Laura Bowman

From: Official Information
Sent: Thursday, 10 November 2022 9:35 am
To: 7(2)(a) [redacted]
Cc: Official Information
Subject: Final Response - LGOIMA 283997 - 7(2)(a) [redacted] - Water analysis monitoring of the Taitua water supply for the last 6 months
Attachments: Attachment A HCC Taitua - Routine Monitoring Results.XLSX; Attachment B Taitua Chemical Comprehensive - March 2022.PDF

Kia Ora,

I refer to your **information request below**, Hamilton City Council is able to provide the following response.

The City Waters Team of the Hamilton City Council have answered the initial part of your request concerning the of use of the terms "low fluoride water supply" instead of "fluoride free water supply" in their email to you dated 29 September 2022. Therefore we are responding to the following the remaining parts of your request.

Your request 1:
Please also send me a copy of the read-out of your required regular water analysis monitoring of the Taitua Water Supply (including measuring fluoride content), for the last 6 months (or from when the readings were resumed if they had ceased in that time) up until the present day.

Our Response 1:

The following are the results of commission monitoring of the Taitua Arboretum additional water supply from March 2022 – October 2022:

1. **Attachment A:** commission monitoring for bacteria (E.coli, Total Coliforms, Heterotrophic Plate Count) and associated field tests (turbidity, pH, UV transmittance) – various sites;
2. **Attachment B:** Taitua chemical comprehensive: 29/03/22 – raw water and treated water - includes fluoride.

The sample sites at Taitua Arboretum include:

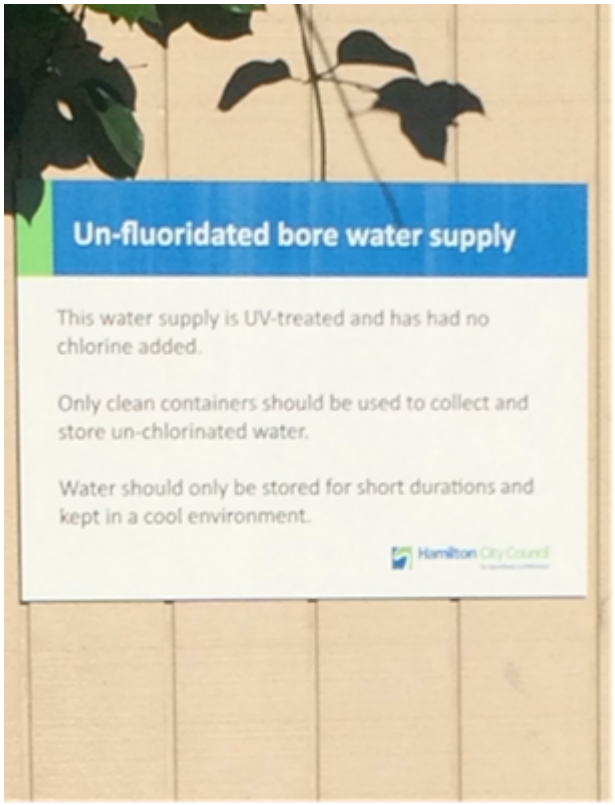
1. Taitua Arboretum – treated water supplied to the public tap;
2. Taitua Arboretum pre-filtration – untreated water – sample tap immediately before the cartridge filters;
3. Taitua Arboretum post filtration – partially treated water – sample tap immediately after the cartridge filters
4. Taitua Arboretum post UV-treated water – sample tap immediately after ultra violet treatment;
5. Taitua Arboretum reservoir tap – treated water – sample tap within treatment area compound;
6. Taitua Arboretum - site one – treated water

Your Request 2:
As the water supply at Claudelands does not originate as bore water and instead a reverse osmosis filtration system is used to remove the fluoride (and other contaminants) from the town water - do you also apply the same "low fluoride" description to that public water supply?
Can you tell me what wording is being used on the notices at both the Taitua and the Claudelands taps, please? Is the water described as "low fluoride"?

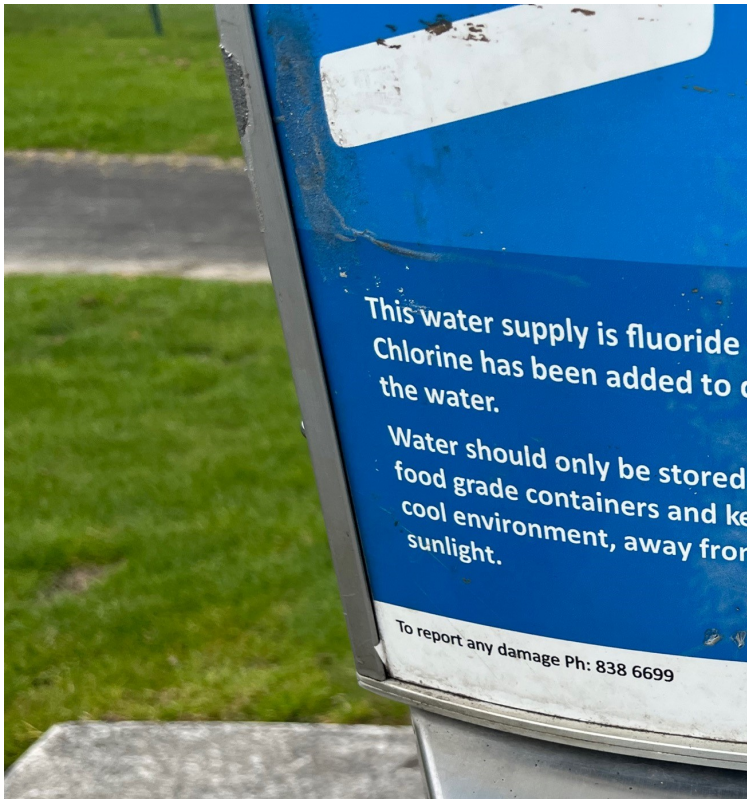
Our Response 2:
The Claudelands public drinking water tap is supplied from an on-site system that reduces the fluoride levels in the Hamilton mains supply by reverse osmosis. The Claudelands public drinking water tap notice describes this supply as

"fluoride free" which Council acknowledges is technically incorrect. Our team will action revised signage for Claudelands to reflect the low fluoride element.

The additional water supply for the Taitua Arboretum describes the water as an "un-fluoridated bore water supply".



Taitua Arboretum



Claudelands Water Fountain

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Kind Regards,

Laura | Official Information Coordinator
Governance & Assurance Team | People and Organisational Performance
Email: officialinformation@hcc.govt.nz

Hamilton City Council
Te kaunihera o Kirikiriroa

Hamilton City Council | Private Bag 3010 | Hamilton 3240 | Hamilton City Council

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From: Ashanti Neems <Ashanti.Neems@hcc.govt.nz>
Sent: Thursday, 29 September 2022 10:29 am
To: 7(2)(a) [redacted] >

Cc: Official Information <officialinformation@hcc.govt.nz>
Subject: RE: Taitua Arboretum Low Fluoride Additional Water Supply Now Back in Service

Good Morning 7(2)(a)

City Waters staff prefer not to describe the water supply as"fluoride free" as the groundwater from the bore contains trace levels of fluoride at around 0.05 – 0.08 milligrams per litre. There is no additional fluoride that is added by Hamilton City Council. For comparison, the Waikato River trace levels of fluoride is around 0.2 milligrams per litre from the water intake point at the Waiora Treatment Plant. Council apologies for the previously used descriptions and hope the above provides clarity on the term "low fluoride".

In regards to your LGOIMA request below, the request for data has now been actioned and will be provided to you within the official information timeframes.

Kind regards,

Ashanti Neems
Acting Compliance Manager – City Waters
Performance & Support Manager – City Waters (Kaitohu Taapuhipuhi) | Infrastructure Operations

DDI: 7(2)(a) | Email: Ashanti.Neems@hcc.govt.nz | Mobile: 7(2)(a)

From: 7(2)(a)
Sent: Wednesday, 28 September 2022 8:39 pm
To: Ashanti Neems <Ashanti.Neems@hcc.govt.nz>
Subject: Re: Taitua Arboretum Low Fluoride Additional Water Supply Now Back in Service

Hi Ashanti

That is very good news indeed. It has been a long awaited outcome for many Hamiltonians!

There is one point in your letter, however, that has concerned and worried a lot of people and that is your description of Taitua's water supply as a "low fluoride water supply" instead of as a "fluoride free water supply", as it was previously referred to by the Council and the public.

My understanding is that Taitua Arboretum's water is bore water and has no added fluoride or chlorine. To call it "low fluoride" is very confusing and distressing for consumers. Please explain fully the reason for the change of description.

Please also send me a copy of the read-out of your required regular water analysis monitoring of the Taitua Water Supply (including measuring fluoride content), for the last 6 months (or from when the readings were resumed if they had ceased in that time) up until the present day.

This is a LGOIMA request - Local Govt Official Information & Meetings Act 1987.

Thank you for your time

Kind regards

7(2)(a) [redacted]

On 28/09/2022 3:03 pm, Ashanti Neems wrote:

> Hello,
>
> This email is to advise you that the Taitua Arboretum low fluoride additional water supply has been returned to public service today, Wednesday 28 September 2022, following the completion of upgrade and maintenance works. Quality monitoring and clearance sampling of the treated water has been completed and the new water regulator, Taumata Arowai, have been notified.
>
> Hamilton City Council would like to extended their thanks for your continued patience over this time whilst we worked hard to return this supply to service.
>
> Kind regards,
>
> **Ashanti Neems**
> Acting Compliance Manager – City Waters
> Performance & Support Manager – City Waters (Kaitohu Taapuhipuhi) | Infrastructure Operations
>
> DDI: 7(2)(a) [redacted] | Email: Ashanti.Neems@hcc.govt.nz | Mobile: 7(2)(a) [redacted]

Hamilton City Council
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Hamilton City Council | **Private Bag 3010** | **Hamilton 3240** | **www.hamilton.govt.nz**

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							Ecoli	TotCol	HPC	%T254 (UF)	Turb	pH
							MPN/100mL	MPN/100mL	cfu/mL	%T	NTU	
HamiltonCC	2022001579	Monitoring	7/03/2022	09:30	TAI018TA	Taitua Arboretum	<1	<1	46	98.3	0.72	6.5
HamiltonCC	2022001615	Monitoring	8/03/2022	12:52	TAI018TA	Taitua Arboretum	<1	<1	199	97.9	0.39	6.5
HamiltonCC	2022001655	Monitoring	9/03/2022	09:21	TAI018TA	Taitua Arboretum	<1	<1	286	98.1	0.27	6.5
HamiltonCC	2022001894	Monitoring	16/03/2022	13:40	TAI018TA	Taitua Arboretum	<1	<1	>5700	97.4	0.71	
HamiltonCC	2022001895	Monitoring	16/03/2022	13:30	TAI018TA	Taitua Arboretum Post UV	<1	<1	>5700	97.7	0.84	
HamiltonCC	2022001896	Monitoring	17/03/2022	11:18	TAI018TA	Taitua Arboretum	<1	<1	est 400	98.1	0.38	
HamiltonCC	2022001897	Monitoring	17/03/2022	11:28	TAI018TA	Taitua Arboretum Post UV	<1	<1	est 4000	98	0.33	
HamiltonCC	2022002246	Monitoring	29/03/2022	12:38	TAI018TA	Taitua Arboretum Pre Filtration	<1	1	56	97.6	0.41	6.7
HamiltonCC	2022002250	Monitoring	29/03/2022	12:55	TAI018TA	Taitua Arboretum	<1	<1	800	97.8	0.3	7.1
HamiltonCC	2022003376	Monitoring	12/05/2022	12:23	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	461	86.9	0.35	6.5
HamiltonCC	2022003480	Monitoring	17/05/2022	08:50	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	588	99	0.51	6.5
HamiltonCC	2022003609	Monitoring	20/05/2022	13:26	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	>5700	97.5	0.21	7.1
HamiltonCC	2022003728	Monitoring	24/05/2022	12:52	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	1229	86.9	0.46	6.6
HamiltonCC	2022003795	Monitoring	26/05/2022	12:58	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	est 3339	97.2	0.34	6.8
HamiltonCC	2022003968	Monitoring	31/05/2022	11:20	TAI018TA	Taitua Arboretum Pre Filtration	2	2		97.7	0.41	6.3
HamiltonCC	2022004042	Monitoring	1/06/2022	09:45	TAI018TA	Taitua Arboretum Pre Filtration	<1	4	316	97.6	0.42	6.6
HamiltonCC	2022004103	Monitoring	3/06/2022	12:45	TAI018TA	Taitua Arboretum Pre Filtration	<1	2	187	97.4	0.61	6.6
HamiltonCC	2022004972	Monitoring	29/06/2022	15:02	TAI018TA	House next to Taitua Arboretum	<1	<1	<1		0.42	
HamiltonCC	2022004973	Monitoring	30/06/2022	11:21	TAI018TA	House next to Taitua Arboretum	<1	<1	1		0.47	
HamiltonCC	2022004974	Monitoring	1/07/2022	08:58	TAI018TA	House next to Taitua Arboretum	<1	<1	<1		0.39	
HamiltonCC	2022004986	Monitoring	1/07/2022	08:40	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	2	97.7	0.46	6.5
HamiltonCC	2022005077	Monitoring	5/07/2022	08:39	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	7	89.5	0.43	6.4
HamiltonCC	2022005214	Monitoring	7/07/2022	14:07	TAI018TA	Taitua Arboretum Pre Filtration	<1	>201	est 2000	97.7	0.46	
HamiltonCC	2022005215	Monitoring	7/07/2022	14:08	TAI018TA	Taitua Arboretum Post Filtration	<1	>201	336	97.8	0.28	
HamiltonCC	2022005216	Monitoring	7/07/2022	14:11	TAI018TA	Taitua Arboretum Post UV	<1	<1	7	97.7	0.51	
HamiltonCC	2022005217	Monitoring	7/07/2022	14:01	TAI018TA	Taitua Arboretum	<1	<1	7	97.7	0.56	
HamiltonCC	2022005218	Monitoring	7/07/2022	14:00	TAI018TA	House next to Taitua Arboretum	<1	<1	18	97.5	0.38	
HamiltonCC	2022005222	Monitoring	8/07/2022	09:10	TAI018TA	Taitua Arboretum Pre Filtration	<1	>201	584	97.3	0.41	
HamiltonCC	2022005223	Monitoring	8/07/2022	09:20	TAI018TA	Taitua Arboretum Post Filtration	<1	>201	350	97.2	0.27	
HamiltonCC	2022005224	Monitoring	8/07/2022	09:25	TAI018TA	Taitua Arboretum Post UV	<1	<1	181	97.3	0.27	
HamiltonCC	2022005225	Monitoring	8/07/2022	09:15	TAI018TA	Taitua Arboretum	<1	<1	73	97.4	0.28	
HamiltonCC	2022005226	Monitoring	8/07/2022	09:00	TAI018TA	House next to Taitua Arboretum	<1	<1	707	97.3	0.3	
HamiltonCC	2022005309	Monitoring	9/07/2022	13:00	TAI018TA	Taitua Arboretum Pre Filtration	<1	>201	950	97.4	0.43	
HamiltonCC	2022005310	Monitoring	9/07/2022	13:05	TAI018TA	Taitua Arboretum Post Filtration	<1	>201	500	97.7	0.29	
HamiltonCC	2022005311	Monitoring	9/07/2022	13:10	TAI018TA	Taitua Arboretum Post UV	<1	<1	300	97.5	0.39	
HamiltonCC	2022005312	Monitoring	9/07/2022	13:20	TAI018TA	Taitua Arboretum	<1	<1	135	97.5	0.45	

HamiltonCC	2022005313	Monitoring	9/07/2022	13:30	TAI018TA	House next to Taitua Arboretum	<1	<1	600	97.7	0.41	
HamiltonCC	2022005314	Monitoring	11/07/2022	13:50	TAI018TA	House next to Taitua Arboretum	<1	<1	3200	42.5	0.61	
HamiltonCC	2022005345	Monitoring	12/07/2022	14:30	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	~920	41.3	0.34	6.4
HamiltonCC	2022005479	Monitoring	18/07/2022	12:30	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	>5700	97.7	0.37	6.3
HamiltonCC	2022005570	Monitoring	20/07/2022	10:00	TAI018TA	Taitua Arboretum Reservoir Tap	<1	<1	est 4000	98.2	0.29	6.5
HamiltonCC	2022005680	Monitoring	25/07/2022	13:25	TAI018TA	Taitua Arboretum Pre Filtration	<1	<1	220	97.2	0.48	
HamiltonCC	2022005681	Monitoring	25/07/2022	13:30	TAI018TA	Taitua Arboretum Post Filtration	<1	<1	est 800	97.6	0.36	
HamiltonCC	2022005682	Monitoring	25/07/2022	13:35	TAI018TA	Taitua Arboretum Post UV	<1	<1	255	97.6	0.31	
HamiltonCC	2022005683	Monitoring	25/07/2022	13:40	TAI018TA	Taitua Arboretum	<1	<1	est 410	97.6	0.37	
HamiltonCC	2022005739	Monitoring	26/07/2022	13:50	TAI018TA	Taitua Arboretum Pre Filtration	<1	<1	575	57.6	0.63	
HamiltonCC	2022005740	Monitoring	26/07/2022	13:55	TAI018TA	Taitua Arboretum Post Filtration	<1	<1	325	99.2	0.54	
HamiltonCC	2022005741	Monitoring	26/07/2022	13:58	TAI018TA	Taitua Arboretum Post UV	<1	<1	>5700	99.3	0.61	
HamiltonCC	2022005742	Monitoring	26/07/2022	14:13	TAI018TA	Taitua Arboretum	<1	<1	>5700	99.3	0.45	
HamiltonCC	2022005778	Monitoring	27/07/2022	11:20	TAI018TA	Taitua Arboretum Pre Filtration	<1	<1	168	98.1	0.45	
HamiltonCC	2022005779	Monitoring	27/07/2022	11:24	TAI018TA	Taitua Arboretum Post Filtration	<1	<1	123	98.4	0.42	
HamiltonCC	2022005780	Monitoring	27/07/2022	11:27	TAI018TA	Taitua Arboretum Post UV	<1	<1	143	97.5	0.39	
HamiltonCC	2022005781	Monitoring	27/07/2022	11:32	TAI018TA	Taitua Arboretum	<1	<1	400	98.4	0.34	
HamiltonCC	2022005830	Monitoring	28/07/2022	13:00	TAI018TA	Taitua Arboretum Pre Filtration	<1	<1	257	89.4	0.5	
HamiltonCC	2022005831	Monitoring	28/07/2022	13:05	TAI018TA	Taitua Arboretum Post Filtration	<1	<1	171	88.2	0.65	
HamiltonCC	2022005832	Monitoring	28/07/2022	13:10	TAI018TA	Taitua Arboretum Post UV	<1	<1	est 4000	88.5	0.59	
HamiltonCC	2022005833	Monitoring	28/07/2022	13:16	TAI018TA	Taitua Arboretum	<1	<1	est 4000	88.8	0.45	
HamiltonCC	2022005879	Monitoring	29/07/2022	11:05	TAI018TA	Taitua Arboretum Pre Filtration	<1	<1	400	97.7	0.5	
HamiltonCC	2022005880	Monitoring	29/07/2022	11:10	TAI018TA	Taitua Arboretum Post Filtration	<1	<1	124	97.8	0.29	
HamiltonCC	2022005881	Monitoring	29/07/2022	11:15	TAI018TA	Taitua Arboretum Post UV	<1	<1	148	97.8	0.32	
HamiltonCC	2022005882	Monitoring	29/07/2022	11:20	TAI018TA	Taitua Arboretum	<1	<1	272	97.8	0.33	
HamiltonCC	2022005919	Monitoring	1/08/2022	13:10	TAI018TA	Taitua Arboretum	<1	<1	>5700	98.8	0.61	6.5
HamiltonCC	2022006002	Monitoring	3/08/2022	12:38	TAI018TA	Taitua Arboretum	<1	<1	400	98.1	0.43	6.5
HamiltonCC	2022006108	Monitoring	5/08/2022	13:00	TAI018TA	Taitua Arboretum	<1	<1	est 40000	97.6	0.7	6.5
HamiltonCC	2022006181	Monitoring	8/08/2022	14:48	TAI018TA	Taitua Arboretum	<1	<1	est 200	98.5	0.4	6.5
HamiltonCC	2022006271	Monitoring	10/08/2022	09:07	TAI018TA	Taitua Arboretum	<1	<1	172	98.1	0.38	6.6
HamiltonCC	2022006328	Monitoring	12/08/2022	08:40	TAI018TA	Taitua Arboretum	<1	<1	est 400	98.8	0.61	6.5
HamiltonCC	2022006449	Monitoring	16/08/2022	09:37	TAI018TA	Taitua Arboretum	<1	<1	62	97.4	0.38	6.6
HamiltonCC	2022006468	Monitoring	17/08/2022	09:47	TAI018TA	Taitua Arboretum	<1	<1	est 400	98	0.42	6.6
HamiltonCC	2022006567	Monitoring	19/08/2022	12:20	TAI018TA	Taitua Arboretum	<1	<1	407	97.4	0.57	6.6
HamiltonCC	2022006766	Monitoring	29/08/2022	12:18	TAI018TA	Taitua Arboretum	<1	<1	272	90.1	0.37	6.6
HamiltonCC	2022006858	Monitoring	31/08/2022	09:52	TAI018TA	Taitua Arboretum	<1	<1	Est 400	98.2	0.37	6.5
HamiltonCC	2022006920	Monitoring	2/09/2022	13:15	TAI018TA	Taitua Arboretum	<1	<1	151	97.4	0.65	6.7
HamiltonCC	2022007023	Monitoring	6/09/2022	09:49	TAI018TA	Taitua Arboretum	<1	<1	est 300	97.7	0.44	6.5

HamiltonCC	2022007139	Monitoring	8/09/2022	14:40	TAI018TA	Taitua Arboretum	<1	<1	est 1000	97.6	0.39	6.6
HamiltonCC	2022007181	Monitoring	9/09/2022	12:11	TAI018TA	Taitua Arboretum	<1	<1	87	97.8	0.62	6.6
HamiltonCC	2022007227	Monitoring	12/09/2022	09:10	TAI018TA	Taitua Arboretum	<1	<1	89	97.9	0.28	6.6
HamiltonCC	2022007317	Monitoring	14/09/2022	11:00	TAI018TA	Taitua Arboretum	<1	<1	94	98	0.35	6.6
HamiltonCC	2022007446	Monitoring	16/09/2022	10:14	TAI018TA	Taitua Arboretum	<1	<1	137	91.6	0.33	6.5
HamiltonCC	2022007542	Monitoring	20/09/2022	12:37	TAI018TA	Taitua Arboretum	<1	<1	1696	97.7	0.59	6.5
HamiltonCC	2022007592	Monitoring	21/09/2022	09:15	TAI018TA	Taitua Arboretum	<1	<1	est 400	97.9	0.29	6.5
HamiltonCC	2022007666	Monitoring	23/09/2022	13:05	TAI018TA	Taitua Arboretum	<1	<1	est 400	97.7	0.49	6.5
HamiltonCC	2022007732	Monitoring	27/09/2022	10:40	TAI018TA	Taitua Arboretum	<1	<1	77	98.2	0.28	6.4
HamiltonCC	2022007777	Monitoring	28/09/2022	12:25	TAI018TA	Taitua Arboretum	<1	<1	167	97.3	0.36	6.5
HamiltonCC	2022007826	Monitoring	29/09/2022	08:27	TAI018TA	Taitua Arboretum	<1	<1	710	97.3	0.53	6.3
HamiltonCC	2022008001	Monitoring	5/10/2022	10:00	TAI018TA	Taitua Arboretum	<1	<1	243	97.7	0.33	6.3
HamiltonCC	2022008002	Monitoring	5/10/2022	09:45	TAI018TA	Taitua Arboretum Pre Filtration	<1	29	88	97.5	0.43	6.5
HamiltonCC	2022008003	Monitoring	5/10/2022	09:50	TAI018TA	Taitua Arboretum Post UV	<1	<1	18	97.9	0.25	6.4
HamiltonCC	2022008004	Monitoring	5/10/2022	09:35	TAI018TA	House next to Taitua Arboretum	<1	<1	459	97.5	0.54	6.7
HamiltonCC	2022008295	Monitoring	13/10/2022	10:01	TAI018TA	Taitua Arboretum	<1	<1	126	77	0.38	6.5
HamiltonCC	2022008479	Monitoring	19/10/2022	08:57	TAI018TA	Taitua Arboretum	<1	<1	540	98	0.33	6.4
HamiltonCC	2022008659	Monitoring	26/10/2022	08:40	TAI018TA	Taitua Arboretum	<1	<1	est 400	97.9	0.34	6.5

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Subregional Shared Services Laboratory	**Lab No:**	2936352	DWMAVUPv1
Contact:	Subregional Shared Services Laboratory C/- Hamilton City Council Private Bag 3010 Hamilton 3240	**Date Received:**	29-Mar-2022	
		Date Reported:	11-Apr-2022	
		Quote No:	40431	
		Order No:	1182665	
		Client Reference:	Taitua	
		Submitted By:	Shahnaz Nazli	

Sample Type: Aqueous

		Sample Name:	2022002246 Taitua pre filtration 29-Mar-2022	Maximum Acceptable Value	Outside Limit
		Lab Number:	2936352.1		
Individual Tests					
True Hazen Colour	Hazen units		< 10 ± 2.1	-	-
Total Alkalinity	g/m³ as $CaCO_3$		26.0 ± 1.3	-	-
Total Hardness	g/m³ as $CaCO_3$		10.22 ± 0.48	-	-
Total Dissolved Solids (TDS)	g/m³		144 ± 19	-	-
Dissolved Calcium	g/m³		2.31 ± 0.15 #1	-	-
Total Iodine	g/m³		0.00330 ± 0.00080	-	-
Dissolved Iron	g/m³		< 0.02 ± 0.014	-	-
Dissolved Magnesium	g/m³		1.082 ± 0.074 #1	-	-
Dissolved Manganese	g/m³		0.00100 ± 0.00035 #1	-	-
Dissolved Potassium	g/m³		3.37 ± 0.25 #1	-	-
Dissolved Sodium	g/m³		14.9 ± 1.6 #1	-	-
Bromide	g/m³		0.054 ± 0.042	-	-
Bromate	g/m³		< 0.005 ± 0.0034	0.01	No
Total Cyanide	g/m³		< 0.002 ± 0.0017	0.6	No
Chloride	g/m³		12.80 ± 0.85	-	-
Chlorite	g/m³		< 0.005 ± 0.0034	0.8	No
Chlorate	g/m³		< 0.005 ± 0.0034	0.8	No
Fluoride	g/m³		0.058 ± 0.041	1.5	No
Total Ammoniacal-N	g/m³		< 0.010 ± 0.0067	-	-
Nitrite-N	g/m³		< 0.002 ± 0.0014	0.06 0.91 (short term)	No
Nitrate-N	g/m³		0.099 ± 0.013	11.3	No
Nitrate-N + Nitrite-N	g/m³		0.099 ± 0.012	-	-
Reactive Silica	g/m³ as SiO_2		97.1 ± 2.0	-	-
Sulphate	g/m³		2.96 ± 0.39	-	-
Dissolved Organic Carbon (DOC)	g/m³		< 0.5 ± 1.6	-	-
Total Organic Carbon (TOC)	g/m³		< 0.5 ± 1.3	-	-
Drinking water metals suite, totals, trace					
Total Aluminium	g/m³		0.0066 ± 0.0023	-	-
Total Antimony	g/m³		< 0.00021 ± 0.00014	0.02	No
Total Arsenic	g/m³		< 0.0011 ± 0.00074	0.01	No
Total Barium	g/m³		0.0862 ± 0.0069	0.7	No
Total Beryllium	g/m³		0.000122 ± 0.000075	-	-
Total Boron	g/m³		0.0128 ± 0.0039	1.4	No
Total Cadmium	g/m³		< 0.000053 ± 0.000036	0.004	No
Total Calcium	g/m³		2.282 ± 0.098 #1	-	-
Total Chromium	g/m³		< 0.00053 ± 0.00036	0.05	No
Total Copper	g/m³		0.0378 ± 0.0038	2	No

Sample Type: Aqueous				
Sample Name:		2022002246 Taitua pre filtration 29-Mar-2022	**Maximum Acceptable Value**	**Outside Limit**
Lab Number:		2936352.1		
Drinking water metals suite, totals, trace				
Total Iron	g/m³	< 0.021 ± 0.014	-	-
Total Lead	g/m³	0.00275 ± 0.00019	0.01	No
Total Lithium	g/m³	0.00505 ± 0.00067	-	-
Total Magnesium	g/m³	0.997 ± 0.081 #1	-	-
Total Manganese	g/m³	0.00096 ± 0.00037 #1	0.4	No
Total Mercury	g/m³	< 0.00008 ± 0.000053	0.007	No
Total Molybdenum	g/m³	< 0.00021 ± 0.00015	0.07	No
Total Nickel	g/m³	< 0.00053 ± 0.00036	0.08	No
Total Potassium	g/m³	3.34 ± 0.21 #1	-	-
Total Selenium	g/m³	< 0.0011 ± 0.00074	0.01	No
Total Silver	g/m³	< 0.00011 ± 0.000074	-	-
Total Sodium	g/m³	14.71 ± 0.89 #1	-	-
Total Tin	g/m³	< 0.00053 ± 0.00036	-	-
Total Uranium	g/m³	0.000088 ± 0.000016	0.02	No
Total Zinc	g/m³	0.588 ± 0.048	-	-
Hydrogen sulphide profile*				
pH	pH Units	6.6 ± 0.2	-	-
Electrical Conductivity (EC)	mS/m	10.3 ± 0.3	-	-
Sample Temperature*	°C	20.0	-	-
Un-ionised hydrogen sulphide	g/m³	< 0.002	-	-
Total Sulphide	g/m³	< 0.05 ± 0.034	-	-

Sample Name:		2022002250 Taitua Arboretum 29-Mar-2022	**Maximum Acceptable Value**	**Outside Limit**
Lab Number:		2936352.2		
Individual Tests				
True Hazen Colour	Hazen units	< 10 ± 2.1	-	-
Total Alkalinity	g/m³ as $CaCO_3$	26.2 ± 1.3	-	-
Total Hardness	g/m³ as $CaCO_3$	10.26 ± 0.49	-	-
Total Dissolved Solids (TDS)	g/m³	141 ± 19	-	-
Dissolved Calcium	g/m³	2.34 ± 0.15 #1	-	-
Total Iodine	g/m³	0.00341 ± 0.00081	-	-
Dissolved Iron	g/m³	< 0.02 ± 0.014	-	-
Dissolved Magnesium	g/m³	1.073 ± 0.074 #1	-	-
Dissolved Manganese	g/m³	0.00099 ± 0.00035	-	-
Dissolved Potassium	g/m³	3.39 ± 0.25 #1	-	-
Dissolved Sodium	g/m³	15.0 ± 1.7 #1	-	-
Bromide	g/m³	0.068 ± 0.042	-	-
Bromate	g/m³	< 0.005 ± 0.0034	0.01	No
Total Cyanide	g/m³	< 0.002 ± 0.0017	0.6	No
Chloride	g/m³	13.67 ± 0.89	-	-
Chlorite	g/m³	< 0.005 ± 0.0034	0.8	No
Chlorate	g/m³	< 0.005 ± 0.0034	0.8	No
Fluoride	g/m³	< 0.05 ± 0.041	1.5	No
Total Ammoniacal-N	g/m³	< 0.010 ± 0.0067	-	-
Nitrite-N	g/m³	< 0.002 ± 0.0014	0.06 0.91 (short term)	No
Nitrate-N	g/m³	0.104 ± 0.013	11.3	No
Nitrate-N + Nitrite-N	g/m³	0.105 ± 0.013	-	-
Reactive Silica	g/m³ as SiO_2	92.9 ± 1.9	-	-
Sulphate	g/m³	3.47 ± 0.40	-	-
Dissolved Organic Carbon (DOC)	g/m³	< 0.5 ± 1.6	-	-
Total Organic Carbon (TOC)	g/m³	< 0.5 ± 1.6	-	-
Drinking water metals suite, totals, trace				
Total Aluminium	g/m³	0.0076 ± 0.0024	-	-
Total Antimony	g/m³	< 0.00021 ± 0.00014	0.02	No
Total Arsenic	g/m³	< 0.0011 ± 0.00074	0.01	No

Sample Type: Aqueous				
Sample Name:		2022002250 Taitua Arboretum 29-Mar-2022	**Maximum Acceptable Value**	**Outside Limit**
Lab Number:		2936352.2		
Drinking water metals suite, totals, trace				
Total Barium	g/m³	0.0847 ± 0.0068	0.7	No
Total Beryllium	g/m³	< 0.00011 ± 0.000074	-	-
Total Boron	g/m³	0.0124 ± 0.0039	1.4	No
Total Cadmium	g/m³	< 0.000053 ± 0.000036	0.004	No
Total Calcium	g/m³	2.32 ± 0.10 #1	-	-
Total Chromium	g/m³	< 0.00053 ± 0.00036	0.05	No
Total Copper	g/m³	0.0289 ± 0.0030	2	No
Total Iron	g/m³	0.037 ± 0.015	-	-
Total Lead	g/m³	0.00352 ± 0.00023	0.01	No
Total Lithium	g/m³	0.00488 ± 0.00065	-	-
Total Magnesium	g/m³	0.990 ± 0.081 #1	-	-
Total Manganese	g/m³	0.00115 ± 0.00037	0.4	No
Total Mercury	g/m³	< 0.00008 ± 0.000053	0.007	No
Total Molybdenum	g/m³	< 0.00021 ± 0.00015	0.07	No
Total Nickel	g/m³	< 0.00053 ± 0.00036	0.08	No
Total Potassium	g/m³	3.33 ± 0.21 #1	-	-
Total Selenium	g/m³	< 0.0011 ± 0.00074	0.01	No
Total Silver	g/m³	< 0.00011 ± 0.000074	-	-
Total Sodium	g/m³	14.23 ± 0.86 #1	-	-
Total Tin	g/m³	< 0.00053 ± 0.00036	-	-
Total Uranium	g/m³	0.000092 ± 0.000016	0.02	No
Total Zinc	g/m³	0.575 ± 0.047	-	-
Hydrogen sulphide profile*				
pH	pH Units	6.6 ± 0.2	-	-
Electrical Conductivity (EC)	mS/m	10.1 ± 0.3	-	-
Sample Temperature*	°C	20.0	-	-
Un-ionised hydrogen sulphide	g/m³	< 0.002	-	-
Total Sulphide	g/m³	< 0.05 ± 0.034	-	-

The Maximum Acceptable Values (MAV) are taken from the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2018)', Ministry of Health. Copies of this publication are available from:
https://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2018

The Maximum Acceptable Values (MAVs) have been defined by the Ministry of Health for parameters of health significance and should not be exceeded. The 'Drinking-water Standards for New Zealand' also contains Guideline Values which are the limits for aesthetic determinands that, if exceeded, may render the water unattractive to consumers. This report compares the results obtained with the Maximum Acceptable Values only.

Under Section 73 (2) of the Water Services Act (2021), the laboratory is required to report the results of any analysis or test carried out (for the purposes of testing for compliance with the New Zealand Drinking Water Standards 2005 (Revised 2018)) that indicates any non-compliance (transgression) with the Maximum Acceptable Values (MAVs) to Taumata Arowai, the water services regulator for Aotearoa.

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling. For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website:
http://www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Note that the units g/m³ are the same as mg/L and ppm.

Analyst's Comments

#1 It has been noted that the result for the dissolved fraction was greater than that for the total fraction, but within analytical variation of the methods.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
TMAH Digestion*	Tetramethylammonium hydroxide micro digestion, filtration. P.A.Fecher, I.Goldman and A.Nagengast. Journal of Analytical Atomic Spectrometry, 1998, **13**, 977-982.	-	1-2
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-2
Total acid digest for Silver analysis	Boiling nitric / hydrochloric acid digestion (5:1 ratio). APHA 3030 F (modified) 23rd ed. 2017.	-	1-2
True Hazen Colour	Filtered sample. Spectrophotometry. APHA 2120 C (modified) 23rd ed. 2017.	10 Hazen units	1-2
pH	pH meter. APHA 4500-H^+ B 23rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-2
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-2
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m³ as $CaCO_3$	1-2
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23rd ed. 2017.	0.1 mS/m	1-2
Total Dissolved Solids (TDS)	Filtration through GF/C (1.2 µm), gravimetric. APHA 2540 C (modified; drying temperature of 103 - 105°C used rather than 180 ± 2°C) 23rd ed. 2017.	10 g/m³	1-2
Sample Temperature*	A nominal sample temperature of 20°C has been assumed by the laboratory.	0.1 °C	1-2
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-2
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m³	1-2
Total Iodine	Sample digestion with aqueous TMAH at 90°C. Analysis by ICP-MS. APHA 3125 B 23rd ed. 2017.	0.0010 g/m³	1-2
Dissolved Iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m³	1-2
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m³	1-2
Dissolved Manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.0005 g/m³	1-2
Dissolved Potassium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m³	1-2
Dissolved Sodium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m³	1-2
Bromide	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.05 g/m³	1-2
Bromate	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B (modified).	0.005 g/m³	1-2
Total Cyanide Trace	On-line distillation, colorimetry, trace level. ISO 14403:2012(E) (modified).	0.002 g/m³	1-2
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-2
Chlorite	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B (modified).	0.005 g/m³	1-2
Chlorate	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B (modified).	0.005 g/m³	1-2
Fluoride	Direct measurement, ion selective electrode. APHA 4500-F^- C 23rd ed. 2017.	0.05 g/m³	1-2
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m³	1-2
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	1-2
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-2
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	1-2
Reactive Silica	Filtered sample. Heteropoly blue colorimetry. Flow Injection Analyser. APHA 4500-SiO2 F (modified) 23rd ed. 2017.	0.10 g/m³ as SiO_2	1-2

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Un-ionised hydrogen sulphide	Calculation from Total Sulphide, Electrical Conductivity, pH and Temperature*. ***Note: For accurate calculation of the un-ionised Hydrogen Sulphide the sample temperature should be taken using a calibrated thermometer at the time of sampling and recorded on the paperwork submitted with the sample. If a sample temperature is not supplied, a nominal temperature of 20°C will show in the results table above and be used in the calculation. In this case, please interpret the un-ionised Hydrogen Sulphide result with caution**. APHA 4500-S^{2-} H (modified) 23rd ed. 2017.	0.002 g/m³	1-2
Total Sulphide Screen	In-line distillation, segmented flow colorimetry. APHA 4500-S^{2-} E (modified) 23rd ed. 2017.	0.05 g/m³	1-2
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m³	1-2
Dissolved Organic Carbon (DOC)	Filtered sample, Supercritical persulphate oxidation, IR detection, for Total C. Acidification, purging for Total Inorganic C. TOC = TC -TIC. APHA 5310 C (modified) 23rd ed. 2017.	0.5 g/m³	1-2
Total Organic Carbon (TOC)	Supercritical persulphate oxidation, IR detection, for Total C. Acidification, purging for Total Inorganic C. TOC = TC -TIC.The uncertainty of the calculated result is a combination of the uncertainties of the two analytical determinands in the subtraction calculation. Where both determinands are similar in magnitude, the calculated result has a significantly higher uncertainty than would normally be achieved if one of the results was significantly less than the other. In such cases, the elevated uncertainty should be kept in mind when interpreting the data. APHA 5310 C (modified) 23rd ed. 2017.	0.5 g/m³	1-2
Drinking water metals suite, totals, trace			
Total Aluminium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0032 g/m³	1-2
Total Antimony	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00021 g/m³	1-2
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0011 g/m³	1-2
Total Barium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0053 g/m³	1-2
Total Beryllium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00011 g/m³	1-2
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.0053 g/m³	1-2
Total Cadmium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 g/m³	1-2
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-2
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-2
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-2
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-2
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00011 g/m³	1-2
Total Lithium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00021 g/m³	1-2
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m³	1-2
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-2
Total Mercury	Bromine Oxidation followed by Atomic Fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m³	1-2
Total Molybdenum	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00021 g/m³	1-2
Total Nickel	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.00053 g/m³	1-2
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.053 g/m³	1-2
Total Selenium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0011 g/m³	1-2

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Silver	Boiling nitric / hydrochloric acid digestion (5:1 ratio), ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00011 g/m^3	1-2
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.021 g/m^3	1-2
Total Tin	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00053 g/m^3	1-2
Total Uranium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000021 g/m^3	1-2
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.0011 g/m^3	1-2

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 29-Mar-2022 and 09-Apr-2022. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental