

Stormwater Basin Environmental Investigation

Comprehensive Stormwater Network Discharge Consent
(CRC190445)

27-May-2022

CCC Stormwater Basins

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Commercial-in-Confidence

Stormwater Basin Environmental Investigation

Comprehensive Stormwater Network Discharge Consent (CRC190445)

Client: Christchurch City Council

Co No.: N/A

Prepared by

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Quality Information

Document Stormwater Basin Environmental Investigation

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Prepared by Simon Hay

Reviewed by Terry Widdowson

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	20-May-2022	DRAFT Report. Awaiting final lab result	Simon Hay Principal Environmental Scientist	
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1.0 Introduction

AECOM New Zealand Limited (AECOM) was engaged by Christchurch City Council (CCC) to undertake a groundwater investigation at three stormwater infiltration basins in Christchurch. The basins were Awatea Basin, Kakapo Basin and Outlook Place Basin located at Awatea Road, Miromiro Place and Outlook Place respectively ('the sites'). Site figures are presented in **Appendix A**.

1.1 Background

The investigation was undertaken to satisfy conditions of the new Comprehensive Stormwater Network Discharge Consent (CSNDC), granted in December 2019 by Environment Canterbury (ECan) to CCC. The CSNDC serves as a global consent enabling CCC to discharge water and contaminants to land and water from the stormwater network. The CSNDC contains conditions for monitoring, technical studies and reporting. The consent condition relevant to this investigation are as follows:

Consent condition 49:

'The Consent Holder shall implement the EMP attached to this consent, with the purpose of monitoring whether the Receiving Environment Objectives and Attribute Target Levels are being met.'

The Environmental Monitoring Programme (EMP)¹ provides details on regular city-wide groundwater monitoring to be completed by CCC as part of the consent. The EMP also sets out a draft methodology for a "Detailed Study" to be initiated to assess localised changes in groundwater levels, and the flow and the quality of any nearby springs arising from the discharge of stormwater to three infiltration basin facilities.

This groundwater investigation has been undertaken in general accordance with the draft methodology for a "Detailed Study" set out in Sections 3.2.3 and 3.3.1 of the EMP.

1.2 Objectives

The purpose of this groundwater investigation is to assess changes in groundwater level and groundwater quality at the sites to satisfy the objectives specified in Section 3.1 of the EMP as follows:

- Measure whether stormwater discharges are causing adverse effects on groundwater quality or quantity.
- Determine compliance with the conditions of the consent.
- Inform stormwater mitigation (while stormwater mitigation is not within AECOM's scope, this report will assist in informing stormwater mitigation).

¹ Environmental Monitoring Programme for the Comprehensive Stormwater Network Discharge Consent, Version 7, prepared by CCC, CTN Consulting Ltd, Aquatic Ecology Limited, PDP Limited and Boffa Miskell on behalf of CCC dated August 2020

2.0 Scope of Work

To meet the investigation objectives, AECOM completed the following scope of work:

- Installation of seven groundwater monitoring wells as follows:
 - Engagement of a specialist service locator and the completion of service clearance.
 - Supervision of the drilling and installation of two groundwater monitoring wells in Kakapo Basin, two groundwater monitoring wells in Outlook Place Basin, and three groundwater monitoring wells in Awatea Basin in accordance with the CCC Statement of Work.
 - Development and sampling of the groundwater monitoring wells using a submersible pump.
- Deployment of telemetry enabled data loggers in each of the seven monitoring wells to monitor standing water level (SWL) and electrical conductivity (EC) for the monitoring period.
- Installation of a telemetry enabled vented level logger in the centre of each stormwater basin (three in total) at depths of approximately 0.05 to 0.15 m below ground level (bgl) in a screened PVC standpipe. The standpipes were used to monitor the depth of stormwater in each basin to assist in the programming of the monthly monitoring events. Loggers were operational for 10 months due to delays commencement of this project and delays in sourcing the loggers due to the Covid-19 global pandemic.
- Surveying of the location, top of casing (TOC) elevation and ground elevation for the seven monitoring wells, location and TOC elevation for the three basin loggers, and location of the three telemetry transmitters. Surveying was completed by Eliot Sinclair.
- Completion of twelve groundwater monitoring events (one per month) from June 2021 to May 2022. Where possible, groundwater monitoring was undertaken following rainfall events and following subsequent stormwater discharge to ground, as indicated by the telemetry data from the basin loggers.
- Collection of surface water samples, where surface water was present in the infiltration basins.
- Preparation of this report, specifically to present the extent and magnitude of any effects on groundwater arising from the operation of the stormwater basins, with particular reference to the Attribute Target Limits in the CSNDC.

3.0 Methodology

Fieldwork was completed under the supervision of an experienced environmental scientist in accordance with AECOM procedures. A site-specific safety, health and environmental management plan (SHEMP) was prepared for the works.

3.1 Groundwater Monitoring Well Drilling

The groundwater monitoring well drilling methodology is summarised in **Table 1**.

Table 1 Groundwater Monitoring Well Drilling Summary

Date	Activity	Method
9 April 2021	Service Clearance	Service clearance information and plans from local utility providers was obtained in accordance with AECOMs procedures. Underground service clearance was undertaken by a licensed service locator (Canterbury Locating Specialist Limited).
14 – 16 April 2021	Drilling	Bores were advanced to 1.5 m bgl using hydro-vacuum excavation by Hydrotech Ltd in accordance with AECOM procedures. Bores were drilled to target depth (approximately 2 m beyond groundwater strike) using a DT45 Sonic Coring Rig by McMillan Drilling Limited. Three bores (Loc 1, Loc 2 and Loc 3) were drilled in the Awatea Basin to a maximum depth of 8.9 m bgl; two bores (Loc 4 and Loc 5) were drilled in the Kakapo Basin to a maximum depth of 13.6 m bgl; and two bores (Loc 6 and Loc 7) were drilled in the Outlook Basin to a maximum depth of 6.0 m bgl.
14 – 16 April 2021	Soil Logging	Soils were logged as prescribed in AS1726:2017. Encountered soils are described in bore logs in Appendix C .
14 – 16 April 2021	Well Installation	Groundwater monitoring wells were constructed with a 50 mm PVC pipe with depths ranging between 5.8 m bgl and 13.6 m bgl. Screens were installed with lengths of 4 m at Outlook Place Basin, 6 m at Awatea Basin and 9 m at Kakapo Basin, to allow for fluctuations in local groundwater level at the sites. Groundwater monitoring wells were installed with above ground standpipes inside lockable steel monuments. Well construction details are presented in Table T1, Appendix B and bore logs are presented in Appendix C .
14 – 19 April 2021	Well Development	Wells were developed by removing between 32.5 and 46 L of groundwater utilising a submersible pump and disposable bailer.
14 April 2022	Survey	Surveying of the location, TOC elevation and ground elevation for the seven monitoring wells, and the TOC elevation for the three basin loggers was undertaken by Elliot Sinclair. Surveying was completed using CDD datum, Mount Pleasant 2000 circuit. The survey report is presented in Appendix F .
16 and 17 June 2021	Installation of pressure transducers	Following delays in shipping, the telemetry enabled data loggers were deployed in each of the seven monitoring wells to monitor SWL and EC for a 10-month period. A telemetry enabled vented level logger was installed in the centre of each stormwater basin (three in total) to depths of approximately 0.05 to 0.15 m bgl in a screened PVC standpipe. Telemetry data is presented in Appendix B .

3.2 Monthly Monitoring Methodology

The groundwater monitoring methodology is described in **Table 2**.

Table 2 Groundwater Monitoring Summary

Activity/Item	Details
Well Gauging	The SWL in each monitoring well was gauged using an oil/water interface.
Groundwater Purging and Sampling	<p>Wells were purged of at least three well volumes of groundwater using a battery powered submersible pump with dedicated tubing. Purged groundwater was discharged to surface within the stormwater basin. Water quality parameters (pH, EC, redox potential, dissolved oxygen and temperature) were measured using a YSI water quality meter. Purging continued until water quality parameters stabilised (+/- 10% for dissolved oxygen, +/- 3% for EC, +/- 0.05 for pH, +/- 10 mV for redox, +/- 0.2 °C for temperature).</p> <p>Groundwater samples were collected directly into laboratory prepared sample bottles using disposable polyethylene tubing. Field filtering was not undertaken. Field sampling forms are presented in Appendix D.</p>
Sample preservation and analysis	<p>Groundwater samples were placed in laboratory-supplied bottles containing preservatives, as required. Samples were stored on ice (<4°C) in a chilly bin while on site and during transit to the laboratory. Samples were transported to the CCC wastewater laboratory on the day of sampling under standard chain of custody (CoC) procedures.</p> <p>Samples were submitted for analysis of <i>E.coli</i>, total coliforms, dissolved metals (copper, lead and zinc) and EC. Laboratory reports (as received) and CoC information is presented in Appendix E.</p>
Decontamination Procedures	Equipment used across monitoring wells (submersible pump and interface probe) was decontaminated with Decon 90 solution and then rinsed with potable water between sampling of monitoring wells.

4.0 Investigation Findings

The soil conditions encountered beneath the sites during the installation of the monitoring wells are summarised below.

4.1 Awatea Basin

Silts and sandy silts were present from surface to depths of 0.01 m bgl (Loc 3) to 2.8 m bgl (Loc 1), underlain by gravels and gravelly sands to depths of 6.0 m bgl (Loc 3) to 8.9 m bgl (Loc 2). A layer of sands (overlain by 300 mm of silty clay at Loc 1) was encountered beneath the gravels/gravelly sands at Loc 1 and Loc 3.

Groundwater was encountered between 6.7 and 7.7 m bgl.

4.2 Kakapo Basin

Lithology generally consisted of silts and sand from surface to depths of 2.7 m bgl (Loc 5) to 3.9 m bgl (Loc 4). These were underlain by gravels and sandy gravels to target depth of 13.5 m bgl (Loc 4) and 10.5 m bgl (Loc 5). Silty clay was encountered beneath the sandy gravels from 10.5 m bgl to target depth (13.5 m bgl) at Loc 5.

Groundwater was encountered at approximately 11.1 m bgl.

4.3 Outlook Basin

Lithology generally consisted of topsoil in the upper 0.2 m, underlain by rounded cobbles and gravels and sandy gravels to target depth (6 m bgl).

Groundwater was encountered between 1.84 and 2.44 m bgl.

5.0 Attribute Target Levels

Groundwater analytical data for copper, lead, zinc and electrical conductivity has been compared to the attribute target levels specified in Schedule 9 of the CSNDC, in accordance with section 3.4 of the EMP. The attribute target levels are presented in **Table 3**.

E.coli counts were not assessed under the attribute target level in this investigation as drinking water supply sampling was not in this scope of work. However analytical data for *E.coli* and total coliforms is presented in **Table T3, Appendix B**.

Table 3 Receiving Environment Objectives and Attribute Target Levels for Groundwater and Springs (Schedule 9, CRC190445)

Objective	Attribute	Attribute Target Level
Protect drinking water quality	Copper, lead, zinc and <i>Escherichia coli</i> concentrations in drinking water	Concentrations to not exceed: Dissolved copper: 0.5 mg/L Dissolved lead: 0.0025 mg/L Dissolved zinc: 0.375 mg/L No statistically significant increase in the concentration of <i>Escherichia coli</i> at drinking water supply wells.
Avoid widespread adverse effects on shallow groundwater quality	Electrical conductivity in groundwater	No statistically significant increase in electrical conductivity.

5.1 Statistically significant

To assess for statistically significant increases in EC, Mann-Kendall (M-K) time trend analysis with a statistical significance of 5% was used. The analysis was undertaken using ProUCL software (version 5.1), where the relevant definitions are as follows:

p-value = the probability that the null hypothesis is true²³

Where the null hypothesis (H_0) is:

There will be no change in EC across the investigation time period.

In summary, where $p > 0.05$, the null hypothesis can be rejected and a statistically significant increase in EC with time, is present.

² Dzone.com/articles/what-is-p-value-in-layman-terms

³ P-value = In statistical hypothesis testing, the p-value associated with an observed value, t_{observed} of some random variable T used as a test statistic is the probability that, given that the null hypothesis is true, T will assume a value as or more unfavourable to the null hypothesis as the observed value t_{observed} . The null hypothesis is rejected for all levels of significance, α greater than or equal to the p-value (USEPA. ProUCL Version 5.1 User Guide. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations (October 2015)).

6.0 Trend Analysis & Discussion

The following subsections present and discuss the extent and magnitude of any effects arising from the infiltration of stormwater to shallow groundwater beneath the sites.

6.1 Awatea Basin

Analytical results for Awatea basin are presented in **Table T2, Appendix B**. Groundwater elevation and EC are plotted against rainfall data in **Appendix B**. The data range for the key analytes for Awatea basin is summarised in **Table 4**.

Table 4 Summary of Analyte Concentrations – Awatea Basin

Analyte / Measurement	Minimum	Maximum
Groundwater elevation (m CDD)	23.85	27.35
E.C (µs/cm)	<1	20
Copper (mg/L)	<0.0001	0.0018
Lead (mg/L)	<0.0001	0.00036
Zinc (mg/L)	<0.0001	0.01
E.Coli (MPN/100ml)	<1	20
Total Coliforms (MPN/100ml)	<10	<24,000

Note: EC and groundwater elevation data from loggers. Remaining data is from CCC laboratory analytical results.

6.1.1 Groundwater Elevation

There appears to be a good correlation between rainfall events and increased groundwater level beneath the basin. This correlation is expected as the purpose of the infiltration basins is to capture surface water from the broader area and allow it to infiltrate to ground.

Groundwater level data is not available beyond 15 March 2022 as the downhole data loggers deployed in the three monitoring wells were damaged or malfunctioned. The cause of the data logger failures is unknown.

Trend analysis shows that there is expected correlation between rainfall events and increases in groundwater levels within the unconfined aquifer beneath the study area. Groundwater level trends are increasing (Loc 2), decreasing (Loc 1) and slightly increasing (Loc 3) over the 10-months of data logger data.

6.1.2 Metals

The attribute target levels for dissolved copper (0.5 mg/L), lead (0.0025 mg/L) and zinc (0.375 mg/L) were not exceeded during the 12-months of monthly monitoring.

Dissolved copper concentrations ranged from below laboratory limit of reporting (LOR) to 0.0018 mg/L. Concentrations remain at least two orders of magnitude below the attribute target level.

Dissolved lead was detected above laboratory LOR on only one occasion (October 2021) in two locations. Concentrations remain at least one order of magnitude below the attribute target level.

Dissolved zinc concentrations ranged from below laboratory LOR to 0.01 mg/L. Concentrations remain up to two orders of magnitude below the attribute target level.

Tabulated and graphed analytical data is presented in **Appendix B**.

6.2 Kakapo Basin

Analytical results for Kakapo basin are presented in **Table T2, Appendix B**. Groundwater elevation and EC are plotted against rainfall data in **Appendix B**. The data range for the key analytes for Awatea basin is summarised in **Table 5**.

Table 5 Summary of Analyte Concentrations – Kakapo Basin

Analyte / Measurement	Minimum	Maximum
Groundwater elevation (m CDD)	21.72	25.50
E.C (µs/cm)	189.7	279.2
Copper (mg/L)	<0.0001	0.00071
Lead (mg/L)	<0.0001	0.00063
Zinc (mg/L)	<0.0001	0.0029
E.Coli (MPN/100ml)	<1	<10
Total Coliforms (MPN/100ml)	<1	1,600

Note: EC and groundwater elevation data from loggers. Remaining data is from CCC laboratory analytical results.

6.2.1 Groundwater Elevation

There is expected correlation between rainfall events and increases in groundwater levels within the unconfined aquifer beneath the study area. However, the correlation is weaker at Kakapo basin with only three rainfall events (>30 mm daily rainfall) correlating with an increase in groundwater level.

Changes in groundwater elevation at Kakapo basins as a response to rainfall were smaller (i.e. November 2021 rainfall event reported a groundwater elevation increase of approximately 0.2 m at Kakapo basin compared to up to 2 m at Awatea basin). Additionally, the responses to rainfall events were also pronounced at Kakapo basin with groundwater elevation spiking and dropping more slowly.

The 'less spikey' plot of groundwater elevations at Kakapo basin suggests that groundwater beneath the site may be hydraulically connected to the adjacent Arcon Stream. In this situation, groundwater levels would be influenced by stream flow (i.e. potentially increased surface water flows from July to November 2021) in addition to the artificial loading from stormwater infiltration.

Trend analysis shows that groundwater elevation was stable across the 10-month monitoring period beneath Kakapo Basin.

6.2.2 Metals

The attribute target levels for dissolved copper, lead and zinc were not exceeded during the 12-months of monthly monitoring.

Dissolved copper concentrations ranged from below laboratory LOR to 0.00071 mg/L. Concentrations remain at least three orders of magnitude below the attribute target level.

Dissolved lead was only reported above laboratory LOR on two occasions at Loc 4. Concentrations remain at least one order of magnitude below the attribute target level.

Dissolved zinc concentrations ranged from below laboratory LOR to 0.0029 mg/L. Concentrations remain up to four orders of magnitude below the attribute target level.

6.3 Outlook Place

Table 6 Summary of Analyte Concentrations – Outlook Basin

Analyte / Measurement	Minimum	Maximum
Groundwater elevation (m CDD)	26.5978	27.2851
E.C (µs/cm)	43.2	393.6
Copper (mg/L)	0.00019	0.0031

Analyte / Measurement	Minimum	Maximum
Lead (mg/L)	<0.0001	0.0006
Zinc (mg/L)	<0.0001	0.0037
E.Coli (MPN/100ml)	<1	20
Total Coliforms (MPN/100ml)	1	2,600

Note: EC and groundwater elevation data from loggers. Remaining data is from CCC laboratory analytical results.

6.3.1 Groundwater Elevation

There was correlation between rainfall events and increases in groundwater levels (Loc 6), with some responses occurring from minor rainfall events (<10 mm daily rainfall), which may reflect the shallow groundwater levels beneath the basin. The less pronounced correlation at Loc 7 may reflect its close proximity (20 m) to Lake Roto Kohatu.

Trend analysis shows that groundwater level was declining over the monitoring period. However, the decrease is relatively small (less than 0.2 m), and this could be attributed to natural (seasonal) fluctuations in groundwater level.

6.3.2 Metals

The attribute target levels for dissolved copper, lead and zinc were not exceeded during the 12-months of monthly monitoring.

Dissolved copper concentrations ranged from below laboratory LOR to 0.0031 mg/L. Concentrations remain three to four orders of magnitude below the attribute target level.

Dissolved lead concentrations ranged from below laboratory LOR to 0.0006 mg/L. Concentrations remain at least one order of magnitude below the attribute target level.

Dissolved zinc concentrations ranged from below laboratory LOR to 0.0037 mg/L. Concentrations remain up to four orders of magnitude below the attribute target level.

6.4 Electrical Conductivity

Review of the p values (<0.05) reported in the M-K tests reported no statistically significant increasing trends in groundwater beneath the three basins.

While the M-K testing reported '*statistically significant evidence of an increasing trend*' for EC in groundwater at a 95% confidence interval in all seven monitoring wells, this refers to the presence of a monotonic (upward) trend over time in all seven wells rather than a statistically significant increasing trend as defined in **Section 5.0**.

The M-K test outputs are presented in **Appendix B**.

6.5 Springs

A review of the 'Spring Location' layer on Canterbury Maps⁴ reported one spring in close proximity (<500 m from the basin) to Outlook basin (440 metres east). However, the mapped spring is located beneath Johns Road. No springs were identified in close proximity to Awatea or Kakapo basins. Assessment of water quality in Arcon Stream or Lak Roto Kohatu, located adjacent to Kakapo basin and Outlook basin respectively, was not included in the statement of work informing this investigation.

⁴ <https://mapviewer.canterburymaps.govt.nz/> accessed on 5 May 2022.

7.0 Conclusion

7.1 Groundwater Quality

Based on the analytical data and monitoring well logger data for the total investigation period of June 2021 to May 2022 in comparison to the attribute target levels, the operation of the three infiltration basins in this investigation does not appear to have an adverse effect on the quality of shallow groundwater beneath the basins.

There were no exceedances of the attribute target levels for metals (copper, lead and zinc) in groundwater during the 12 monthly sampling events.

Surface water samples collected from the basins (where water was present at the time of sampling) did not report concentrations of analytes above the attribute target levels. While the attribute target levels are not applicable to surface water within the basin, the data provides some assurance that stormwater discharging into the basins is currently not resulting in deterioration of groundwater quality.

No statistically significant trends were reported for EC in groundwater beneath the basins

Analysis of groundwater quality in upgradient and downgradient wells at each basin was not completed as groundwater flow direction at each basin could not be adequately inferred. However, water quality and quantity (groundwater elevation) between wells within each basin was broadly consistent.

7.2 Groundwater Quantity

Overall, there appears to be a good correlation between rainfall events and increased groundwater elevation at all three basins. This is expected as the infiltration basins are designed to capture surface water from the broader area and allow for rapid infiltration to ground.

Rainfall data plotted with both groundwater elevation and standing water levels in the basins (Appendix B) reported a good correlation with rainfall events as low as 2-4 mm correlating with standing water in the basins. The correlation indicates that the infiltration basins are operating as required with rainfall events resulting in water levels registered at the basin followed by rapid infiltration to groundwater which reports short term increases in groundwater elevation.

The logger at Awatea basin malfunctioned resulting in no data for a five-month period from 3 September 2021 to 28 February 2022. No data is available from 15 March due to a separate fault with the broader Awatea basin system.

7.3 Effects on Electrical Conductivity and Springs

There does not appear to be any adverse effects on the water quality or quantity of nearby springs from the operation of infiltration basins at the three basins.

There were no statistically significant increasing trends in EC in groundwater beneath the three basins.

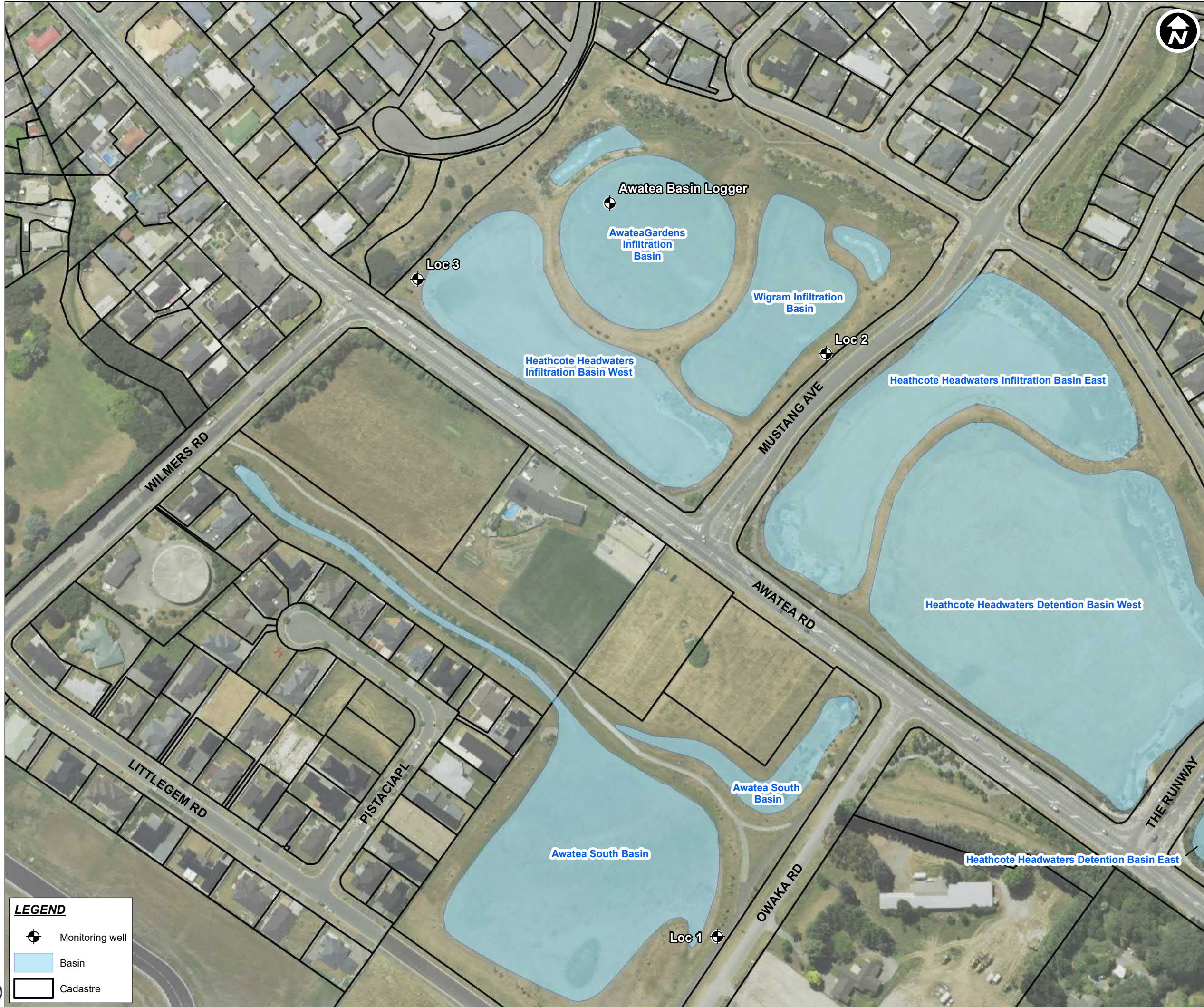
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- c) This conclusion is based solely on the scope of work agreed between AECOM and Christchurch City Council and described in **Section 2.0** of this Report.
- d) This Report has been prepared for the sole benefit of Christchurch City Council and neither the whole nor any part of this Report may be used or relied upon by any party other than Christchurch City Council.
- e) This Report is dated 27 May 2022. AECOM accepts no responsibility for any events arising from any changes in site conditions or in the information reviewed that have occurred after the completion of the report.
- f) The assessment carried out for the purposes of the Report have been undertaken, and the Report has been prepared, in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this Report.
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Appendix A


Figures




LEGEND

 Monitoring well

 Basin

 Cadastre



PROJECT
STORMWATER BASIN
ENVIRONMENTAL
INVESTIGATION, CSNDC

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SPATIAL REFERENCE

Scale: 1:2,000 (A3 size)

20

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40

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80

m

Map features depicted in terms of NZTM 2000 projection.


PROJECT MANAGEMENT

Approved	AC	Date	5/18/2022
Checked	AC	Date	5/18/2022
Designed	SD	Date	5/18/2022
Drawn	SD	Date	5/18/2022

ISSUE/REVISION

A	5/18/2022	DRAFT
Rev	Date	Description

KEY PLAN



PROJECT NUMBER
60649177


SHEET TITLE
SITE LOCATION PLAN,
AWATEA BASIN


MAP NUMBER
FIGURE 1


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LEGEND

 Monitoring well

 Basin

 Cadastre



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SPATIAL REFERENCE

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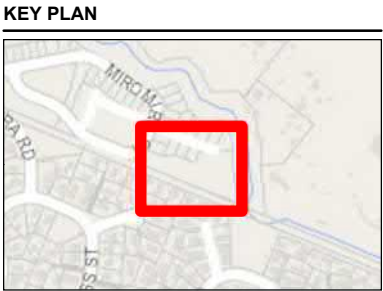
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m

Map features depicted in terms of NZTM 2000 projection.

PROJECT MANAGEMENT		
Approved	AC	Date 5/18/2022
Checked	AC	Date 5/18/2022
Designed	SD	Date 5/18/2022
Drawn	SD	Date 5/18/2022

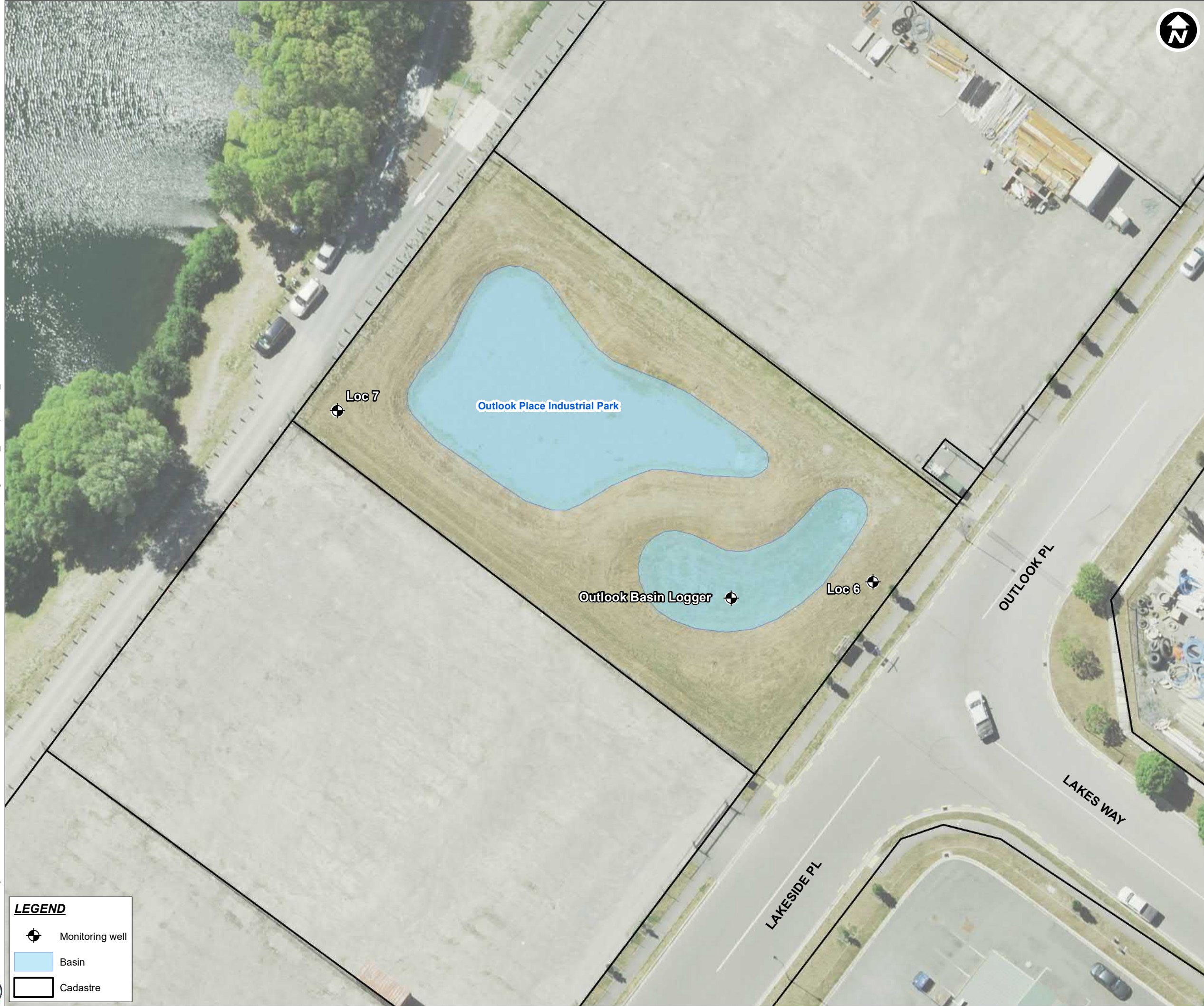
ISSUE/REVISION		
A	5/18/2022	DRAFT
Rev	Date	Description




PROJECT NUMBER
60649177


SHEET TITLE
SITE LOCATION PLAN,
KAKAPO BASIN


MAP NUMBER
FIGURE 2



LEGEND

 Monitoring well

 Basin

 Cadastre



PROJECT

STORMWATER BASIN
ENVIRONMENTAL
INVESTIGATION, CSNDC

CLIENT

CHRISTCHURCH
CITY COUNCIL

CONSULTANT

AECOM New Zealand Limited
www.aecom.com

SPATIAL REFERENCE

Scale: 1:400 (A3 size)

10

5

0

10

m

Map features depicted in terms of NZTM 2000 projection.

PROJECT MANAGEMENT			
Approved	AC	Date	5/18/2022
Checked	AC	Date	5/18/2022
Designed	SD	Date	5/18/2022
Drawn	SD	Date	5/18/2022

ISSUE/REVISION		
A	5/18/2022	DRAFT
Rev	Date	Description



PROJECT NUMBER

60649177

SHEET TITLE

SITE LOCATION PLAN,
OUTLOOK BASIN

MAP NUMBER

FIGURE 3

Appendix B

Tables & Graphs

Table T1 Groundwater Monitoring Well Construction Details

Basin ID	Well ID	Construction/ Installation Date	Northing	Easting	Ground Elevation (m CDD)	Top of Casing (mASL)	Top of Well Screen (mbgs)	Top of Well Screen (mASL)	Bottom of Well Screen (mbgs)	Bottom of Well Screen (mASL)	Well Depth (mbgs)	Well Depth (mASL)	Lithology of Screened Interval
Awatea Basin	Loc 1	15-Apr-21	385097.307	803519.956	30.62	31.10	2.90	27.72	8.90	21.72	8.90	21.72	Gravelly Sand, Silty Clay, Sand
	Loc 2	16-Apr-21	385158.736	803843.788	30.73	31.21	2.80	27.93	8.80	21.93	8.80	21.93	Sandy Gravel, Gravels
	Loc 3	15-Apr-21	384931.610	803886.268	30.82	31.28	2.90	27.92	8.90	21.92	8.90	21.92	Gravelly Sand, Gravels, Sand
	Awatea Basin Logger	13-Jun-21	385038.646	803928.278	27.93	27.98	-	-	-	-	-	-	-
Kakapo Basin	Loc 4	14-Apr-21	384786.008	806629.867	34.81	35.16	4.63	30.18	13.63	21.18	13.63	21.18	Sand, Cobbles, Sandy Gravel, Gravel
	Loc 5	13-Apr-21	384900.015	806608.725	34.64	35.11	4.35	30.29	13.35	21.29	13.35	21.29	Sand, Gravels, Gravelly Sand/Sandy Gravel
	Kakapo Basin Logger	13-Jun-21	384861.478	806601.497	33.11	33.15	-	-	-	-	-	-	-
Outlook Basin	Loc 6	14-Apr-21	387938.060	814123.516	28.33	28.77	1.30	27.03	5.80	22.53	5.80	22.53	Gravels
	Loc 7	14-Apr-21	387878.516	814142.755	28.51	28.99	1.50	27.01	5.96	22.55	5.96	22.55	Gravels
	Outlook Basin Logger	13-Jun-21	387922.261	814121.779	27.20	27.23	-	-	-	-	-	-	-

Notes:

CDD - Christchurch Drainage Datum

Table T2 Groundwater Gauging Results

Basin ID	Well ID	Purge Date	SWL (m btoc)	Temp. (°C)	DO (mg/L)	EC (µScm)	pH	Redox (mV)	Comments
Awatea Basin	Loc 1	1-Jun-21	5.170	12.7	10.09	26.6	6.67	262.3	Low turbidity, cloudy, no odour
		23-Jun-21	6.548	12.3	8.58	46.7	6.78	181.4	Cloudy, minor turbidity
		5-Aug-21	6.091	11.2	9.73	39.1	6.32	302.4	No odour, moderate turbidity, clear
		6-Oct-21	6.020	10.1	9.29	58.6	N/A**	73.2	Clear, sl turbidity, no odour
		10-Nov-21	6.315	11.0	7.39	158.1	5.87	117.1	Brown, mod turbidity, no odour
		1-Dec-21	6.420	11.8	8.39	104.4	N/A**	-787.3	Clear, no turbidity, no odour
		22-Dec-21	6.010	15.1	9.12	63.4	5.46	26.4	Clear, no turbidity, no odour
		14-Jan-22	6.490	14.3	5.61	133.1	6.25	5.9	Moderate turbidity, cloudy, no odour
		17-Feb-22	5.900	17.6	7.77	59.2	6.56	162.0	Slightly turbid, slightly cloudy, no odour
		10-Mar-22	6.390	16.6	6.84	111.8	6.13	74.9	Brown, no odour, mod - high turbidity
		6-Apr-22	6.420	15.9	6.44	138.8	5.99	171.1	Clear, low/no turbidity, no odour
		5-May-22	6.520	15.8	5.09	184.9	5.83	113.0	Clear, no odour, no turbidity
	Loc 2	1-Jun-21	2.840	12.5	9.95	29.4	6.12	202.2	Low turbidity, no odour
		23-Jun-21	5.756	11.2	6.55	51.1	6.09	129.5	Clear, turbidity
		5-Aug-21	5.795	10.4	7.25	43.9	6.55	161.8	Clear, no turbidity, no odour
		5-Oct-21	6.100	11.0	2.64	90.8	N/A**	-6.9	Clear, sl turbidity, no odour
		11-Nov-21	6.340	11.5	2.11	109.6	5.71	104.9	Clear, no odour, no turbidity
		1-Dec-21	6.240	11.8	4.67	76.5	15.88**	-863.3	Clear, no odour, no turbidity
		21-Dec-21	5.420	15.1	6.05	64.1	5.67	34.4	Clear, no turbidity, no odour
		14-Jan-22	6.400	14.3	0.86	90.4	6.11	307.0	Clear, no odour, no turbidity
		17-Feb-22	5.050	17.4	6.47	42.8	6.90	58.2	Clear, no odour, no turbidity
		10-Mar-22	6.370	16.4	4.70	89.3	5.95	235.6	Brown, no odour, mod - high turbidity
		6-Apr-22	6.390	15.8	1.54	93.5	5.59	196.6	Cloudy, sl. brown, no odour
		5-May-22	6.560	15.5	0.78	94.8	5.49	107.3	Clear, no odour, no turbidity
	Loc 3	1-Jun-21	2.585	14.9	2.76	73.9	6.04	138.0	Clear, no odour
		23-Jun-21	5.670	14.2	1.73	116.6	5.87	84.8	Clear, low to no turbidity
		5-Aug-21	5.605	13.2	0.95	86.6	6.08	194.6	Clear, low turbidity
		6-Oct-21	5.900	13.4	1.28	227.2	N/A**	24.5	Clear, no turbidity, no odour
		11-Nov-21	6.355	13.0	1.39	274.1	6.19	85.3	Brown-Clear, mod turbidity, no odour
		1-Dec-21	6.200	13.3	1.58	235.1	15.83**	-838.9	Brown, high turbidity, no odour
		22-Dec-21	5.440	13.3	4.39	140.7	6.06	-4.5	Clear, no odour, no turbidity
		13-Jan-22	6.370	13.6	1.20	258.2	6.02	227.9	Cloudy, moderate turbidity, no odour
		17-Feb-22	5.040	14.9	4.97	77.7	6.90	31.2	Clear, no odour, no turbidity
		10-Mar-22	6.380	15.2	4.49	232.5	6.55	259.2	Brown, mod turbidity, no odour
		6-Apr-22	6.370	14.6	2.88	164.1	5.79	187.9	Brown, moderate turbidity, no odour
		5-May-22	6.580	14.7	2.05	167.6	5.73	88.2	Clear, no odour, no turbidity
Kakapo Basin	Loc 4	2-Jun-21	11.110	13.2	7.09	168.0	6.53	135.6	Moderate turbidity, cloudy, no odour
		24-Jun-21	10.788	13.2	6.65	223.2	6.72	102.8	Clear, low turbidity
		6-Aug-21	10.173	13.2	7.24	162.8	7.07	237.5	Clear, no odour, no turbidity
		6-Oct-21	9.670	13.9	7.14	244.1	N/A**	69.8	Clear, no odour, no turbidity
		11-Nov-21	9.940	13.4	8.14	242.1	6.60	77.6	Clear, no odour, no turbidity
		30-Nov-21	10.170	13.6	7.51	239.5	15.82**	-926.5	Brown, no odour, moderate turbidity
		21-Dec-21	10.100	13.9	7.68	258.0	6.49	77.1	Cloud, mod-high turbidity, no odour
		13-Jan-22	10.235	13.5	7.03	263.8	6.37	186.8	Moderate turbidity, cloudy, no odour
		16-Feb-22	10.150	13.4	7.83	257.2	6.79	110.1	Clear, no odour, no turbidity
		9-Mar-22	10.080	12.6	7.71	255.6	6.32	115.7	Cloudy, turbid, brown, no odour
		5-Apr-22	9.935	13.5	9.07	262.2	6.28	176.3	Clear, no turbidity, no odour
		4-May-22	10.090	13.7	7.40	252.2	6.33	55.5	Sl. turbidity, clear, no odour
	Loc 5	2-Jun-21	11.105	13.3	7.40	134.6	7.02	254.9	Low turbidity, no odour
		24-Jun-21	10.780	13.6	6.72	182.6	6.68	76.5	Clear, no turbidity
		6-Aug-21	10.185	13.2	6.91	162.8	6.88	113.2	Clear, no odour, no turbidity
		6-Oct-21	9.680	13.8	7.36	234.3	N/A**	88.9	Sl. turbidity, clear, no odour
		10-Nov-21	9.940	13.1	8.04	233.0	6.94	19.1	Clear, no odour, no turbidity
		30-Nov-21	10.160	13.2	7.91	231.4	15.83**	-966.2	Brown, moderate turbidity, no odour
		21-Dec-21	10.100	13.4	8.13	215.5	6.42	143.9	Cloudy, no odour, no turbidity
		13-Jan-22	10.240	13.3	7.22	256.2	6.39	177.8	Clear, no odour, no turbidity
		16-Feb-22	10.160	13.4	7.99	181.3	6.27	108.5	Clear, slightly to moderately turbid
		9-Mar-22	10.090	14.9	4.88	75.2	6.85	28.7	Cloudy, mod - high turbidity, no odour, brown
		5-Apr-22	9.945	13.7	8.66	255.1	6.35	182.8	Clear, sl. turbidity, no odour
		4-May-22	10.100	13.4	7.37	250.3	6.33	43.7	Clear, no odour, no turbidity
Outlook Basin	Loc 6	2-Jun-21	1.810	10.9	6.73	41.8	6.92	143.8	Clear, no odour
		23-Jun-21	1.850	10.3	5.19	79.4	6.90	131.8	Clear, no turbidity
		6-Aug-21	1.815	9.0	7.11	55.1	7.73	66.4	Clear, no odour no turbidity
		5-Oct-21	1.885	12.0	4.55	77.1	N/A**	65.7	Clear, sl turbidity, no odour
		10-Nov-21	2.075	13.9	1.56	133.2	6.87	117.8	Clear, no odour, no turbidity
		30-Nov-21	2.130	15.76	0.76	102.6	15.76**	-1109.9	Clear, no turbidity, no odour
		21-Dec-21	1.945	16.9	1.27	115.9	6.46	69.7	Clear, no odour, no turbidity
		14-Jan-22	2.115	18.9	0.69	138.8	6.56	41.8	Clear, no odour, no turbidity
		16-Feb-22	1.790	17.0	1.92	92.8	6.39	111.0	Clear, no turbidity
		10-Mar-22	1.960	18.0	4.11	119.8	7.04	124.3	Light brown, mod - high turbidity, no odour
		5-Apr-22	1.965	18.6	1.25	120.1	6.31	167.8	Clear, no odour, no turbidity
		4-May-22	2.080	16.6	0.54	141.3	6.38	27.5	Clear, no turbidity, no odour
	Loc 7	2-Jun-21	1.800	12.9	1.09	84.7	6.9	178.1	Clear, no odour
		23-Jun-21	1.810	11.3	0.53	98.7	6.94	128.9	Clear, no turbidity
		6-Aug-21	1.800	8.8	1.07	64.8	7.79	12.9	Clear, no odour no turbidity
		5-Oct-21	1.895	12.3	4.92	106.1	N/A**	108.1	Clear, no odour, no turbidity
		10-Nov-21	2.095	16.4	1.19	116.0	6.31	84.0	Clear, no turbidity, no odour
		30-Nov-21	2.160	18.3	2.37	90.8	15.68**	-1080.7	Clear, no turbidity, no odour
		21-Dec-21	1.950	18.5	0.85	119.7	6.95	211.8	Clear, no odour, no turbidity
		14-Jan-22	2.145	20.7	0.75	106.1	6.63	125.3	Clear, no odour, no turbidity
		16-Feb-22	1.800	20.3	1.23	126.7	7.22	71.7	Clear, no odour, no turbidity
		10-Mar-22	1.960	18.9	3.70	112.8	7.16	138.4	Moderate turbidity, cloudy, no odour, clear to light brown
		5-Apr-22	1.960	18.4	0.95	115.2	6.53	180.7	Clear, sl. turbidity, no odour
		4-May-22	2.060	15.9	0.49	134.4	6.43	3.9	Clear, no turbidity, no odour

Notes:

SWL - standing water level

m btoc - metres below top of casing

°C - degrees celsius

mg/L - milligrams per litre

µScm - microsiemens per centimetre

mV - millivolts

** - pH sensor not functioning properly at time of site visit

Table T3 Groundwater Analytical Results

Groundwater Analytical Results					Physical		Pathogens		Dissolved Metals		
					Conductivity	E. coli	Total Coliforms	Copper Dissolved	Lead Dissolved	Zinc Dissolved	
					µS/cm	MPN/100 mL	MPN/100 mL	mg/L	mg/L	mg/L	
Attribute Target Levels (CRC190445)					-	550	-	0.5	0.0025	0.375	
Basin ID	Well ID	Date sampled	AECOM sample ID	Lab number							
Awatea Basin	Loc 1	1-Jun-21	Loc 1	2110430	35.1	<20	100	0.00065	<0.0010	<0.0010	
		23-Jun-21	Loc 1	2112326	44.8	<1	20	0.00062	<0.0010	<0.0010	
		5-Aug-21	Loc 1	2115234	54.0	<10	10	0.00046	<0.0010	0.00027	
		6-Oct-21	Loc 1	2119421	54.3	<10	31	0.0011	0.00036	0.00091	
		10-Nov-21	Loc 1	2121605	168.0	<1	2	0.0018	<0.0010	0.00087	
		1-Dec-21	Loc 1	2123231	140.0	<1	3	0.00075	<0.0010	0.0018	
		22-Dec-21	Loc 1	2124888	59.8	<1	38	0.00076	<0.0010	0.00031	
		14-Jan-22	Loc 1	2200734	129.0	1	41	0.00037	<0.0010	0.0014	
		17-Feb-22	Loc 1	2202885	47.1	<1	23	0.00067	<0.0010	0.0015	
		10-Mar-22	Loc 1	2204570	239.0	<10	140	0.00043	<0.0010	0.00012	
		6-Apr-22	Loc 1	2206032	140.0	<1	2	0.00043	<0.0010	0.0013	
		5-May-22	Loc 1	2207449	237.0	<1	23	0.00032	<0.0010	0.0013	
	Loc 2	1-Jun-21	Loc 2	2110440	36.5	20	350	0.00085	<0.0010	0.00032	
		23-Jun-21	Loc 2	2112327	49.5	<1	10	0.0010	<0.0010	0.00096	
		5-Aug-21	Loc 2	2115235	61.0	<10	<10	0.00065	<0.0010	0.0011	
		6-Oct-21	Loc 2	2119424	80.7	<10	5	0.00091	0.00013	0.0030	
		11-Nov-21	Loc 2	2121608	106.0	<1	1	0.00093	<0.0010	0.0024	
		1-Dec-21	Loc 2	2123232	74	2	270	0.0012	<0.0010	0.0028	
		22-Dec-21	Loc 2	2124889	60.5	6	66	0.00093	<0.0010	0.0028	
		14-Jan-22	Loc 2	2200735	87.2	<1	24	0.0010	<0.0010	0.0034	
		17-Feb-22	Loc 2	2202886	38.2	1	91	<0.0010	<0.0010	0.0011	
		10-Mar-22	Loc 2	2204571	87.7	<10	140	0.00077	<0.0010	0.00064	
		6-Apr-22	Loc 2	2206033	87.7	<1	19	0.00099	<0.0010	0.0028	
		5-May-22	Loc 2	2207450	97.3	<1	2	0.00081	<0.0010	0.0034	
	Loc 3	1-Jun-21	Loc 3	2110441	83.4	<20	20	0.00012	<0.0010	0.0014	
		23-Jun-21	Loc 3	2112328	112.0	<1	27	0.00020	<0.0010	0.0021	
		5-Aug-21	Loc 3	2115236	113.0	10	10	<0.0010	<0.0010	0.0021	
		6-Oct-21	Loc 3	2119420	215.0	<10	<10	0.00030	<0.0010	0.0037	
		11-Nov-21	Loc 3	2121609	168.0	<1	>2,400	0.00035	<0.0010	0.0041	
		1-Dec-21	Loc 3	2123233	237	<1	160	0.00035	<0.0010	0.0052	
		22-Dec-21	Loc 3	2124890	130	<1	110	0.00041	<0.0010	0.0080	
		13-Jan-22	Loc 3	2200696	24.7	<1	11	0.00029	<0.0010	0.0039	
		17-Feb-22	Loc 3	2202887	69	<1	17	0.00018	<0.0010	0.0019	
		10-Mar-22	Loc 3	2204572	234	<10	>24,000	0.00058	<0.0010	0.010	
		6-Apr-22	Loc 3	2206034	148.0	<1	8	0.00030	<0.0010	0.0059	
		5-May-22	Loc 3	2207451	156.0	<1	2	0.00019	<0.0010	0.0034	
	Awatea Basin	1-Jun-21	Awatea Basin	2110442	17.2	320	15,000	0.0013	<0.0010	0.029	
		23-Jun-21	Awatea Basin	2112329	24.5	75	>2400	0.0015	<0.0010	0.02	
		5-Aug-21	Awatea Basin	2115237	35.0	400	11,000	0.0013	<0.0010	0.067	
		6-Oct-21	Awatea Basin	2119417	28.8	N/A*	0.0028	0.00015	0.00015	0.092	
		11-Nov-21	Awatea Basin	-	-	No sample collected, no water in basin					
		1-Dec-21	Awatea Basin	-	-	No sample collected, no water in basin					
		21-Dec-21	Awatea Basin	-	-	No sample collected, no water in basin					
		17-Feb-22	Awatea Basin	2202888	34.6	320	>24000	0.0013	<0.0010	0.027	
		10-Mar-22	Awatea Basin	-	-	No sample collected, no water in basin					
		5-Apr-22	Awatea Basin	-	-	No sample collected, no water in basin					
		5-May-22	Awatea Basin	-	-	No sample collected, no water in basin					
	Loc 4	1-Jun-21	Loc 4	2110530	200.0	<1	460	0.00063	<0.0010		
		24-Jun-21	Loc 4	2112379	214.0	<1	24	<0.0010	<0.0010	0.00032	
		6-Aug-21	Loc 4	2115238	207.0	<1	6	<0.00000	<0.0010	0.00050	
		6-Oct-21	Loc 4	2119419	233.0	<10	<10	0.00071	0.00012	0.00055	
		11-Nov-21	Loc 4	2122008	251.0	<1	<1	0.00012	<0.0010	0.00036	
		30-Nov-21	Loc 4	2123162	258	<1	14	<0.0010	<0.0010	0.0013	
		21-Dec-21	Loc 4	2124765	250	<1	1	<0.0010	<0.0010	0.00035	
		13-Jan-22	Loc 4	2200697	25.8	<1	<1	<0.0010	<0.0010	0.00087	
		16-Feb-22	Loc 4	2202836	240	<1	<1	0.00019	<0.0010	0.00079	
		9-Mar-22	Loc 4	2204544	263	<10	41	0.00020	<0.0010	0.00072	
		5-Apr-22	Loc 4	2205971	257.0	<1	24	<0.0010	<0.0010	0.00060	
		4-May-22	Loc 4	2207368	239.0	<1	730	<0.0010	<0.0010	0.00120	
Kakapo Basin	Loc 5	2-Jun-21	Loc 5	2110531	162.0	2	1,000	<0.0010	<0.0010	<0.0010	
		24-Jun-21	Loc 5	2112380	176.0	<1	38	<0.0010	<0.0010	0.00036	
		6-Aug-21	Loc 5	2115239	209.0	<1	2	<0.00000	<0.0010	0.00011	
		6-Oct-21	Loc 5	2119418	222.0	<10	<10	0.00011	<0.0010	0.00016	
		11-Nov-21	Loc 5	2122009	242.0	<1	2	<0.0010	<0.0010	<0.0010	
		30-Nov-21	Loc 5	2123163	244	<1	5	<0.0010	<0.0010	0.00290	
		21-Dec-21	Loc 5	2124766	208	<1	62	<0.0010	<0.0010	0.00032	
		13-Jan-22	Loc 5	2200698	25.2	<1	1	<0.0010	<0.0010	0.00064	
		16-Feb-22	Loc 5	2202837	166	<1	1,600	0.00015	<0.0010	0.00110	
		9-Mar-22	Loc 5	2204545	245	<10	10	0.00018	<0.0010	0.00034	
		5-Apr-22	Loc 5	2205972	246.0	<1	11	<0.0010	<0.0010	0.0013	
		4-May-22	Loc 5	2207367	239.0	<1	160	<0.0010	<0.0010	0.0010	
Kakapo Basin	Kakapo Basin	1-Jun-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		23-Jun-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		6-Aug-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		6-Oct-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		11-Nov-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		1-Dec-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		21-Dec-21	Kakapo Basin	-	-	No sample collected, no water in basin					
		14-Jan-22	Kakapo Basin	-	-	No sample collected, no water in basin					
		17-Feb-22	Kakapo Basin	-	-	No sample collected, no water in basin					
		10-Mar-22	Kakapo Basin	-	-	No sample collected, no water in basin					
		5-Apr-22	Kakapo Basin	-	-	No sample collected, no water in basin					
		4-May-22	Kakapo Basin	-	-	No sample collected, no water in basin					
Loc 6	2-Jun-21	Loc 6	2110532	53.3	4	260	0.00070	0.00015	<0.0010		
	23-Jun-21	Loc 6	2112331	96.0	<1	50	0.00057	<0.0010	<0.0010		
	6-Aug-21	Loc 6	2115240	79.0	1	170	0.00077	0.00018	0.00084		
	5-Oct-21	Loc 6	2119423	68.5	<10	31	0.0014	0.00060	0.0023		
	10-Nov-21	Loc 6	2121604	128.0	<1	2	0.00037	<0.0010	0.00010		
	30-Nov-21	Loc 6	2123164	124.0	<1	110	0.00057	<0.0010	0.00120		
	21-Dec-21	Loc 6	2124767	106.0	2	180	0.00078	<0.0010	0.00140		
	14-Jan-22	Loc 6	2200737	132.0	1	36	0.00052	<0.0010	0.0010		
	16-Feb-22	Loc 6	2202838	81.0	5	610	0.00090	<0.0010	0.00099		
	10-Mar-22	Loc 6	2204573	113.0	20	2,600	0.00050	<0.0010	<0.0010		
	5-Apr-22	Loc 6	2205973	111.0	<1	32	0.00041	<0.0010	0.00083		
	4-May-22	Loc 6	2207368	134.0	<1	16	0.00033	<0.0010	0.00068		
Outlook Basin	Loc 7	2-Jun-21	Loc 7	2110533	102.0	1	170	0.00019	<0.0010	<0.0010	
		23-Jun-21	Loc 7	2112332	96.2	<1	27	0.00021	<0.0010	<0.0010	
		6-Aug-21	Loc 7	2115241	92.3	1	19	<0.0010	<0.0010	<0.0010	
		5-Oct-21	Loc 7	2119422	100.0	<10	2	0.00029	0.00017	0.00170	
		10-Nov-21	Loc 7	2121601	110.0	<1	12	0.00026	<0.0010	<0.0010	
		30-Nov-21	Loc 7	2123165	101	<1	1	0.00027	<0.0010	0.00190	
		21-Dec-21	Loc 7	2124768	109	<1	250	0.00031	<0.0010	0.00370	
		14-Jan-22	Loc 7	2200738	100	<1	260	0.00023	<0.0010	0.0010	
		16-Feb-22	Loc 7	2202839	112	5	83	0.00042	<0.0010	0.00080	
		10-Mar-22	Loc 7	2204574	104	<10	190	0.00040	<0.0010	0.00034	
		5-Apr-22	Loc 7	2205974	106.0	<1	13	0.00025	<0.0010	0.00062	
		4-May-22	Loc 7	2207369	127.0	5	5	0.00025	<0.0010	0.00013	
Outlook Basin	Outlook Basin	23-Jun-21	Outlook Basin	2110534	89.0	10	250	0.00018	<0.0010	0.0023	
		6-Aug-21	Outlook Basin	2115242	89.2	<1	210	0.00010	<0.0010	0.0026	
		6-Oct-21	Outlook Basin	-	-	No sample collected, no water in basin					
		11-Nov-21	Outlook Basin	-	-	No sample collected, no water in basin					
		1-Dec-21	Outlook Basin	-	-	No sample collected, no water in basin					
		21-Dec-21	Outlook Basin	-	-	No sample collected, no water in basin					
		14-Jan-22	Outlook Basin	-	-	No sample collected, no water in basin					
		16-Feb-22	Outlook Basin	2202840	105	390	24,000	0.00040	<0.0010	0.00086	
		10-Mar-22	Outlook Basin	-	-	No sample collected, no water in basin					
		5-Apr-22	Outlook Basin	-	-	No sample collected, no water in basin					
		5-May-22	Outlook Basin	-	-	No sample collected, no water in basin					

Figure 1 Groundwater Elevation, Awatea Basin Location 1¹

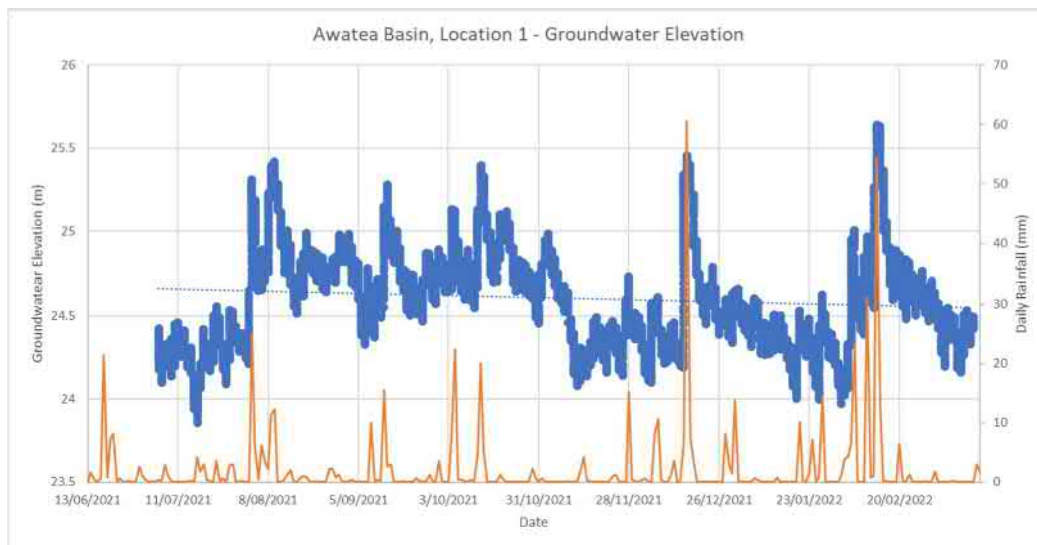


Figure 2 Groundwater Elevation, Awatea Basin Location 2¹

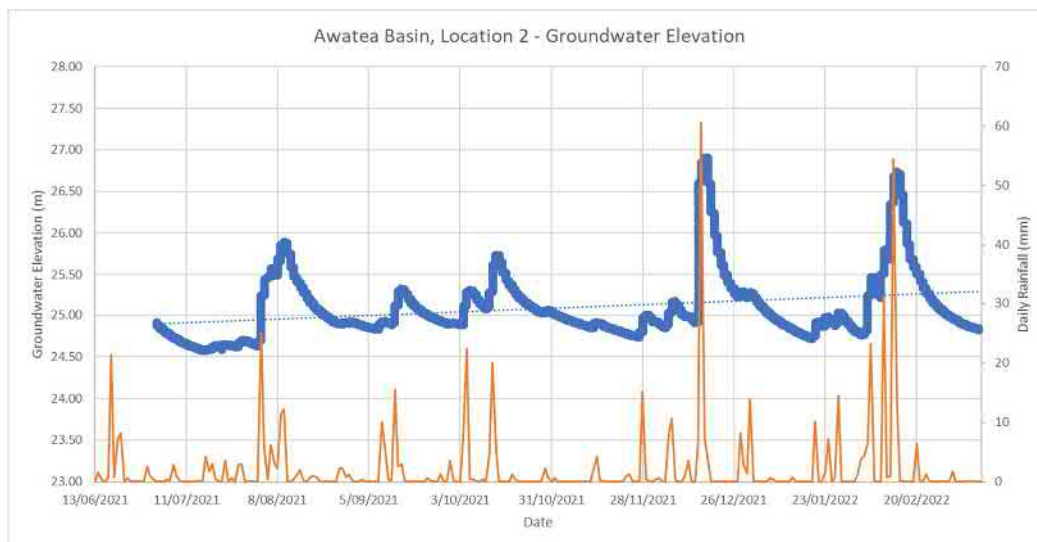
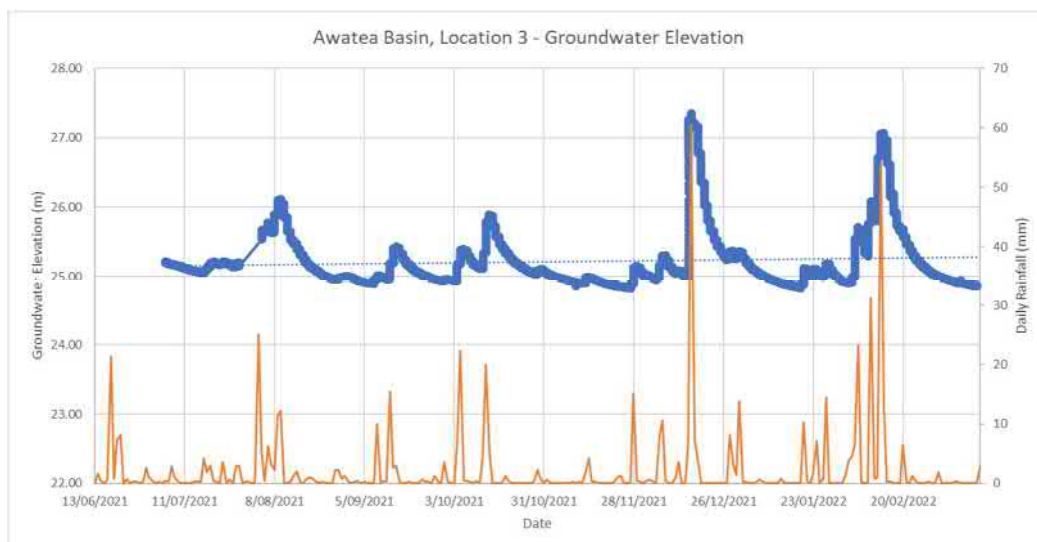


Figure 3 Groundwater Elevation, Awatea Basin Location 3¹



¹ Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.

Figure 4 Groundwater Elevation, Kakapo Basin Location 4²

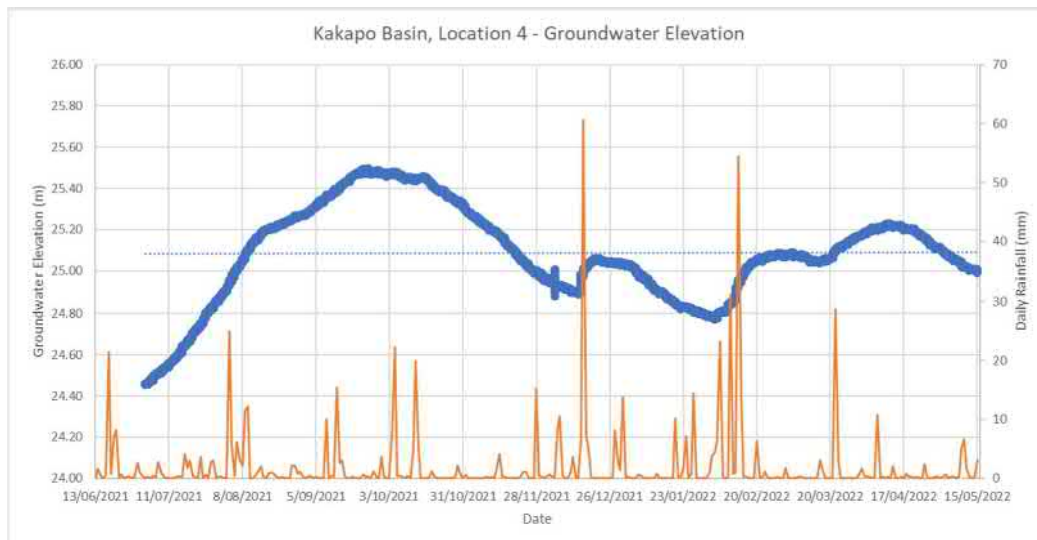
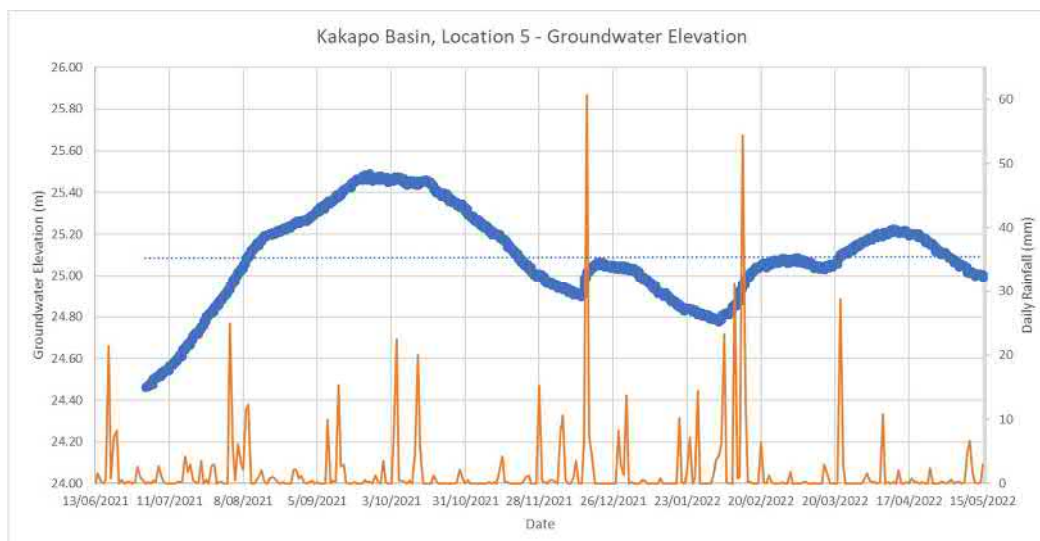


Figure 5 Groundwater Elevation, Kakapo Basin Location 5²



^{2 2} Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.

Figure 6 Groundwater Elevation, Outlook Basin Location 6³

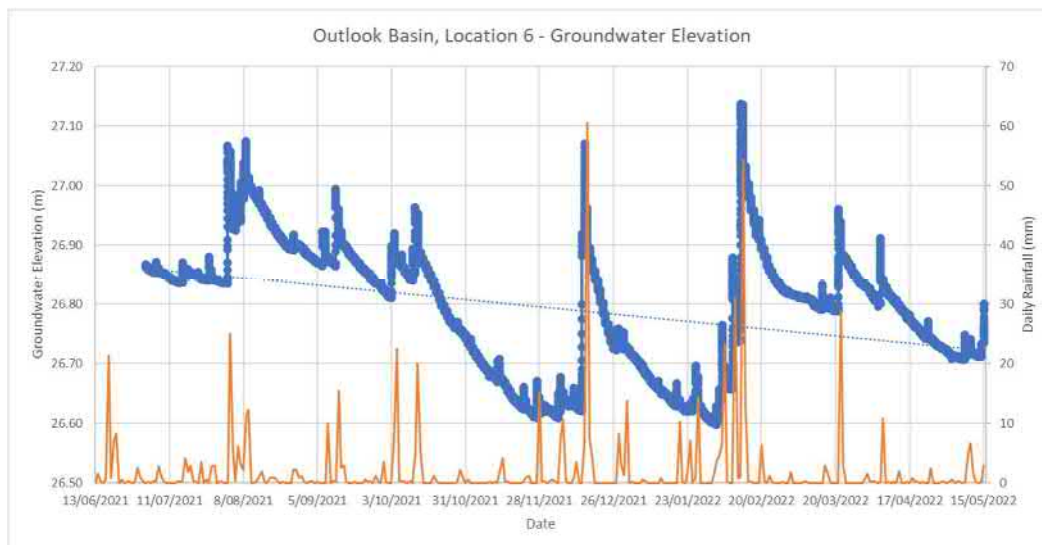
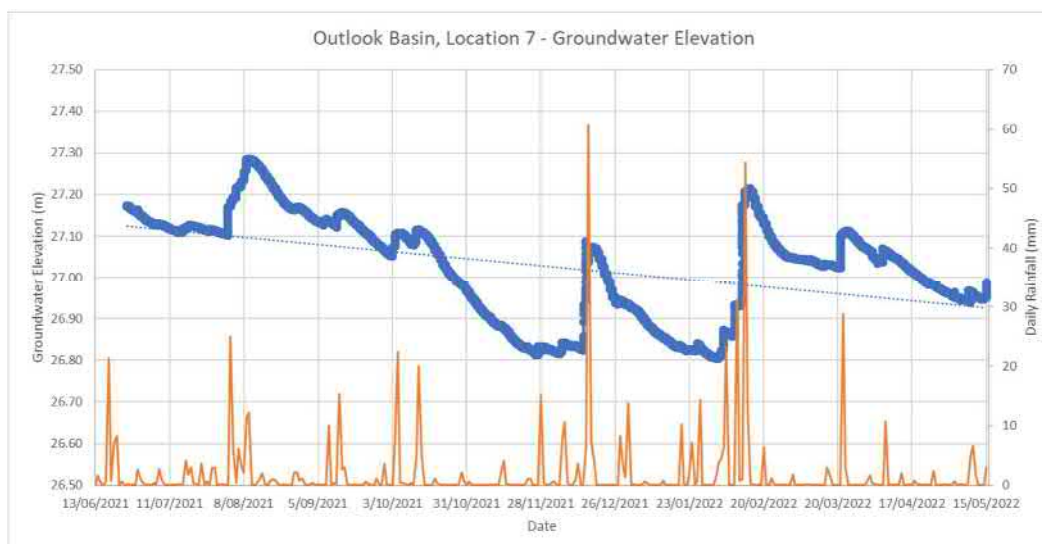


Figure 7 Groundwater Elevations, Outlook Basin Location 7³



³ Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.

Figure 8 Rainfall vs Surface Water Level Elevation, Awatea Basin⁴

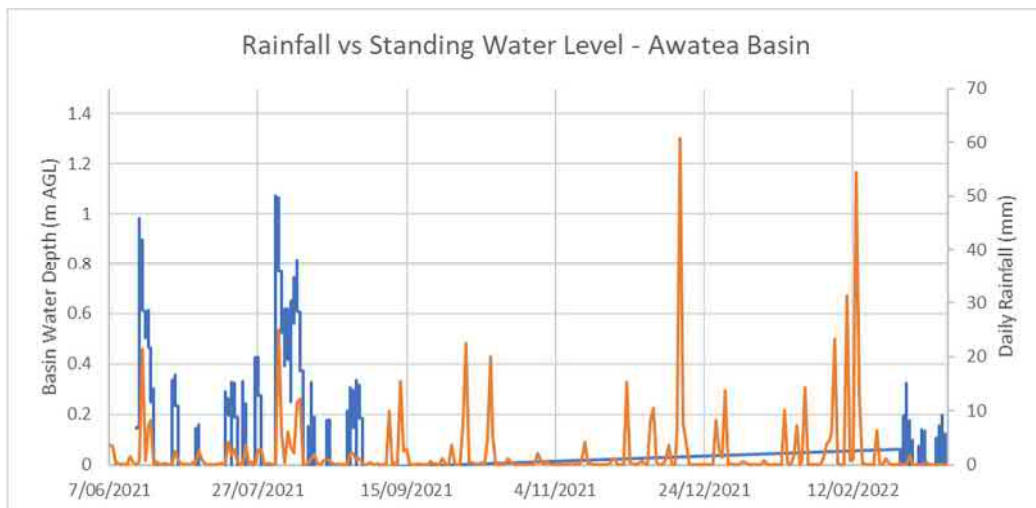


Figure 9 Rainfall vs Surface Water Level Elevation, Kakapo Basin⁴

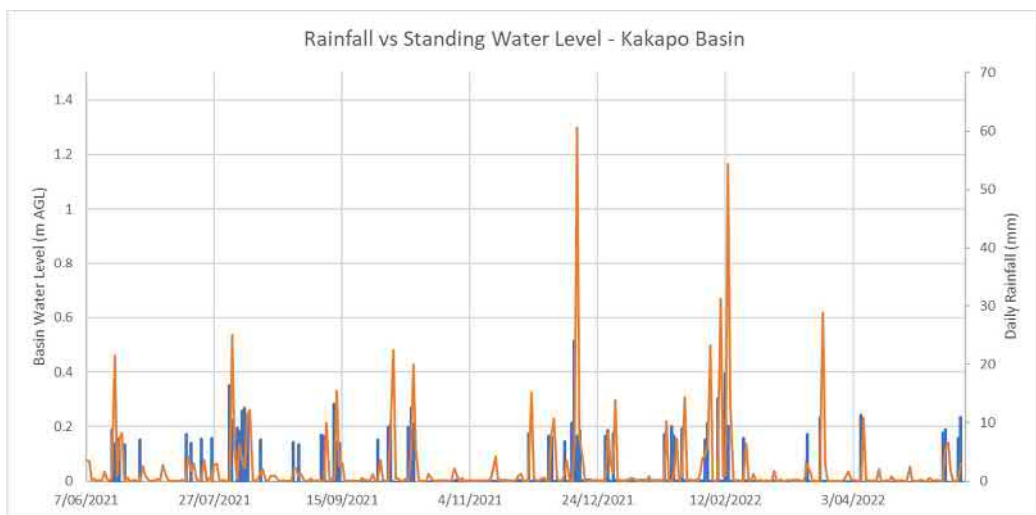
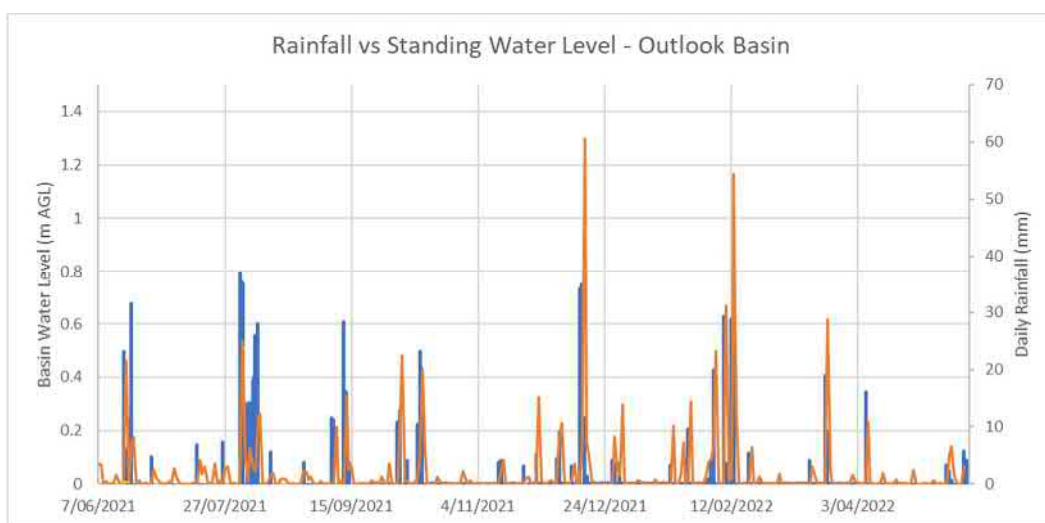


Figure 10 Rainfall vs Surface Water Level Elevation, Outlook Basin⁴



^{4 4} Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.

Figure 11 Rainfall vs Level Elevation, Awatea Basin⁵

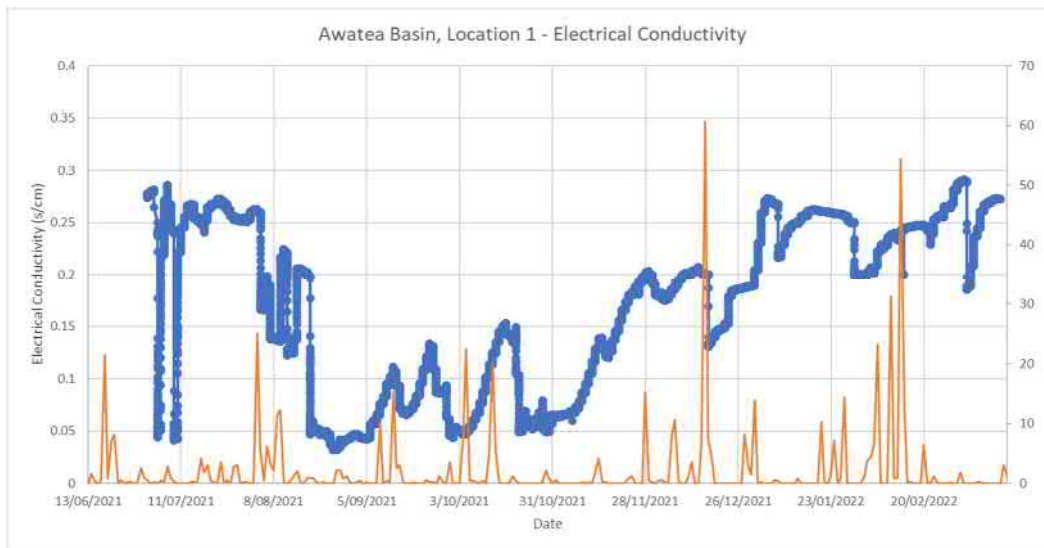


Figure 12 Rainfall vs Electrical Conductivity, Awatea Basin⁵

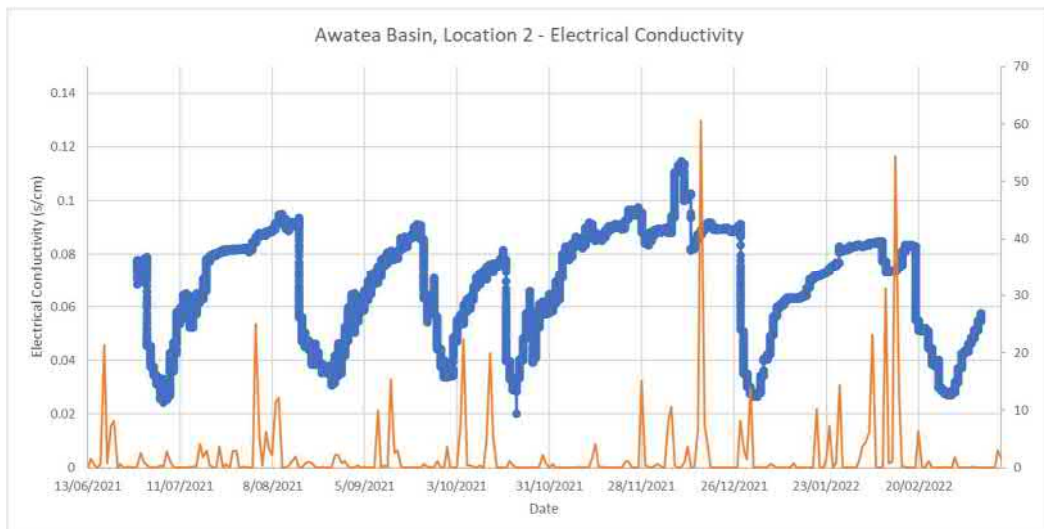
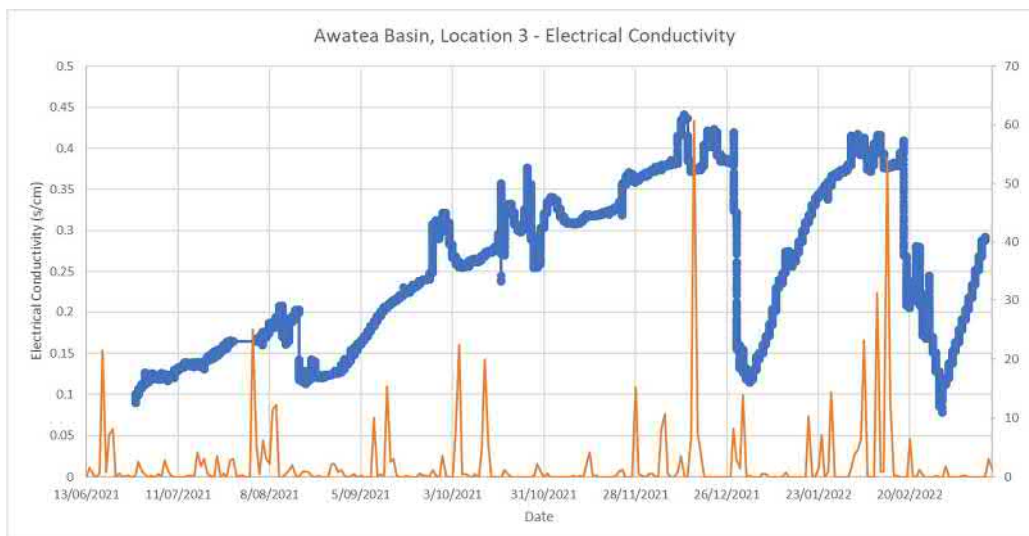


Figure 13 Rainfall vs Electrical Conductivity, Awatea Basin



⁵ Rainfall data sourced from NIWA Cliffo Database on 16 May 2022.

Figure 14 Rainfall vs Electrical Conductivity, Kakapo Basin⁶

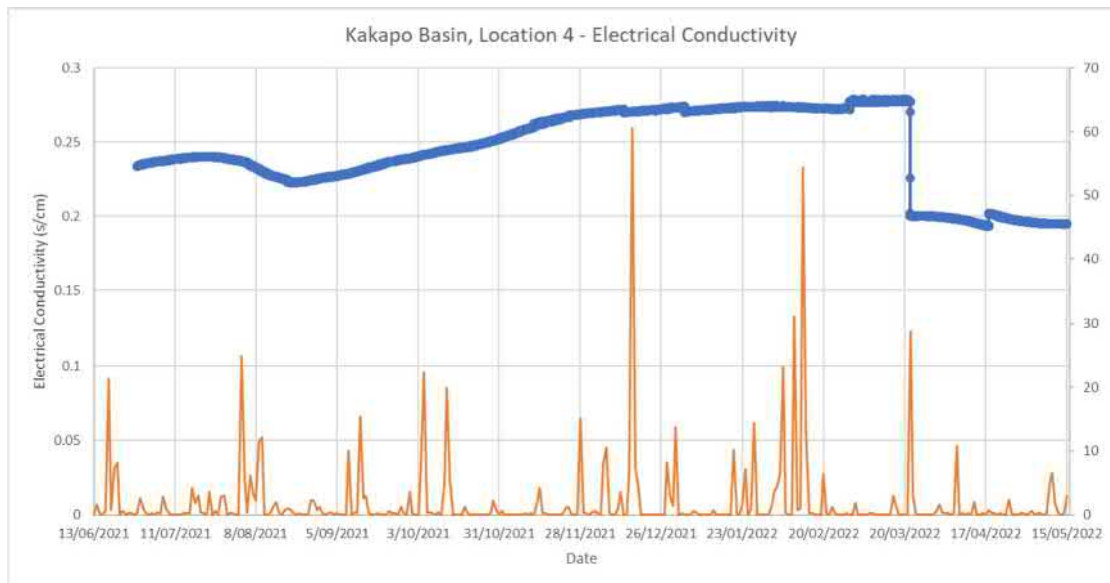
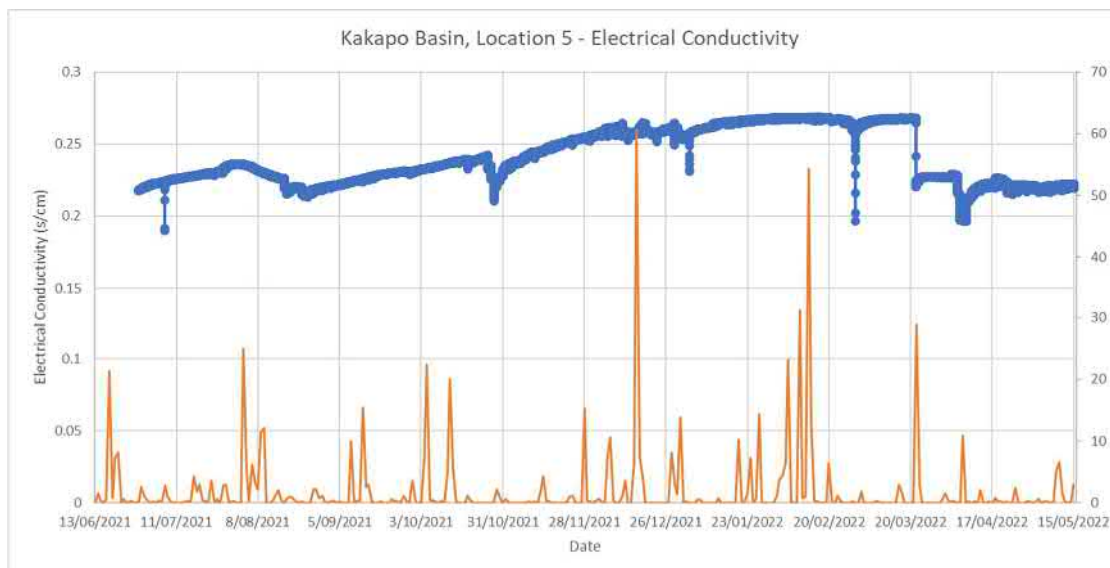


Figure 15 Rainfall vs Electrical Conductivity, Kakapo Basin⁶



⁶ Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.

Figure 16 Rainfall vs Electrical Conductivity, Outlook Basin⁷

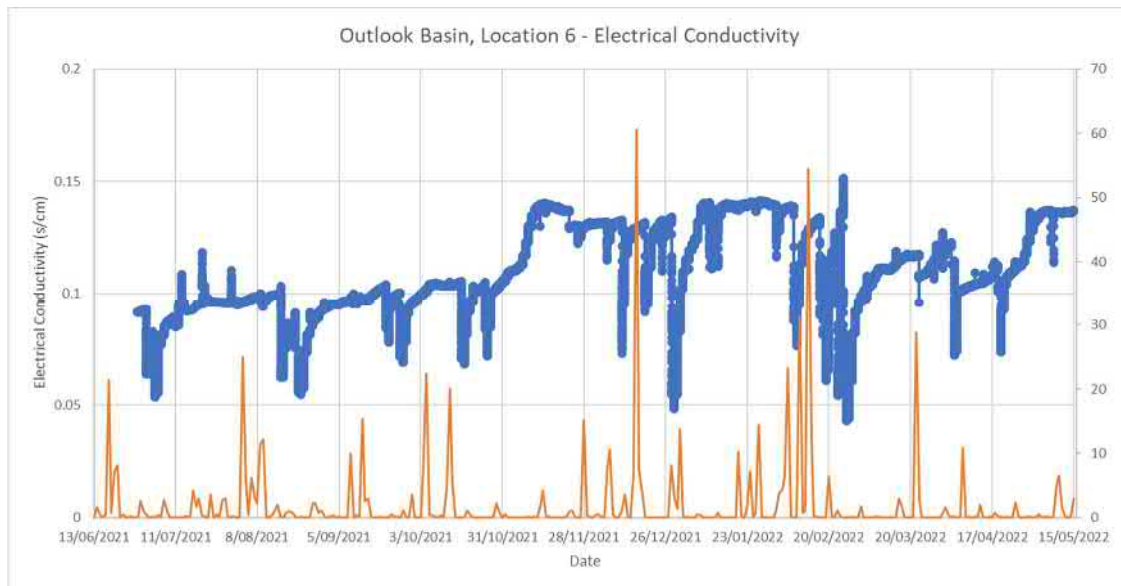
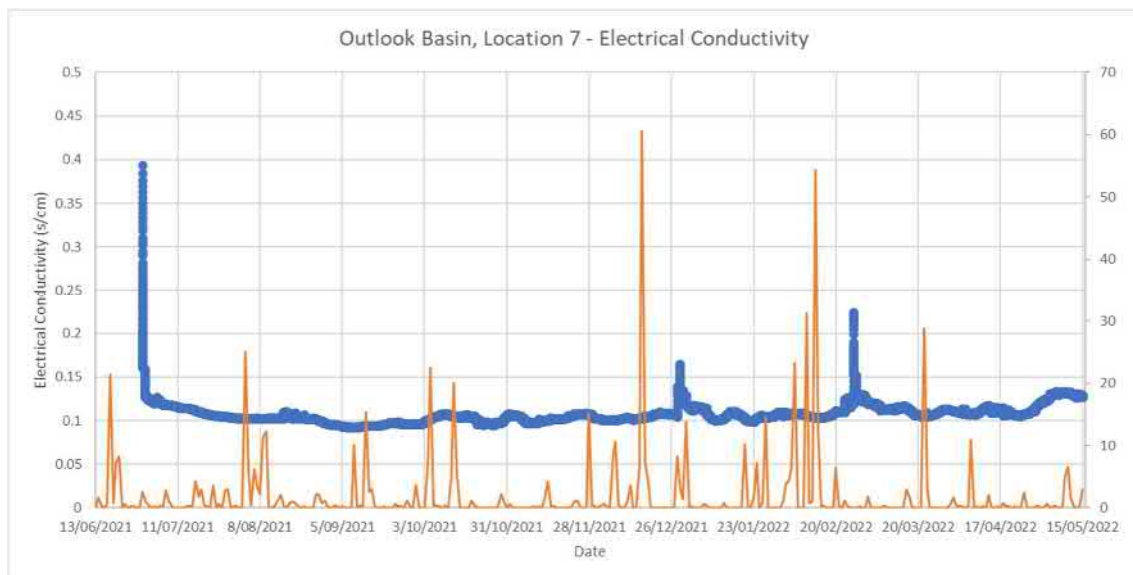
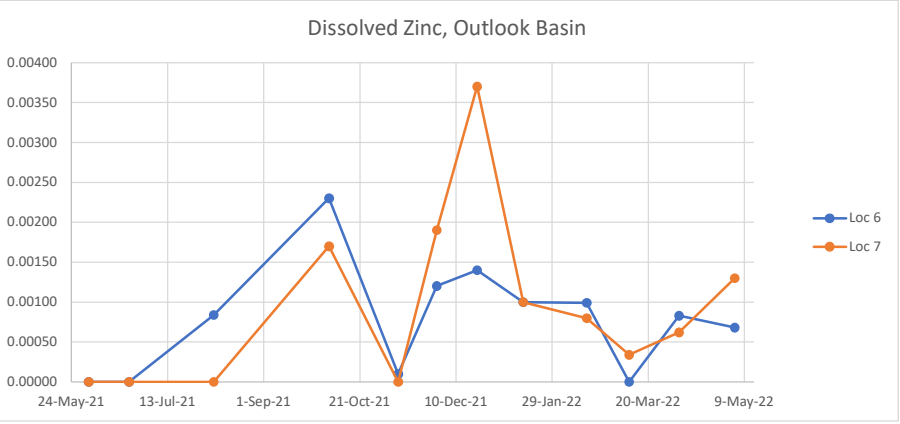
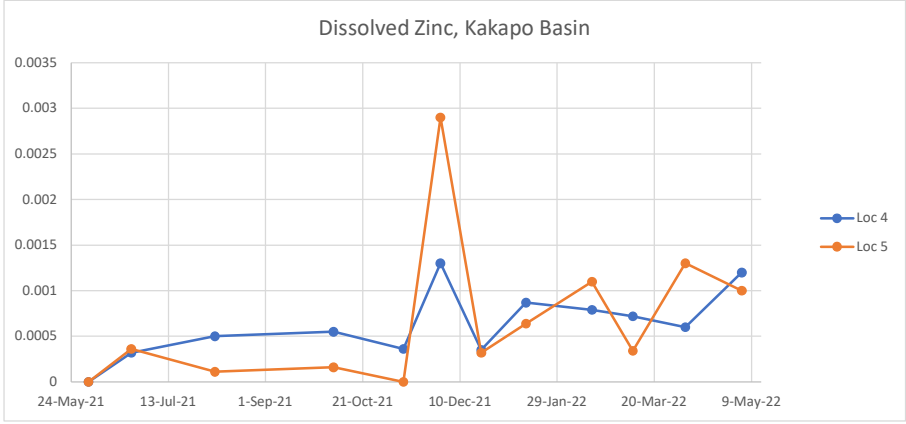
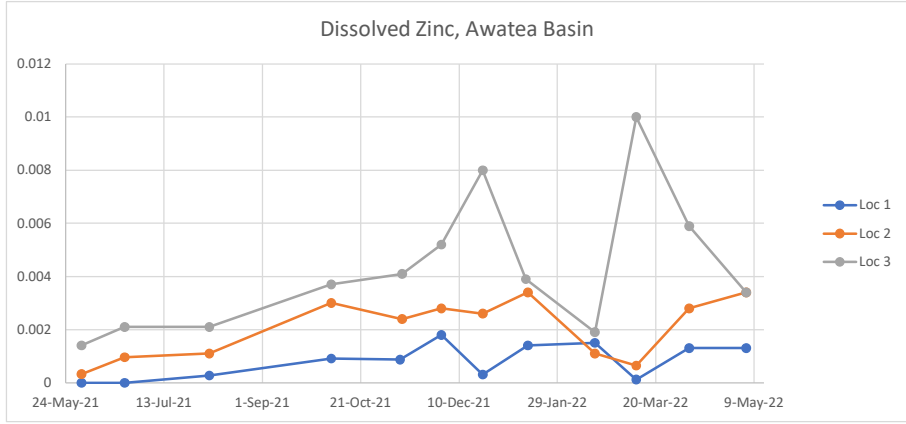
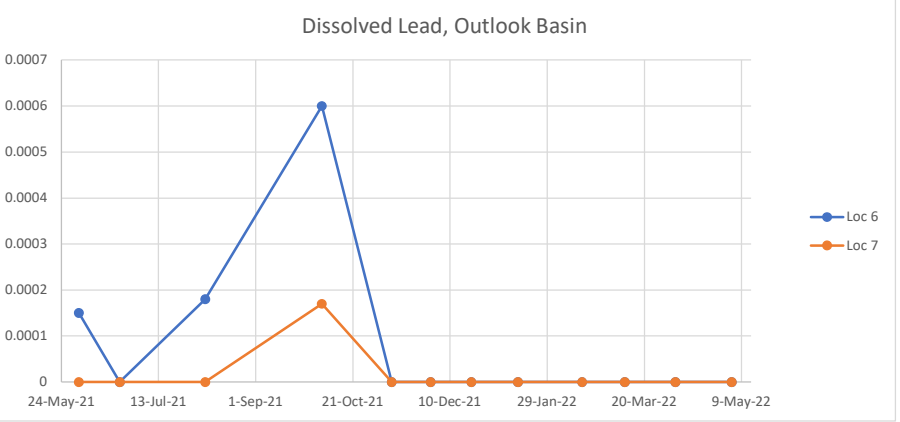
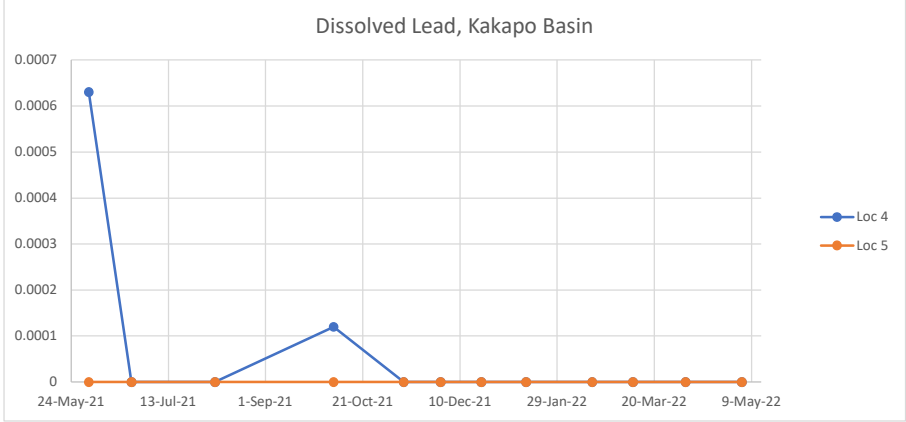
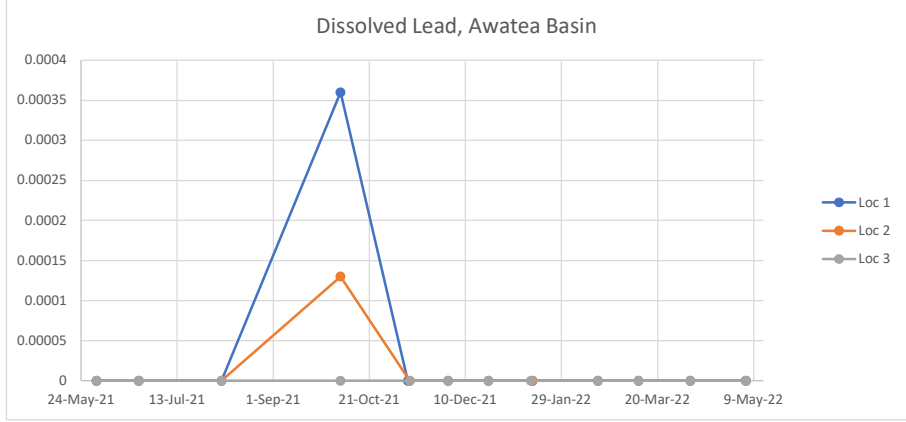
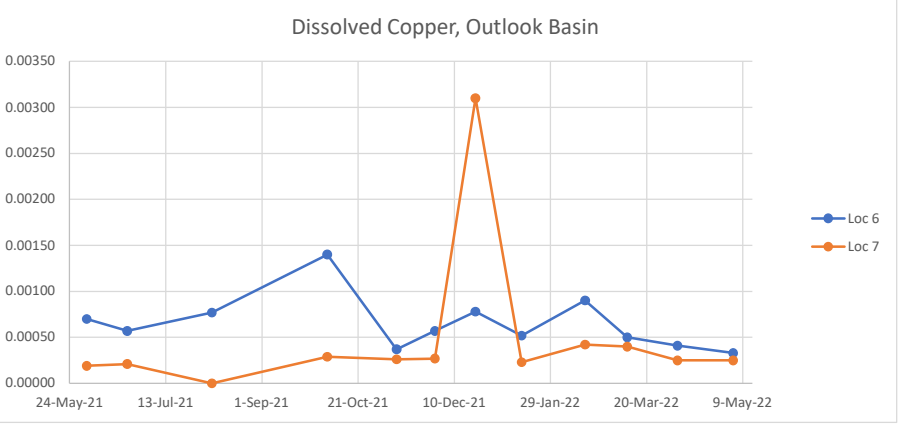
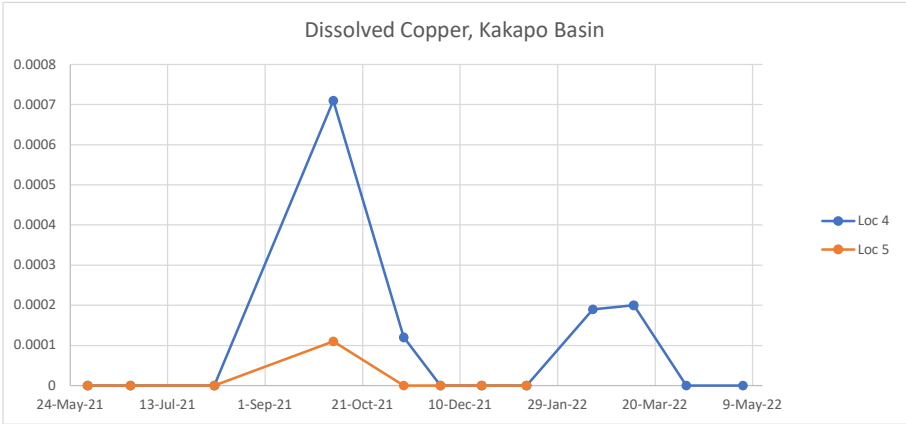
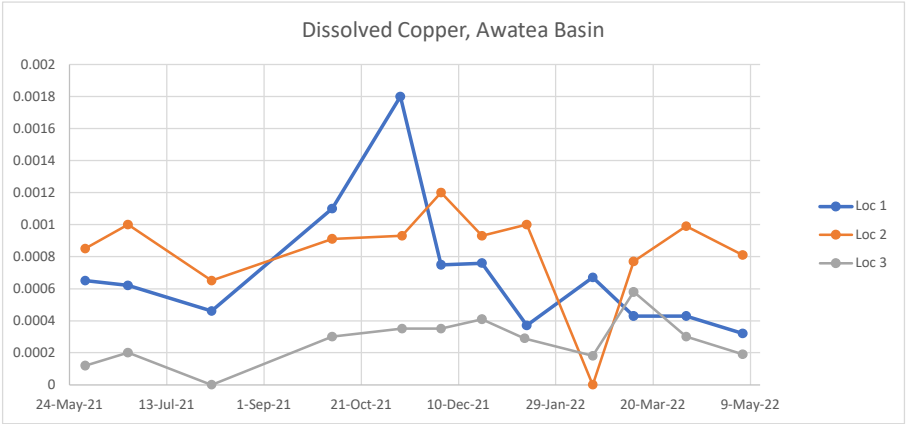
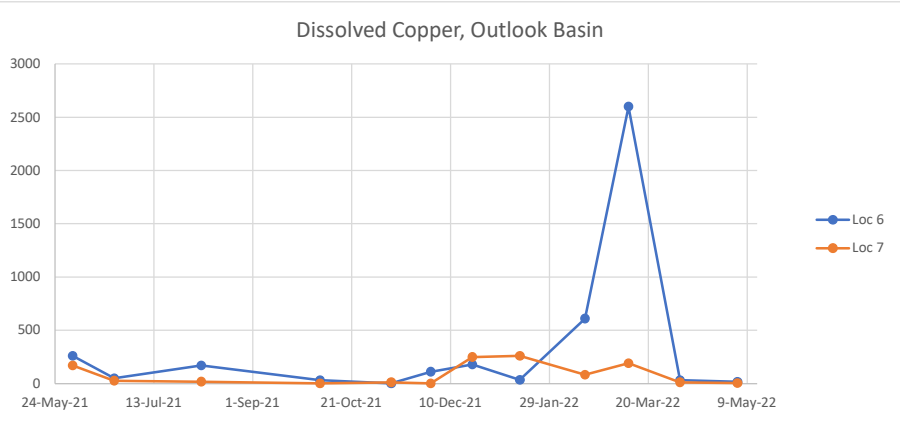
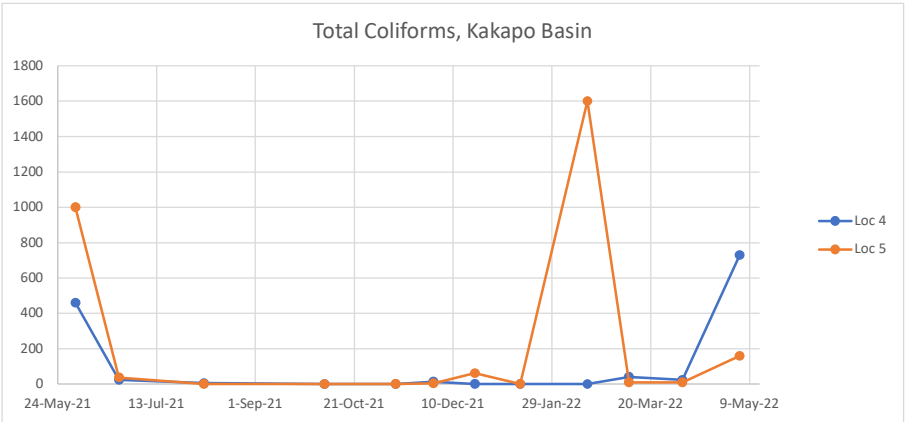
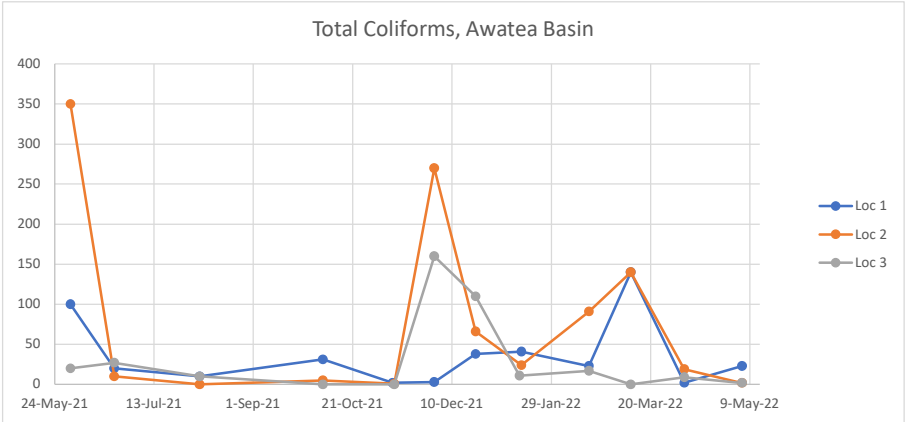


Figure 17 Rainfall vs Electrical Conductivity, Outlook Basin⁷



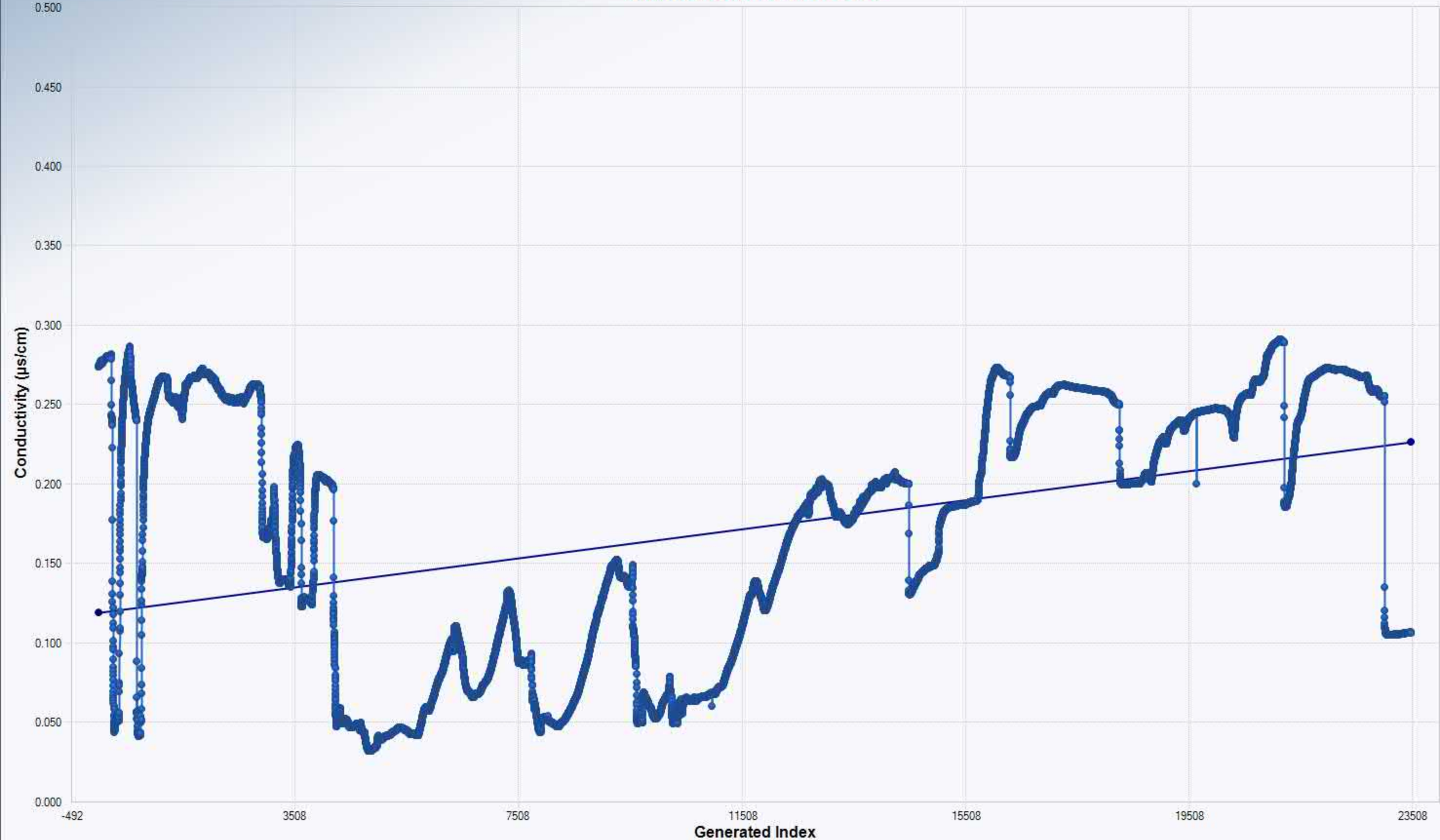
⁷ Rainfall data sourced from NIWA Cliflo Database on 16 May 2022.



Mann-Kendall Trend Test Location 1

Mann-Kendall Trend Analysis	
n	23,482
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,199,485.4354
Standardized Value of S	74.9209
M-K Test Value (S)	89,866.502
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.1188

Statistically significant evidence
of an increasing trend at the
specified level of significance.



Mann-Kendall Trend Test Location 2

Mann-Kendall Trend Analysis	
n	23,488
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,199,941.1188
Standardized Value of S	6.8921
M-K Test Value (S)	8,270,135
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.0676
Statistically significant evidence of an increasing trend at the specified level of significance.	



Mann-Kendall Trend Test Location 3

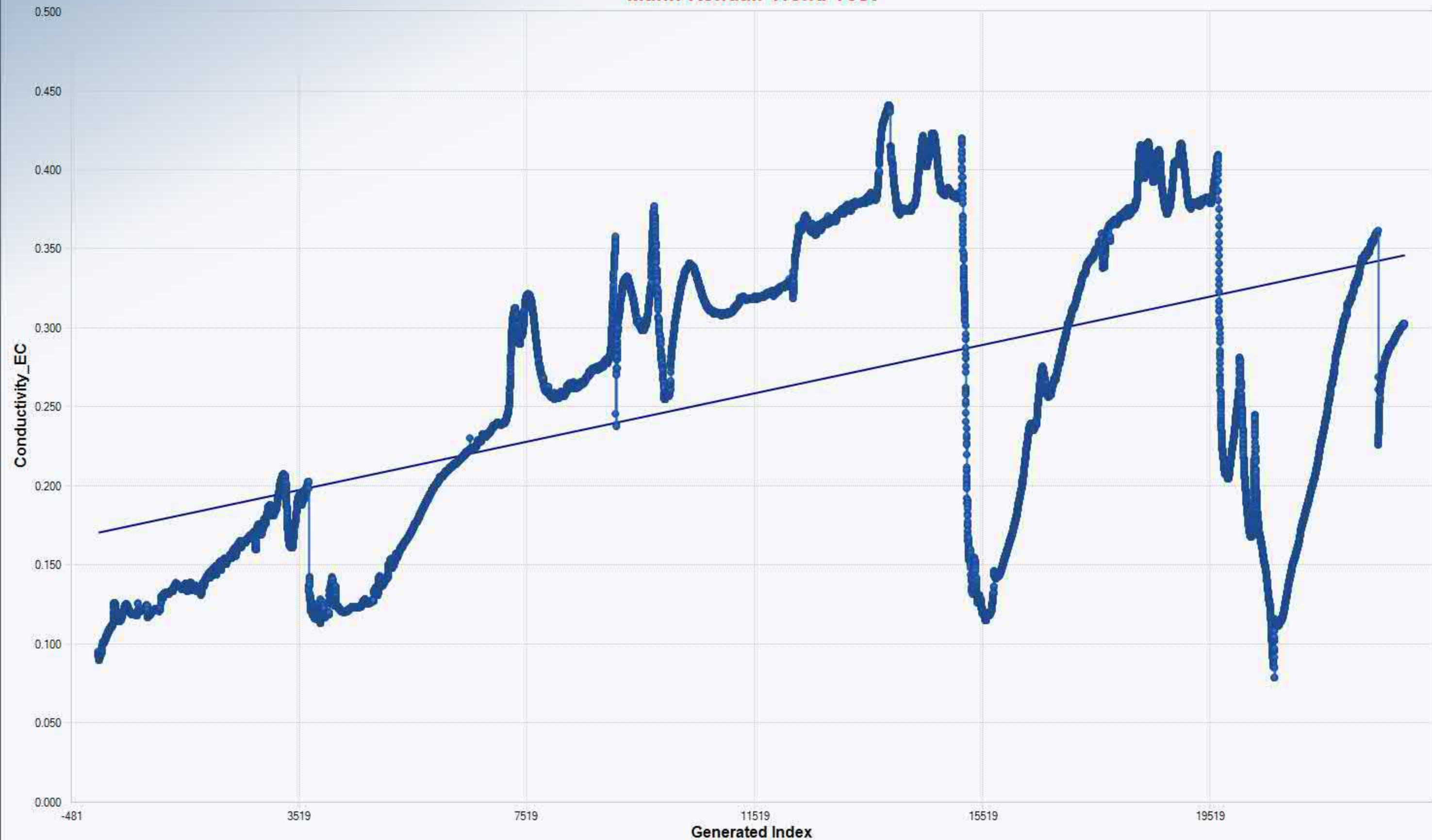
Mann-Kendall Trend Analysis

n	22,934
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,157,744.0613
Standardized Value of S	101.6492
M-K Test Value (S)	117,683.733
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

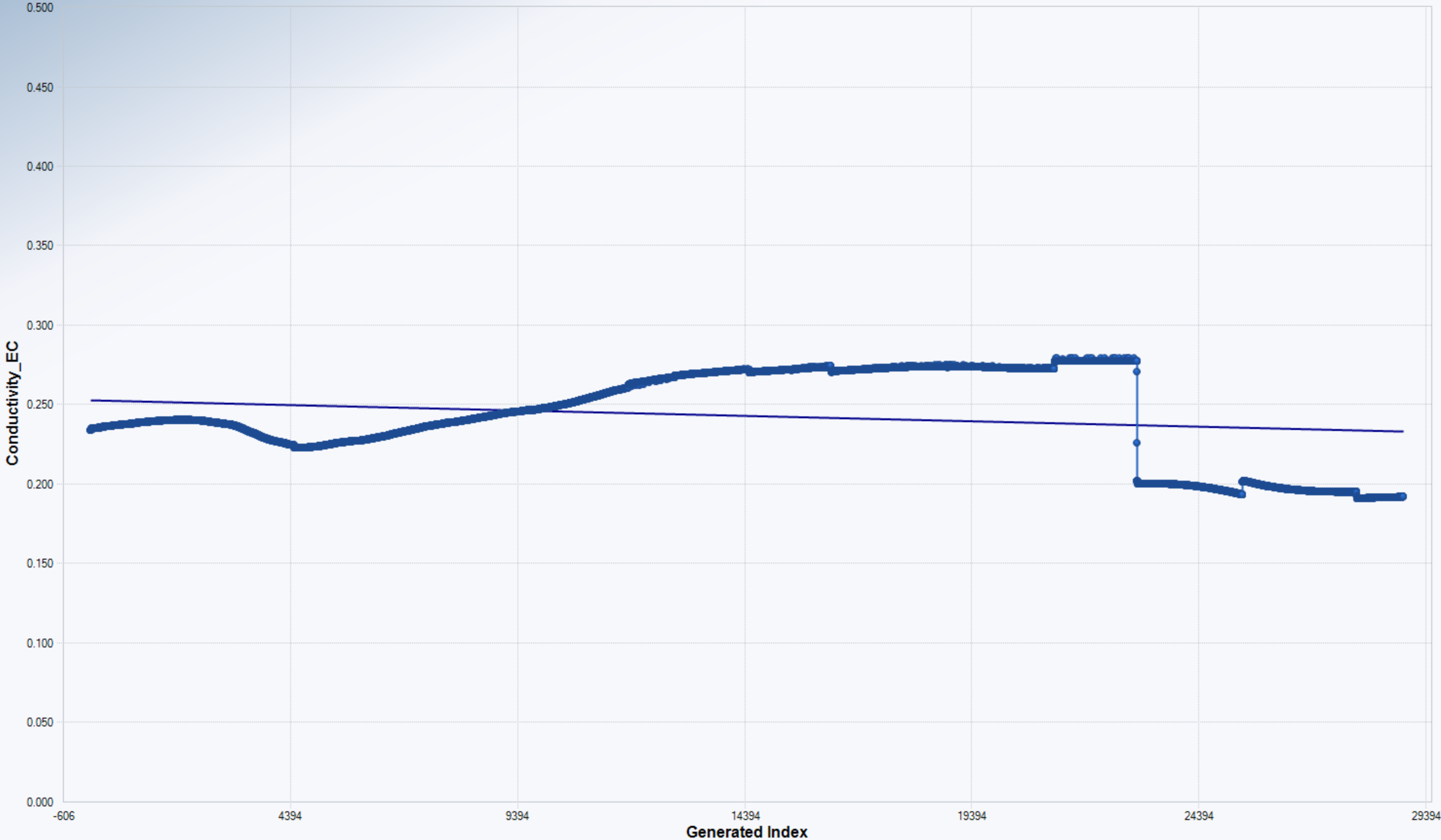
OLS Regression Slope	0.0000
OLS Regression Intercept	0.1705

Statistically significant evidence
of an increasing trend at the
specified level of significance.



Mann-Kendall Trend Test Location 4

Mann-Kendall Trend Analysis	
n	28,894
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,637,201.5283
Standardized Value of S	38.3388
M-K Test Value (S)	62,768,304
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.2527
Statistically significant evidence of an increasing trend at the specified level of significance.	



Mann-Kendall Trend Test Location 5

Mann-Kendall Trend Analysis

n	28,922
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,639,555.0700
Standardized Value of S	64.3960
M-K Test Value (S)	105,580,865
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.2334

Statistically significant evidence
of an increasing trend at the
specified level of significance.



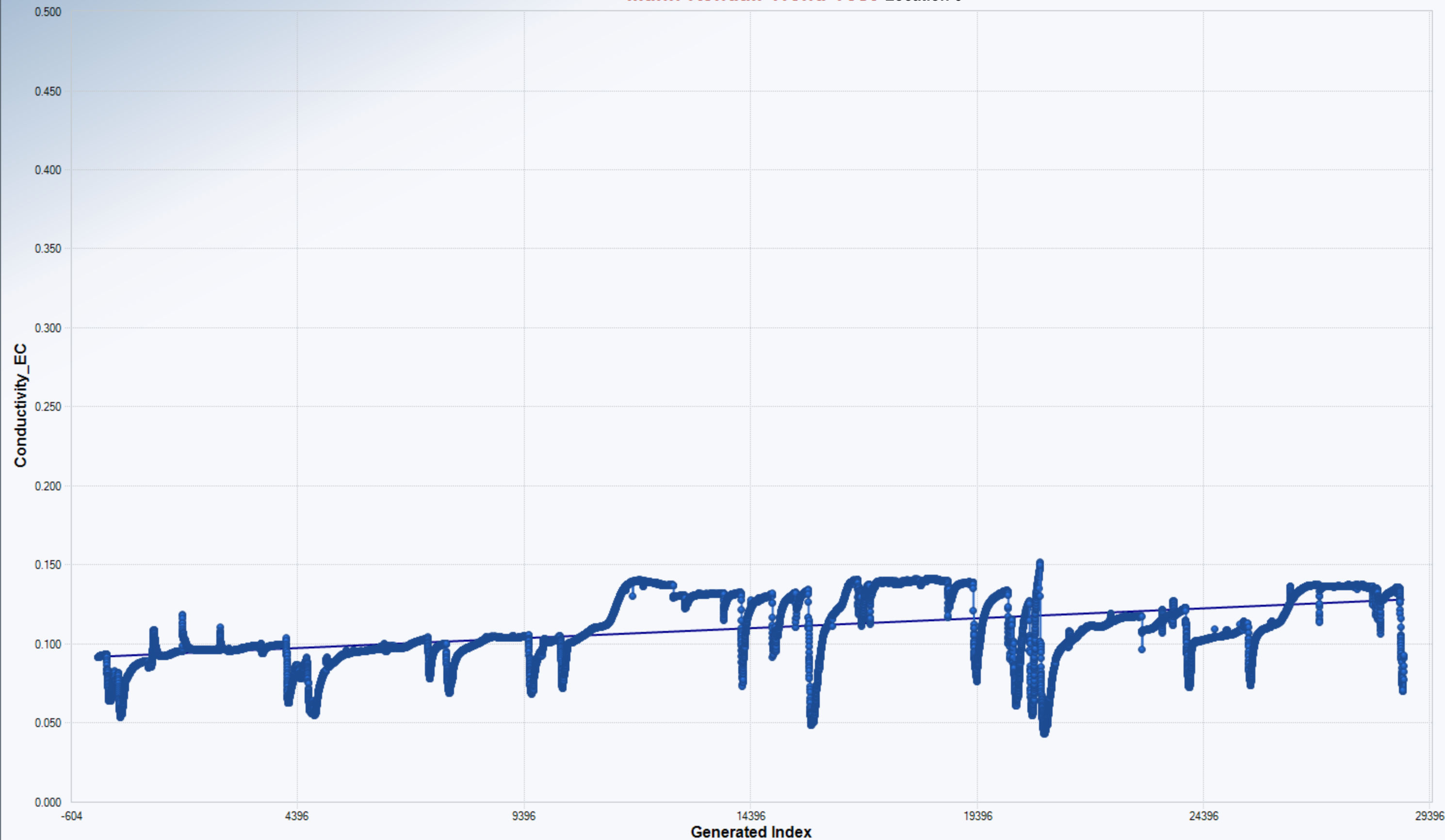
Mann-Kendall Trend Test Location 6

Mann-Kendall Trend Analysis

n	28,823
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,631,160.9608
Standardized Value of S	104.2379
M-K Test Value (S)	170,028,860
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.0922

Statistically significant evidence
of an increasing trend at the
specified level of significance.



Mann-Kendall Trend Test Location 7

Mann-Kendall Trend Analysis

n	28,818
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	1,630,723.0445
Standardized Value of S	94.4126
M-K Test Value (S)	153,960,860
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.1010

Statistically significant evidence
of an increasing trend at the
specified level of significance.



Appendix C

Bore Logs

Client Christchurch City Council
 Project CCC SW Basin Investigation
 Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING			Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ODOURS AND COMMENTS	Groundwater	Well Construction	
	Sample ID	Analysis	PID (ppm)								
VAC EX				0-100%		Grey SANDY SILT, dry, hard, organics present (roots).	Sandy SILT			A	
Sonic				1		Brown grey SAND, poorly graded, medium grained, loose. (50% core loss)	Sand				
				2							
				3		Grey GRAVELS, well graded, loose, cobbles present, rounded.	SAND Gravel				
				4		Grey GRAVELLY SAND Grey GRAVELS, well graded, loose, cobbles present, rounded.	Gravelly SAND				
				5			Gravel				
				6							
				7							
				8		Grey SILTY CLAY, brown and orange mottling, moist, moderately stiff, high plasticity, round cobbles and gravels present Grey, fine SAND, wet Silt lense at 8.0 to 8.2 m bgl	Silt Sand				
				9							
				GROUNDWATER OBSERVATIONS							Date logged 15/04/2021
Depth 7.2m						Logged SH		Method Sonic Drill Rig			
Reading -						Checked SH		Started 12/04/2021			
								Finished 15/04/2021			
								Page 1 of 1			

DRILLHOLE LOG ENVIRONMENTAL LOC 1 - LOC 7 WELL INSTALLATION GINT LOGS.GPJ TEST_ENVIRODRILLHOLE.GDT 21/03/22

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING			Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)							
VAC EX				0-100%		Grey SILT, dry, very hard, organics present (roots), minor orange mottling.	Silt			
Sonic				1		Grey SANDY GRAVELS, slightly moist, moderate dense, well graded, rounded.	Sandy gravel			
				2		Silt to coarse SAND				
				3		Grey SANDY GRAVELS, slightly moist, moderate dense, well graded, rounded.				
				4						
				5		Grey GRAVELS, rounded, well graded, loose	Gravel			
				6						
				7		Grey GRAVELLY SAND, slightly moist, moderate dense, well graded, rounded.	Sandy gravel			
8		Grey, GRAVELS, rounded cobbles and pebbles, moderately graded	Gravel							
9										
GROUNDWATER OBSERVATIONS Depth 7.68m Reading Date						Date logged 16/04/2021 Logged SH Checked SH		Remarks		
						Driller McMillan Method Sonic Drill Rig Started 12/04/2021 Finished 16/04/2021		Page 1 of 1		

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING			Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)							
VAC EX				0-100%		Grey SILT, hard, dry, organics (roots). Rounded GRAVELS and cobbles	Gravel			
						Rounded GRAVELS with sand	Sandy gravel			
Sonic						Grey GRAVELLY SAND, slightly moist, moderately graded, fine sand to medium sand and small to large rounded gravel and cobbles	Gravely SAND			
						Grey SAND, fine, moderately graded, wet, soft	Gravel			
						Grey SAND, fine, moderately graded, wet, soft	Sand			
						Wood fragment				
GROUNDWATER OBSERVATIONS Depth 6.726m Reading Date						Date logged 15/04/2021 Logged SH Checked SH		Remarks		
								Driller McMillan Method Sonic Drill Rig Started 12/04/2021 Finished 15/04/2021		
								Page 1 of 1		

Client Christchurch City Council
 Project CCC SW Basin Investigation
 Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING				Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)	Depth						
VAC EX						Grey SILT, hard, dry, organics present (roots), occasional round pebble and gravel	Silt			
Sonic				1		Grey clayey SILT, stiff, minor clay content, grey and tan mottling	Silt			
				2		Grey SAND, medium dense, slightly moist, poorly graded, grey and tan mottling Silt lense at 2.2 to 2.4 m bgl.	Sand			
				3		SAND with gravels, well graded, dense Gravelly Cobbles Grey SANDS, loose, poorly graded	Sand Gravel			
				4		Sandy GRAVELS, well graded, loose, angular to sub-rounded, some cobbles	Gravel			
				5						
				6		GRAVELS, grey, subangular to rounded, gravels to cobbles	Gravel			
				7		Sandy GRAVELS, grey, well graded	Sandy gravel			
				8		GRAVELS, grey, well graded, decreasing sand content				
				9		Dense sandy layer at 8.5 - 8.8 m bgl. GRAVELS, grey, well graded, decreasing sand content				

GROUNDWATER OBSERVATIONS			Date logged	Remarks	Driller	McMillan
Depth	Reading	Date	14/04/2021		Method	Sonic Drill Rig
			Logged		Started	13/04/2021
			SH		Finished	14/04/2021
			Checked			
			SH		Page 1 of 2	

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea,
Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING				Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)	Depth						
Sonic				0-100%		GRAVELS, grey, well graded, decreasing sand content	Sandy gravel			
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
GROUNDWATER OBSERVATIONS Depth <u>11.09m</u> Reading <u>-</u> Date <u>-</u>						Date logged 14/04/2021 Logged SH Checked SH	Remarks	Driller McMillan Method Sonic Drill Rig Started 13/04/2021 Finished 14/04/2021	Page 2 of 2	

Client Christchurch City Council
 Project CCC SW Basin Investigation
 Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING				Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)	Depth						
VAC EX				0-100%		Grey SILT, hard, dry, organics present (roots), rare round cobbles.	Silt			
Sonic				1						
				2		Brown, silty CLAY with grey and orange mottling, moist, stiff, moderate plasticity.	CLAY			
				3		Brown grey SAND, slightly moist, loose, fine sand, poorly graded, orange mottling.	Sand			
				4		Grey GRAVELS, sub rounded to sub angular, cobbles present, well graded.	Gravel			
				5		Grey GRAVELLY SAND, slightly moist, loose, well graded, occasional cobbles	Sand			
			6		Grey SANDY GRAVEL, loose, fines washed out by rig and not recovered, subrounded to rounded, cobbles	Sandy gravel				
			7							
			8		Increasing fine angular gravels present.					
			9							
GROUNDWATER OBSERVATIONS						Date logged	Remarks		Driller McMillan	
Depth _ Reading Date						13/04/2021			Method Sonic Drill Rig	
						Logged SH			Started 12/04/2021	
						Checked SH			Finished 13/04/2021	
									Page 1 of 2	

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING				Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)	Depth						
Sonic				0-100%		Grey SANDY GRAVEL, loose, fines washed out by rig and not recovered, subrounded to rounded, cobbles	Silty CLAY			
				11		Brown SILTY CLAY, slightly moist, moderately stiff, high plasticity, trace gravels				
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
GROUNDWATER OBSERVATIONS Depth 11.05m Reading Date						Date logged 13/04/2021 Logged SH Checked SH	Remarks		Driller McMillan Method Sonic Drill Rig Started 12/04/2021 Finished 13/04/2021	
								Page 2 of 2		

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING				Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)	Depth						
VAC EX				0-100%		Grey sandy SILT, dry Rounded cobbles	Silt			
				1		Pea gravel layer Rounded boulders	Gravel			
				2		GRAVEL, sub-rounded, loose to angular, well graded.	Gravel			
				3		Sandy GRAVEL, brown, coarse grained sands, well graded, loose	Sandy gravel			
				4		Grey GRAVEL, fines washed out by rig and not recovered.	Gravel			
				5						
				6						
				7						
				8						
				9						
GROUNDWATER OBSERVATIONS						Date logged	Remarks		Driller McMillan Method Sonic Drill Rig Started 12/04/2021 Finished 13/04/2021 Page 1 of 1	
Depth 1.84m						13/04/2021				
Reading						SH				
Date						Checked				
						SH				

Client Christchurch City Council
Project CCC SW Basin Investigation
Project number 60649177

Co-ordinates

Location CCC Stormwater Basins (Awatea, Kakapo, Outlook)

Excavation Method	SAMPLING & TESTING			Depth	Graphic Log	MATERIAL DESCRIPTION (consistency, relative density, water content, plasticity, grading, etc)	GEOLOGICAL DESCRIPTION	STAINING/ ODOURS AND COMMENTS	Groundwater	Well Construction
	Sample ID	Analysis	PID (ppm)							
VAC EX				0-100%		Grey sandy SILT, dry organics present Rounded COBBLES	Silt			
Sonic				1		GRAVEL, grey, sub-rounded, well grades, loose, medium grained	Cobbles			
				2			Gravel			
				3		Fine grained GRAVEL Sandy GRAVELS, wet, dense, well graded, some cobbles				
				4			Gravelly SAND			
				5		Sandy, gravelly COBBLES, well graded, sub-rounded.	Sandy Cobbles			
				6						
				7						
				8						
				9						

GROUNDWATER OBSERVATIONS			Date logged	Remarks	Driller	McMillan
Depth	Reading	Date	14/04/2021		Method	Sonic Drill Rig
2.44m		-	Logged		Started	12/04/2021
			SH		Finished	14/04/2021
			Checked			
			SH			
					Page	1 of 1

Appendix D

Field Sampling Forms

ANZ FQM - Groundwater Sampling and Purging Record

QAAN(EV)-405-FM1

AECOM

Black Key

Project Name:		CCC Stormwater Basins		Project Number:		60649177 - 3.2.3		PM Name:		S Hay		Bore ID:		Location 1					
Client:		CCC		Project Location:		Amara Basin		Fieldwork Staff:		E.B. Smu		Sample Date:		Well Development or Well Sampling Event? (circle)					
General Bore Information																			
Date of GW Level: 5-Aug-21				Bore Radius (mm):				Chem Kit Serial No.:				Decontamination							
Depth to GW (m-pvc): 6.041				Screen Interval (m): 2.9-8.9				Chem Kit Model:				Decontaminated							
Bore Depth (m-pvc): 9.365				Casing Radius (mm): 25				Corrected Redox: Y / N				F1 Disposable							
Depth to Product (m-pvc):				Cover Type (jet/slick up):				(The correction to apply is probe dependent)				F1 Other (specify)							
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method: F1 Downhole				F1 Other (specify)							
Key Type (if applicable):				Retrieved				F1				F1							
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):							
Water Quality Parameters																			
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity										
10:40	Begin								No odor, mod. turbidity, clear										
11:04	48	6.125		9.95	39.1	6.11	240.6	11.1											
11:09		6.125		10.01	39.1	6.16	246.2	11.1											
11:11				9.96	39.1	6.23	261.1	11.1											
11:13				9.96	39.1	6.26	273.8	11.2											
11:15				9.82	39.0	6.28	286.9	11.2											
11:17				9.75	39.0	6.29	293.6	11.2											
11:19				9.79	39.0	6.31	296.2	11.2											
11:21				9.73	39.1	6.32	302.4	11.2											
	Sample	collected			11:23 a.m.														
Acceptable Parameter Range:																			
				± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C							
Analytes Sampled for:				Bottles Collected				QA/QC Information				Field Comments							
Field Filtered:				Unfiltered:				x 40 mL Vial (HCl)				x 60 mL Ferrous				x 60 mL metals (HNO ₃)			
								x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber				x 250 mL Plastic			
								2 Backs				1 Inorganic							
Approval and Distribution																			
Fieldwork Staff Signature				Date				Checker Name and Signature				Date							
Project Manager Signature				Date				Distribution: Project Central File											

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

Sampling at 11:23 a.m. 7.62 by 13.0916L x 3
 13.0916 x 3 = 39.288L

ANZ FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		PM Name: S Hay		Bore ID: Location 2	
Client: CCC		Project Location:		Fieldwork Staff: E. Reissner		Sample Date:	
General Bore Information				Parameter Info.		Sampling Method	
Date of GW Level: 5-28-21		Bore Radius (mm):		Chem Kit Serial No.:		Well Development or Well Sampling Event? (circle)	
Depth to GW (m-pvc): 5.795		Screen Interval (m): 2.8-8.8		Chem Kit Model:		Hydrasleeve Info.	
Bore Depth (m-pvc): 9.065		Casing Radius (mm): 25		Corrected Redox: Y / N		Monitoring sequence followed (number in order):	
Depth to Product (m-pvc):		Cover Type (gauge stick up):		(The correction to apply is probe dependent)		F1 Disposal	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Baller	
Key Type (if applicable):		Retrieved		F1 Other (specify):		F1 Peristaltic Pump	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1:00 PM	48 L						
1:02		5.80		7.05	43.2	7.17	145.8
1:04				7.03	43.3	7.01	149.9
1:06				7.03	43.4	6.78	156.7
1:08				7.30	43.0	6.81	144.9
1:10				7.30	43.8	6.73	147.1
1:12				7.28	43.7	6.68	151.6
1:14				7.28	43.8	6.59	155.8
1:16				7.27	43.9	6.54	161.1
1:18				7.23	43.9	6.55	161.8
Sample collected at 1:20							
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV
Analyses Sampled for:				Bottles Collected		QA/QC Information	
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous	
				x 40 mL Vial (H ₂ SO ₄)		x 60 mL metals (HNO ₃)	
				x 100 mL Amber		x 250 mL Plastic	
Approval and Distribution							
Fieldwork Staff Signature				Date		Checker Name and Signature	
Project Manager Signature				Date		Distribution: Project Central File	
						Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
						$4 \times (9.065 - 5.795) \times 3$ $= 39.24 \text{ L}$	

Dark Blue Key

Q4AN(EV)-405-FM1
FCM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 13, 2016

FGM - Groundwater Sampling and Purging Record

QAAN(EV)-405-FM1

Sample ID: 4

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		PM Name: S Hay		Sample ID: 4	
Client: CCC		Project Location: Kakahe Basin		Fieldwork Staff: G. Brown		Well Development or Well Sampling Event? (circle)	
General Bore Information				Parameter Info.		Sampling Method	
Date of GW Level: 6-Aug-21		Bore Radius (mm): 45.3-13.6		Chem Kit Serial No.: F1		Decontamination	
Depth to GW (m-pvc): 10.173		Screen Interval (m): 4.5		Chem Kit Model: F1		Dedicated	
Bore Depth (m-pvc): 13.970		Casing Radius (mm): 45		Corrected Redox: Y / N		Disposable	
Depth to Product (m-pvc):		Cover Type (gastic/brick top):		(The correction to apply is probe dependent)		Other (Specify)	
Product Thickness (m):		Bore Locker (YES/NO):		Parameter method: F1 Downhole		Other (Specify)	
Key Type (if applicable):		Retrieved		Total purged volume (L):		Submersible	
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)		# purge volumes removed:	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)
120m	180m			7.28	162.5	7.03	21.1
155m	48L			7.27	162.6	7.00	22.2
157m				7.26	162.5	7.00	22.4
159m				7.29	162.8	7.04	23.2
201m				7.25	162.8	7.08	23.1
203m				7.24	162.8	7.07	23.5
205m							13.2
Odour, Colour, Turbidity							
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp							
Analyses Sampled for:				Bottles Collected		QA/QC Information	
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous	
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber	
				x 60 mL Ferrous		x 250 mL Plastic	
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

4x (13.970 - 10.173) x 3 =

45.564 L

Sample at 11.93m

FGM - Groundwater Sampling and Purging Record

QAAN(EV)-405-FM1

Light Blue Key

Project Name:		CCC Stormwater Basins		Project Number:		60649177 - 3.2.3		Bore ID:		Location 5	
Client:		CCC		Project Location:		Kakahe Basin		PM Name:		S Hay	
General Bore Information				Parameter Info.				Decontamination		Sampling Method	
Date of GW Level:		6-4-8-21		Bore Radius (mm):		Chem Kit Serial No.:		F1 Decontaminated		F1 Low Flow Pump rate:	
Depth to GW (m-pvc):		10.185		Screen Interval (m):		Chem Kit Model:		F1 Dedicated		Intake depth:	
Bore Depth (m-pvc):		13.800		Casing Radius (mm):		Corrected Redox: Y / N		F1 Disposable		F1 Bailor	
Depth to Product (m-pvc):				Cover Type (gauge stick up):		(The correction to apply is probe dependent)		F1 Other (specify)		F1 Peristaltic Pump	
Product Thickness (m):				Bore Locked (YES/NO):		Parameter method:		F1 Downhole		F1 Other (specify)	
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)		# purge volumes removed:		F1 Retrieved		Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
12:12	Begin								All odour, clear, no turbidity		
12:35	48.2			8.96	162.7	7.01	109.2	13.1			
12:40				8.96	162.8	6.96	110.4	13.2			
12:42				8.94	162.9	6.93	84.4	13.2			
12:44				8.97	162.8	6.91	111.2	13.2			
12:48				8.95	162.8	6.89	113.5	13.2			
12:50				8.91	162.8	6.88	113.2	13.2			
SHUTTER Collected				12:52 (A)							
Analyses Sampled for:				Acceptable Parameter Range:				Field Comments			
				± 10%				± 3%			
				± 0.05				± 10 mV			
				± 0.2 °C				± 10% turbidity (if using a turbidity meter)			
Field Filtered:				Unfiltered:				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (HCl)				x 60 mL Ferrous			
				x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber			
				x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature				Date				Checker Name and Signature			
Project Manager Signature				Date				Distribution: Project Central File			

ANZ
FQM - Groundwater Sampling and Purging Record

Green Key

QAAN(EV)-405-FM1

AECOM

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		Bore ID: Location 6	
Client: CCC		Project Location: Outfall 8.5m		Sample Date:	
General Bore Information		Parameter Info.		Decontamination	
Date of GW Level: 6-4-21	Bore Radius (mm):	Chem Kit Serial No.:	Decontaminated	Sampling Method	
Depth to GW (m-pvc): 1.815	Screen Interval (m): 1.3-5.8	Chem Kit Model:	Dedicated	Low Flow Pump rate:	
Bore Depth (m-pvc): 6.08m	Casing Radius (mm): 25	Corrected Redox: Y / N	F1 Disposable	Intake depth:	
Depth to Product (m-pvc):	Cover Type (Bastic/Block up):	(The correction to apply is probe dependent)	F1 Other (Specify)	F1 Bailor	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Other (Specify)	F1 Peristaltic Pump	
Calculated bore volume (L):	Key Type (if applicable):	X Retrieved	F1 Other (Specify)	F1 Waterra	
Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):		
Water Quality Parameters					
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)
9:10 am	1.815				
9:25 am					
9:34					
9:36					
9:38					
9:40					
9:42					
9:44					
Sample collected 9:46 am					
Redox = 66.4					
No odour, clear, no turbidity					
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C					
Analytes Sampled for:		Bottles Collected		QA/QC Information	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	
Approval and Distribution					
Fieldwork Staff Signature		Date		Checker Name and Signature	
Project Manager Signature		Date		Distribution: Project Central File	
Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
4x (6.08-1.815) x 3 = 51.18L					
Sampled @ 4.14m bgl					

ANZ
FQM - Groundwater Sampling and Purging Record

QAANIEV)405-FM1

AECOM

Project Name:		CCC Stormwater Basins		Project Number:		60649177 - 3.2.3		PM Name:		S Hay		Bore ID:		Location	
Client:		CCC		Project Location:		Oxley Basin		Fieldwork Staff:		E. Resman		Sample Date:		6-Aug-21	
General Bore Information															
Date of GW Level:				6-Aug-21				Bore Radius (mm):				1550			
Depth to GW (m-pvc):				1.80				Screen Interval (m):				1.5-5.10			
Bore Depth (m-pvc):				6.34				Casing Radius (mm):				25			
Depth to Product (m-pvc):								Cover Type (check tick up):							
Product Thickness (m):								Bore Locked (YES/NO):				YES			
Calculated bore volume (L):								Includes/ excludes bore annulus (circle)							
								# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
10:15	1.80	1.80	Begin Pump						No odour, clear						
10:33	6.0 L	1.80		0.96	7.91	0.4	8.8		No turbidity						
10:45		1.8		1.01	8.42	7.91	8.0	8.8							
10:49				1.03	8.42	7.83	13.7	8.8							
10:51				1.03	8.42	7.83	11.5	8.8							
10:53				1.07	8.48	7.79	12.9	8.8							
Sample collected to 35 cm B															
Acceptable Parameter Range:															
Field Filled:		Unfiltered:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments									
		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)									
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic									
		2 Redox		1 Turbidity											
		1 Redox													
Approval and Distribution															
Fieldwork Staff Signature				Date				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							

4 x (6.34 - 1.80) x 3
4 x 4.54 x 3 = 54.48 L
Sample @ 3.54 m bgl

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SWP Part 1		Project Number: 6049177		PM Name: S. Key		Bore ID: Loca 1001				
Client: CAC		Project Location: 1001		Fieldwork Staff: GK		Sample Date: 6/10/21				
Date of GW Level: 6-10-21		Bore Radius (mm): 75		Chem Kit Serial No.: 1001		Well Development or Well Sampling Event? (circle)				
Depth to GW (m-pvc): 6.02		Screen Interval (m): 2.9-8.9		Chem Kit Model:		Monitoring sequence followed (number in order):				
Bore Depth (m-pvc): 9.45		Casing Radius (mm): 25		Corrected Redox: Y / N		Hydrasleeve Type: Gauging				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		Hydrasleeve Install time: Hydrasleeve in				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F Downhole		Sampling Start Time: Hydrasleeve out				
Key Type (if applicable):		Retrieved		# purge volumes removed:		Parameters				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		Water Quality Parameters						
Time		Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:50	6.02									
11:05	45 L	6.04			9.86	58.3	N/A	56.5	10.2	
11:10	6.04				9.47	58.3	N/A	72.1	10.1	
11:15	6.04				9.41	58.5	N/A	85.7	10.1	
11:17	6.04				9.43	58.5	N/A	84.1	10.1	
11:19	6.04				9.37	58.6	N/A	77.9	10.1	
11:21	6.04				9.35	58.6	N/A	75.2	10.1	
11:23	6.04				9.29	58.6	N/A	73.2	10.1	
11:25 a.m Sample collected										
Acceptable Parameter Range:										
Analytes Sampled for:		Unfiltered:		Bottles Collected		QA/QC Information		Field Comments		
Field Filtered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 80 mL metals (HNO ₃)		± 10% turbidity (if using a turbidity meter)		
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic		± 10% turbidity (if using a turbidity meter)		
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
Project Manager Signature		Date		Distribution: Project Central File						

Project Name: CCC SW		Project Number: 66649177		PM Name:		Bore ID: Loc 2	
Client: CCC		Project Location:		Fieldwork Staff: S. K. S. S. S.		Sample Date: 5/10/21	
General Bore Information				Sampling Method			
Date of GW Level: 5-10-21		Bore Radius (mm): 25		F1 Low Flow Pump rate:		Hydrasleeve Info:	
Depth to GW (m-pvc): 6.10 m		Screen Interval (m): 2.88-8.8		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 8.20 m		Casing Radius (mm): 25		F1 Bailer		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/sick up):		F1 Peristaltic Pump		Hydrasleeve install time:	
Product Thickness (m):		Bore Locked (YES/NO):		F1 Other (specify):		Hydrasleeve out	
Key Type (if applicable):		Retrieved		Total purged volume (L):		Parameters	
Calculated bore volume (L):		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1:45	1	6.10					
2:05	406	6.12		3.43	91.1	16.10	0.1
2:09		6.12		3.11	92.1	16.13	0.7
2:09		6.12		2.91	91.0	16.13	2.0
2:11		6.12		2.79	91.0	16.16	3.8
2:13		6.12		2.68	90.9	16.15	4.9
2:13		6.12		2.65	90.9	16.30	6.1
2:17		6.12		2.64	90.9	16.32	6.4
2:19		6.12		2.64	90.8	16.34	6.9
Acceptable Parameter Range:							
Analytes Sampled for:		Bottles Collected		QA/QC Information			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

[illegible]

[illegible]

FQM - Groundwater Sampling and Purging Record

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: <u>CC GW</u>		Project Number: <u>60644177</u>		PM Name: <u>S. King</u>		Bore ID: <u>Loc 6</u>	
Client: <u>CC</u>		Project Location: <u>CC SW 3501</u>		Fieldwork Staff: <u>TK</u>		Sample Date: <u>5-10-21</u>	
General Bore Information				Well Development or Well Sampling Event (circle)			
Date of GW Level: <u>5-10-21</u>	Bore Radius (mm): <u>1.3-5.8</u>	Chem Kit Serial No.: <u>CC SW 3501</u>		Sampling Method: <u>Low Flow Pump rate:</u>		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>1.885</u>	Screen Interval (m): <u>1.3-5.8</u>	Chem Kit Model: <u>Corrected Redox: Y / N</u>		Intake depth: <u>F1</u>		Hydrasleeve Size: <u>F1</u>	
Bore Depth (m-pvc): <u>6.16</u>	Casing Radius (mm): <u>2.5</u>	(The correction to apply is probe dependent)		Bailer: <u>F1</u>		Hydrasleeve Type: <u>F1</u>	
Depth to Product (m-pvc): <u>6.16</u>	Cover Type (gatic/sic): <u>up</u>	Parameter method: <u>F1</u>		Peristaltic Pump: <u>F1</u>		Sampling Depth (m-pvc): <u>F1</u>	
Product Thickness (m): <u>6.16</u>	Bore Locked: <u>YES/NO</u>	Retrieved: <u>YES/NO</u>		Other (specify): <u>Waters</u>		Hydrasleeve Install time: <u>F1</u>	
Key Type (if applicable):		Downhole: <u>Retrieved</u>		Sampling Start Time: <u>5:30 PM</u>		Hydrasleeve out Parameters: <u>Parameters</u>	
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
11:05	1	1.885					
11:25	60	1.885					
11:30	135	1.885					
11:40	185	1.885					
11:42				4.71	76.0	4.99	48.4
11:44				4.70	76.8	5.08	50.5
11:46				4.66	76.8	5.14	55.6
11:48				4.67	76.9	5.14	50.6
11:50				4.61	76.9	5.23	60.0
11:52				4.59	76.9	5.26	62.3
11:54				4.55	77.1	5.27	65.7
Sample collected				11:55	77.1	5.27	65.7
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C							
Analytes Sampled for:				QA/QC Information			
Field Filtered:	Unfiltered:	Bottles Collected		Field Comments			
		x 40 mL Vial (HCl)	x 60 mL Ferrous	Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber				
			x 60 mL metals (HNO ₃)				
			x 250 mL Plastic				
Approval and Distribution							
Fieldwork Staff Signature				Checker Name and Signature			
Date				Date			
Project Manager Signature				Distribution: Project Central File			
Date				Date			

$4 \times (6.16 - 1.885) \times 3$
 $17.1 \times 3 = 51.3 \text{ L}$
 Sample collected @ 3m

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: <u>CCS Spargmaster</u>		Project Number: <u>60649177</u>		PM Name: <u>S. Kelly</u>		Bore ID: <u>Location 7</u>	
Client: <u>CCC</u>		Project Location: <u>CCC</u>		Fieldwork Staff: <u>E. L. Suman</u>		Sample Date: <u>6-11-21</u>	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: <u>5-Oct-21</u>	Bore Radius (mm): <u>1.895</u>	Chem Kit Serial No.: <u>1.5-596</u>	Chem Kit Model: <u>25</u>	Sampling Method		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>1.895</u>	Screen Interval (m): <u>1.5-596</u>	Corrected Redox: <u>Y / N</u>	DO (ppm or mg/L): <u>4.74</u>	Intake depth: <u>11</u> Bailer <u>11</u> Hydrasleeve <u>11</u> Peristaltic Pump <u>11</u> Waterra <u>11</u> Other (specify) <u>Submersible</u>		Hydrasleeve Size: <u>11</u> Hydrasleeve Type: <u>11</u> Sampling Depth (m-pvc): <u>11</u> Hydrasleeve Install time: <u>11</u> Hydrasleeve out Parameters: <u>11</u>	
Bore Depth (m-pvc): <u>6.40</u>	Casing Radius (mm): <u>25</u>	(The correction to apply is probe dependent)	E.C. (mS/cm or µS/cm): <u>105.9</u>	Parameter method: <u>11</u> Downhole <u>11</u> Retrieved		Total purged volume (L): <u>18.02</u>	
Depth to Product (m-pvc): <u>1</u>	Cover Type (gatic/stick up): <u>1</u>	Parameter method: <u>11</u> Downhole <u>11</u> Retrieved	pH: <u>N/A</u>	Redox (mV): <u>140.3</u>		Temp °C: <u>12.2</u>	
Product Thickness (m): <u>1</u>	Bore Locked (YES/NO): <u>1</u>	Key Type (if applicable): <u>1</u>	DO (ppm or mg/L): <u>4.92</u>	pH: <u>16.71</u>		Temp °C: <u>12.3</u>	
Calculated bore volume (L): <u>1</u>	Includes/ excludes bore annulus (circle): <u>1</u>	# purge volumes removed: <u>1</u>	Pump Rate: <u>36 L/min</u>	DO (ppm or mg/L): <u>4.87</u>		Temp °C: <u>12.3</u>	
Water Quality Parameters				Odour, Colour, Turbidity			
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
9:10	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.74</u>	<u>105.9</u>	<u>N/A</u>	<u>140.3</u>
9:25	<u>55 L/min</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.92</u>	<u>106.2</u>	<u>16.71</u>	<u>69</u>
9:40	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.87</u>	<u>106.2</u>	<u>16.65</u>	<u>87.1</u>
10:00	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.86</u>	<u>106.3</u>	<u>16.65</u>	<u>96.1</u>
10:05	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.90</u>	<u>106.2</u>	<u>16.72</u>	<u>105.8</u>
10:10	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.91</u>	<u>106.2</u>	<u>16.68</u>	<u>107.7</u>
10:15	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.92</u>	<u>106.1</u>	<u>16.67</u>	<u>108.1</u>
10:20	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.92</u>	<u>106.1</u>	<u>16.67</u>	<u>108.1</u>
10:25	<u>1.895</u>	<u>1.895</u>	<u>36 L/min</u>	<u>4.92</u>	<u>106.1</u>	<u>16.67</u>	<u>108.1</u>
Acceptable Parameter Range:				± 10% DO ± 3% E.C. ± 0.05 pH ± 10 mV Redox ± 0.2 °C Temp			
Analytes Sampled for:				QA/QC Information			
Field Filtered:	Unfiltered:	Bottles Collected		Field Comments			
		x 40 mL Vial (HCl)	x 60 mL Ferrous	Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber				
			x 250 mL Plastic				
Approval and Distribution							
Fieldwork Staff Signature				Checker Name and Signature			
Date				Date			
Project Manager Signature				Distribution: Project Central File			
Date				Date			

4x (6.40 - 1.895) x 3
 4x (4.505)
 18.02 x 3 = 54.06 L

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SW		Project Number: 00646177		PM Name: S. Han		Bore ID: Location 1	
Client: CCC		Project Location: Harwood		Fieldwork Staff: S. Han		Sample Date: 10-11-21	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: 10-11-21	Bore Radius (mm): 6.315	Chem Kit Serial No.: D851	Decontamination: <input checked="" type="checkbox"/> Decontaminated	Sampling Method: <input checked="" type="checkbox"/> Low Flow Pump rate			
Depth to GW (m-pvc): 6.315	Screen Interval (m): 7.42	Chem Kit Model: 20053	Dedicated	Intake depth: <input checked="" type="checkbox"/> Bailer			
Bore Depth (m-pvc): 7.42	Casing Radius (mm): 6.315	Corrected Redox: Y / N	Disposable	<input checked="" type="checkbox"/> Peristaltic Pump			
Depth to Product (m-pvc): 7.42	Cover Type (gastic/stick up): 7.42	(The correction to apply is probe dependent)	Other (Specify)	<input checked="" type="checkbox"/> Waterra			
Product Thickness (m): 7.42	Bore Locked (YES/NO): 7.42	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)			
	Key Type (if applicable):	Retrieved					
Calculated bore volume (L):		# purge volumes removed:		Total purged volume (L):			
Includes/ excludes bore annulus (circle)							
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1:15	48.2	6.315		7.77	168.6	5.91	124.2
1:20		6.315		7.53	167.3	5.92	125.1
1:25		6.315		7.42	163.3	5.81	123.2
1:30		6.315		7.45	161.2	5.85	128.1
1:35		6.315		7.39	158.6	5.87	117.1
SAMPLE COLLECTED (1:40)							
Brown, Mod turbidity, no odour							
Odour, Colour, Turbidity							
Acceptable Parameter Range:				QA/QC Information			
± 10%				± 10 mV			
± 3%				± 0.2 °C			
Bottles Collected				Field Comments			
Unfiltered:				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
x 40 mL Vial (HCl)				HVL 9.42-6.315) x 3			
x 60 mL Ferrous				37.26 L			
x 40 mL Vial (H ₂ SO ₄)							
x 100 mL Amber							
x 250 mL Plastic							
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		Project Number:		PM Name:		Bore ID:	
Client:		Project Location:		Fieldwork Staff:		Sample Date:	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.:		Well Development or Well Sampling Event (circle)	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model:		Hydrasleeve Info:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		Hydrasleeve Size:	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) Y / N		Hydrasleeve Type:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		Sampling Depth (m-pvc):	
		Key Type (if applicable):		F1 Retrieved		Hydrasleeve Install time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Sampling Start Time:	
						Hydrasleeve out Parameters	
Total purged volume (L):							
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1:55	360	6.34		7.70	109.6	5.91	73.6
2:00		6.34		3.47	108.0	6.72	81.9
2:05		6.34		2.84	108.7	5.66	93.7
2:10		6.34		2.57	109.1	5.07	97.6
2:15		6.34		2.34	109.4	5.70	101.4
2:20		6.34		2.10	109.6	5.70	103.8
2:22		6.34		2.09	109.6	5.71	104.0
2:24		6.34		2.11	109.6	5.71	104.0
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> SAMPLE COLLECTED 2:25 </div>							
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Clear, no colour, no turbidity </div>							
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Odour, Colour, Turbidity </div>							
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Acceptable Parameter Range: ± 10% DO, ± 3% EC, ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp </div>							
Analytes Sampled for:				QA/QC Information			
Unfiltered:				Bottles Collected			
Field Filtered:				x 40 mL Vial (HCl)			
				x 60 mL Ferrous			
				x 40 mL Vial (H ₂ SO ₄)			
				x 100 mL Amber			
				x 250 mL Plastic			
				x 50 mL metals (HNO ₃)			
				x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature				Checker Name and Signature			
Date				Date			
Project Manager Signature				Date			
				Distribution: Project Central File			
Field Comments							
Bore volume calculation: bore condition, fate of tubing, redox correction etc.							
<div style="border: 1px solid black; padding: 10px; display: inline-block;"> 4 x (9.18 - 6.34) x 3 = 34.08L </div>							

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW		Project Number:		60649177		PM Name:		3.Hay		Bore ID:		6063																																																																																																																																				
Client:		166		Project Location:		Anston BSW		Fieldwork Staff:		E. Keisman		Sample Date:		11-11-21																																																																																																																																				
<table border="1"> <tr> <th colspan="8">General Bore Information</th> <th colspan="4">Parameter Info.</th> <th colspan="4">Decontamination</th> <th colspan="4">Sampling Method</th> <th colspan="4">Hydrasleeve Info</th> </tr> <tr> <td>Date of GW Level:</td> <td>15-11-21</td> <td>Bore Radius (mm):</td> <td>6.42</td> <td>Chem Kit Serial No.:</td> <td>V551</td> <td><input checked="" type="checkbox"/> Decontaminated</td> <td><input type="checkbox"/> Low Flow Pump rate:</td> <td>Hydrasleeve Size:</td> <td>Monitoring sequence followed (number in order):</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Depth to GW (m-pvc):</td> <td>6.35</td> <td>Screen Interval (m):</td> <td></td> <td>Chem Kit Model:</td> <td>DS 720</td> <td><input type="checkbox"/> Dedicated</td> <td>Intake depth:</td> <td>Hydrasleeve Type:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Bore Depth (m-pvc):</td> <td>7.845</td> <td>Casing Radius (mm):</td> <td></td> <td>Corrected Redox:</td> <td>Y / N</td> <td><input checked="" type="checkbox"/> Disposable</td> <td><input type="checkbox"/> Bailor</td> <td>Sampling Depth (m-pvc):</td> <td>Gauging</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Depth to Product (m-pvc):</td> <td></td> <td>Cover Type (gauge/lock up):</td> <td></td> <td>(The correction to apply is probe dependent)</td> <td></td> <td><input checked="" type="checkbox"/> Other (specify)</td> <td><input checked="" type="checkbox"/> Peristaltic Pump</td> <td>Hydrasleeve Install time:</td> <td>Hydrasleeve In</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Product Thickness (m):</td> <td></td> <td>Bore Locked (YES/NO):</td> <td></td> <td>Parameter method:</td> <td>Downhole</td> <td></td> <td><input type="checkbox"/> Other (specify)</td> <td>Sampling Start Time:</td> <td>Parameters</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Key Type (if applicable):</td> <td></td> <td><input checked="" type="checkbox"/> Retrieved</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4">Calculated bore volume (L):</td> <td colspan="4"># purge volumes removed:</td> <td colspan="8">Total purged volume (L):</td> </tr> </table>																General Bore Information								Parameter Info.				Decontamination				Sampling Method				Hydrasleeve Info				Date of GW Level:	15-11-21	Bore Radius (mm):	6.42	Chem Kit Serial No.:	V551	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):							Depth to GW (m-pvc):	6.35	Screen Interval (m):		Chem Kit Model:	DS 720	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:							Bore Depth (m-pvc):	7.845	Casing Radius (mm):		Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailor	Sampling Depth (m-pvc):	Gauging						Depth to Product (m-pvc):		Cover Type (gauge/lock up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	Hydrasleeve Install time:	Hydrasleeve In						Product Thickness (m):		Bore Locked (YES/NO):		Parameter method:	Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters								Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved											Calculated bore volume (L):				# purge volumes removed:				Total purged volume (L):							
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<table border="1"> <tr> <th colspan="10">Water Quality Parameters</th> <th colspan="2">Odour, Colour, Turbidity</th> </tr> <tr> <th>Time</th> <th>Cumulative Vol. Removed (L)</th> <th>SWL (m-pvc)</th> <th>Pump Rate</th> <th>DO (ppm or mg/L)</th> <th>E.C. (mS/cm or µS/cm)</th> <th>pH</th> <th>Redox (mV)</th> <th>Temp °C</th> <th></th> <th></th> <th></th> </tr> <tr> <td>12:40</td> <td>24</td> <td>6.42</td> <td></td> <td>3.07</td> <td>281.0</td> <td>6.26</td> <td>83.7</td> <td>13.1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>12:45</td> <td></td> <td>6.42</td> <td></td> <td>1.78</td> <td>278.5</td> <td>6.08</td> <td>90.8</td> <td>13.1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>12:50</td> <td></td> <td>6.42</td> <td></td> <td>1.61</td> <td>277.0</td> <td>6.14</td> <td>88.1</td> <td>13.1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>12:55</td> <td></td> <td>6.42</td> <td></td> <td>1.45</td> <td>274.5</td> <td>6.20</td> <td>85.8</td> <td>13.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1:00</td> <td></td> <td>6.42</td> <td></td> <td>1.41</td> <td>274.0</td> <td>6.20</td> <td>86.4</td> <td>13.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1:05</td> <td></td> <td>6.42</td> <td></td> <td>1.39</td> <td>274.1</td> <td>6.19</td> <td>85.3</td> <td>13.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="12">SAMPLE Collected</td> </tr> </table>																Water Quality Parameters										Odour, Colour, Turbidity		Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C				12:40	24	6.42		3.07	281.0	6.26	83.7	13.1				12:45		6.42		1.78	278.5	6.08	90.8	13.1				12:50		6.42		1.61	277.0	6.14	88.1	13.1				12:55		6.42		1.45	274.5	6.20	85.8	13.0				1:00		6.42		1.41	274.0	6.20	86.4	13.0				1:05		6.42		1.39	274.1	6.19	85.3	13.0				SAMPLE Collected																																		
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4x (7.845 - 6.355) x 3 = 4x (1.50) x 3 = 18.72 L

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		Project Number:		PM Name:		Bore ID:	
Client:		Project Location:		Fieldwork Staff:		Sample Date:	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.:		Well Development or Well Sampling Event? (circle)	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model:		Hydrasleeve Size:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (gatic/sick up):		The correction to apply (is probe dependent):		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: FI Downhole		Hydrasleeve Install time:	
		Key Type (if applicable):		FI Retrieved		Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle):		# purge volumes removed:		Parameters	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu\text{S/cm}$)	pH	Redox (mV)
11:10	600	9.940		8.65	242.3	6.47	73.1
11:15		9.95		8.78	241.9	6.48	74.2
11:20		9.95		8.22	242.0	6.59	72.3
11:25		9.950		8.19	242.0	6.60	75.7
11:30		9.950		8.14	242.1	6.60	77.6
11:35							
Total purged volume (L):							
Temperature: 13.4							
Odour, Colour, Turbidity							
Clear, no odour, no turbidity							
Monitoring sequence followed (number in order):							
Gauging							
Hydrasleeve out							
Field Comments							
Bore volume calculation: bore condition, fate of tubing, redox correction etc.							
<p>4x (14.15 - 9.940) x 3 =</p> <p>4x (4.21) x 3 = 50.52 L to purge</p>							

FQM - Groundwater Sampling and Purging Record

[illegible]

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: LEC SW		Project Number: 60649177		PM Name: S. HAY		Bore ID: Location 06	
Client: CCC		Project Location: 11 Howard		Fieldwork Staff: S. HAY		Sample Date: 10-11-21	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: 10-11-21	Bore Radius (mm):	Chem Kit Serial No.:	Decontamination	Sampling Method		Hydrasleeve Info.	
Depth to GW (m-pvc): 2.075	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Decontaminated <input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 6.125	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer		Hydrasleeve Type:	
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump		Sampling Depth (m-pvc):	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Hydrasleeve Install Time:	
	Key Type (if applicable):					Sampling Start Time:	
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu S/cm$)	pH	Redox (mV)
11:00	60	2.075		4.52	133.2	6.79	129.1
11:05		2.075		2.08	133.3	6.90	121.5
11:10		2.075		1.81	133.3	6.88	120.3
11:15		2.075		1.66	133.3	6.88	119.3
11:20		2.075		1.59	133.3	6.87	118.7
11:25		2.075		1.56	133.2	6.87	117.8
SAMPLE Collected 11:30							
Clear, No odour, no turbidity							
Odour, Colour, Turbidity							
Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ ± 0.05 $\pm 10\text{ mV}$ $\pm 0.2^\circ\text{C}$ $\pm 10\%$ turbidity (if using a turbidity meter)							
Analytes Sampled for:				Field Comments			
Unfiltered:				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
Field Filtered:				4x (6.125-2.075) x 3 =			
				(78-6c)			
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FCM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

3.2.3

Project Name: <u>CCS SW</u>		Project Number: <u>6064977</u>		Bore ID: <u>boahun 2</u>					
Client: <u>CC</u>		Project Location: <u>Kyabram</u>		Sample Date: <u>11/2/21</u>					
General Bore Information									
Date of GW Level: <u>11/2/21</u>	Bore Radius (mm): <u>35</u>	Chem Kit Serial No.: <u>YSI 2</u>	Decontamination: <u>N</u>	Sampling Method: <u>Low Flow Pump rate:</u>					
Depth to GW (m-pvc): <u>6.42</u>	Screen Interval (m):	Chem Kit Model: <u>Dropus</u>	Decontaminated: <u>N</u>	Intake depth:					
Bore Depth (m-pvc): <u>9.42</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	Dedicated: <u>N</u>	Hydrasleeve Size:					
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	Disposable: <u>N</u>	Hydrasleeve Type:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>F1</u> Downhole	Other (specify):	Sampling Depth (m-pvc):					
Calculated bore volume (L):	Key Type (if applicable):	<u>F1</u> Retrieved		Hydrasleeve Install time:					
	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Hydrasleeve Start Time:					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:50	36L	6.42	8.47	104.4	15.88	-742.2	11.4		
10:55		6.42	8.34	104.5	15.88	-740.3	11.4		
10:00		6.42	8.40	104.5	15.88	-784.1	11.4		
1:05		6.42	8.38	104.6	15.88	-745.8	11.8		
1:10		6.42	8.39	104.4	15.88	-787.3	11.4		
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C									
Analytes Sampled for:		Bottles Collected			QA/QC Information				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature			Date			Checker Name and Signature			Date
Project Manager Signature			Date			Distribution: Project Central File			
Field Comments									
Bore volume calculation, bore condition, fate of tubing, redox correction etc.									
<p>4x(9.42-6.42) x 3</p> <p>4x(3) x 3 = 36L</p>									

Project Name: 11C SW		Project Number: 60649177/3.2.3		Bore ID: Location 2	
Client: 11C		Project Location: Ashepa Basin		Sample Date: 11/12/21	
General Bore Information					
Date of GW Level: 1/12/21	Bore Radius (mm): 2.5	Chem Kit Serial No.: YSI 2	Decontamination: Fieldwork Staff: CHH		
Depth to GW (m-pvc): 6.24 m bgl	Screen Interval (m):	Chem Kit Model: Pro 705	Well Development or Well Sampling Event? (circle)		
Bore Depth (m-pvc): 9.105	Casing Radius (mm):	Corrected Redox: N	Sampling Method: Stelman		
Depth to Product (m-pvc):	Cover Type (gallic/stick up):	(The correction to apply is probe dependent) FI Other (specify)	Hydrasteeve Info.		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: FI Downhole	Monitoring sequence followed (number in order):		
	Key Type (if applicable):	FI Retrieved	Hydrasteeve in:		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:		Hydrasteeve out Parameters
Water Quality Parameters					
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)
					pH
					Redox (mV)
					Temp °C
					Odour, Colour, Turbidity
9:40	36L	6.24	5.04	73.8	15.88
9:45		6.24	4.84	76.2	15.88
9:50		6.24	4.74	76.3	15.88
9:55		6.24	4.74	76.4	15.88
10:00		6.24	4.67	76.5	15.88
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C					
Analyses Sampled for:					
Field Filtered:	Unfiltered:	Bottles Collected		QA/QC Information	
		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	
Approval and Distribution					
Fieldwork Staff Signature		Date		Checker Name and Signature	
Project Manager Signature		Date		Distribution: Project Central File	

4x 9.105-6.24 x 3
4x (2.865) x 3 =
11.46 x 3 = 34.38 L

Q4AN(EV)-405-FM1

$$4x(8.6-6.2) \times 3 = 4x(2.4) \times 3 =$$

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SW		Project Number: 606417-7/3.2.3		PM Name: S. Hay		Bore ID: Location 4	
Client: CCC		Project Location: Keeper Basin		Fieldwork Staff: E.R.		Sample Date: 30-11-21	
General Bore Information							
Date of GW Level: 30/11/21		Bore Radius (mm): 25		Chem Kit Serial No.: YSI 2		Well Development or Well Sampling Event? (circle)	
Depth to GW (m-pvc): 10.17		Screen Interval (m):		Chem Kit Model: Pro Plus		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 14.28		Casing Radius (mm):		Corrected Redox: 0 / N		Hydrasleeve Info.	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		Hydrasleeve Type: Low Flow Pump rate:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: FI Downhole		Intake depth: FI Hydrasleeve	
Key Type (if applicable):		Retrieved		Other (specify):		Sampling Depth (m-pvc): FI Hydrasleeve	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Sampling Start Time: FI Other (specify)	
Total purged volume (L):							
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
14:00 PM	50 L	10.17		8.32	237.7	15.82	-433.5
1:45		10.17		7.64	238.4	15.82	-426.7
1:50		10.17		7.60	238.9	15.82	-431.5
1:55		10.17		7.47	239.3	15.82	-432.3
2:00		10.17		7.51	239.5	15.82	-426.5
Sample collected at 2:00 PM.							
Odour, Colour, Turbidity							
Brown, cloudy, no odour, mod turbidity							
Clear, no odour, no turbidity							
Acceptable Parameter Range:							
Field Filtered:		± 10%		± 3%		± 0.05	
Unfiltered:		± 10 mV		± 0.2 °C			
Bottles Collected		QA/QC Information		Field Comments		± 10% turbidity (if using a turbidity meter)	
x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

$$4 \times (14.28 - 10.17) \times 3$$

$$= 49.32 \text{ L}$$

to Purge

Q4AN(EV)-405-FM1

$$4 \times (13.99 - 10.16) \times 3$$

$$15.32 \times 3 = 45.96 \text{ L}$$

Q44AN(EV)-405-FM1

$$4 \times (6.13 - 2.13) \times 3$$

$$4 \times 4 \times 3$$

$$16 \times 3 = 48 \text{ L pages}$$

ANZ
FQM - Groundwater Sampling and Purging Record

AECOM
Q4AN(EV)-405-FM1

Project Name: <u>CLC SW</u>		Project Number: <u>60649137/323</u>		PM Name: <u>S. HAY</u>		Bore ID: <u>60649137</u>	
Client: <u>CLC</u>		Project Location: <u>60649137/323</u>		Fieldwork Staff: <u>EPJ & L</u>		Sample Date: <u>30-11-21</u>	
General Bore Information				Parameter Info.			
Date of GW Level: <u>30-11-21</u>	Bore Radius (mm): <u>75</u>	Chem Kit Serial No.:	Decontamination	Sampling Method			
Depth to GW (m-pvc): <u>3.16 mbs</u>	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:		
Bore Depth (m-pvc): <u>6.36 mbs</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:		
Depth to Product (m-pvc):	Cover Type (gall/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Baller	Sampling Depth (m-pvc):		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>F1</u> Downhole	<input checked="" type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Peristaltic Pump	Hydrasleeve Install time:		
Calculated bore volume (L):	Key Type (if applicable):	<u>F1</u> Retrieved	<input checked="" type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Waterra	Hydrasleeve out Parameters		
Includes/ excludes bore annulus (circle)				Total purged volume (L):			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or mg/L)	DO (mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)
10:10	60	2.17	2.41	90.9	15.68	-930.8	18.3
10:15	80	2.17	2.42	90.8	15.68	-943.4	18.3
10:20	100	2.17	2.34	90.9	15.68	-1093.5	18.3
10:25	120	2.17	2.35	90.2	15.68	-1077.2	18.3
10:30	140	2.17	2.37	90.8	15.68	-1080.7	18.3
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C							
Analytes Sampled for:		Bottles Collected		QA/QC Information			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 80 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
	3+	x 40 mL Vial (H ₂ SO ₄)	2	x 100 mL Amber	4x (6.36 - 2.16) x 3 =		
		x 250 mL Plastic			50.4 L		
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

Sampled at 4.5 mbs

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW Basins		Project Number:		60649177 Task 3.2.3		PM Name:		S.HAY		Bore ID:		60649177				
Client:		CCC		Project Location:		CCC SW Basins		Fieldwork Staff:		E. Reisman		Sample Date:		22-12-20				
General Bore Information																		
Date of GW Level:		22-12-21		Bore Radius (mm):		25		Chem Kit Serial No.:		1512		Well Development or Well Sampling Event? (circle):		Hydrasleeve in.				
Depth to GW (m-pvc):		6.01		Screen Interval (m):				Chem Kit Model:		20715		Monitoring sequence followed (number in order):						
Bore Depth (m-pvc):		9.45		Casing Radius (mm):				Corrected Redox:		Y / N		Hydrasleeve Size:						
Depth to Product (m-pvc):				Cover Type (gatic/stick up):				(The correction to apply is probe dependent)				Hydrasleeve Type:						
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method:		FI Downhole		Sampling Depth (m-pvc):		Gauging				
				Key Type (if applicable):						FI Retrieved		Hydrasleeve Install time:		Hydrasleeve in				
Calculated bore volume (L):		41.4		Includes/ excludes bore annulus (circle)				# purge volumes removed:				Sampling Start Time:		Hydrasleeve out				
												Total purged volume (L):		Parameters				
Water Quality Parameters																		
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity									
1:00 pm	4.8	6.02		10.06	63.8	6.29	-6.9	15.1	Clear, no turbidity, no odour									
1:05 pm		6.02		9.34	63.4	5.71	20.9	15.1										
1:10		6.02		9.14	63.5	5.50	20.2	15.1										
1:15		6.02		9.15	63.4	5.47	23.4	15.0										
1:20		6.02		9.12	63.4	5.46	26.4	15.1										
Acceptable Parameter Range:									± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:									Bottles Collected		QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.								
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic										
Approval and Distribution																		
Fieldwork Staff Signature				Date				Checker Name and Signature				Date						
Project Manager Signature				Date				Distribution: Project Central File										

44(945-6.01) x 3-41.28 L

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW Basins		Project Number:		60649177 Task 3.2.3		PM Name:		S.HAY		Bore ID:		Location 2	
Client:		CCC		Project Location:		CCC SW Basins		Fieldwork Staff:		E. Reisman		Sample Date:		21/12/21	
General Bore Information															
Date of GW Level:		22/12/21		Bore Radius (mm):				Chem Kit Serial No.:		YSE2		Sampling Method:		Low Flow Pump rate:	
Depth to GW (m-pvc):		5.42		Screen Interval (m):				Chem Kit Model:		P08105		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc):		9.12		Casing Radius (mm):				Corrected Redox:		Y / N		Bailer		Hydrasleeve Type:	
Depth to Product (m-pvc):				Cover Type (gatic/stick up):				(The correction to apply is probe dependent)				Peristaltic Pump		Sampling Depth (m-pvc):	
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method:		F1 Downhole		Other (specify)		Hydrasleeve Install time:	
				Key Type (if applicable):				F1 Retrieved						Sampling Start Time:	
Calculated bore volume (L):		444L		Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):		Parameters	
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu S/cm$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
9:40	48	5.42		0.35	63.2	5.47	30.0	15.1	Clear, no turbidity, no odour						
9:45		5.42		0.31	63.3	5.37	30.9	15.1							
9:50		5.42		0.10	64.0	5.64	35.3	15.1							
9:55		5.42		0.08	64.1	5.66	35.1	15.1							
10:00		5.42		0.05	64.1	5.67	34.4	15.1							
									SAMPLE Collected 10:00 am						
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp															
Analytes Sampled for:		Bottles Collected				QA/QC Information				Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.										
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic											
Approval and Distribution															
Fieldwork Staff Signature				Date				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							

4 × (9.12 - 5.42) × 3 = 44.4L

Q4AN(EV)-405-FM1

$$4x(8.6 - 5.44) \times 3$$

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SW Basins		Project Number: 60649177 Task 3.2.3		PM Name: SHAY		Bore ID: Location 4	
Client: CCC		Project Location: CCC SW Basins		Fieldwork Staff: E. Reisman		Sample Date: 21-12-21	
General Bore Information				Parameter Info.		Sampling Method	
Date of GW Level: 21-12-21	Bore Radius (mm): 25	Chem Kit Serial No.: Y512	Decontamination: <input checked="" type="checkbox"/> Decontaminated	Low Flow Pump rate: <input checked="" type="checkbox"/>		Hydrasleeve Size: <input checked="" type="checkbox"/>	
Depth to GW (m-pvc): 10.10	Screen Interval (m):	Chem Kit Model: V5 Basins	Dedicated: <input checked="" type="checkbox"/>	Intake depth: <input checked="" type="checkbox"/>		Hydrasleeve Type: <input checked="" type="checkbox"/>	
Bore Depth (m-pvc): 14.72	Casing Radius (mm):	Corrected Redox: Y / N	Disposable: <input checked="" type="checkbox"/>	Bailer: <input checked="" type="checkbox"/>		Sampling Depth (m-pvc): <input checked="" type="checkbox"/>	
Depth to Product (m-pvc):	Cover Type (gait/slick up):	(The correction to apply is probe dependent)	Other (specify):	Peristaltic Pump: <input checked="" type="checkbox"/>		Hydrasleeve Install time: <input checked="" type="checkbox"/>	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify):	Water: <input checked="" type="checkbox"/>		Hydrasleeve in: <input checked="" type="checkbox"/>	
Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved	Total purged volume (L): 50.44		Hydrasleeve out: <input checked="" type="checkbox"/>		
Calculated bore volume (L): 50.44		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Parameters	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
11:05	50.4	10.10					
11:10			9.54	260.2	6.52	77.7	14.0
11:15			7.71	258.4	6.44	78.0	13.9
11:20			7.69	258.1	6.48	76.8	13.9
11:25			7.68	258.1	6.44	77.0	13.9
11:30			7.68	258.0	6.44	77.1	13.9
SAMPLE COLLECTED 11:10							
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C							
Analytes Sampled for:		Bottles Collected		QANOC Information			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date: 21/12/21		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			
Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
4 x (14.22 - 10.10) x 3 = 49.44 L							
Cloudy, mod-high turbidity, no odor							
Clear, no turbidity, no odor							

Q4AN(EV)-405-FM1

Project Name: CCC SW Basins		Project Number: 60649177 Task 3.2.3		PM Name: S.HAY		Bore ID: 60649177				
Client: CCC		Project Location: CCC SW Basins		Fieldwork Staff: E. Reisman		Sample Date: 21-12-21				
General Bore Information:				Well Development or Well Sampling Event? (circle)						
Date of GW Level: 21-12-21		Bore Radius (mm): 25		Sampling Method: <input checked="" type="checkbox"/> Low Flow Pump rate: <input type="checkbox"/> Intake depth: <input type="checkbox"/> Bailer <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Other (specify) <u>Submersible Pump</u>		Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 10.10 m		Screen Interval (m): 13.94		Hydrasleeve Size: <input type="checkbox"/> Hydrasleeve Type: <input type="checkbox"/> Sampling Depth (m-pvc): <input type="checkbox"/> Hydrasleeve Install time: <input type="checkbox"/> Hydrasleeve Start Time: <input type="checkbox"/> Hydrasleeve out: <input type="checkbox"/> Parameters: <input type="checkbox"/>		Monitoring sequence followed (number in order):				
Bore Depth (m-pvc): 13.94		Casing Radius (mm):		Sampling Depth (m-pvc):		Monitoring sequence followed (number in order):				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		Sampling Depth (m-pvc):		Monitoring sequence followed (number in order):				
Product Thickness (m):		Bore Locked (YES/NO):		Sampling Depth (m-pvc):		Monitoring sequence followed (number in order):				
Key Type (if applicable):		Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		Sampling Depth (m-pvc):		Monitoring sequence followed (number in order):				
Calculated bore volume (L): 46.6 L				# purge volumes removed: 25		Total purged volume (L):				
Includes/ excludes bore annulus (circle)										
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
9:35	48L	10.10		8.47	217.6	6.44	161.5	13.3	Cloudy, no odour, mod-high turbidity sp (clear, no odour, no turbidity)	
9:40				8.19	216.5	6.20	157.0	13.4		
9:45				8.18	216.3	6.22	157.5	13.4		
9:50				8.18	216.2	6.37	145.2	13.4		
9:55				8.13	215.5	6.42	143.9	13.4		
SAMPLE TAKEN 10:00 am										
Acceptable Parameter Range:								± 10%	± 10 mV	± 0.2 °C
Analytes Sampled for:								QA/QC Information		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Field Comments		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
Approval and Distribution										
Fieldwork Staff Signature								Date		
Project Manager Signature								Date		
Checker Name and Signature								Date		
Distribution: Project Central File										

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW Basins		Project Number:		60649177 Task 3.2.3		PM Name:		S.HAY		Bore ID:		21-12-21	
Client:		CCC		Project Location:		CCC SW Basins		Fieldwork Staff:		E. Reisman		Well Development or Well Sampling Event? (circle)			
General Bore Information															
Date of GW Level:		Bore Radius (mm):		25		Chem Kit Serial No.:		VS12		Decontaminated		F1 Low Flow Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		1.945		Screen Interval (m):		Chem Kit Model:		VS12		F1 Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc):		6.15		Casing Radius (mm):		Corrected Redox:		Y / N		F1 Disposable		F1 Bailer		Hydrasleeve Type:	
Depth to Product (m-pvc):				Cover Type (gatic/stick up):		(The correction to apply is probe dependent)				F1 Other (specify)		F1 Peristaltic Pump		Sampling Depth (m-pvc):	
Product Thickness (m):				Bore Locked (YES/NO):		Parameter method:		F1 Downhole				F1 Other (specify)		Hydrasleeve Install time:	
				Key Type (if applicable):		F1 Retrieved						F1 Other (specify)		Sampling Start Time:	
Calculated bore volume (L):		50.46		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		Parameters	
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
1:55	60.6	1.945		1.69	116.1	6.61	68.1	17.0	Clear, no odour, no turbidity						
1:56		1.945		1.50	116.1	6.51	69.4	17.1							
2:00		1.945		1.37	116.3	6.49	69.0	17.0							
2:05		1.945		1.29	115.9	6.48	69.2	16.9							
2:10		1.945		1.27	115.9	6.47	69.1	16.9							
2:15		1.945		1.27	115.9	6.46	69.7	16.9							
									Sample Collected 2:20 PM						
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp															
Analyses Sampled for:		Unfiltered:		Bottles Collected		QA/QC Information		Field Comments							
Field Filtered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic		4x (6.15 - 1.945) x 3 = 50.46 L							
Approval and Distribution															
Fieldwork Staff Signature				Date				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW Basins		Project Number:		60649177 Task 3.2.3		PM Name:		S.HAY		Bore ID:		60649177	
Client:		CCC		Project Location:		CCC SW Basins		Fieldwork Staff:		E. Reisman		Sample Date:		21/12/21	
General Bore Information															
Date of GW Level:		21/12/21		Bore Radius (mm):				Chem Kit Serial No.:				Well Development or Well Sampling Event? (circle):		Hydrasleeve Info.	
Depth to GW (m-pvc):		1.95		Screen Interval (m):				Chem Kit Model:				Monitoring sequence followed (number in order):		Hydrasleeve Size:	
Bore Depth (m-pvc):		0.40		Casing Radius (mm):				Corrected Redox: Y / N				Intake depth:		Hydrasleeve Type:	
Depth to Product (m-pvc):				Cover Type (gatic/stick up):				(The correction to apply is probe dependent)				Bailer		Sampling Depth (m-pvc):	
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method:		F1 Downhole		Peristaltic Pump		Hydrasleeve Install time:	
				Key Type (if applicable):				F1 Retrieved				Other (specify)		Hydrasleeve out	
Calculated bore volume (L):		53.4		Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):		Parameters	
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
1:00	60.46	1.95		1.82	20.2	7.05	21.3	18.5	Chas, no odor, no turbidity						
1:05		1.95		1.19	19.9	7.01	21.5	18.5							
1:10		1.95		0.96	19.7	6.98	21.1	18.5							
1:15		1.95		0.84	19.6	6.95	21.2	18.5							
1:20		1.95		0.87	19.7	6.95	21.2	18.5							
1:25		1.95		0.85	19.7	6.95	21.8	18.5							
									SAMPLE Collected						
Acceptable Parameter Range:															
Analyses Sampled for:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)			
Field Filtered:		Unfiltered:		Bottles Collected		QA/QC Information		Field Comments							
		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic									
Approval and Distribution															
Fieldwork Staff Signature		Date		Checker Name and Signature		Date									
Project Manager Signature		Date		Distribution: Project Central File											

$4 \times (6.4 - 1.95) \times 3 = 44.7$
 $4 \times (4.45) \times 3 = 53.4$

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SW Basins		Project Number: 60649177 Task 3.2.3		PM Name: S.HAY		Bore ID: Location 1		
Client: CCC		Project Location: CCC SW Basins		Fieldwork Staff: E. Reisman		Sample Date: 14-1-21		
General Bore Information								
Date of GW Level: 14-1-21	Bore Radius (mm): 25	Chem Kit Serial No.: K347	Decontamination: F1 Decontaminated		Sampling Method: F1 Low Flow Pump rate:			
Depth to GW (m-pvc): 6.44	Screen Interval (m): 1	Chem Kit Model: 700 PUS	Dedicated: F1		Intake depth: Hydrasleeve Size: Hydrasleeve Type:			
Bore Depth (m-pvc): 9.42	Casing Radius (mm):	Corrected Redox: Y / N	Disposable: F1		F1 Bailor F1 Hydrasleeve			
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	Other (specify):		F1 Peristaltic Pump F1 Waterra			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	Other (specify):		F1 Other (specify):			
Key Type (if applicable):		F1 Retrieved	Total purged volume (L):					
Calculated bore volume (L): 35.16		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Odour, Colour, Turbidity		
Water Quality Parameters								
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C
11:56	36	6.44		5.73	133.5	6.13	6.1	14.3
12:20		6.44		5.60	133.1	6.23	5.4	14.2
12:05		6.44		5.67	131.1	6.21	4.8	14.2
12:10		6.19		5.61	133.2	6.25	5.8	14.2
12:15		6.44		5.61	133.1	6.25	5.9	14.3
12:26				Sample collected at 12:20				
Acceptable Parameter Range:								
± 10%				± 3%		± 0.05		± 10 mV
± 0.2 °C								
Analyses Sampled for:								
Unfiltered:		Bottles Collected		QA/QC Information				
x 40 mL Vial (HCl)		x 60 mL Ferrous		± 10% turbidity (if using a turbidity meter)				
x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		Field Comments				
				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
Approval and Distribution								
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		
Project Manager Signature		Date		Distribution: Project Central File				

$$4 \times (9.42 - 6.44) \times 3 = 35.16$$

Project Name: CCC SW Basins		Project Number: 60649177 Task 3.2.3		PM Name: S. HAY		Bore ID: 104520 2				
Client: CCC		Project Location: CCC SW Basins		Fieldwork Staff: E. Reisman		Sample Date: 14-1-21				
General Bore Information				Parameter Info.		Well Development or Well Sampling Event? (circle)				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: V437	Decontamination:	Sampling Method		Hydrasleeve type:				
Depth to GW (m-pvc): 0.40	Screen Interval (m):	Chem Kit Model: 90 Plus	F1 Decontaminated	F1 Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Bore Depth (m-pvc): 9.15	Casing Radius (mm):	Corrected Redox: Y / N	F1 Dedicated	Intake depth:	F1 Hydrasleeve	Gauging				
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	F1 Disposable	F1 Bailor	F1 Hydrasleeve	Sampling Depth (m-pvc):				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Other (specify)	F1 Peristaltic Pump	F1 Waterra	Hydrasleeve install time:				
Calculated bore volume (L): 33 L		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):		Sampling Start Time:				
						Hydrasleeve out				
						Parameters				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11.6	36 L	6.40		139	90.2	6.15	318.2	14.4	Clear, no odour, no turbidity	
11.5		6.40		0.80	90.3	6.1	311.6	14.4		
12.0		6.40		0.83	90.3	6.1	309.2	14.3		
12.5		6.40		0.85	90.4	6.1	307.4	14.3		
13.0		6.40		0.86	90.4	6.1	307.0	14.3		
Acceptable Parameter Range:										
Field Filtered:		Unfiltered:		Bottles Collected		QA/QC Information		Field Comments		
				± 10%		± 3%	± 0.05	± 10 mV	± 0.2 °C	Bore volume calculation, bore condition, fate of tubing, redox correction etc.
				x 40 mL Vial (HCl)		x 60 mL Ferrous	x 60 mL metals (HNO ₃)			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

Q44AN(EV)-405-FM1

Task
3.2.3

$$4x(8.60 - 6.27) \times 3$$

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CC SW Project Number: 6060447-3.2.2 PM Name: S-HAY Bore ID: 10240004
 Client: CC Project Location: CC SW Fieldwork Staff: CC SW E. Reisman Sample Date: 13-11-21
 Date of GW Level: 13-11-21 Bore Radius (mm): 75 Chem Kit Serial No.: Y887 Decontamination: Decontaminated Sampling Method: Low Flow Pump rate: Hydrasleeve Size: 10240004
 Depth to GW (m-pvc): 10.235 Screen Interval (m): 1.285 Chem Kit Model: 2.885 Dedicated: Yes Intake depth: Hydrasleeve Type: Hydrasleeve Type: Monitoring sequence followed (number in order):
 Bore Depth (m-pvc): 14.10 Casing Radius (mm): Corrected Redox: Y / N Disposable: Yes Baler: Yes Hydrasleeve: Yes Sampling Depth (m-pvc): Gauging
 Depth to Product (m-pvc): 1 Cover Type (gatic/stick up): (The correction to apply is probe dependent) Other (specify): Yes Peristaltic Pump: Yes Hydrasleeve Install time: Hydrasleeve in
 Product Thickness (m): 1 Bore Locked (YES/NO): Parameter method: F1 Downhole Other (specify): Yes Other (specify): Yes Sampling Start Time: Hydrasleeve out
 Key Type (if applicable): F1 Retrieved Total purged volume (L): 46.35 Parameters: Parameters
 Calculated bore volume (L): 46.35 Includes/ excludes bore annulus (circle) # purge volumes removed: Water Quality Parameters

Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:15	48 (L)	10.24		7.74	263.8	6.44	208.9	13.5	Clear, turbid, grey brown, no odour
12:20				7.24	263.7	6.37	208.9	13.5	Clear, no odour, no turbidity
12:25				7.11	263.8	6.42	205.8	13.5	
12:30				7.05	263.8	6.38	188.4	13.5	
12:35				7.02	263.9	6.37	187.0	13.5	
12:46				7.03	263.8	6.37	186.8	13.5	

Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ ± 0.05 ± 10 mV ± 0.2 °C
 Field Filtered: Unfiltered: Bottles Collected: x 40 mL Vial (HCl) x 60 mL Ferrous x 60 mL metals (HNO₃)
x 40 mL Vial (H₂SO₄) x 100 mL Amber x 250 mL Plastic
 Approval and Distribution: TO Duce:
 Fieldwork Staff Signature: 4x (14.10-10.235) x 3 = 46.35
 Project Manager Signature: (3.863) Date: 13-11-21 Checker Name and Signature: CC SW Distribution: Project Central File

Project Name: CCC SW Basin		Project Number: 606447-7/723		PM Name: S. HAY		Bore ID: M Location 5	
Client: CCC		Project Location: Melbourne Street		Fieldwork Staff: E. K. Z. Mac		Sample Date: 13-1-21	
General Bore Information				Parameter Info.		Sampling Method	
Date of GW Level: 13-1-21	Bore Radius (mm): 25	Chem Kit Serial No.:	Decontamination	Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.24 m	Screen Interval (m):	Chem Kit Model:	Decontaminated	Intake depth:	Hydrasleeve Type:	Gauging	
Bore Depth (m-pvc): 13.99 m	Casing Radius (mm):	Corrected Redox: Y / N	Dedicated	Disposible	Hydrasleeve	Sampling Depth (m-pvc):	
Depth to Product (m-pvc):	Cover Type (gallicstick up):	(The correction to apply is probe dependent)	Other (specify)	Other (specify)	Peristaltic Pump	Hydrasleeve Install time:	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Retrieved	Other (specify)	Waterline	Hydrasleeve in	
Calculated bore volume (L): 440		Includes/ excludes bore annulus (circle):		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
10:30	46L	10.27		7.34	256.4	6.34	181.9
10:35				7.29	256.4	6.36	180.2
10:40				7.25	256.2	6.38	178.8
10:45				7.26	256.3	6.38	178.4
10:50				7.22	256.2	6.39	177.8
Sample Collected 16:50							
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV
Analyses Sampled For:				Bottles Collected		QA/QC Information	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, rate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date: 13-1-21		Checker Name and Signature		Date:	
Project Manager Signature		Date:		Distribution: Project Central File			

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: <u>CCC SW 3.5m</u>		Project Number: <u>Q4040174/1323</u>		Bore ID: <u>Lochin 6</u>	
Client: <u>CCC</u>		Project Location: <u>CCC Boring</u>		Sample Date: <u>14-11-21</u>	
General Bore Information				Well Development or Well Sampling Event? (circle)	
Date of GW Level: <u>14/11/21</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>25514</u>	Decontamination: <u>7</u> Decontaminated		
Depth to GW (m-pvc): <u>2.115</u>	Screen Interval (m):	Chem Kit Model: <u>20805</u>	Sampling Method: <u>ER</u>		
Bore Depth (m-pvc): <u>6.135</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	Intake depth: <u>7</u> Low Flow Pump rate:		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<u>7</u> Disposable		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>7</u> Downhole	<u>7</u> Peristaltic Pump		
	Key Type (if applicable):	<u>7</u> Retrieved	<u>7</u> Waterra		
Calculated bore volume (L): <u>48.04</u>		Includes/ excludes bore annulus (circle)		Total purged volume (L): <u>48.04</u>	
Water Quality Parameters					
Time	Gumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)
10:30	50L	2.12	1.59	134.1	6.54
10:35		2.12	0.78	139.0	42.1
10:40		2.12	0.73	138.4	41.4
10:45		2.12	0.72	138.4	41.4
10:50		2.12	0.69	138.5	41.4
10:55				10:55	18.5
Clear na odor, no turbidity					
QA/QC Information					
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV
Field Filtered:		Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic
Field Comments					
Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
$4 \times (6.135 - 2.115) \times 3 = 48.04 = 50 \text{ L (rounded)}$					
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>14/11/21</u>		Approval and Distribution	
Project Manager Signature: _____		Date: _____		Checker Name and Signature: _____	
		Distribution: Project Central File		Date: _____	

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CCC SW Basins		Project Number:		60649177 Task 3.2.3		PM Name:		S.HAY		Bore ID:		Location 7	
Client:		CCC		Project Location:		CCC SW Basins		Fieldwork Staff:		E. Reisman		Sample Date:		13-1-21	
General Bore Information															
Date of GW Level:				14-1-21				Bore Radius (mm):				Chen Kit Serial No.:			
Depth to GW (m-pvc):				2.145				Screen Interval (m):				Chen Kit Model:			
Bore Depth (m-pvc):				6.36				Casing Radius (mm):				Corrected Redox: Y / N			
Depth to Product (m-pvc):								Cover Type (gato/stick up):				(The correction to apply is probe dependent)			
Product Thickness (m):								Bore Locked (YES/NO):				Parameter method: F1 Downhole			
Key Type (if applicable):								Retrieved							
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
9:00	0.60	2.15	1.60	106.0	6.64	123.5	20.8								
9:05		2.15	1.14	106.0	6.63	123.5	20.7								
9:10		2.15	0.88	106.0	6.63	124.5	20.7								
9:15		2.15	0.83	106.1	6.63	125.2	20.7								
9:20		2.15	0.79	106.1	6.63	125.3	20.7								
9:25		2.15	0.75	106.1	6.63	125.3	20.7								
(9:25 SAMPLE COLLECTED)															
Acceptable Parameter Range:															
DO				± 10%	E.C.	± 3%	pH	± 0.05	Redox	± 10 mV	Temp	± 0.2 °C			
Analyses Sampled for:															
Unfiltered:				Bottles Collected				QA/QC Information							
x 40 mL Vial (HCl)				x 60 mL Ferrous				x 60 mL metals (HNO ₃)							
x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber				x 250 mL Plastic							
Approval and Distribution															
Fieldwork Staff Signature				Date				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							
Field Comments										Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
4x (6.36 - 2.145) x 3										= 50.54					

FCM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CC SW		Project Number: 6064972		PM Name: CHH		Bore ID: 6064972-1	
Client: CC		Project Location: Ashtan		Fieldwork Staff: EP		Sample Date: 17-2-22	
General Bore Information				Parameter Info.			
Date of GW Level: 17-2-22	Bore Radius (mm):	Chem Kd Serial No.:	Decontamination:	Sampling Method:			
Depth to GW (m-pvc): 5.90	Screen Interval (m):	Chem Kd Model:	F1 Decontaminated	F1 Low Flow Pump rate:	Hydrasleeve Info.		
Bore Depth (m-pvc): 4.41	Casing Radius (mm):	Corrected Redox: Y / N	F1 Dedicated	Intake depth:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to Product (m-pvc):	Cover Type (gauge/stock up):	(The connection to apply is probe dependent)	F1 Disposable	F1 Bailor	F1 Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Other (specify):	F1 Peristaltic Pump	F1 Wellera	Hydrasleeve Install time:	Hydrasleeve In
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):	Hydrasleeve out Parameters			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or m³/h)	DO (ppm or mg/l)	E.C. (µS/cm or dS/m)	pH	Redox (mV)
1:00	6.0	5.9	7.50	56.6	18.98	115.1	17.6
1:05			7.79	50.1	18.84	127.4	17.6
1:10			7.78	53.3	18.65	145.0	17.6
1:15			7.78	54.4	18.54	155.6	17.6
1:20			7.74	54.2	18.47	166.1	17.6
1:25			7.74	54.2	18.54	167.3	17.6
1:30			7.74	54.2	18.53	161.8	17.6
1:35			7.74	54.2	18.56	167.0	17.6
<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;"> SWL & Collected 1:35 </div>							
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	
Analyses Sampled for:		Bottles Collected		QA/QC Information			
Field Filtered:	Unfiltered:	× 40 mL Vial (HCl)	× 60 mL Ferrous	× 60 mL metals (HNO ₃)			
		× 40 mL Vial (H ₂ SO ₄)	× 100 mL Amber	× 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			
Field Comments							
Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
4x(9.41-5.90) x 3 =							

041AN(EV)-405-FM1

748.84 C

MAN/ENV JOE EMU

$$4x(8.56-5.04) \times 3 = 42.24$$

MAN/EMJ05EM1

$$4 \times (13.68 - 10.15) \times 3 = \boxed{45.96 \text{ L}}$$

ANZ
FGM - Groundwater Sampling and Purging Record

Q44N(EV)-405-FM1

Project Name: <u>CCC SW Sassy</u>		Project Number: <u>080417-3.2.3</u>		Bore ID: <u>Location 5</u>					
Client: <u>CCC</u>		Project Location: <u>Moro Morro</u>		Sample Date: <u>16-02-22</u>					
General Bore Information				Well Development or Well Sampling Event? (circle) <input checked="" type="checkbox"/> Development <input type="checkbox"/> Sampling					
Date of GW Level: <u>16-2-22</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>Pa D55-2</u>	Decontamination: <input checked="" type="checkbox"/> Decontaminated		Hydrasteeve Size:				
Depth to GW (m-pvc): <u>10.16 m</u>	Screen Interval (m):	Chem Kit Model: <u>980 D55</u>	Dedicated: <input type="checkbox"/>		Hydrasteeve Type:				
Bore Depth (m-pvc): <u>13.98 m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	Disposable: <input checked="" type="checkbox"/>		Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	Other (specify):		Hydrasteeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>F1 Downhole</u>	Other (specify): <u>Silicate</u>		Hydrasteeve Start Time:				
Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved	Monitoring sequence followed (number in order):						
Calculated bore volume (L): <u>45.84</u>		Includes/ excludes bore annulus (circle):		Total purged volume (L):					
Water Chemistry Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or m3/h)	DO (mg/l)	E.C. (mS/cm or dS/m)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
<u>10:00</u>	<u>48.2</u>	<u>10.16</u>	<u>8.43</u>	<u>181.7</u>	<u>6.27</u>	<u>112.4</u>	<u>13.3</u>		<u>body, 5 mod turbidity</u>
<u>10:05</u>		<u>10.16</u>	<u>8.14</u>	<u>181.5</u>	<u>6.27</u>	<u>108.4</u>	<u>13.7</u>		
<u>10:10</u>		<u>10.16</u>	<u>8.01</u>	<u>181.4</u>	<u>6.27</u>	<u>108.2</u>	<u>13.4</u>		
<u>10:15</u>		<u>10.16</u>	<u>7.98</u>	<u>181.3</u>	<u>6.26</u>	<u>108.5</u>	<u>13.4</u>		
<u>10:20</u>		<u>10.16</u>	<u>8.00</u>	<u>181.3</u>	<u>6.26</u>	<u>108.5</u>	<u>13.4</u>		
<u>10:25</u>		<u>10.16</u>	<u>7.99</u>	<u>181.3</u>	<u>6.27</u>	<u>108.5</u>	<u>13.4</u>		
<u>SAMPLE COLLECTED 10:30 AM</u>									
Acceptable Parameter Range:									
Field Filtered:		Unfiltered:		Bottles Collected		QA/QC Information			
x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO3)		Bore volume calculation, bore condition, time of tubing, redox correction etc.			
x 40 mL Vial (H2SO4)		x 100 mL Amber		x 250 mL Plastic					
Field Comments									
<u>4 x (13.98 - 10.16) x 3 = 45.84 L</u>									
Project Manager Signature: <u>[Signature]</u> Date: <u>16/2/22</u>				Checker Name and Signature: _____ Date: _____					
Distribution: Project Central File									

ANZ
FGM - Groundwater Sampling and Purging Record

Q44N(EV)-405-FM1

Project Name: <u>CCC SW Sassy</u>		Project Number: <u>080417-3.2.3</u>		Bore ID: <u>Location 5</u>	
Client: <u>CCC</u>		Project Location: <u>Moro Morro</u>		Sample Date: <u>16-02-22</u>	
General Bore Information				Well Development or Well Sampling Event? (circle) <input checked="" type="checkbox"/> Development <input type="checkbox"/> Sampling	
Date of GW Level: <u>16-2-22</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>Pa D55-2</u>	Decontamination: <input checked="" type="checkbox"/> Decontaminated	Sampling Method: <u>Low Flow Pump rate:</u>	Hydrasteeve Size:
Depth to GW (m-pvc): <u>10.16 m</u>	Screen Interval (m):	Chem Kit Model: <u>980 D55</u>	<input checked="" type="checkbox"/> Dedicated	Inlet depth:	Hydrasteeve Type:
Bore Depth (m-pvc): <u>13.98 m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	Sampling Depth (m-pvc):
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump	Hydrasteeve Install time:
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>F1 Downhole</u>	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify): <u>Silicate</u>	Hydrasteeve Start Time:
Key Type (if applicable):		Total purged volume (L):		Monitoring sequence followed (number in order):	
Calculated bore volume (L): <u>45.84</u>		Includes/ excludes bore annulus (circle)		Gauging Hydrasteeve in Parameters	
Water Chemistry Parameters					
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or m3/h)	DO (ppm or mg/l)	E.C. (mS/cm or μ S/cm)
<u>10:00</u>	<u>48.2</u>	<u>10.15</u>	<u>8.43</u>	<u>181.7</u>	<u>6.27</u>
<u>10:05</u>	<u>10.16</u>	<u>8.14</u>	<u>181.5</u>	<u>6.27</u>	<u>108.4</u>
<u>10:10</u>	<u>10.16</u>	<u>8.01</u>	<u>6.27</u>	<u>108.2</u>	<u>13.4</u>
<u>10:15</u>	<u>10.16</u>	<u>7.98</u>	<u>181.3</u>	<u>6.26</u>	<u>13.4</u>
<u>10:20</u>	<u>10.16</u>	<u>8.00</u>	<u>181.3</u>	<u>6.26</u>	<u>108.5</u>
<u>10:25</u>	<u>10.16</u>	<u>7.99</u>	<u>181.3</u>	<u>6.27</u>	<u>108.5</u>
<u>SAMPLE COLLECTED 10:30 AM</u>					
Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ ± 0.05 ± 10 mV ± 0.2 °C					
Analytes Sampled for:		Bottles Collected		QA/QC Information	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	
Approval and Distribution					
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>16/2/22</u>		Checker Name and Signature: _____	
Project Manager Signature: _____		Date: _____		Distribution: Project Central File	

$$4 \times (13.98 - 10.16) \times 3 = 45.84 \text{ L}$$

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: <u>CEC SN</u>		Project Number: <u>6049177</u>		PM Name: <u>S. HAY</u>		Bore ID: <u>LC 6</u>	
Client: <u>CCC</u>		Project Location: <u>Wade's Creek</u>		Fieldwork Staff: <u>CHL</u>		Sample Date: <u>16-2-22</u>	
General Bore Information				Parameter Info.			
Date of GW Level: <u>16-2-22</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>1851</u>	Decontamination		Sampling Method		
Depth to GW (m-pvc): <u>1.34 m</u>	Screen Interval (m):	Chem Kit Model: <u>RD35</u>	F1 Decontaminated		F1 Low Flow Pump rate:		
Bore Depth (m-pvc): <u>6.28</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	F1 Dedicated		Intake depth:		
Depth to Product (m-pvc):	Cover Type (gatic/slick top):	(The correction to apply is probe dependent)	F1 Disposable		F1 Bailor		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>F1 Downhole</u>	F1 Other (specify)		F1 Hydraulic		
Key Type (if applicable):					F1 Peristaltic Pump		
					F1 Waterra		
					F1 Other (specify)		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)
1:30	60	1.8	4.26	92.8	6.56	99.2	17.1
1:35		1.8	2.67	92.5	6.46	102.7	17.0
1:40		1.8	2.11	92.6	6.20	115.8	17.0
1:45		1.8	2.60	92.7	6.24	116.8	17.0
1:50		1.8	1.97	92.7	6.24	115.7	16.7
1:55		1.8	1.93	92.8	6.34	112.6	17.0
2:00		1.8	1.92	92.8	6.38	111.2	17.0
2:05		1.8	1.92	92.8	6.39	111.6	17.0
Acceptable Parameter Range:							
DO: $\pm 10\%$				E.C.: $\pm 3\%$		pH: ± 0.05	
Redox: ± 10 mV				Temp: ± 0.2 °C			
Analyses Sampled for:							
Unfiltered:				Bottles Collected		QA/QC Information	
x 40 mL Vial (HCl)				x 60 mL Ferrous		x 60 mL metals (HNO ₃)	
x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber		x 250 mL Plastic	
Approval and Distribution							
Fieldwork Staff Signature: <u>CHL</u>				Date: <u>16-2-22</u>			
Project Manager Signature: _____				Date: _____			
Checker Name and Signature: _____				Date: _____			
Distribution: Project Central File							
Bore volume calculation, bore condition, date of tubing, redox correction etc.							
4 x (4.58) x 3 = 54.96							

ANZ
FQM - Groundwater Sampling and Purging Record

AECOM
QAN(EV)-405-FM1

Project Name: <u>CC Sea Series</u>		Project Number: <u>60649172</u>		Bore ID: <u>Loc 7</u>	
Client: <u>CC</u>		Project Location: <u>Porto A</u>		Sample Date: <u>16-8-22</u>	
General Bore Information		Parameter Info.		Well Development or Well Sampling Event? (circle)	
Date of GW Level: <u>16/2/22</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>DSS 1</u>	Decontamination: <input checked="" type="checkbox"/> Decontaminated	Sampling Method: <u>FT Low Flow Pump rate:</u>	
Depth to GW (m-pvc): <u>1.80</u>	Screen Interval (m):	Chem Kit Model: <u>70-355</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth: <u>FT</u>	
Bore Depth (m-pvc): <u>6.38</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	FT Bailor <u>FT</u> Hydrasleeve	
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <u>FT</u> Downhole	<input checked="" type="checkbox"/> Other (specify)	FT Peristaltic Pump <u>FT</u> Waterra	
Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	FT Other (specify) <u>FT</u>	
Calculated bore volume (L): <u>54.96</u> Includes/excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L): <u>602</u>	
Water Quality Parameters					
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or gpm)	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)
12:30	0.0	1.80	3.92	12.66	6.55
12:35	1.80	1.80	2.41	12.65	6.90
12:40	1.80	1.80	1.33	12.66	7.20
12:45	1.80	1.80	1.24	12.67	7.22
12:50	1.80	1.80	1.23	12.67	7.17
3 samples collected					
Acceptable Parameter Range: ±10% DO, ±3% E.C., ±0.05 pH, ±10 mV Redox, ±0.2 °C Temp					
Field Filled:		Bottles Collected		QA/QC Information	
Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	±10% turbidity (if using a turbidity meter)	
	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	Field Comments	
Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
Approval and Distribution					
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>16/2/22</u>		Checker Name and Signature: <u>[Signature]</u>	
Project Manager Signature: <u>[Signature]</u>		Date: <u>16/2/22</u>		Distribution: Project Central File	

4 x (6.38 - 1.8) x 3 =

54.96 L

AECOM

Project Name: CCSC 352		Project Number: G664917/321		PM Name:		Bore ID: LDC 1			
Client: C.C.		Project Location:		Fieldwork Staff:		Sample Date: 12/3/22			
General Bore Information				Parameter Info.					
Date of GW Level: 6-3-22	Bore Radius (mm): 75	Chem Kit Serial No.: YSFEZ	F1 Decontamination	F1 Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 6.39	Screen Interval (m):	Chem Kit Model: P2P2U	F1 Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 9.40	Casing Radius (mm):	Corrected Redox: Y / N	F1 Disposable	F1 Bailor	F1 Hydrasleeve				
Depth to Product (m-pvc):	Cover Type (gauge/stick up):	(The correction to apply is probe dependent)	F1 Other (specify):	F1 Peristaltic Pump	F1 Walterra				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole		F1 Other (specify):					
Key Type (if applicable):		R4 Retrieved							
Calculated bore volume (L): 17.72 Includes/excludes bore annulus (circle)				# purge volumes removed:	Total purged volume (L):				
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity
7:00	18	6.39	1	6.86	105.1	6.11	65.7	16.6	Brown, no odour, st. turbidity - red blood, brown no odour, high clarity
7:15		6.39		6.84	111.8	6.13	74.4	16.6	
Acceptable Parameter Range:									
				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	
Analyses Sampled for:				Bottles Collected			QA/QC Information		
Field Filtered:				Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		
					x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		
Approval and Distribution									
Fieldwork Staff Signature			Date			Checker Name and Signature			Date
Project Manager Signature			Date			Distribution: Project Central File			
<p style="text-align: center;">Bore volume calculation, bore condition, file of tubing, redox correction etc.</p> <p style="text-align: right;">(9.40 - 6.39) x 6.25 = 3 x .60314 = 1.80942 17.72 Litres</p>									

AECOM

AECOM

$$= 11.53$$

ANZ FGM - Groundwater Sampling and Purging Record

Project Name: 6445		Project Number: 6064917		PM Name: SHH		Bore ID: Loc 4			
Project Location: 6064917		Fieldwork Staff: SHH		Sample Date: 9-3-27		Well Development or Well Sampling Event? (circle)			
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 9-3-27	Bore Radius (mm): 75	Chem Kit Serial No.: YSI7	FT Decontaminated	FT Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	Hydrasleeve Info.		
Depth to GW (m-pvc): 10.08	Screen Interval (m):	Chem Kit Model: YSI7	FT Dedicated	Intake depth:	Hydrasleeve Type:	Gauging			
Bore Depth (m-pvc): 13.49	Casing Radius (mm):	Corrected Redox: Y / N	FT Disposable	FT Bailor	FT Hydrasleeve	Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (galvanized):	(The correction to apply is probe dependent)	FT Other (specify):	FT Peristaltic Pump	FT Waterma	Hydrasleeve install time:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: FT Downhole	FT Other (specify):	FT Other (specify):	FT Other (specify):	Sampling Start Time:	Hydrasleeve out Parameters		
Key Type (if applicable):		Retrieved		Total purged volume (L):					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Odour, Colour, Turbidity			
Time		Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (lpm or m³/h)	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C
1:45	24	0.08							
1:50	71	10.08		7.71	255.6	6.32	115.7	12.6	
<p>Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C</p> <p>Analyses Sampled for:</p> <p>Field Filtered: Unfiltered:</p> <p>Field Comments: (13.49-10.08) x 625 x 3 (6.0311) = 23.02 Lms</p>									
<p>Approval and Distribution</p> <p>Fieldwork Staff Signature: _____ Date: _____</p> <p>Project Manager Signature: _____ Date: _____</p> <p>Checker Name and Signature: _____ Date: _____</p> <p>Distribution: Project Central File</p>									

Q4AN(EV)-405-FM1

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1

Boe ID:	10C 6
Sample Date:	10-3-22
Well Development or Well Sampling Event? (circle)	
Hydrasleeve	
Hydrasleeve Size:	Monitoring sequence followed (number in order):
Hydrasleeve Type:	
Sampling Depth (m-pvc):	Gauging
Hydrasleeve Install time:	Hydrasleeve in
Sampling Start Time:	Hydrasleeve out
	Parameters

Water Quality Parameters

Total purged volume (L):

1

Odour, Colour, Turbidity

mod-high fusid. by no odour

± 10% turbidity (if using a turbidity meter)

Field Comments

calculation, bore condition, fate of tubing, redox correction etc.

(14) $(625 \times 3 \times (.00314))$

$625 \times 3 \times (.00314) = 29.14$

$$\frac{(6.06 - 1.94) \times 10^{25} \times 3 \times (.00317)}{(4.1) \times 10^{25} \times 3 \times (.00317) + 29.14}$$

Approval and Distribution

Checker Name and Signature

Date _____

Fieldwork Staff Signature

Date _____

Project Manager Signature

Date _____

Distribution: Project Central File

AECOM
Q44N(EV)-405-FM+

Silly

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Analytes Sampled For		Bottles Collected		QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.

Approval and Distribution

Date _____

Distribution: Project Central File

17405-FM1
Underwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
July 12, 2016

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		CC SW Basin		Project Number:		00641773.3		PM Name:		S HAY		Bore ID:		LOC 1	
Client:		CC		Project Location:		Gwater Basin		Fieldwork Start:		E. P. 3 men		Sample Date:		6-4-22	
General Bore Information															
Date of GW Level:		6-4-22		Bore Radius (mm):				Chem Kit Serial No.:		YSI 4		Hydrasleeve Size:			
Depth to GW (m-pvc):		6.42		Screen Interval (m):				Chem Kit Model:		YSI 4		Hydrasleeve Type:			
Bore Depth (m-pvc):		9.74		Casing Radius (mm):				Corrected Redox:		0 / N		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):				Cover Type (gatic/stick up):				(The correction to apply is probe dependent)				Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method:		Downhole		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):				Retrieved										Parameters	
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
12:00	36.2	6.43		7.70	138.8	6.06	112.1	15.9	Clear, low turbidity, no odour						
12:05		6.43		6.77	139.1	6.15	172.91	15.9	Clear, no turbidity, no odour						
12:10		6.43		6.51	139.0	6.01	171.6	15.9							
12:15		6.43		6.48	138.8	6.00	171.1	15.9							
12:20		6.43		6.40	138.8	5.99	170.2	15.9							
12:25		6.43		6.44	138.8	5.99	171.1	15.9							
Acceptable Parameter Range:									± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp						
Analytes Sampled for:									QA/QC Information						
Field Filtered:		Unfiltered:		Bottles Collected		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)					
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic							
Approval and Distribution															
Fieldwork Staff Signature				Date				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							

4 x (9.28 - 6.42) x 3
= 34.32

FQM - Groundwater Sampling and Purging Record

[illegible]

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCCSW Basins		Project Number: 60649177		PM Name: SHAK		Bore ID: LOC 3	
Client: CCC		Project Location: Avonlea B.S. h		Fieldwork Staff: Elson		Sample Date: 6/4/22	
General Bore Information				Sampling Method			
Date of GW Level: 6/4/22	Bore Radius (mm):	Chem Kit Serial No.: 1534	Decontamination	Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 6.37	Screen Interval (m):	Chem Kit Model: 200 PLUS	<input checked="" type="checkbox"/> Decontaminated	Intake depth:	Hydrasleeve Type:		
Bore Depth (m-pvc): 8.30	Casing Radius (mm):	Corrected Redox: 81	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Hydrasleeve out Parameters	
Calculated bore volume (L):				Total purge volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)
9:30	36	6.38		2.81	175.7	5.94	202.7
9:35		6.38		2.80	175.2	5.85	200.0
9:40		6.38		2.85	165.2	5.78	189.7
9:45		6.38		2.84	164.8	5.78	189.1
9:50		6.38		2.87	164.5	5.79	188.3
9:55		6.38		2.88	164.1	5.79	187.9
Sample collected 10:00 am							
Brown moderate turbidity, no odour, try taking to clear, SL turbidity no odour							
Odour, Colour, Turbidity							
Acceptable Parameter Range: $\pm 10\%$ DO, $\pm 3\%$ E.C., ± 0.05 pH, ± 10 mV, ± 0.2 °C							
Analyses Sampled for:				QA/QC Information			
Field Filtered:	Unfiltered:	Bottles Collected		Field Comments			
		x 40 mL Vial (HCl)	x 60 mL Ferrous	Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber				
			x 60 mL metals (HNO ₃)				
			x 250 mL Plastic				
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

$$4 \times (8.30 - 6.37) \times 3$$

$$= 23.16 \text{ L}$$

Q4AN(EV)-405-FM1

$$4 \times 1000 \times 13.75 - 9.935 \times 3 = 45.78 \text{ L}$$

Q4AN(EV)-405-FM1

$$4 \times (99999 - 13.73 - 9.945) \times 3 = 4 \times (3.783) \times 3 = 45.42$$

FQM - Groundwater Sampling and Purging Record

Project Name: 44 SW Bush		Project Number: 60649177/323		PM Name: S. HAY		Bore ID: 405-6	
Client: CLC		Project Location: OUTLOOK AVE		Fieldwork Staff: E. Rossini		Sample Date: 5/4/22	
General Bore Information				Sampling Method			
Date of GW Level: 5/1/22		Bore Radius (mm):		Decontamination		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.963		Screen Interval (m):		F1 Low Flow Pump rate:		Hydrasleeve Size:	
Bore Depth (m-pvc): 6.05		Casing Radius (mm):		Intake depth:		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		F1 Bailer		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		F1 Peristaltic Pump		Hydrasleeve Install time:	
		Key Type (if applicable):		F1 Other (specify):		Sampling Start Time:	
				F1 Downhole		Hydrasleeve out	
				F1 Retrieved		Parameters	
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)
1:15	60	1.97		3.03	120.7	6.34	177.8
1:20		1.97		1.53	120.2	6.18	177.1
1:25		1.97		1.45	120.2	6.22	174.2
1:30		1.97		1.38	120.3	6.22	169.2
1:35		1.97		1.30	120.0	6.29	165.0
1:40		1.97		1.27	120.1	6.28	166.7
1:45		1.97		1.25	120.1	6.31	167.8
(SAMPLE COLLECTED 1:50)							
Acceptable Parameter Range:							
Analyses Sampled for:		Bottles Collected		QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

44605-1965) x 3 = 49.02

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: <u>1cc SW Bore</u>		Project Number: <u>60649177</u>		PM Name: <u>S. HAY</u>		Bore ID: <u>LOC 7</u>	
Client: <u>CC</u>		Project Location: <u>60649177</u>		Fieldwork Staff: <u>S. HAY</u>		Sample Date: <u>5/4/22</u>	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: <u>5/4/22</u>		Bore Radius (mm):		Sampling Method		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>1.96</u>		Screen Interval (m):		Intake depth: <u>1.96</u>		Hydrasleeve Size:	
Bore Depth (m-pvc): <u>6.40</u>		Casing Radius (mm):		Bore Depth: <u>6.40</u>		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		Bore Depth: <u>6.40</u>		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		Bore Depth: <u>6.40</u>		Hydrasleeve Install time:	
		Key Type (if applicable):		Bore Depth: <u>6.40</u>		Sampling Start Time:	
				Bore Depth: <u>6.40</u>		Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or %)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
12:20	1.965	1.965	1.52	116.2	6.31	146.8	18.7
12:25	1.965	1.965	1.21	115.7	6.40	188.1	18.2
12:30	1.965	1.965	1.19	115.5	6.42	187.9	18.7
12:35	1.965	1.965	1.02	115.4	6.50	183.3	18.5
12:40	1.965	1.965	0.97	115.2	6.53	180.8	18.5
12:45	1.965	1.965	0.96	115.2	6.53	180.7	18.7
12:50	1.965	1.965	0.95	115.2	6.53	180.7	18.7
Odour, Colour, Turbidity							
<u>Clear, sl. turbidity, no odour</u>							
Acceptable Parameter Range:							
Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)	
Filtered:		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic	
QA/QC Information							
Fieldwork Staff Signature				Date			
Project Manager Signature				Date			
Checker Name and Signature				Date			
Distribution: Project Central File							
Approval and Distribution							
Field Comments							
Bore volume calculation: bore condition, fate of tubing, rack/correction etc.							
<u>4 x (6.4 - 1.96) x 3 = 53.28 L</u>							

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ANZ
FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: CCC SW Basins		Project Number: 60649177/3.2.3		PM Name: S.HAY		Bore ID: 10C 2	
Client: CCC		Project Location: <u>Avatara Basin</u>		Fieldwork Staff: E. Reisman		Sample Date: 5/5/12	
General Bore Information				Parameter Info.			
Data of GW Level: 6.55		Bore Radius (mm):		Chem Kit Serial No.: DSS 2		F1 Decontaminated	
Depth to GW (m-pvc): 6.55		Screen Interval (m):		Chem Kit Model: DSS 20		F1 Dedicated	
Bore Depth (m-pvc): 4.07		Casing Radius (mm):		Corrected Redox: Y 1 W		F1 Disposable	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		F1 Other (Specify)	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Other (Specify)	
Key Type (if applicable):		F1 Retrieved		Submersible		F1 Other (Specify)	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or % sat)	E.C. (mS/cm or dS/m)	pH	Redox (mV)
10:00	48 L	6.56	—	1.1 V	44.7	5.49	107.2
10:05		6.56		0.92	44.7	5.49	107.2
10:10		6.56		0.85	44.7	5.49	107.2
10:15		6.56		0.81	44.7	5.49	107.3
10:20		6.56		0.78	44.8	5.49	107.3
Analyses Sampled for:							
Field Filtered:		Unfiltered:		Bottles Collected		QA/QC Information	
x 40 mL Vial (HCl)		x 60 mL Ferrous		x 80 mL metals (HNO ₃)			
x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
Approval and Distribution							
Fieldwork Staff Signature		Date: 5/5/12		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			
Field Comments							
Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
4x (4.07 - 6.55) x 3 = 30.2-1							
Odour, Colour, Turbidity							
Clarity, no odour, no turbidity							

$$4 \times (830-6-56) \times 3 =$$

Q44AN(EV)-405-FM1

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Project Name:		CCC SW Basins		Project Number:		60649177 / 3.2.3		PM Name:		S.HAY		Bore ID:		LOC 5					
Client:		CCC		Project Location:		K6K6A		Fieldwork Start:		E. Reisman		Sample Date:		4/5/20					
General Bore Information																			
Date of GW Level:		4/4/22		Bore Radius (mm):		Chem Kit Serial No.:		D657		F1 Decontaminated		F1 Low Flow Pump rate:		Hydrasleeve Size:					
Depth to GW (m-pvc):		10.08		Screen Interval (m):		Chem Kit Model:		D5570		F1 Dedicated		Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):		12.78		Casing Radius (mm):		Corrected Redox:		Y / N		F1 Disposable		F1 Bailor		F1 Hydrasleeve					
Depth to Product (m-pvc):				Cover Type (gatic/stick up):		(The correction to apply is probe dependent)				F1 Other (specify)		F1 Peristaltic Pump		F1 Hydrasleeve Install time:					
Product Thickness (m):				Bore Locked (YES/NO):		Parameter method:		F1 Downhole		F1 Other (specify)		F1 Waterra		Hydrasleeve out					
Calculated bore volume (L):				Key Type (if applicable):		F1 Retrieved				F1 Submersible				Parameters					
Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):											
Water Quality Parameters																			
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (ms/cm or $\mu S/cm$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity										
12:15	48	10.04	1	7.72	250.3	6.33	49.1	13.4	Clear no odour, not turbid										
12:20		10.10		7.40	250.3	6.32	44.3	13.4											
12:25		10.10		7.38	250.3	6.32	44.2	13.4											
12:30		10.10		7.38	250.3	6.32	44.0	13.4											
12:35		10.10		7.37	250.3	6.33	43.4	13.7											
				SAMPLE Collected				12:40											
Acceptable Parameter Range:																			
				± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:				Bottles Collected				QAA/NEV Information				Field Comments							
Field Filtered:				Unfiltered:				x 40 mL Vial (HCl)				x 60 mL Ferrous				x 60 mL metals (HNO ₃)			
								x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber				x 250 mL Plastic			
Approval and Distribution																			
Fieldwork Staff Signature				Date				Checker Name and Signature				Date							
Project Manager Signature				Date				Distribution: Project Central File											

4 x (13.78 - 10.08) / 3 = 44.4

Project Name: CCC SW Basins		Project Number: 60649177/3.2.3		PM Name: S.HAY		Bore ID: 1016	
Client: CCC		Project Location: Outlook Region		E. Reisman		Sample Date: 4/5/22	
General Bore Information				Parameter Info			
Date of GW Level:	4/5/22	Bore Radius (mm):	Chem Kit Serial No.: 0552	Decontamination:	Sampling Method:	Hydrasleeve Info:	Monitoring sequence followed (number in order):
Depth to GW (m-PVC):	2.06	Screen Interval (m):	Chem Kit Model: PLS 55	F1 Decontaminated	F1 Low Flow Pump rate:	Hydrasleeve Size:	
Bore Depth (m-PVC):	6.07	Casing Radius (mm):	Corrected Redox: Y / N	F1 Dedicated	Intake depth:	Hydrasleeve Type:	
Depth to Product (m-PVC):		Cover Type (gallic/stick up):	(The correction to apply is probe dependent)	F1 Disposable	F1 Bailor	Sampling Depth (m-PVC):	Gauging
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Other (specify)	F1 Peristaltic Pump	Hydrasleeve Install time:	Hydrasleeve in
		Key Type (if applicable):	F1 Retrieved		F1 Other (specify)	Sampling Start Time:	Hydrasleeve out
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-PVC)	Pump Rate	DO (ppm or mg/l)	E.C. (mS/cm or dS/m)	pH	Redox (mV)
11:00	6.0	2.07		0.79	141.4	6.38	32.7
11:05	6.0	2.08		0.75	141.4	6.38	31.4
11:10		2.08		0.56	141.3	6.38	29.2
11:15		2.08		0.56	141.4	6.38	27.9
11:20		2.06		0.55	141.3	6.38	27.6
11:25		2.08		0.54	141.3	6.38	27.5
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp							
Analyses Sampled for:				Bottles Collected			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous	x 60 mL metals (HNO ₃)	QA/QC Information	
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber	x 250 mL Plastic		
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			
<p>Chloride, no odor</p> <p>4x (6.07 x 2.06) = 49.12</p> <p>Field Comments: Bore volume calculation, bore condition, fate of tubing, redox correction etc.</p>							

Project Name:		CCC SW Basins		Project Number:		60649177 / 3.2.3		PM Name:		S.HAY		Bore ID:		Loc 7	
Client:		CCC		Project Location:		Outlook Base		Fieldwork Staff:		E. Reisman		Sample Date:		4/5/22	
General Bore Information															
Date of GW Level:				4/5/22				Bore Radius (mm):				Chem Kit Serial No.:			
Depth to GW (m-pvc):				2.05				Screen Interval (m):				Chem Kit Model:			
Bore Depth (m-pvc):				6.37				Casing Radius (mm):				Corrected Redox: Y / N			
Depth to Product (m-pvc):				Cover Type (gate/stock up):				(The correction to apply is probe dependent)				F1 Disposable			
Product Thickness (m):				Bore Locked (YES/NO):				Parameter method:				F1 Downhole			
				Key Type (if applicable):				F1 Retrieved							
Calculated bore volume (L):				Includes / excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity						
9:30	0.0	2.06		0.47	134.3	6.36	12.8	15.9	Clear, no turbidity, no odour						
9:35	-	2.06		0.53	134.3	6.42	6.1	15.9							
9:40	-	2.06		0.51	134.3	6.43	4.7	15.9							
9:45	-	2.06		0.50	134.4	6.43	4.3	15.9							
9:50	-	2.06		0.49	134.4	6.43	3.9	15.9							
				SAMPLE COLLECTED @ 10:00 AM											
Acceptable Parameter Range:															
				± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C			
Analytes Sampled for:				Bottles Collected				QA/QC Information				Field Comments			
Unfiltered:				x 40 mL Vial (HCl)				x 60 mL Ferrous				x 60 mL metals (HNO ₃)			
				x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber				x 250 mL Plastic			
Approval and Distribution															
Fieldwork Staff Signature				Date				Approval and Distribution				Date			
Project Manager Signature				Date				Checker Name and Signature				Date			
				Distribution: Project Central File											

4x(6.37-2.05)x3 = 51.84

ANZ

FQM - Groundwater Sampling and Purging Record

Sampling @ ~ 7.27m

start @ 1347

Project Name: CCC SW Basins		Project Number: 60649177		PM Name: SH		Bore ID: Location 1	
Client: CCC		Project Location: Awatera Basin		Fieldwork Staff: MF+ER		Sample Date: 1-6-2021	
General Bore Information				Sampling Method			
Date of GW Level: 01.06.2021	Bore Radius (mm): 5.17	Chem Kit Serial No.: 125100652	Decontaminated	F1 Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 5.17	Screen Interval (m): 2.9-3.9	Chem Kit Model: YSI Pro-Series	Dedicated	Intake depth:	Hydrasleeve Type:	Gauging	
Bore Depth (m-pvc): 9.425	Casing Radius (mm): 25	Corrected Redox: -1.1	F1 Disposable	F1 Bailor	Sampling Depth (m-pvc):	Hydrasleeve in	
Depth to Product (m-pvc): ---	Cover Type (gastic/click up):	(The correction to apply is probe dependent)	F1 Other (specify):	F1 Peristaltic Pump	Hydrasleeve Install time:	Hydrasleeve out	
Product Thickness (m): ---	Bore Locked (YES/NO):	Parameter method: F1 Downhole	Retrieved	Other (specify):	Sampling Start Time:	Parameters	
Key Type (if applicable): NA				Submersible			
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm-or. mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1347	10						
1350	20						
1352	30						
1354	40						
1355	50						
1357	60			10.60	27.1	7.65	102.3
1400				10.28	26.7	6.78	232.6
1403		5.175		10.10	26.6	6.63	269.9
1408				10.12	26.6	6.64	261.1
1409				10.09	26.6	6.67	262.3
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV
Bottles Collected				QA/QC Information			
Analytes Sampled for:				Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc. V = 4 x (9.425 - 5.17) = 4 x 4.255 = 17.02 L x 3 = 51.06 L		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
		2 Bacterial	1 Inorganics				
		1 Metals					
Approval and Distribution							
Fieldwork Staff Signature				Date			
Project Manager Signature				Date			
Checker Name and Signature				Date			
Distribution: Project Central File							

10L Bucket = 01:16:00

ANZ

FQM - Groundwater Sampling and Purging Record

P. 1 of 2

Start @ 1132

Project Name: CCC SW BSA		Project Number: 6069977		PM Name: SK		Bore ID: 100002
Client: CCC		Project Location: Baker Ranch		Fieldwork Staff: SK		Sample Date: 1-6-2021
General Bore Information						
Date of GW Level: 1-6-21	Bore Radius (mm): 2.8-8.8	Chem Kit Serial No.: 12F100652	Decontamination: <input checked="" type="checkbox"/> Decontaminated		Hydrasleeve Info:	
Depth to GW (m-pvc): 2.1840	Screen Interval (m): 2.8-8.8	Chem Kit Model: YSL Pro-Series	<input checked="" type="checkbox"/> Dedicated		Hydrasleeve Size: Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 9-125	Casing Radius (mm): 25	Corrected Redox: Y/N	<input checked="" type="checkbox"/> Disposable		Hydrasleeve Type: Gauging	
Depth to Product (m-pvc): -	Cover Type (gauge/tick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		Sampling Depth (m-pvc):	
Product Thickness (m): -	Bore Locked (YES/NO):	Parameter method: F1 Downhole	<input checked="" type="checkbox"/> Tubing		Hydrasleeve Install time:	
	Key Type (if applicable): NA	Retrieved	<input checked="" type="checkbox"/> Submersible		Sampling Start Time:	
Calculated bore volume (L):			# purge volumes removed:		Total purged volume (L):	

Water Quality Parameters						
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (mg/L)	E.C. (µS/cm)	Temp °C
1132	10					
1134	20					
1135	30	2.84				
1136	40	"				
1138	50	"				
1140	60					
1141	70					
1142	80					
1143	90					
1146	100					
1148	110					
1150	120					
1152	130					

Analyses Sampled for:		Acceptable Parameter Range:		QA/QC Information	
Field Filtered:	Unfiltered:	Bottles Collected	QA/QC Information	Field Comments	
	ALL	x 40 mL Vial (HCl)	x 60 mL Ferrous	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amherst		
		2 Bacterial	1 Inorganics		
		1 Metals			
Approval and Distribution			V=4x(9.125-2.1840)		
			=4x6.285		
			=25.4 x 3		
			=75.4 L		
Fieldwork Staff Signature: M. Mather			SWL = 2.84 m		
Date: 1-6-21					
Checker Name and Signature			Date		
Project Manager Signature			Date		
Distribution: Project Central File					

Depth sampling ~ 6.35m.

[illegible]

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Start @ 0937

Project Name: CCC SW Basins.		Project Number: 60644177		PM Name: SH		Bore ID: Location 3	
Client: CCC		Project Location: Awaitea Basin		Fieldwork Staff: MF, ER, SH		Sample Date: 1-6-2021	
General Bore Information							
Date of GW Level: 1-6-21		Bore Radius (mm): 2.9-8.9		Chem Kit Serial No.: 2F100652		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.585		Screen Interval (m): 2.9-8.9		Chem Kit Model: YSE Pro Series		Hydrasleeve Size:	
Bore Depth (m-pvc): 8.82		Casing Radius (mm): 2.5		Corrected Redox: Y / N		Hydrasleeve Type:	
Depth to Product (m-pvc): -		Cover Type (stick up):		(The correction to apply is probe dependent)		Sampling Depth (m-pvc):	
Product Thickness (m): -		Bore Locked (YES/NO):		Parameter method: F1 Downhole		Hydrasleeve Install time:	
		Key Type (if applicable): NA		Retrieved		Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu\text{S/cm}$)	pH	Redox (mv)
0938	10	2.640					
	20	2.640					
	30	2.640					
	40	2.640					
	50	2.640					
	60	2.640					
	70	2.640					
9:47	80	2.640		2.92	74.6	6.21	110.1
9:49		2.640		2.80	74.1	6.26	143.0
9:51		2.640		2.82	73.8	6.25	151.0
9:53		2.640		2.82	73.9	6.01	142.0
9:54		2.640		2.76	73.9	6.04	138.3
9:55		2.640		2.76	73.9	6.04	138.0
Acceptable Parameter Range:		± 10%		± 3%		± 0.05	
Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	± 10 mV		± 0.2 °C	
Now.	All.	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	± 10 mV		± 10% turbidity (if using a turbidity meter)	
		x 20 mL Vial (H ₂ SO ₄)	x 250 mL Plastic			Bore volume calculation: bore condition, rate of tubing, redox correction etc.	
Approval and Distribution		1 x metal		1 x Inorganic		<p>Q4AN(EV)-405-FM1</p> <p>V = MP x (depth well - depth water)</p> <p>= 4 x (0.82 - 2.585)</p> <p>= 4 x 6.235</p> <p>= 24.94 L</p> <p>(x 3) = 75 L</p> <p>3 well vol.</p>	
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Start @ 9.14 am

Project Name: CCC GME SW		Project Number: 6064977		PM Name: SH		Bore ID: Location 4	
Client: CCC		Project Location: Rakapo Basins		Fieldwork Staff: MF + ER		Sample Date: 2-6-21	
General Bore Information				Well Development or Well Sampling Event (circle)			
Date of GW Level: 2-6-21	Bore Radius (mm): 11.11	Chem Kit Serial No.: 12F104652	Decontamination: F1 Low Flow Pump rate:	Hydrasleeve Info:			
Depth to GW (m-pvc): 11.11	Screen Interval (m): 4.63-13.63	Chem Kit Model: 451 Pro Series	Intake depth: F1 Hydrasleeve	Hydrasleeve Size:			
Bore Depth (m-pvc): 14.74	Casing Radius (mm): 25	Corrected Redox: X + N	F1 Bailor	Hydrasleeve Type:			
Depth to Product (m-pvc): 11.11	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	F1 Peristaltic Pump	Sampling Depth (m-pvc):			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole	F1 Other (specify):	Hydrasleeve Install time:			
	Key Type (if applicable): NA	Retrieved		Sampling Start Time:			
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (approx. mg/L)	E.C. (mS/cm)	pH	Redox (mV)
0916	10	11.11					
0918	20	"					
0921	30	"					
0924	40	"					
0928	50	"					
0930	60			7.28	160.1	6.75	135.1
0932				7.23	160.0	6.65	140.3
0935				7.51	157.8	6.54	131.1
0937				7.17	160.0	6.54	133.1
0939				7.12	160.0	6.54	134.6
0941				7.09	160.0	6.53	135.6
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV
Bottles Collected				QA/QC Information			
Analytes Sampled for:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)	
Unfiltered:		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic	
Approval and Distribution							
Fieldwork Staff Signature				Date			
Project Manager Signature				Date			
Checker Name and Signature				Date			
Distribution: Project Central File							

± 10% turbidity (if using a turbidity meter)

Field Comments

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

$$V = 4 \times (14.25 - 11.11)$$

$$= 4 \times 12$$

$$= 12.56 \times 37.68 \text{ L}$$

Samples collected @ 0943

[illegible]

FQM - Groundwater Sampling and Purging Record

1 10L Bucket = 1:04:92.

Project Name: SW Basins		Project Number: 6064977		PM Name: SH		Bore ID: Location 6	
Client: CCE		Project Location: 04 Floor Basin		Fieldwork Staff: MF + ER		Sample Date: 2-6-2021	
General Bore Information				Sampling Method			
Date of GW Level: 2-6-21	Bore Radius (mm): 1.3-5.8	Chem Kit Serial No.: YSI 60 Series	F1 Low Flow Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc): 1.81	Screen Interval (m): 25	Corrected Redox: Y / N	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 6.165	Casing Radius (mm): 25	(The correction to apply is probe dependent)	F1 Disposable		Sampling Depth (m-pvc):		
Depth to Product (m-pvc): -	Cover Type (gauge/stick up):	Parameter method: F1 Downhole	F1 Other (specify):		Hydrasleeve Install time:		
Product Thickness (m): -	Bore Locked (YES/NO):	Parameter method: F1 Retrieved	Submersible		Sampling Start Time:		
Calculated bore volume (L):				Total purged volume (L):			
Includes/ excludes bore annulus (circle)				# purge volumes removed:			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm)	pH	Redox (mV)
1147	10						
1148	20						
1149	30						
1150	40						
1151	50						
1152	60						
1156			7.03	41.7	7.17	125.8	10.9
1158			6.94	41.7	7.04	132.7	10.9
12:00			6.80	41.7	6.97	136.8	10.9
12:02			6.78	41.7	6.93	140.5	10.9
			6.73	41.8	6.92	143.8	10.9
Acceptable Parameter Range:							
Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
	ALL	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
Approval and Distribution		V = 4 x (6.165 - 1.81)					
Fieldwork Staff Signature		= 4 x 4.355					
Date: 2-6-21		= 17.42 (x3)					
Project Manager Signature		= 52.26 L					
Date		Ridge sampling @ = 3.075 m					
Checker Name and Signature							
Date							
Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

start @ 1230

A 10L bucket = 01:01:00

[illegible]

Black key

purged @ 7.5m.

[illegible]

SPL $\frac{w}{G^m}$

Red Key.

[illegible]

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Purge @ 7.87m.

Project Name:		CCC Stormwater Basins		Project Number:		60849177 - 3.2.3		PM Name:		S Hay		Bore ID:		Location 3	
Client:		CCC		Project Location:		Awatek Basin		Fieldwork Staff:		M. Fletcher		Sample Date:		23-6-2021	
General Bore Information															
Date of GW Level:		23-6-21		Bore Radius (mm):				Chem Kit Serial No.:				Well Development or Well Sampling Event? (circle)		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		5.670		Screen Interval (m):		2.9-0.9		Corrected Redox: Y / N		1		Hydrasleeve Size:		Gauging	
Bore Depth (m-pvc):		8.800		Casing Radius (mm):		25		(The correction to apply is probe dependent!)				Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):		-		Cover Type (gauge/stick up):				Parameter method: F1 Downhole				Hydrasleeve Insulation Time:		Hydrasleeve out	
Product Thickness (m):		-		Bore Locked (YES/NO):				Retrieved				Sampling Start Time:		Parameters	
Key Type (if applicable):															
Calculated bore volume (L):				Includes/excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters															
Time		Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (mg/L)	E.C. (µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity					
1150		5.738		Start	Purging.										
1157	48	5.736		YSI	in bucket										
1158					2.41	116.1	7.07	92.2	14.2	Clear. Low to no turbidity.					
1200					2.06	116.0	6.08	88.4	14.2						
1202					1.85	116.3	5.08	86.2	14.2						
1204					1.78	116.5	5.87	85.7	14.2						
1206					1.73	116.6	5.87	84.0	14.2						
1208				Samples	Collected.										
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp															
Analyses Sampled for:															
Unfiltered:		A11 x4		Bottles Collected		QA/QC Information		Field Comments							
Field Filtered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic									
		2 Bacterial		1 Inorganics.											
		1 Metals													
Approval and Distribution															
Fieldwork Staff Signature				Checker Name and Signature				Date				Date			
Project Manager Signature				Distribution: Project Central File											

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Purge @ ~12.4 m

Orange Key

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		PM Name: Kakapo Basin		S Hay		Bore ID: Location 4	
Client: CCC		Project Location:		Fieldwork Staff: M. Fletcher		Sample Date: 24-6-2021		Well Development or Well Sampling Event? (circle)	
General Bore Information				Parameter Info.				Sampling Method	
Date of GW Level: 24-6-21		Bore Radius (mm):		Chem Kit Serial No.:		F1 Decontaminated		Hydrasleeve Size:	
Depth to GW (m-pvc): 10.788		Screen Interval (m): 4.63-13.63		Chem Kit Model: VSI 1		F1 Dedicated		Hydrasleeve Type:	
Bore Depth (m-pvc): 14.17		Casing Radius (mm): 25		Corrected Redox: Y / N		F1 Disposable		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (get/stick up):		(The correction to apply is probe dependent)		F1 Other (specify):		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Tubing		Hydrasleeve out	
Key Type (if applicable):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		F1 Retrieved		Sampling Start Time:	
Calculated bore volume (L):								Parameters	
Total purged volume (L):									
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
0905	10.785	Start	Purging						
0915	10.785	45L	in bucket	8.22	224.6	7.71	115.3	13.2	Clear. Low turbidity.
0916	"			7.44	224.1	7.12	112.6	13.2	
0918				7.13	223.9	6.91	110.7	13.2	
0920				6.95	223.9	6.80	109.8	13.2	No turb.
0922				6.69	223.3	6.73	104.9	13.2	
0926				6.66	223.2	6.72	103.8	13.2	
0928				6.65	223.2	6.72	102.8	13.2	
0930									
0932			Samples collected.						
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp									
Analytes Sampled for:		Bottles Collected				QA/QC Information			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					
	All	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
	x 4	2 Bacterial	1 Inorganics						
		1 Metals							
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Date	
M. Fletcher		24-6-21							
Project Manager Signature		Date		Distribution: Project Central File					

Field Comments

Bore volume calculation, bore condition, rate of tubing, redox correction etc.

$V = 4 \times (\text{Depth} - \text{SW})$
 $= 4 \times (14.17 - 10.788)$
 $= 13.528 \times 3$
 $= 40.584 \text{ L}$

Purge flow noticeably slower ~02:25:00 per 12L bucket.

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Purging @ ~ 12.5 m.

Light Blue Key

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		PM Name: S Hay		Bore ID: Location 5	
Client: CCC		Project Location: Kakapo Basin		Fieldwork Staff: M Fletcher		Sample Date: 24-6-2021	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: 24-6-21		Bore Radius (mm):		Sampling Method		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.785		Screen Interval (m): 4.35-13.35		F1 Low Flow Pump rate:		Hydrasleeve Size:	
Bore Depth (m-pvc): 13.81		Casing Radius (mm): 25		Intake depth:		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (gasket/stick up):		F1 Bailor		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		F1 Peristaltic Pump		Hydrasleeve Install Time:	
		Key Type (if applicable):		Other (specify)		Sampling Start Time:	
				Submersible		Hydrasleeve out Parameters	
Calculated bore volume (L):		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
1022	10.785	Start purging					
1032	10.782	YSI in bucket					
1036			7.54	105.2	7.02	117.0	13.5
1038			7.25	104.2	6.82	112.2	13.5
1040			7.13	103.7	6.73	109.4	13.5
1042			6.82	103.5	6.70	78.6	13.6
1044			6.76	102.0	6.69	77.3	13.6
1046			6.72	102.6	6.68	76.5	13.6
1048							
1048			Sample collected				
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp							
Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments	
Field Filtered:	Unfiltered: All x 4	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			
		2 Biological	1 Inorganics				
		1 Metals					
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

Time to fill 12L bucket = ~ 02:36:42

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1

[illegible]

Blank Key (no colour)

Q4AN(EV)-405-FM1

Purge @ ~ 4.35m

Project Name: CCC Stormwater Basins		Project Number: 60649177 - 3.2.3		PM Name: S Hay		Bore ID: Location 7			
Client: CCC		Project Location: Outlets Basin		Fieldwork Staff: M. Fletcher		Sample Date: 23-6-21			
General Bore Information				Well Development or Well Sampling Event? (circle)					
Date of GW Level: 23-6-21		Bore Radius (mm): 1.5-5.96		Chem Kit Serial No.: YSI 1		Monitoring sequence followed (number in order): Gauging			
Depth to GW (m-pvc): 1.81		Screen Interval (m): 25		Corrected Redox: Y / N		Hydrasleeve Size: Gauging			
Bore Depth (m-pvc): 6.37		Casing Radius (mm): 25		(The correction to apply is probe dependent)		Hydrasleeve Type: Sampling Depth (m-pvc): Hydrasleeve in			
Depth to Product (m-pvc):		Cover Type (gate/stick up):		Parameter method: F1 Downhole		Hydrasleeve Initial time: Sampling Start Time: Hydrasleeve out			
Product Thickness (m):		Bore Locked (YES/NO):		F1 Retrieved		Parameters			
Key Type (if applicable):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1420		1.86	Start	Purged					
1435		1.008	YSI	in bucket					
1437					98.8	7.88	140.1	11.3	Clear. No turbidity.
1439					98.8	7.42	134.9	11.3	
1441					98.7	7.16	132.0	11.3	
1443					98.7	7.01	130.3	11.3	
1445					98.8	6.97	129.4	11.3	
1447					98.7	6.95	128.9	11.3	
1449					98.7	6.94	128.9	11.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc. V = 4 x (Depth - SW) = 4 x (6.37 - 1.01) = 10.24 x 3 = 54.72 L.				
	All x4	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
		2 Biological	1 Inorganics						
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

Sampled @ 1870

Appendix E

Laboratory Report



9/06/2021

Quality and Compliance
P O Box 73041
Christchurch 8154

Report Number: 210601023

Client Order No: 60649177

LABORATORY ANALYSIS REPORT

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
2110430	1/06/21 14.10 1/06/21 Eli Reisman	Stormwater	Loc 1 - 210601		
				Conductivity	35.1 µS/cm
				Copper dissolved	0.00065 mg/L
				E. coli	<20 MPN/100 mL
				Lead dissolved	<0.00010 mg/L
				Total Coliforms	100 MPN/100 mL
				Zinc dissolved	<0.00010 mg/L
2110440	1/06/21 11.58 1/06/21 Eli Reisman	Stormwater	LOC 2 - 210601		
				Conductivity	36.5 µS/cm
				Copper dissolved	0.00085 mg/L
				E. coli	20 MPN/100 mL
				Lead dissolved	<0.00010 mg/L
				Total Coliforms	350 MPN/100 mL
				Zinc dissolved	0.00032 mg/L
2110441	1/06/21 09.55 1/06/21 Eli Reisman	Stormwater	LOC 3 - 210601		
				Conductivity	83.4 µS/cm

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Contact: Paul Woods
DDI: 03 941 5702

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
			Copper dissolved	0.00012	mg/L
			E. coli	<20	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	20	MPN/100 mL
			Zinc dissolved	0.0014	mg/L
2110442	1/06/21 10.14 1/06/21 Eli Reisman	Stormwater	Awatea Basin 210601		
			Conductivity	17.2	µS/cm
			Copper dissolved	0.0013	mg/L
			E. coli	320	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	15000	MPN/100 mL
			Zinc dissolved	0.029	mg/L
2110530	2/06/21 09.43 2/06/21 Melissa Fletcher	Groundwater	Loc 4 - 210602		
			Conductivity	200	µS/cm
			Copper dissolved	<0.00010	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	0.00063	mg/L
			Total Coliforms	460	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L
2110531	2/06/21 11.00 2/06/21 Melissa Fletcher	Groundwater	Loc 5 - 210602		
			Conductivity	162	µS/cm
			Copper dissolved	<0.00010	mg/L
			E. coli	2	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	1000	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L

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Contact: Paul Woods
DDI: 03 941 5702

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
2110532	2/06/21 12.08 2/06/21 Melissa Fletcher	Groundwater Loc 6 - 210602			
			Conductivity	53.3	µS/cm
			Copper dissolved	0.00070	mg/L
			E. coli	4	MPN/100 mL
			Lead dissolved	0.00015	mg/L
			Total Coliforms	260	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L
2110533	2/06/21 12.45 2/06/21 Melissa Fletcher	Groundwater Loc 7 - 210602			
			Conductivity	102	µS/cm
			Copper dissolved	0.00019	mg/L
			E. coli	1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	170	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L
2110534	2/06/21 12.00 2/06/21 Melissa Fletcher	Stormwater, Outlook Basin - 210602			
			Conductivity	86.3	µS/cm
			Copper dissolved	0.00016	mg/L
			E. coli	10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	250	MPN/100 mL
			Zinc dissolved	0.0023	mg/L

Methods:

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Contact: Paul Woods
DDI: 03 941 5702

Lab. No:	Date Sampled:	Sample Description:	Parameter Name:	Result:	Units:
Sample Name:	Time Sampled:				
	Date Received:				
	Sampled By:				

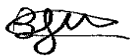
<u>Parameter name</u>	<u>Method</u>	<u>Test Completed</u>
Total Coliforms	APHA 9223 B	03/06/21
E. coli	APHA 9223 B	03/06/21
Copper dissolved	APHA 3125B (mod)	09/06/21
Lead dissolved	APHA 3125B (mod)	09/06/21
Zinc dissolved	APHA 3125B (mod)	09/06/21
Conductivity	APHA 2510 B	03/06/21

Comments.

Symbols: < means less than, > means greater than
 Units of mg/L are equivalent to g/m3 and ppm
 APHA: American Public Health Association 23rd Edition
 (S) = Subcontracted analysis
 (*) = Not IANZ accredited for this method
 e = Estimated No. CFU/100ml
 Results reported are related only to the items analysed at the laboratory.
 Samples analysed as recieved at the laboratory.
 Samples collected by client



Nicholas Ohs
Team Leader Microbiology Laboratory



Belinda Wilson
Laboratory Manager

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Contact: Paul Woods
 DDI: 03 941 5702



30/06/2021

Quality and Compliance
P O Box 73041
Christchurch

Report Number: 210623006

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
2112326	23/06/21 11.03 23/06/21 M.Fletcher	Loc1 - 21.06.23			
			Conductivity	44.8	µS/cm
			Copper acid extractable	0.0016	mg/L
			Copper dissolved	0.00062	mg/L
			E. coli	<1	MPN/100 mL
			Lead acid extractable	0.0016	mg/L
			Lead dissolved	<0.00010	mg/L
			pH	6.3	
			Total Coliforms	20	MPN/100 mL
			Zinc acid extractable	0.0063	mg/L
			Zinc dissolved	<0.00010	mg/L
2112327	23/06/21 09.44 23/06/21 M.Fletcher	Loc2 - 21.06.23			
			Conductivity	49.5	µS/cm
			Copper acid extractable	0.0015	mg/L
			Copper dissolved	0.0010	mg/L
			E. coli	<1	MPN/100 mL
			Lead acid extractable	<0.0010	mg/L
			Lead dissolved	<0.00010	mg/L

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Contact: Belinda Wilson
DDI: 03 941 5706

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
			pH	6.1	
			Total Coliforms	10	MPN/100 mL
			Zinc acid extractable	0.0023	mg/L
			Zinc dissolved	0.00096	mg/L
2112328	23/06/21 12.08 23/06/21 M.Fletcher	Loc3 - 21.06.23			
			Conductivity	112	µS/cm
			Copper acid extractable	<0.0010	mg/L
			Copper dissolved	0.00020	mg/L
			E. coli	<1	MPN/100 mL
			Lead acid extractable	<0.0010	mg/L
			Lead dissolved	<0.00010	mg/L
			pH	5.9	
			Total Coliforms	27	MPN/100 mL
			Zinc acid extractable	0.0025	mg/L
			Zinc dissolved	0.0021	mg/L
2112329	23/06/21 10.00 23/06/21 M.Fletcher	Awatea Basin			
			Conductivity	24.5	µS/cm
			Copper acid extractable	0.0026	mg/L
			Copper dissolved	0.0015	mg/L
			E. coli	75	MPN/100 mL
			Lead acid extractable	<0.0010	mg/L
			Lead dissolved	<0.00010	mg/L
			pH	6.5	
			Total Coliforms	>2400	MPN/100 mL
			Zinc acid extractable	0.029	mg/L
			Zinc dissolved	0.020	mg/L
2112330	23/06/21 14.10 23/06/21 M.Fletcher	Outlook Basin			

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Contact: Belinda Wilson
DDI: 03 941 5706

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
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Conductivity	89.0	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00026	mg/L
E. coli	3	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
pH	7.3	
Total Coliforms	240	MPN/100 mL
Zinc acid extractable	0.0032	mg/L
Zinc dissolved	0.0013	mg/L

2112331

23/06/21
13.55
23/06/21
M.Fletcher

Loc6 - 21.06.23

Conductivity	96.0	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00057	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
pH	6.8	
Total Coliforms	50	MPN/100 mL
Zinc acid extractable	<0.0010	mg/L
Zinc dissolved	<0.00010	mg/L

2112332

23/06/21
14.48
23/06/21
M.Fletcher

Loc7 - 21.06.23

Conductivity	96.2	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00021	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
pH	6.8	

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Contact: Belinda Wilson
DDI: 03 941 5706

Lab. No: Sample Name:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
			Total Coliforms	27	MPN/100 mL
			Zinc acid extractable	<0.0010	mg/L
			Zinc dissolved	<0.00010	mg/L
2112379	24/06/21 09.32 24/06/21 M.Fletcher	Loc4 - 21.06.24			
			Conductivity	214	µS/cm
			Copper acid extractable	<0.0010	mg/L
			Copper dissolved	<0.00010	mg/L
			E. coli	<1	MPN/100 mL
			Lead acid extractable	<0.0010	mg/L
			Lead dissolved	<0.00010	mg/L
			pH	6.7	
			Total Coliforms	24	MPN/100 mL
			Zinc acid extractable	0.0011	mg/L
			Zinc dissolved	0.00032	mg/L
2112380	24/06/21 10.48 24/06/21 M.Fletcher	Loc5 - 21.06.24			
			Conductivity	176	µS/cm
			Copper acid extractable	<0.0010	mg/L
			Copper dissolved	<0.00010	mg/L
			E. coli	<1	MPN/100 mL
			Lead acid extractable	<0.0010	mg/L
			Lead dissolved	<0.00010	mg/L
			pH	6.7	
			Total Coliforms	38	MPN/100 mL
			Zinc acid extractable	0.0012	mg/L
			Zinc dissolved	0.00036	mg/L

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Contact: Belinda Wilson
DDI: 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	Parameter Name:	Result:	Units:
Sample Name:	Time Sampled:				
	Date Received:				
	Sampled By:				

Methods:

<u>Parameter name</u>	<u>Method</u>	<u>Test Completed</u>
Total Coliforms	APHA 9223 B	25/06/21
E. coli	APHA 9223 B	25/06/21
Conductivity	APHA 2510 B	25/06/21
pH	APHA 4500H+ B	25/06/21
Copper acid extractable	APHA 3030E, 3125B (mod)	29/06/21
Copper dissolved	APHA 3125B (mod)	29/06/21
Lead acid extractable	APHA 3030E, 3125B (mod)	29/06/21
Lead dissolved	APHA 3125B (mod)	29/06/21
Zinc dissolved	APHA 3125B (mod)	29/06/21
Zinc acid extractable	APHA 3030E, 3125B (mod)	29/06/21

Comments.

Symbols: < means less than, > means greater than

Units of mg/L are equivalent to g/m3 and ppm

APHA: American Public Health Association 23rd Edition

(S) = Subcontracted analysis



(*) = Not IANZ accredited for this method

e = Estimated No. CFU/100ml

Results reported are related only to the items analysed at the laboratory.

Samples analysed as recieved at the laboratory.

Samples collected by client

Nicholas Ohs
Team Leader Microbiology Laboratory

Belinda Wilson
Laboratory Manager

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Contact: Belinda Wilson
DDI: 03 941 5706



12/08/2021

Veronica Zefferino
Christchurch City Council
PO Box 73041
Christchurch 8154

Report Number: 210805001

Client Order No: 60649177

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
2115234	5/08/21 11:30 5/08/21 Eli Reisman	Stormwater, Loc 1 -	Conductivity	54.0	µS/cm
			Copper dissolved	0.00046	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	10	MPN/100 mL
			Zinc dissolved	0.00027	mg/L
2115235	5/08/21 13:30 5/08/21 Eli Reisman	Stormwater, LOC 2 -	Conductivity	61.0	µS/cm
			Copper dissolved	0.00065	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	<10	MPN/100 mL
			Zinc dissolved	0.0011	mg/L
2115236	5/08/21 14:30 5/08/21 Eli Reisman	Stormwater, LOC 3 -	Conductivity	113	µS/cm
			Copper dissolved	<0.00010	mg/L
			E. coli	10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L



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Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
			Total Coliforms	10	MPN/100 mL
			Zinc dissolved	0.0021	mg/L
2115237	5/08/21 14:30 5/08/21 Eli Reisman	Stormwater, Awatea Basin <i>This sample was collected in a non-sterile container. Consequently, test results may not be reflective of bacterial concentrations present at the time of sampling.</i>			
			Conductivity	35.0	µS/cm
			Copper dissolved	0.0013	mg/L
			E. coli	400	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	11000	MPN/100 mL
			Zinc dissolved	0.067	mg/L
2115238	6/08/21 14.07 6/08/21 Eli Reisman	Groundwater, Loc 4 -			
			Conductivity	207	µS/cm
			Copper dissolved	<0.00000	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	6	MPN/100 mL
			Zinc dissolved	0.00050	mg/L
2115239	6/08/21 12.52 6/08/21 Eli Reisman	Groundwater, Loc 5 -			
			Conductivity	209	µS/cm
			Copper dissolved	<0.00000	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	2	MPN/100 mL
			Zinc dissolved	0.00011	mg/L
2115240	6/08/21 09.46 6/08/21 Eli Reisman	Groundwater, Loc 6 -			
			Conductivity	79.0	µS/cm
			Copper dissolved	0.00077	mg/L
			E. coli	1	MPN/100 mL
			Lead dissolved	0.00018	mg/L
			Total Coliforms	170	MPN/100 mL

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Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Parameter Name:	Result:	Units:
			Zinc dissolved	0.00084	mg/L
2115241	6/08/21 10.55 6/08/21 Eli Reisman	Groundwater, Loc 7 -			
			Conductivity	92.3	µS/cm
			Copper dissolved	<0.00010	mg/L
			E. coli	1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	19	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L
2115242	6/08/21 10.20 6/08/21 Eli Reisman	Stormwater, Outlook Basin - 210602			
			Conductivity	89.2	µS/cm
			Copper dissolved	0.00010	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	210	MPN/100 mL
			Zinc dissolved	0.0026	mg/L

Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc dissolved	APHA 3125B (mod)

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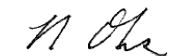
This Laboratory is accredited by International Accreditation New Zealand. The reported tests have been performed in accordance with its terms of accreditation, with the exception of tests marked *, which are not accredited.

Lab. No:	Date Sampled:	Sample Description:	Parameter Name:	Result:	Units:
	Time Sampled:				
	Date Received:				
	Sampled By:				

Comments.

Symbols: < means less than, > means greater than.
Units of mg/L are equivalent to g/m3 and ppm.
APHA: American Public Health Association 23rd Edition.
(S) = Subcontracted analysis.
(*) = Not IANZ accredited for this method.
e = Estimated No. CFU/100ml.
Results reported are related only to the items analysed at the laboratory.
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Samples collected by client.

Testing was completed: 11/08/2021 11:59:44AM. For completion dates of individual analyses, please contact the laboratory.



Nicholas Ohs
Team Leader Microbiology Laboratory

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Belinda Wilson
Laboratory Manager



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19/10/2021

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Report Number: 211004002

Quality and Compliance
P O Box 73041
Christchurch

Order No: 60649177

LABORATORY ANALYSIS REPORT

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
2119417	6/10/21 08.50	SW 061021 Awatea Basin	Due to a lab error, there are no test results for E. coli and total coliforms.		
			Conductivity	28.8	µS/cm
			Copper dissolved	0.0028	mg/L
			E. coli	No result	MPN/100 mL
			Lead dissolved	0.00015	mg/L
			Total Coliforms	No result	MPN/100 mL
			Zinc dissolved	0.092	mg/L
2119418	6/10/21 01.21	LOC 5 - 061021			
			Conductivity	222	µS/cm
			Copper dissolved	0.00011	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	<10	MPN/100 mL
769 817 770			Test results indicated as not accredited are outside the scope of the laboratory's accreditation		
				Contact: Belinda Wilson	
				DDI 03 941 5706	

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
			Zinc dissolved	0.00016	mg/L
2119419	6/10/21 02.21	LOC 4 - 061021			
			Conductivity	233	µS/cm
			Copper dissolved	0.00071	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	0.00012	mg/L
			Total Coliforms	<10	MPN/100 mL
			Zinc dissolved	0.00055	mg/L
2119420	6/10/21 09.30	LOC 3 - 061021			
			Conductivity	215	µS/cm
			Copper dissolved	0.00030	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	<10	MPN/100 mL
			Zinc dissolved	0.0037	mg/L
2119421	6/10/21 11.25	LOC 1 - 061021			
			Conductivity	54.3	µS/cm
			Copper dissolved	0.0011	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	0.00036	mg/L

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Test results indicated as not
accredited are outside the
scope of the laboratory's
accreditation

Contact: Belinda Wilson

DDI 03 941 5706

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
			Total Coliforms	31	MPN/100 mL
			Zinc dissolved	0.00091	mg/L
2119422	5/10/21 10.30	Loc 7 - 051021			
			Conductivity	100	µS/cm
			Copper dissolved	0.00029	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	0.00017	mg/L
			Total Coliforms	2	MPN/100 mL
			Zinc dissolved	0.0017	mg/L
2119423	5/10/21 11.55	Loc 6 - 051021			
			Conductivity	68.5	µS/cm
			Copper dissolved	0.0014	mg/L
			E. coli	<10	MPN/100 mL
			Lead dissolved	0.00060	mg/L
			Total Coliforms	31	MPN/100 mL
			Zinc dissolved	0.0023	mg/L
2119424	5/10/21 02.15	Loc 2 - 051021			
			Conductivity	80.7	µS/cm
			Copper dissolved	0.00091	mg/L
			E. coli	<10	MPN/100 mL

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Contact: Belinda Wilson

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Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
			Lead dissolved	0.00013	mg/L
			Total Coliforms	5	MPN/100 mL
			Zinc dissolved	0.0030	mg/L

Methods:

	Method
Conductivity	APHA 2510 B
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc dissolved	APHA 3125B (mod)

Comments.

Symbols: < means less than, > means greater than.

Units of mg/L are equivalent to g/m3 and ppm.

APHA: American Public Health Association 23rd Edition.

(S) = Subcontracted analysis.

(*) = Not IANZ accredited for this method.

e = Estimated No. CFU/100ml.

Results reported are related only to the items analysed at the laboratory.

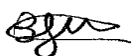
Samples analysed as recieved at the laboratory.

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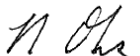
Sampled collected by client.

Testing was completed on 10/18/2021

For completion dates of individual analyses please contact the laboratory.



Belinda Wilson
Laboratory Manager



Nicholas Ohs
Team Leader Microbiology Laboratory

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accreditation

Contact: Belinda Wilson

DDI 03 941 5706

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accreditation

Contact: Belinda Wilson

DDI 03 941 5706



22/11/2021


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Report Number: 211105003

Quality and Compliance
P O Box 73041
Christchurch

Order No: 60649177

LABORATORY ANALYSIS REPORT

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
2121601	10/11/21	Groundwater			
	10.15	LOC7-101121			
			Conductivity	110	µS/cm
			Copper dissolved	0.00026	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	12	MPN/100 mL
		Zinc dissolved	<0.00010	mg/L	
2121604	10/11/21	Groundwater			
	11.30	LOC6-101121			
			Conductivity	128	µS/cm
			Copper dissolved	0.00037	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
		Total Coliforms	2	MPN/100 mL	
769 817 770			Test results indicated as not accredited are outside the scope of the laboratory's accreditation		
			Contact: Belinda Wilson		
			DDI 03 941 5706		

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
			Zinc dissolved	0.00010	mg/L
2121605	10/11/21 13.40	Groundwater LOC1-101121			
			Conductivity	168	µS/cm
			Copper dissolved	0.0018	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	2	MPN/100 mL
			Zinc dissolved	0.00087	mg/L
2121608	11/11/21 14.30	Groundwater LOC 2 11121			
			Conductivity	106	µS/cm
			Copper dissolved	0.00093	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	1	MPN/100 mL
			Zinc dissolved	0.0024	mg/L
2121609	11/11/21 13.00	Groundwater LOC 3 11121			
			Conductivity	168	µS/cm
			Copper dissolved	0.00035	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
<div> <div> 769 817 770 </div> <div> ACCREDITED  TESTING LABORATORY </div> </div> <div> Test results indicated as not accredited are outside the scope of the laboratory's accreditation </div> <div> Contact: Belinda Wilson DDI 03 941 5706 </div>					

Laboratory Number:	Date/Time Sampled :	Sample Description:	Parameter Name:	Result:	Units:
			Total Coliforms	>2400	MPN/100 mL
			Zinc dissolved	0.0041	mg/L
2122008	11/11/21 11.35	Groundwater LOC 4 11121			
			Conductivity	251	µS/cm
			Copper dissolved	0.00012	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	<1	MPN/100 mL
			Zinc dissolved	0.00036	mg/L
2122009	11/11/21 09.50	Groundwater LOC 5 11121			
			Conductivity	242	µS/cm
			Copper dissolved	<0.00010	mg/L
			E. coli	<1	MPN/100 mL
			Lead dissolved	<0.00010	mg/L
			Total Coliforms	2	MPN/100 mL
			Zinc dissolved	<0.00010	mg/L

Methods:

	Method
Conductivity	APHA 2510 B
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B

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scope of the laboratory's
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Contact: Belinda Wilson

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	Method
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc dissolved	APHA 3125B (mod)

Comments.

Symbols: < means less than, > means greater than.

Units of mg/L are equivalent to g/m3 and ppm.

APHA: American Public Health Association 23rd Edition.

(S) = Subcontracted analysis.

(*) = Not IANZ accredited for this method.

e = Estimated No. CFU/100ml.

Results reported are related only to the items analysed at the laboratory.

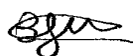
Samples analysed as recieved at the laboratory.

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Sampled collected by client.

Testing was completed on 11/22/2021

For completion dates of individual analyses please contact the laboratory.



Belinda Wilson
Laboratory Manager



Nicholas Ohs
Team Leader Microbiology Laboratory

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scope of the laboratory's
accreditation

Contact: Belinda Wilson

DDI 03 941 5706

6/12/2021

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 211130003

Client Order No: 60649177/3.2.3

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2123162	30/11/21 14.00 30/11/21 Eli Reisman	LOC 4 - 2021.11.30		
			Result:	Units:

Parameter Name:	Conductivity	258	µS/cm
	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	14	MPN/100 mL
	Zinc dissolved	0.0013	mg/L

2123163	30/11/21 14.00 30/11/21 Eli Reisman	LOC 5 - 2021.11.30		
			Result:	Units:

Parameter Name:	Conductivity	244	µS/cm
	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	5	MPN/100 mL
	Zinc dissolved	0.0029	mg/L

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Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2123164	30/11/21 14.00 30/11/21 Eli Reisman	LOC 6 - 2021.11.30		
			Result:	Units:

Parameter Name:	Conductivity	124	µS/cm
	Copper dissolved	0.00057	mg/L
	E. coli	<1	MPN/100 mL
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	110	MPN/100 mL
	Zinc dissolved	0.0012	mg/L

2123165	30/11/21 14.00 30/11/21 Eli Reisman	LOC 7 - 2021.11.30		
			Result:	Units:

Parameter Name:	Conductivity	101	µS/cm
	Copper dissolved	0.00027	mg/L
	E. coli	<1	MPN/100 mL
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	1	MPN/100 mL
	Zinc dissolved	0.0019	mg/L

2123231	1/12/21 13.10 1/12/21 Eli Reisman	LOC 1 - 21.12.1		
			Result:	Units:

Parameter Name:	Conductivity	140	µS/cm
	Copper dissolved	0.00075	mg/L
	E. coli	<1	MPN/100 mL
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	3	MPN/100 mL
	Zinc dissolved	0.0018	mg/L

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Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2123232	1/12/21 10.00 1/12/21 Eli Reisman	LOC 2 - 21.12.1		
			Result:	Units:
Parameter Name:	Conductivity	74.0	µS/cm	
	Copper dissolved	0.0012	mg/L	
	E. coli	2	MPN/100 mL	
	Lead dissolved	<0.00010	mg/L	
	Total Coliforms	270	MPN/100 mL	
	Zinc dissolved	0.0028	mg/L	
2123233	1/12/21 11.30 1/12/21 Eli Reisman	LOC 3 - 21.12.1		
			Result:	Units:
Parameter Name:	Conductivity	237	µS/cm	
	Copper dissolved	0.00035	mg/L	
	E. coli	<1	MPN/100 mL	
	Lead dissolved	<0.00010	mg/L	
	Total Coliforms	160	MPN/100 mL	
	Zinc dissolved	0.0052	mg/L	

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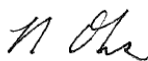
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc dissolved	APHA 3125B (mod)

Comments.

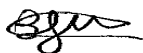
Symbols: < means less than, > means greater than.
 Units of mg/L are equivalent to g/m3 and ppm.
 APHA: American Public Health Association 23rd Edition.
 (S) = Subcontracted analysis.
 (*) = Not IANZ accredited for this method.
 e = Estimated No. CFU/100ml.
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Testing was completed: 3/12/2021 3:25:34PM. For completion dates of individual analyses, please contact the laboratory.



Nicholas Ohs
Team Leader Microbiology Laboratory

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Belinda Wilson
Laboratory Manager

13/01/2022

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 211221005

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:	Result:	Units:
2124765	21/12/21 11.30 21/12/21 Eli Reisman	LOC 4-2021.12.21		

Parameter Name:	Conductivity	250	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	1	MPN/100 mL
	Zinc acid extractable	0.0014	mg/L
	Zinc dissolved	0.00035	mg/L

2124766	21/12/21 09.30 21/12/21 Eli Reisman	LOC 5-2021.12.21	Result:	Units:
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Parameter Name:	Conductivity	208	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	<0.00010	mg/L

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	62	MPN/100 mL
	Zinc acid extractable	0.011	mg/L
	Zinc dissolved	0.00032	mg/L

2124767	21/12/21 14.20 21/12/21 Eli Reisman	LOC 6-2021.12.21		
			Result:	Units:

Parameter Name:	Conductivity	106	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00078	mg/L
	E. coli	2	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	180	MPN/100 mL
	Zinc acid extractable	0.0023	mg/L
	Zinc dissolved	0.0014	mg/L

2124768	21/12/21 13.25 21/12/21 Eli Reisman	LOC 7-2021.12.21		
			Result:	Units:

Parameter Name:	Conductivity	109	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.0031	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson
DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Lead dissolved	<0.00010	mg/L
	Total Coliforms	250	MPN/100 mL
	Zinc acid extractable	0.0034	mg/L
	Zinc dissolved	0.0037	mg/L

2124888 22/12/21
13.15
22/12/21
Eli Reisman

LOC 1-2021.12.22

Result: **Units:**

Parameter Name:	Conductivity	59.8	µS/cm
	Copper acid extractable	0.0014	mg/L
	Copper dissolved	0.00076	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	38	MPN/100 mL
	Zinc acid extractable	0.0041	mg/L
	Zinc dissolved	0.00031	mg/L

2124889 22/12/21
10.00
22/12/21
Eli Reisman

LOC 2-2021.12.22

Result: **Units:**

Parameter Name:	Conductivity	60.5	µS/cm
	Copper acid extractable	0.0014	mg/L
	Copper dissolved	0.00093	mg/L
	E. coli	6	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	66	MPN/100 mL

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Test results indicated as not
accredited are outside the
scope of the laboratory's
accreditation

Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Zinc acid extractable	0.0059	mg/L
	Zinc dissolved	0.0026	mg/L

2124890	22/12/21 11.20 22/12/21 Eli Reisman	LOC 3-2021.12.22		
			Result:	Units:

Parameter Name:	Conductivity	130	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00041	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	110	MPN/100 mL
	Zinc acid extractable	0.0066	mg/L
	Zinc dissolved	0.0080	mg/L

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson

DDI 03 941 5706

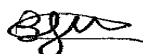
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments.

Symbols: < means less than, > means greater than.
 Units of mg/L are equivalent to g/m3 and ppm.
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Testing was completed: 12/01/2022 12:20:29PM. For completion dates of individual analyses, please contact the laboratory.



Belinda Wilson
Laboratory Manager



Simon Armstrong
Drinking Water Sampling Technician

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31/01/2022

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 220113003

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2200696	13/01/22 14.33 13/01/22 Eli Reisman	LOC 3-2021-1-13		
			Result:	Units:

Parameter Name:	Conductivity	24.7	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00029	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	11	MPN/100 mL
	Zinc acid extractable	0.0056	mg/L
	Zinc dissolved	0.0039	mg/L

2200697	13/01/22 12.40 13/01/22 Eli Reisman	LOC 4-2021-1-13		
			Result:	Units:

Parameter Name:	Conductivity	25.8	µS/cm
	Copper acid extractable	<0.0010	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	<1	MPN/100 mL
	Zinc acid extractable	0.0024	mg/L
	Zinc dissolved	0.00087	mg/L

2200698	13/01/22 10.30 13/01/22 Eli Reisman	LOC 5-2021-1-13		
			Result:	Units:

Parameter Name:	Conductivity	25.2	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	1	MPN/100 mL
	Zinc acid extractable	0.0026	mg/L
	Zinc dissolved	0.00064	mg/L

2200734	14/01/22 12.20 14/01/22 Eli Reisman	LOC 1		
			Result:	Units:

Parameter Name:	Conductivity	129	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00037	mg/L
	E. coli	1	MPN/100 mL

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	41	MPN/100 mL
	Zinc acid extractable	0.0037	mg/L
	Zinc dissolved	0.0014	mg/L

2200735 14/01/22 **LOC 2**
13.30
14/01/22
Eli Reisman

Result: **Units:**

Parameter Name:	Conductivity	87.2	µS/cm
	Copper acid extractable	0.0012	mg/L
	Copper dissolved	0.0010	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	24	MPN/100 mL
	Zinc acid extractable	0.0081	mg/L
	Zinc dissolved	0.0034	mg/L

2200737 14/01/22 **LOC 6**
10.55
14/01/22
Eli Reisman

Result: **Units:**

Parameter Name:	Conductivity	132	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00052	mg/L
	E. coli	1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Total Coliforms	36	MPN/100 mL
	Zinc acid extractable	0.0042	mg/L
	Zinc dissolved	0.0010	mg/L

2200738	14/01/22 09.25 14/01/22 Eli Reisman	LOC 7		
			Result:	Units:

Parameter Name:	Conductivity	100	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00023	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	260	MPN/100 mL
	Zinc acid extractable	0.0024	mg/L
	Zinc dissolved	0.0010	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

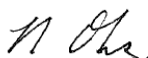
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments.

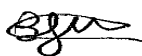
Symbols: < means less than, > means greater than.
Units of mg/L are equivalent to g/m3 and ppm.
APHA: American Public Health Association 23rd Edition.
(S) = Subcontracted analysis.
(*) = Not IANZ accredited for this method.
e = Estimated No. CFU/100ml.
Results reported are related only to the items analysed at the laboratory.
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Testing was completed: 28/01/2022 3:29:13PM. For completion dates of individual analyses, please contact the laboratory.



Nicholas Ohs
Team Leader Microbiology Laboratory

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Belinda Wilson
Laboratory Manager

2/03/2022

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 220216003

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2202836	16/02/22 11.30 16/02/22 Eli Reisman	LOC 4-2022-02-16		
			Result:	Units:

Parameter Name:	Conductivity	240	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00019	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	<1	MPN/100 mL
	Zinc acid extractable	0.0027	mg/L
	Zinc dissolved	0.00079	mg/L

2202837	16/02/22 10.30 16/02/22 Eli Reisman	LOC 5-2022-02-16		
			Result:	Units:

Parameter Name:	Conductivity	166	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00015	mg/L

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DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	1600	MPN/100 mL
	Zinc acid extractable	0.0019	mg/L
	Zinc dissolved	0.0011	mg/L

2202838	16/02/22 14.00 16/02/22 Eli Reisman	LOC 6-2022-02-16		
			Result:	Units:

Parameter Name:	Conductivity	81.0	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00090	mg/L
	E. coli	5	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	610	MPN/100 mL
	Zinc acid extractable	0.0068	mg/L
	Zinc dissolved	0.00099	mg/L

2202839	16/02/22 12.45 16/02/22 Eli Reisman	LOC 7-2022-02-16		
			Result:	Units:

Parameter Name:	Conductivity	112	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00042	mg/L
	E. coli	5	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Lead dissolved	<0.00010	mg/L
	Total Coliforms	83	MPN/100 mL
	Zinc acid extractable	0.0011	mg/L
	Zinc dissolved	0.00080	mg/L

2202840 16/02/22 **Outlook basin**
12.50 *Micro sample collected 17.02.22*
16/02/22
Eli Reisman

Result: **Units:**

Parameter Name:	Conductivity	105	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00040	mg/L
	E. coli	390	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	24000	MPN/100 mL
	Zinc acid extractable	0.0013	mg/L
	Zinc dissolved	0.00086	mg/L

2202885 17/02/22 **LOC 1-2022-02-17**
13.00
17/02/22
Eli Reisman

Result: **Units:**

Parameter Name:	Conductivity	47.1	µS/cm
	Copper acid extractable	0.0015	mg/L
	Copper dissolved	0.00067	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	0.0011	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	23	MPN/100 mL

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Zinc acid extractable	0.0048	mg/L
	Zinc dissolved	0.0015	mg/L

2202886	17/02/22 10.00 17/02/22 Eli Reisman	LOC 2-2022-02-17		
			Result:	Units:

Parameter Name:	Conductivity	38.2	µS/cm
	Copper acid extractable	0.0016	mg/L
	Copper dissolved	<0.00010	mg/L
	E. coli	1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	91	MPN/100 mL
	Zinc acid extractable	0.0036	mg/L
	Zinc dissolved	0.0011	mg/L

2202887	17/02/22 11.30 17/02/22 Eli Reisman	LOC 3-2022-02-17		
			Result:	Units:

Parameter Name:	Conductivity	69.0	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00018	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	17	MPN/100 mL
	Zinc acid extractable	0.0027	mg/L
	Zinc dissolved	0.0019	mg/L

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2202888	17/02/22 09.30 17/02/22 Eli Reisman	Awatea Basin		
			Result:	Units:

Parameter Name:	Conductivity	34.6	µS/cm
	Copper acid extractable	0.0019	mg/L
	Copper dissolved	0.0013	mg/L
	E. coli	320	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	>24000	MPN/100 mL
	Zinc acid extractable	0.040	mg/L
	Zinc dissolved	0.027	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

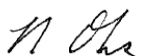
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments.

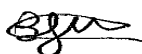
Symbols: < means less than, > means greater than.
Units of mg/L are equivalent to g/m3 and ppm.
APHA: American Public Health Association 23rd Edition.
(S) = Subcontracted analysis.
(*) = Not IANZ accredited for this method.
e = Estimated No. CFU/100ml.
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Testing was completed: 1/03/2022 12:43:54PM. For completion dates of individual analyses, please contact the laboratory.



Nicholas Ohs
Team Leader Microbiology Laboratory

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Belinda Wilson
Laboratory Manager

28/03/2022

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 220309002

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2204544	9/03/22 13.30 9/03/22 Eli Reisman	LOC4 - 2022-03-09		
			Result:	Units:

Parameter Name:	Conductivity	263	µS/cm
	Copper acid extractable	0.13	mg/L
	Copper dissolved	0.00020	mg/L
	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.17	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	41	MPN/100 mL
	Zinc acid extractable	0.48	mg/L
	Zinc dissolved	0.00072	mg/L

2204545	9/03/22 12.30 9/03/22 Eli Reisman	LOC5 - 2022-03-09		
			Result:	Units:

Parameter Name:	Conductivity	245	µS/cm
	Copper acid extractable	0.089	mg/L
	Copper dissolved	0.00018	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.085	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	10	MPN/100 mL
	Zinc acid extractable	0.31	mg/L
	Zinc dissolved	0.00034	mg/L

2204570	10/03/22 14:00 10/03/22 Eli Reisman	LOC1 - 2022-03-10		
			Result:	Units:

Parameter Name:	Conductivity	239	µS/cm
	Copper acid extractable	0.32	mg/L
	Copper dissolved	0.00043	mg/L
	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.50	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	140	MPN/100 mL
	Zinc acid extractable	1.4	mg/L
	Zinc dissolved	0.00012	mg/L

2204571	10/03/22 12:15 10/03/22 Eli Reisman	LOC2 - 2022-03-10		
			Result:	Units:

Parameter Name:	Conductivity	87.7	µS/cm
	Copper acid extractable	0.095	mg/L
	Copper dissolved	0.00077	mg/L
	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.21	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Lead dissolved	<0.00010	mg/L
	Total Coliforms	140	MPN/100 mL
	Zinc acid extractable	0.34	mg/L
	Zinc dissolved	0.00064	mg/L

2204572	10/03/22 13:30 10/03/22 Eli Reisman	LOC3 - 2022-03-10	Result:	Units:
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Parameter Name:	Conductivity	234	µS/cm
	Copper acid extractable	0.039	mg/L
	Copper dissolved	0.00058	mg/L
	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.13	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	>24000	MPN/100 mL
	Zinc acid extractable	0.17	mg/L
	Zinc dissolved	0.010	mg/L

2204573	10/03/22 11:00 10/03/22 Eli Reisman	LOC6 - 2022-03-10	Result:	Units:
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Parameter Name:	Conductivity	113	µS/cm
	Copper acid extractable	0.020	mg/L
	Copper dissolved	0.00050	mg/L
	E. coli	20	MPN/100 mL
	Lead acid extractable	0.022	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	2600	MPN/100 mL

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Zinc acid extractable	0.063	mg/L
	Zinc dissolved	<0.00010	mg/L

2204574	10/03/22 10:00 10/03/22 Eli Reisman	LOC7 - 2022-03-10		
			Result:	Units:

Parameter Name:	Conductivity	104	µS/cm
	Copper acid extractable	0.0063	mg/L
	Copper dissolved	0.00040	mg/L
	E. coli	<10	MPN/100 mL
	Lead acid extractable	0.0061	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	190	MPN/100 mL
	Zinc acid extractable	0.018	mg/L
	Zinc dissolved	0.00034	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

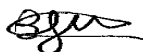
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments.

Symbols: < means less than, > means greater than.
Units of mg/L are equivalent to g/m3 and ppm.
APHA: American Public Health Association 23rd Edition.
(S) = Subcontracted analysis.
(*) = Not IANZ accredited for this method.
e = Estimated No. CFU/100ml.
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Testing was completed: 25/03/2022 2:59:24pm. For completion dates of individual analyses, please contact the laboratory.



Belinda Wilson
Laboratory Manager

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Simon Armstrong
Drinking Water Sampling Technician

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14/04/2022

Veronica Zefferino
Christchurch City Council
P O Box 73041
Christchurch 8154

Report Number: 220405003

Client Order No:

LABORATORY ANALYSIS REPORT

Lab. No:	Date Sampled: Time Sampled: Date Received: Sampled By:	Sample Description:		
2205971	5/04/22 09.00 5/04/22 Eli Reisman	LOC 4 - 2022.4.5		
			Result:	Units:

Parameter Name:	Conductivity	257	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	<0.00010	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	24	MPN/100 mL
	Zinc acid extractable	0.0034	mg/L
	Zinc dissolved	0.00060	mg/L

2205972	5/04/22 10.00 5/04/22 Eli Reisman	LOC 5 - 2022.4.5		
			Result:	Units:

Parameter Name:	Conductivity	246	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	<0.00010	mg/L

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Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	11	MPN/100 mL
	Zinc acid extractable	0.0033	mg/L
	Zinc dissolved	0.0013	mg/L

2205973	5/04/22 13.30 5/04/22 Eli Reisman	LOC 6 - 2022.4.5		
			Result:	Units:

Parameter Name:	Conductivity	111	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00041	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	32	MPN/100 mL
	Zinc acid extractable	0.0011	mg/L
	Zinc dissolved	0.00083	mg/L

2205974	5/04/22 12.45 5/04/22 Eli Reisman	LOC 7 - 2022.4.5		
			Result:	Units:

Parameter Name:	Conductivity	106	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00025	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson
DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Lead dissolved	<0.00010	mg/L
	Total Coliforms	13	MPN/100 mL
	Zinc acid extractable	0.0020	mg/L
	Zinc dissolved	0.00062	mg/L

2206032	6/04/22 13.00 6/04/22 Eli Reisman	LOC 1 - 2022.4.6		
			Result:	Units:

Parameter Name:	Conductivity	140	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00043	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	2	MPN/100 mL
	Zinc acid extractable	0.0067	mg/L
	Zinc dissolved	0.0013	mg/L

2206033	6/04/22 11.30 6/04/22 Eli Reisman	LOC 2 - 2022.4.6		
			Result:	Units:

Parameter Name:	Conductivity	87.7	µS/cm
	Copper acid extractable	0.0013	mg/L
	Copper dissolved	0.00099	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	19	MPN/100 mL

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson

DDI 03 941 5706

Lab. No:	Date Sampled:	Sample Description:	
	Time Sampled:		
	Date Received:		
	Sampled By:		

Parameter Name:	Zinc acid extractable	0.0085	mg/L
	Zinc dissolved	0.0028	mg/L

2206034	6/04/22 09.30 6/04/22 Eli Reisman	LOC 3 - 2022.4.6		
			Result:	Units:

Parameter Name:	Conductivity	148	µS/cm
	Copper acid extractable	<0.0010	mg/L
	Copper dissolved	0.00030	mg/L
	E. coli	<1	MPN/100 mL
	Lead acid extractable	<0.0010	mg/L
	Lead dissolved	<0.00010	mg/L
	Total Coliforms	9	MPN/100 mL
	Zinc acid extractable	0.0059	mg/L
	Zinc dissolved	0.0059	mg/L

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Contact: Belinda Wilson

DDI 03 941 5706

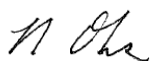
Methods:

	Method Reference
Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments.

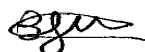
Symbols: < means less than, > means greater than.
Units of mg/L are equivalent to g/m3 and ppm.
APHA: American Public Health Association 23rd Edition.
(S) = Subcontracted analysis.
(*) = Not IANZ accredited for this method.
e = Estimated No. CFU/100ml.
Results reported are related only to the items analysed at the laboratory.
This report must not be reproduced, except in full, without written consent.

Testing was completed: 13/04/2022 1:00:26pm. For completion dates of individual analyses, please contact the laboratory.
The samples were analysed as received.



Nicholas Ohs
Team Leader Microbiology Laboratory

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Belinda Wilson
Laboratory Manager

Laboratory Analysis Report

Client Details:	Eli Reisman	Report Number:	220504007
	2/2 Hazeldean Road	Report Date:	24.05.2022
	Christchurch	Purchase Order:	60649177/3.2.3

Sample Name:	LOC 4 - 22.5.4	Date/Time Sampled:	04.05.2022 /10.00
Lab ID:	2207366	Date Received:	04.05.2022
Sampled By:	Eli Reisman		

Test	Result	Unit
Conductivity	239	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	<0.00010	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	730	MPN/100 mL
Zinc acid extractable	0.030	mg/L
Zinc dissolved	0.0012	mg/L

Sample Name:	LOC 5 - 22.5.4	Date/Time Sampled:	04.05.2022 /11.30
Lab ID:	2207367	Date Received:	04.05.2022
Sampled By:	Eli Reisman		

Test	Result	Unit
Conductivity	239	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	<0.00010	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	160	MPN/100 mL
Zinc acid extractable	0.0020	mg/L
Zinc dissolved	0.0010	mg/L

Sample Name:	LOC 6 - 22.5.4	Date/Time Sampled:	04.05.2022 /12.30
Lab ID:	2207368	Date Received:	04.05.2022
Sampled By:	Eli Reisman		

Test	Result	Unit
Conductivity	134	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00033	mg/L
E. coli	<1	MPN/100 mL

<i>Sample Name:</i>	LOC 6 - 22.5.4	<i>Date/Time Sampled:</i>	04.05.2022 /12.30
<i>Lab ID:</i>	2207368	<i>Date Received:</i>	04.05.2022
<i>Sampled By:</i>	Eli Reisman		

Test	Result	Unit
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	16	MPN/100 mL
Zinc acid extractable	0.0021	mg/L
Zinc dissolved	0.00068	mg/L

<i>Sample Name:</i>	LOC 7 - 22.5.4	<i>Date/Time Sampled:</i>	04.05.2022 /13.45
<i>Lab ID:</i>	2207369	<i>Date Received:</i>	04.05.2022
<i>Sampled By:</i>	Eli Reisman		

Test	Result	Unit
Conductivity	127	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00025	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	5	MPN/100 mL
Zinc acid extractable	0.0018	mg/L
Zinc dissolved	0.0013	mg/L

Test Method References

Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments

- This Laboratory is accredited by International Accreditation New Zealand (IANZ). The reported tests have been performed in accordance with its terms of accreditation, with the exception of tests marked *, which are not accredited.
- Samples were collected by the client and tested by the laboratory, as received. Results reported relate only to the items analysed by the laboratory.
- This report must not be reproduced, except in full, without written consent.
- Symbols used: (S) = subcontracted analysis, (*) = not IANZ accredited for this method, e = estimated No. CFU/100 mL
- Testing was completed: 20/05/2022 12:59:33pm. For completion dates of individual analyses, please contact the lab.



Simon Armstrong
Drinking Water Sampling Technician



Craig Henderson
Team Leader Chemistry Laboratory



Suzie Yates
Laboratory Technician

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Test results indicated as not
accredited are outside the
scope of the laboratory's
accreditation

Laboratory Analysis Report

Client Details: Eli Reisman
2/2 Hazeldean Road
Christchurch

Report Number: 220505004
Report Date: 24.05.2022
Purchase Order: 60649177/3.2.3

Sample Name: LOC - 1 - 22.5.5
Lab ID: 2207449
Sampled By: Eli Reisman

Date/Time Sampled: 05.05.2022 /11.30
Date Received: 05.05.2022

Test	Result	Unit
Conductivity	237	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00032	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	23	MPN/100 mL
Zinc acid extractable	0.0020	mg/L
Zinc dissolved	0.0013	mg/L

Sample Name: LOC - 2 - 22.5.5
Lab ID: 2207450
Sampled By: Eli Reisman

Date/Time Sampled: 05.05.2022 /10.00
Date Received: 05.05.2022

Test	Result	Unit
Conductivity	97.3	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00081	mg/L
E. coli	<1	MPN/100 mL
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	2	MPN/100 mL
Zinc acid extractable	0.0040	mg/L
Zinc dissolved	0.0034	mg/L

Sample Name: LOC - 3 - 22.5.5
Lab ID: 2207451
Sampled By: Eli Reisman

Date/Time Sampled: 05.05.2022 /13.30
Date Received: 05.05.2022

Test	Result	Unit
Conductivity	156	µS/cm
Copper acid extractable	<0.0010	mg/L
Copper dissolved	0.00019	mg/L
E. coli	<1	MPN/100 mL

Sample Name: **LOC - 3 - 22.5.5**
Lab ID: 2207451
Sampled By: Eli Reisman

Date/Time Sampled: 05.05.2022 /13.30
Date Received: 05.05.2022

Test	Result	Unit
Lead acid extractable	<0.0010	mg/L
Lead dissolved	<0.00010	mg/L
Total Coliforms	2	MPN/100 mL
Zinc acid extractable	0.0052	mg/L
Zinc dissolved	0.0034	mg/L

Test Method References

Conductivity	APHA 2510 B
Copper acid extractable	APHA 3030E, 3125B (mod)
Copper dissolved	APHA 3125B (mod)
E. coli	APHA 9223 B
Lead acid extractable	APHA 3030E, 3125B (mod)
Lead dissolved	APHA 3125B (mod)
Total Coliforms	APHA 9223 B
Zinc acid extractable	APHA 3030E, 3125B (mod)
Zinc dissolved	APHA 3125B (mod)

Comments

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- Symbols used: (S) = subcontracted analysis, (*) = not IANZ accredited for this method, e = estimated No. CFU/100 mL
- Testing was completed: 20/05/2022 1:00:18pm. For completion dates of individual analyses, please contact the lab.



Simon Armstrong
Drinking Water Sampling Technician



Craig Henderson
Team Leader Chemistry Laboratory



Suzie Yates
Laboratory Technician

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Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Appendix F

Survey Report

Coordinate System: NZGD2000
Circuit: Mount Pleasant 2000
Datum: CDD
Origin of levels: EHCH (14 Jan 2018)

Location	Easting (m)	Northing (m)	Elevation (m)
AWATEA BASIN GROUND	385038.646	803928.278	27.929
AWATEA BASIN TOP OF CASING	385038.646	803928.278	27.975
AWATEA BASIN TELEMETRY	385025.636	803944.439	29.365
KAKAPO BASIN GROUND	384861.478	806601.497	33.108
KAKAPO BASIN TOP OF CASING	384861.478	806601.497	33.145
KAKAPO BASIN TELEMETRY	384861.061	806589.633	33.944
OUTLOOK BASIN GROUND	387922.261	814121.779	27.203
OUTLOOK BASIN TOP OF CASING	387922.261	814121.779	27.232
OUTLOOK BASIN TELEMETRY	387922.711	814130.141	28.178
WELL 1 GROUND	385097.307	803519.956	30.615
WELL 1 TOP OF CASING	385097.307	803519.956	31.096
WELL 2 GROUND	385158.736	803843.788	30.725
WELL 2 TOP OF CASING	385158.736	803843.788	31.213
WELL 3 GROUND	384931.61	803886.268	30.816
WELL 3 TOP OF CASING	384931.61	803886.268	31.282
WELL 4 GROUND	384786.008	806629.867	34.807
WELL 4 TOP OF CASING	384786.008	806629.867	35.162
WELL 5 GROUND	384900.015	806608.725	34.635
WELL 5 TOP OF CASING	384900.015	806608.725	35.106
WELL 6 GROUND	387938.06	814123.516	28.329
WELL 6 TOP OF CASING	387938.06	814123.516	28.765
WELL 7 GROUND	387878.516	814142.755	28.509
WELL 7 TOP OF CASING	387878.516	814142.755	28.989