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E: [admin@engage-es.com.au](mailto:admin@engage-es.com.au)

M: 0478 362 005

**ENGAGE  
ENVIRONMENTAL  
SERVICES**

ABN 13 629 353 662

**QUARTERLY  
GROUNDWATER  
MONITORING**

**SCONE WASTE  
FACILITY  
NOBLET ROAD  
SCONE NSW**



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**OFFICE**

1/545 Main Road  
Glendale NSW 2285

Ph: 0478 362 005

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



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### FIGURES

**Figure 1**                      Site layout with sample locations

### ATTACHMENTS

<b>Attachment A</b>	Datalog
<b>Attachment B</b>	NATA Accredited Laboratory Results
<b>Attachment C</b>	Calibration Certificate
<b>Attachment D</b>	Field Data Sheets

## 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 27<sup>th</sup> March 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	Sampling Frequency
			2013 and ANZW 2018 Fresh Water 95%	
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	Quarterly
	<b>Alkalinity (total)</b>	mg/L	NA	Quarterly
	<b>Chloride</b>	mg/L	NA	Quarterly
	<b>Fluoride</b>	mg/L	NA	Quarterly
	<b>Potassium<sup>1</sup></b>	mg/L	410	Quarterly
	<b>Magnesium</b>	mg/L	NA	Quarterly
	<b>Sulphate</b>	mg/L	NA	Quarterly
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	Quarterly
	<b>Manganese</b>	mg/L	1.9	Quarterly
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	Quarterly
<b>OCP</b>	<b>Organochlorine Pesticide<sup>3</sup> (OCP)</b>	mg/L	0.00001	Quarterly
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	Quarterly
	<b>Sodium</b>	mg/L	NA	Quarterly
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	Quarterly
	<b>Nitrate</b>	mg/L	50	Quarterly
	<b>Total organic carbon</b>	mg/L	4	Quarterly
	<b>Electrical conductivity</b>	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 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 March 2024 sampling event, results are detailed in **Tables 2 to 6**. Comparisons have been made to the previous rounds of monitoring (March 2023 – March 2024). 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 5mg/L.

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

	Analytes	Units	Site Criteria (mg/L)	MWA	MWA	MWA	MWA	MWA
				March 2023	June 2023	Sept 2023	Jan 2024	Mar 2024
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	500	540	570	570	570
	<b>Alkalinity (total)</b>	mg/L	NA	510	520	540	560	530
	<b>Chloride</b>	mg/L	NA	7100	6300	8000	7200	6500
	<b>Fluoride</b>	mg/L	NA	0.1	0.1	0.1	0.1	0.2
	<b>Potassium<sup>1</sup></b>	mg/L	410	3	4	4	4	3
	<b>Magnesium</b>	mg/L	NA	1000	1000	1100	1200	1100
	<b>Sulphate</b>	mg/L	NA	56	66	62	100	62
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	0.180	<LOR	0.01	<LOR	<LOR
	<b>Manganese</b>	mg/L	1.9	0.010	0.012	0.07	0.038	0.006
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
<b>OCP</b>	<b>OCP<sup>3</sup></b>	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	6.8	6.6	6.9	7.0	7.3
	<b>Sodium</b>	mg/L	NA	1800	2100	2000	2000	2200
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	0.17	0.007	0.043	0.066	0.26
	<b>Nitrate</b>	mg/L	0.7	0.49	0.63	0.59	0.6	0.55
	<b>Total Organic</b>	mg/L	4	3	3	<b>5</b>	<b>9</b>	<b>5</b>
	<b>EC</b>	µS/cm	NA	20000	19000	20000	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 March in MWB, TOC at a concentration of 7mg/L.

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

	Analytes	Units	Site Criteria (mg/L)	MWB March 2023	MWB June 2023	MWB Sept 2023	MWB Jan 2024	MWB Mar 2024
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	420	470	470	480	470
	<b>Alkalinity (total)</b>	mg/L	NA	440	450	440	470	450
	<b>Chloride</b>	mg/L	NA	4800	4200	5200	4700	4300
	<b>Fluoride</b>	mg/L	NA	0.3	0.3	0.2	0.3	0.3
	<b>Potassium<sup>1</sup></b>	mg/L	410	3	3	4	3	2
	<b>Magnesium</b>	mg/L	NA	600	600	630	640	620
	<b>Sulphate</b>	mg/L	NA	82	91	110	100	93
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	0.14	<LOR	<LOR	<LOR	<LOR
	<b>Manganese</b>	mg/L	1.9	0.012	0.017	0.016	0.013	0.014
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
<b>OCP</b>	<b>OCP<sup>3</sup></b>	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR	<LOR
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	6.9	6.9	6.9	7.1	7.5
	<b>Sodium</b>	mg/L	NA	1300	1500	1400	1400	1600
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	<LOR	0.073	0.037	0.03	0.033
	<b>Nitrate</b>	mg/L	0.7	0.30	0.38	0.26	0.26	0.19
	<b>Total Organic Carbon</b>	mg/L	4	<b>7</b>	<b>9</b>	<b>9</b>	<b>14</b>	<b>7</b>
	<b>EC</b>	µS/cm	NA	14000	14000	14000	13000	13000

Highlighted results exceed site criteria

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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 MWC, TOC at a concentration of 10mg/L.

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

	Analytes	Unit s	Site Criteria (mg/L)	MWC Mar 2023	MWC June 2023	MWC Sept 2023	MWC Jan 2024	MWC Mar 2024
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	310	380	390	420	420
	<b>Alkalinity (total)</b>	mg/L	NA	910	990	880	890	840
	<b>Chloride</b>	mg/L	NA	4200	4000	5500	5300	4600
	<b>Fluoride</b>	mg/L	NA	0.2	0.2	0.2	0.2	0.2
	<b>Potassium<sup>1</sup></b>	mg/L	410	2	2	3	2	2
	<b>Magnesium</b>	mg/L	NA	450	500	550	600	600
	<b>Sulphate</b>	mg/L	NA	82	87	91	98	83
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	1.4	<LOR	<LOR	<LOR	0.04
	<b>Manganese</b>	mg/L	1.9	1.6	1.4	1.9	1.5	1.8
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
<b>OCP</b>	<b>OCP<sup>3</sup></b>	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	6.9	6.8	6.9	7.0	7.4
	<b>Sodium</b>	mg/L	NA	1600	1900	1800	1900	2300
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	0.010	<LOR	<LOR	<LOR	0.021
	<b>Nitrate</b>	mg/L	0.7	0.11	0.05	0.068	0.03	0.03
	<b>Total Organic</b>	mg/L	4	7	8	8	14	10
	<b>EC</b>	µS/c	NA	13000	14000	15000	15000	15000

Highlighted results exceed site criteria

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

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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 March 2023 – March 2024  
(MWD) Leachate Well**

	Analytes	Units	Site Criteria (mg/L)	MWD Mar 2023	MWD June 2023	MWD Sept 2023	MWD Jan 2024	MWD Mar 2024
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	110	160	160	160	150
	<b>Alkalinity (total)</b>	mg/L	NA	2200	2300	1900	2000	1200
	<b>Chloride</b>	mg/L	NA	2800	2200	3400	2200	1100
	<b>Fluoride</b>	mg/L	NA	0.2	0.3	0.2	0.3	0.3
	<b>Potassium<sup>1</sup></b>	mg/L	410	1	130	110	120	76
	<b>Magnesium</b>	mg/L	NA	120	270	280	230	130
	<b>Sulphate</b>	mg/L	NA	95	62	51	32	100
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	<b>3.1</b>	<b>0.87</b>	<b>0.88</b>	<b>1.1</b>	<b>0.4</b>
	<b>Manganese</b>	mg/L	1.9	0.38	0.38	0.39	0.47	0.62
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
<b>OCP</b>	<b>OCP<sup>3</sup></b>	mg/L	0.0000	<LOR	<LOR	<LOR	<LOR	<LOR
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	7.6	7.4	7.8	7.6	7.8
	<b>Sodium</b>	mg/L	NA	790	1600	1500	1400	750
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	<b>230</b>	<b>220</b>	<b>200</b>	<b>190</b>	<b>130</b>
	<b>Nitrate</b>	mg/L	0.7	<LOR	<LOR	<LOR	<LOR	<0.005
	<b>Total Organic</b>	mg/L	4	<b>440</b>	<b>220</b>	<b>240</b>	<b>270</b>	<b>89</b>
	<b>EC</b>	µS/c	NA	12000	11000	3600	9700	5600

Highlighted results exceed site criteria

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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 a concentration of 9mg/L.

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

	Analytes	Units	Threshold Criteria (mg/L)	MWE March 2023	MWE June 2023	MWE Sept 2023	MWE Jan 2024	MWE Mar 2024
<b>IONS</b>	<b>Calcium</b>	mg/L	NA	180	130	130	110	82
	<b>Alkalinity (total)</b>	mg/L	NA	1300	1200	1100	1100	1400
	<b>Chloride</b>	mg/L	NA	960	940	1300	1300	440
	<b>Fluoride</b>	mg/L	NA	0.4	0.5	0.4	0.4	0.5
	<b>Potassium<sup>1</sup></b>	mg/L	410	140	0.9	1	0.9	<LOR
	<b>Magnesium</b>	mg/L	NA	250	130	140	130	91
	<b>Sulphate</b>	mg/L	NA	210	180	240	210	120
<b>HEAVY METALS</b>	<b>Iron</b>	mg/L	0.3	2.1	<LOR	0.02	<LOR	0.010
	<b>Manganese</b>	mg/L	1.9	0.88	0.66	1.1	0.9	0.65
<b>PHENOLS</b>	<b>Total phenolics</b>	mg/L	0.32	<LOR	<LOR	<LOR	<LOR	<LOR
<b>OCP</b>	<b>OCP<sup>3</sup></b>	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR	<LOR
<b>MISC. INORGANICS</b>	<b>pH</b>	pH	6.5 – 8	7.3	7.2	7.4	7.3	7.7
	<b>Sodium</b>	mg/L	NA	1300	730	760	830	720
	<b>Ammonia<sup>2</sup></b>	mg/L	0.9	0.034	0.039	0.12	0.015	<LOR
	<b>Nitrate</b>	mg/L	0.7	0.02	0.007	0.01	<LOR	<LOR
	<b>Total Organic Carbon</b>	mg/L	4	6	5	5	19	9
	<b>EC</b>	µS/cm	NA	5000	5100	5500	5800	3700

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.

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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 January 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 is one exceedance of the site criteria:

- The TOC concentration decreased from 9 mg/L in January 2024 to 5 mg/L in March 2024, remaining above site Criteria of 4 mg/L.

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

- Sulphate concentration decreased from 100 mg/L in January 2024 to 62 mg/L in March 2024;
- Manganese concentration decreased from 0.038 mg/L in January 2024 to 0.006 mg/L in January 2024;
- Ammonia concentration increased from 0.066 mg/L in January 2024 to 0.26mg/L in March 2024.

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 decreased from 14mg/L in January 2024 to 7 mg/L in March 2024, 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 decreased from 14 mg/L in January 2024 to 10 mg/L in March 2024, remaining above site Criteria of 4 mg/L.

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

- The Ammonia concentration has increased from a no detection in January 2024 to 0.021 mg/L in March 2024.
- The Iron concentration has increased from no detection to 0.04 mg/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:

- Iron concentration decreased from 1.1 mg/L in January to 0.4 mg/L in March 2024;
- The TOC concentration decreased from 270mg/L to 89 mg/L;
- Chloride concentration decreased from 2200 mg/L to 1200 mg/L;
- Alkalinity decreased from 2000mg/L to 1200 mg/L;
- Sodium decreased from 1400 mg/L to 750 mg/L;
- Sulphate concentration increased from 32mg/L to 100 mg/L;
- Ammonia concentration decreased from 190mg/L to 150mg/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 decreased from 19mg/L to 9 mg/L, above the site criteria of 4mg/L;

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

- The Iron concentration increased from no detection to 0.01 mg/L to, below the site criteria of 0.3mg/L.
- Chloride decreased from 1300 mg/L to 440 mg/L.
- Ammonia decreased from 0.015 mg/L to no detection.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the March 2024 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWA, MWB, MWC and MWE. 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.



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## 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 March 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 March 2024 sampling event; TOC in MWA, MWB, MWC and MWE.

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

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



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

**Title**  
Sampling Locations Noblet Road, Scone

Client	Project No.	Figure No	Date
UHSC	E2424	1	1/02/2024
admin@engage-es.com.au	Scale NA	Compiled DB	Revision 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	
Well Id	Lab Report	Date	Monitoring frequency	Units	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	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)
					Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	347798	27/03/2024	Quarterly		570	530	6500	0.2	<LOR	1100	0.006	<LOR	3	7.3	2200	0.26	0.55	62	5	<LOR	19000
MWB	347798	27/03/2024	Quarterly		470	470	4300	0.3	<LOR	620	0.014	<LOR	2	7.5	1600	0.033	0.19	93	7	<LOR	13000
MWC	347798	27/03/2024	Quarterly		420	840	4600	0.2	0.04	600	1.8	<LOR	2	7.4	2300	0.021	0.03	83	10	<LOR	15000
MWD	347798	27/03/2024	Quarterly		150	1200	1100	0.3	0.4	130	0.62	<LOR	76	7.8	750	130	<LOR	100	89	<LOR	5600
MWE	347798	27/03/2024	Quarterly		82	1400	440	0.5	0.01	91	0.65	<LOR	<LOR	7.7	720	<LOR	<LOR	120	9	<LOR	3700

**ATTACHMENT B**  
**NATA ACCREDITED LABORATORY RESULTS**

## CERTIFICATE OF ANALYSIS 347798

### Client Details

<b>Client</b>	Engage Environmental Services
<b>Attention</b>	Stephen Challinor
<b>Address</b>	113 Reservoir Rd, GLENDALE, NSW, 2285

### Sample Details

<b>Your Reference</b>	<u>E2424-0324 - UHSC</u>
<b>Number of Samples</b>	5 Water
<b>Date samples received</b>	02/04/2024
<b>Date completed instructions received</b>	02/04/2024

### 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

<b>Date results requested by</b>	09/04/2024
<b>Date of Issue</b>	09/04/2024
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### Results Approved By

Diego Bigolin, Inorganics Supervisor  
 Giovanni Agosti, Group Technical Manager  
 Jenny He, Senior Chemist  
 Timothy Toll, Senior Chemist

#### Authorised By

Nancy Zhang, Laboratory Manager



Organochlorine Pesticides in Water						
Our Reference		347798-1	347798-2	347798-3	347798-4	347798-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		27/03/2024	27/03/2024	27/03/2024	27/03/2024	27/03/2024
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	03/04/2024	03/04/2024	03/04/2024	03/04/2024	03/04/2024
Date analysed	-	03/04/2024	03/04/2024	03/04/2024	03/04/2024	03/04/2024
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	%	88	88	96	92	97

Total Phenolics in Water						
Our Reference		347798-1	347798-2	347798-3	347798-4	347798-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		27/03/2024	27/03/2024	27/03/2024	27/03/2024	27/03/2024
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	03/04/2024	03/04/2024	03/04/2024	03/04/2024	03/04/2024
Date analysed	-	03/04/2024	03/04/2024	03/04/2024	03/04/2024	03/04/2024
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference		347798-1	347798-2	347798-3	347798-4	347798-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		27/03/2024	27/03/2024	27/03/2024	27/03/2024	27/03/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	05/04/2024	05/04/2024	05/04/2024	05/04/2024	05/04/2024
Date analysed	-	05/04/2024	05/04/2024	05/04/2024	05/04/2024	05/04/2024
Iron-Dissolved	µg/L	<10	<10	40	400	10
Manganese-Dissolved	µg/L	6	14	1,800	620	650

Ion Balance						
Our Reference		347798-1	347798-2	347798-3	347798-4	347798-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		27/03/2024	27/03/2024	27/03/2024	27/03/2024	27/03/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/04/2024	02/04/2024	02/04/2024	02/04/2024	02/04/2024
Date analysed	-	02/04/2024	02/04/2024	02/04/2024	02/04/2024	02/04/2024
Calcium - Dissolved	mg/L	570	470	420	150	82
Potassium - Dissolved	mg/L	3	2	2	76	<0.5
Sodium - Dissolved	mg/L	2,200	1,600	2,300	750	720
Magnesium - Dissolved	mg/L	1,100	620	600	130	91
Hardness	mgCaCO <sub>3</sub> /L	5,900	3,700	3,500	930	580
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	530	450	840	1,200	1,400
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	530	450	840	1,200	1,400
Sulphate, SO <sub>4</sub>	mg/L	62	93	83	100	120
Chloride, Cl	mg/L	6,500	4,300	4,600	1,100	440
Ionic Balance	%	5.0	6.0	7.0	-4.0	1.0

Miscellaneous Inorganics						
Our Reference		347798-1	347798-2	347798-3	347798-4	347798-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		27/03/2024	27/03/2024	27/03/2024	27/03/2024	27/03/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	02/04/2024	02/04/2024	02/04/2024	02/04/2024	02/04/2024
Date analysed	-	02/04/2024	02/04/2024	02/04/2024	02/04/2024	02/04/2024
pH	pH Units	7.3	7.5	7.4	7.8	7.7
Electrical Conductivity	µS/cm	19,000	13,000	15,000	5,600	3,700
Ammonia as N in water	mg/L	0.26	0.033	0.021	130	<0.005
Fluoride, F	mg/L	0.2	0.3	0.2	0.3	0.5
Total Organic Carbon	mg/L	5	7	10	89	9
Nitrate as N in water	mg/L	0.55	0.19	0.03	<0.005	<0.005

Method ID	Methodology Summary
<b>Inorg-001</b>	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.
<b>Inorg-002</b>	Conductivity and Salinity - measured using a conductivity cell.
<b>Inorg-006</b>	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
<b>Inorg-026</b>	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
<b>Inorg-031</b>	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
<b>Inorg-040</b>	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%.
<b>Inorg-055</b>	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
<b>Inorg-057</b>	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.
<b>Inorg-079</b>	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
<b>Inorg-081</b>	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.
<b>Metals-020</b>	Determination of various metals by ICP-AES.
<b>Metals-022</b>	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.
<b>Org-022/025</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Client Reference: E2424-0324 - UHSC

QUALITY CONTROL: Organochlorine Pesticides in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	347798-1
Date extracted	-			03/04/2024	[NT]	[NT]	[NT]	[NT]	03/04/2024	03/04/2024
Date analysed	-			03/04/2024	[NT]	[NT]	[NT]	[NT]	03/04/2024	03/04/2024
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	95	95
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]	98	95
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]	97	98
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]	95	100
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	107	105
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]	104	107
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	113	115
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	98	102
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]	98	99
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]	100	102
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	90	[NT]	[NT]	[NT]	[NT]	87	86

Client Reference: E2424-0324 - UHSC

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			03/04/2024	1	03/04/2024	03/04/2024		03/04/2024	[NT]
Date analysed	-			03/04/2024	1	03/04/2024	03/04/2024		03/04/2024	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	104	[NT]



Client Reference: E2424-0324 - UHSC

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			05/04/2024	[NT]	[NT]	[NT]	[NT]	05/04/2024	[NT]
Date analysed	-			05/04/2024	[NT]	[NT]	[NT]	[NT]	05/04/2024	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	107	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	110	[NT]

Client Reference: E2424-0324 - UHSC

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	347798-2
Date prepared	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	02/04/2024
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	02/04/2024
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	570	590	3	98	#
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	3	3	0	93	108
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	2200	2300	4	100	#
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1100	1100	0	99	#
Hardness	mgCaCO <sub>3</sub> /L	3	Metals-020	[NT]	1	5900	5900	0	[NT]	[NT]
Hydroxide Alkalinity (OH <sup>-</sup> ) as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	530	530	0	[NT]	[NT]
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	Inorg-006	<5	1	530	530	0	106	[NT]
Sulphate, SO <sub>4</sub>	mg/L	1	Inorg-081	<1	1	62	62	0	111	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	6500	6600	2	101	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	5.0	5.0	0	[NT]	[NT]

Client Reference: E2424-0324 - UHSC

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	347798-2
Date prepared	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	02/04/2024
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	02/04/2024
pH	pH Units		Inorg-001	[NT]	1	7.3	7.4	1	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	19000	19000	0	96	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	0.26	[NT]		110	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	1	0.2	0.1	67	106	87
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	5	5	0	107	105
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.55	[NT]		91	[NT]

**Result Definitions**

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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.

**ATTACHMENT C**  
**CALIBRATION CERTIFICATE**

## Report Comments

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.

MISC\_INORG:Nitrate as N in water:Samples were out of the recommended holding time for this analysis.

## Electrode Quality Certificate

Electrode: HI7698194-3      Parameter: EC      SN: J88036      Recommended for: 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) [ $\mu$ S/cm]:	0	
	Tolerance [ $\mu$ S/cm]:	+1	
	Reading [ $\mu$ S/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: HI98494      Serial Number: M04200028111      SW version, Meter: 1.05      Bluetooth version: 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





**ATTACHMENT D**  
**FIELD DATA SHEETS**

## GROUNDWATER MONITORING FIELD DATA SHEET

<b>Project:</b> E2424-0324 Score	<b>Sample ID:</b> MWA
<b>Client:</b> UHSC	<b>Sampler:</b> SC
<b>Site Address:</b> Noblet Road Score	<b>Date:</b> 27.3.24

<b>Well Information</b>			
Monument damaged: Rusty	YES / <b>NO</b> / N/A	Well ID visible:	<b>YES</b> / NO / N/A
Locked well casing:	YES / <b>NO</b> / N/A	Cap on PVC casing:	<b>YES</b> / NO / N/A
Cement footing damaged:	YES / <b>NO</b> / N/A	Water in monument casing:	YES / <b>NO</b> / N/A
Standing water, vegetation around monument:	YES / <b>NO</b> / N/A	Internal obstruction in casing:	YES / <b>NO</b> / N/A
Well Damaged:	YES / <b>NO</b> / N/A	Odours from groundwater:	YES / <b>NO</b> / N/A
Casing above ground: .....0.77.....	m agl	<b>Weather Conditions:</b>	
Standing water level: ..... 6.7.....	m bgl	Temperature >15 <input type="checkbox"/>	15-20 <input type="checkbox"/>
Total well depth: .....15.66 .....	m bgl	20-25 X	25-30 <input type="checkbox"/>
Initial well volume: .....9.0.....	L	Clear <input type="checkbox"/>	Partly cloudy X
Water level after purging: .....7.3.....	m bgl		Overcast <input type="checkbox"/>
Volume of water purged: .....2.8.....	L		
Water level at time of sampling: .....7.3.....	m bgl	Calm X	Slight breeze <input type="checkbox"/>
Well purged dry:	YES / <b>NO</b>		Moderate breeze <input type="checkbox"/>
Purging equipment:	Bailer		Windy <input type="checkbox"/>
Sample equipment:	Bailer	Fine X	Showers <input type="checkbox"/>
			Rain <input type="checkbox"/>

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

### Water Quality Details:

Time am / pm	DO (mg/L <sup>-1</sup> )	EC (μS cm <sup>-1</sup> )	pH	Redox (mV)	Temp (°C)	Salinity	Comments
8:47am	1.31	5144	6.10	222.3	21.00	18.1	Water clear no smell or sheen
8:50am	1.28	5120	6.12	219.4	21.1	17.9	
8:51am	1.32	5110	6.15	215.2	21.1	17.9	
8:53am	1.30	5115	6.15	216.0	21.1	17.8	

### 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

<b>Project:</b> E2424-0324 Score	<b>Sample ID:</b> MWB
<b>Client:</b> UHSC	<b>Sampler:</b> DB
<b>Site Address:</b> Noblet Road Score	<b>Date:</b> 27.3.24

<b>Well Information</b>			
Monument damaged: Rusty	YES / <b>NO</b> / N/A	Well ID visible:	<b>YES</b> / NO / N/A
Locked well casing:	YES / <b>NO</b> / N/A	Cap on PVC casing:	<b>YES</b> / NO / N/A
Cement footing damaged:	YES / <b>NO</b> / N/A	Water in monument casing:	YES / <b>NO</b> / N/A
Standing water, vegetation around monument:	YES / <b>NO</b> / N/A	Internal obstruction in casing:	YES / <b>NO</b> / N/A
Well Damaged: Rusty	YES / <b>NO</b> / N/A	Odours from groundwater:	YES / <b>NO</b> / N/A
Casing above ground: .....0.8.....	m agl	<b>Weather Conditions:</b>	
Standing water level: ..... 6.6.....	m bgl	Temperature >15 <input type="checkbox"/>	15-20 <input type="checkbox"/>
Total well depth: .....14.04 .....	m bgl	20-25 X	25-30 <input type="checkbox"/>
Initial well volume: .....7.1.....	L	Clear <input type="checkbox"/>	Partly cloudy X    Overcast <input type="checkbox"/>
Water level after purging: .....7.3.....	m bgl	Calm X	Slight breeze <input type="checkbox"/> Moderate breeze <input type="checkbox"/>
Volume of water purged: .....4.5.....	L		Windy <input type="checkbox"/>
Water level at time of sampling: .....7.3.....	m bgl	Fine X	Showers <input type="checkbox"/> Rain <input type="checkbox"/>
Well purged dry:	YES / <b>NO</b>		
Purging equipment:	Bailer		
Sample equipment:	Bailer		

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

### Water Quality Details:

Time am / pm	DO (mg/L <sup>-1</sup> )	EC (μS cm <sup>-1</sup> )	pH	Redox (mV)	Temp (°C)	Salinity	Comments
9:15am	1.34	5112	5.3	140.2	22.5	10.01	Clear water, no sheen
9:16am	2.45	4915	5.4	134.4	21.3	9.9	
9:18am	2.49	4920	5.4	126.2	21.2	8.9	
9:19am	2.45	4924	5.4	128.2	21.2	8.7	

### 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

<b>Project:</b> E2424-0124 Score	<b>Sample ID:</b> MWC
<b>Client:</b> UHSC	<b>Sampler:</b> DB
<b>Site Address:</b> Noblet Road Score	<b>Date:</b> 27.03.24

<b>Well Information</b>			
Monument damaged: Rusty	YES / <b>NO</b> / N/A	Well ID visible:	YES / <b>NO</b> / N/A
Locked well casing:	YES / <b>NO</b> / N/A	Cap on PVC casing:	<b>YES</b> / NO / N/A
Cement footing damaged:	YES / <b>NO</b> / N/A	Water in monument casing:	YES / <b>NO</b> / N/A
Standing water, vegetation around monument:	YES / <b>NO</b> / N/A	Internal obstruction in casing:	YES / <b>NO</b> / N/A
Well Damaged:	YES / <b>NO</b> / N/A	Odours from groundwater:	YES / <b>NO</b> / N/A
Casing above ground: .....0.75.....	m agl	<b>Weather Conditions:</b>	
Standing water level: ..... 5.6.....	m bgl	Temperature >15 <input type="checkbox"/>	15-20 <input type="checkbox"/>
Total well depth: .....12.6 .....	m bgl	20-25 X	25-30 <input type="checkbox"/> >30 <input type="checkbox"/>
Initial well volume: .....6.1.....	L	Clear <input type="checkbox"/>	Partly cloudy X    Overcast    X
Water level after purging: .....6.3.....	m bgl	Calm X	Slight breeze <input type="checkbox"/> Moderate breeze <input type="checkbox"/>
Volume of water purged: .....2.4.....	L		Windy <input type="checkbox"/>
Water level at time of sampling: .....6.5.....	m bgl		
Well purged dry:	YES / <b>NO</b>		
Purging equipment:	Bailer		
Sample equipment:	Bailer	Fine X	Showers <input type="checkbox"/> Rain <input type="checkbox"/>

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

### Water Quality Details:

Time am / pm	DO (mg/L <sup>-1</sup> )	EC (μS cm <sup>-1</sup> )	pH	Redox (mV)	Temp (°C)	Salinity	Comments
9:36am	1.64	6400	5.4	218.7	21.4	12.1	Clear water
9:38am	0.78	6420	5.3	215.5	20.2	12.1	
9:40am	0.78	6510	5.3	217.6	20.2	12.2	
9:43am	0.72	6525	5.3	217.1	20.2	12.2	

### 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.



