m bgl	20-25 ☐	25-30 ☐
Initial well volume: .....18.0.....	L		
Water level after purging: .....8.5.....	m bgl	Clear ☐ Partly cloudy X	Overcast☐
Volume of water purged: .....2.8.....	L		
Water level at time of sampling: .....8.3.....	m bgl	Calm X Slight breeze ☐	Moderate breeze ☐
Well purged dry:	YES / **NO**	Windy ☐	
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X Showers ☐	Rain ☐

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L^{-1})	EC (µS cm^{-1})	pH	Redox (mV)	Temp (°C)	Salinity	Comments
8:34am	1.87	4244	4.87	117.5	19.8	18.65	Water clear no smell or sheen
8:36am	1.87	4225	4.87	117.9	19.1	19.57	
8:38am	1.84	4210	4.84	119.8	19.3	19.96	
8:40am	1.82	4219	4.82	121.1	19.3	20.11	

Water Quality and General Comments:

Water was clear, no odour or sheen or hydrocarbon odour. Grassy vegetation around monument and no standing water around monument.

GROUNDWATER MONITORING FIELD DATA SHEET

Project: E2424-0624 Scone	**Sample ID: MWB**
Client: UHSC	**Sampler: SC**
Site Address: Noblet Road Scone	**Date:** 11.6.24

Well Information

Monument damaged: Rusty	YES / **NO** / N/A	Well ID visible:	**YES** / NO / N/A
Locked well casing:	YES / **NO** / N/A	Cap on PVC casing:	**YES** / NO / N/A
Cement footing damaged:	YES / NO / **N/A**	Water in monument casing:	YES / **NO** / N/A
Standing water, vegetation around monument:	YES / **NO** / N/A	Internal obstruction in casing:	YES / **NO** / N/A
Well Damaged: Rusty	YES / **NO** / N/A	Odours from groundwater:	YES / **NO** / N/A
Casing above ground: .....0.8.....	m agl	**Weather Conditions**:	
Standing water level: ..... 6.75.....	m bgl	Temperature >15 X	15-20 ☐
Total well depth: 14.04	m bgl	20-25 ☐	25-30 ☐
Initial well volume: .....14.....	L		
Water level after purging: .....7.78.....	m bgl	Clear ☐ Partly cloudy X	Overcast ☐
Volume of water purged: .....4.5.....	L		
Water level at time of sampling: .....7.5.....	m bgl	Calm X Slight breeze ☐	Moderate breeze ☐
Well purged dry:	YES / **NO**	Windy ☐	
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X Showers ☐	Rain ☐

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L^{-1})	EC (µS cm^{-1})	pH	Redox (mV)	Temp (°C)	Salinity	Comments
8:56am	2.44	9927	4.85	119.2	19.31	19.26	Clear water, no sheen
8:58am	2.55	9726	4.85	119.0	19.44	19.70	
9:01am	2.59	9840	4.9	119.2	19.4	19.40	
9:04am	2.50	9820	4.8	119.6	19.44	19.47	

Water Quality and General Comments:

Water was clear no odour or sheen or hydrocarbon odour. Bush vegetation and grass around monument and no standing water around monument.

GROUNDWATER MONITORING FIELD DATA SHEET

Project: E2424-0624 Scone	**Sample ID: MWC**
Client: UHSC	**Sampler:** SC
Site Address: Noblet Road Scone	**Date:** 11.06.24

Well Information

Monument damaged: Rusty	YES / **NO** / N/A	Well ID visible:	YES / **NO** / N/A
Locked well casing:	YES / **NO** / N/A	Cap on PVC casing:	**YES** / NO / N/A
Cement footing damaged:	YES / NO / **N/A**	Water in monument casing:	YES / **NO** / N/A
Standing water, vegetation around monument:	YES / **NO** / N/A	Internal obstruction in casing:	YES / **NO** / N/A
Well Damaged:	YES / **NO** / N/A	Odours from groundwater:	YES / **NO** / N/A
Casing above ground: .....0.75.....	m agl	**Weather Conditions**:	
Standing water level: ..... 5.96.....	m bgl	Temperature >15 ☐ 15-20 X	
Total well depth: 12.6	m bgl	20-25 ☐ 25-30 ☐ >30 ☐	
Initial well volume: .....12.....	L		
Water level after purging: .....6.55.....	m bgl	Clear ☐ Partly cloudy X Overcast X	
Volume of water purged: .....4.....	L		
Water level at time of sampling: .....6.5.....	m bgl	Calm X Slight breeze ☐ Moderate breeze ☐	
Well purged dry:	YES / **NO**	Windy ☐	
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X Showers ☐ Rain ☐	

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L^{-1})	EC (µS cm^{-1})	pH	Redox (mV)	Temp (°C)	Salinity	Comments
9:20am	2.54	6700	5.4	190.9	19.4	10.1	Clear water with minor brown sed
9:23am	2.76	6740	5.3	195.5	19.2	10.1	
9:25am	2.74	6690	5.3	197.6	19.2	10.2	
9:28am	2.72	6690	5.3	195.1	19.2	10.2	

Water Quality and General Comments:

Water was clear no odour or sheen or hydrocarbon odour. Grassy vegetation around monument and trees close by, and no standing water around monument. Minor brown sediment.

GROUNDWATER MONITORING FIELD DATA SHEET

Project: E2424-0624 Scone	**Sample ID: MWD Leachate well**
Client: UHSC	**Sampler: SC**
Site Address: Noblet Road Scone	**Date:** 11.06.24

Well Information

Monument damaged:	YES / NO / **N/A**	Well ID visible:	YES / **NO** / N/A
Locked well casing:	YES / NO / **N/A**	Cap on PVC casing:	YES / NO / **N/A**
Cement footing damaged:	YES / NO / **N/A**	Water in monument casing:	YES / **NO** / N/A
Standing water, vegetation around monument:	**YES** / NO / N/A	Internal obstruction in casing:	YES / **NO** / N/A
Well Damaged: Rusty	YES / NO / **N/A**	Odours from groundwater:	**YES** / NO / N/A
Casing above ground: .....N/A.....	m agl	**Weather Conditions**:	
Standing water level: ..... 10.5.....	m bgl	Temperature >15 ☐ 15-20 X	
Total well depth: 12.96	m bgl	20-25 ☐ 25-30 ☐ >30 ☐	
Initial well volume: .....6.....	L		
Water level after purging: .....10.3.....	m bgl	Clear ☐ Partly cloudy X Overcast ☐	
Volume of water purged: .....2.0.....	L		
Water level at time of sampling: .....10.3.....	m bgl	Calm ☐ Slight breeze X Moderate breeze ☐	
Well purged dry:	YES / **NO**	Windy ☐	
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X Showers ☐ Rain ☐	

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L^{-1})	EC (DS cm^{-1})	pH	Redox (mV)	Temp (°C)	Salinity	Comments
10:20pm	--	15.70	6.0	-221.2	24.5	7.0	
10:23pm	--	15.62	6.0	-223.7	24.0	7.1	
10.26pm	--	15.92	6.1	-223.1	24.1	7.3	

Water Quality and General Comments:

Water was green tinged, no sheen or hydrocarbon odour. Methane odour. Grass vegetation around monument and no standing water around monument. Monitoring well is at ground level. The well was surrounded by tyres to protect it.

GROUND WATER MONITORING FIELD DATA SHEET

Project: E2424-0624 Scone	**Sample ID: MWE**
Client: UHSC	**Sampler: SC**
Site Address: Noblet Road Scone	**Date:** 11.06.24

Well Information

Monument damaged: Rusty	YES / **NO** / N/A	Well ID visible:	YES / **NO** / N/A
Locked well casing:	YES / **NO** / N/A	Cap on PVC casing:	**YES** / NO / N/A
Cement footing damaged:	YES / NO / **N/A**	Water in monument casing:	YES / **NO** / N/A
Standing water, vegetation around monument:	YES / **NO** / N/A	Internal obstruction in casing:	YES / **NO** / N/A
Well Damaged: Rusty	YES / **NO** / N/A	Odours from groundwater:	YES / **NO** / N/A
Casing above ground: .....0.68.....	m agl	**Weather Conditions**:	
Standing water level: ..... 4.61.....	m bgl	Temperature >15 ☐ 15-20 X	
Total well depth: 9.46	m bgl	20-25 ☐ 25-30 ☐ >30 ☐	
Initial well volume: .....10.....	L		
Water level after purging: .....5.6.....	m bgl	Clear ☐ Partly cloudy X Overcast ☐	
Volume of water purged: .....4.....	L		
Water level at time of sampling: .....5.6.....	m bgl	Calm ☐ Slight breeze X Moderate breeze ☐	
Well purged dry:	YES / **NO**	Windy ☐	
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X Showers ☐ Rain ☐	

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L^{-1})	EC (µS cm^{-1})	pH	Redox (mV)	Temp (°C)	Salinity	Comments
10:28am	1.69	3224	4.84	119.2	19.53	3.5	Clear water
10:30am	1.70	3228	4.8	119.4	19.4	3.5	
10.31am	1.75	3220	4.84	120.1	19.45	3.3	

Water Quality and General Comments:

Water was clear, no sheen or hydrocarbon odour. Slight sulphur odour. Vegetation around monument and no standing water around monument.