



Certificate of Analysis

Client:	Food and Health Standards (2006) Limited	Lab No:	2769288	DWMAVUPv1
Contact:	Lisa Shaw	Date Received:	16-Nov-2021	
	C/- Food and Health Standards (2006) Limited	Date Reported:	26-Nov-2021	
	PO Box 7469	Quote No:	87133	
	Christchurch 8240	Order No:		
		Client Reference:	HDC DBP Testing	
		Submitted By:	Fraser Cross	

Sample Type: Aqueous

Sample Name:	WAI066UP - Upper Waitohi - Mid-line 16-Nov-2021 9:40 am	Maximum Acceptable Value	Outside Limit
Lab Number:	2769288.1		
Individual Tests			
Monochloramine	g/m ³ < 0.05	3	No
Halogenated Acetic Acids in Water by GC-MS			
Bromochloroacetic acid	g/m ³ < 0.004 ± 0.0013	-	-
Dibromoacetic acid	g/m ³ < 0.004 ± 0.0014	-	-
Dichloroacetic acid	g/m ³ 0.0125 ± 0.0042	0.05	No
Monobromoacetic acid	g/m ³ < 0.004 ± 0.0013	-	-
Monochloroacetic acid	g/m ³ < 0.005 ± 0.0034	0.02	No
Trichloroacetic acid	g/m ³ 0.0169 ± 0.0061	0.2	No
Total HAA	g/m ³ 0.0315 ± 0.0084	-	-
Sum of HAA DWSNZ MAV ratios	0.39 ± 0.19	1	No
Halogenated Volatile Disinfection By-Products in Water by GCMS			
Bromochloroacetonitrile	g/m ³ < 0.0004 ± 0.00019	-	-
Bromodichloromethane	g/m ³ 0.00262 ± 0.0010	0.06	No
Bromoform (tribromomethane)	g/m ³ < 0.0004 ± 0.00013	0.1	No
Carbon tetrachloride	g/m ³ < 0.0007 ± 0.00047	0.005	No
Chloroform (Trichloromethane)	g/m ³ 0.026 ± 0.012	0.4	No
Chloropicrin	g/m ³ < 0.0004 ± 0.00023	-	-
1,2-Dibromo-3-chloropropane	g/m ³ < 0.0004 ± 0.00022	0.001	No
Dibromoacetonitrile	g/m ³ < 0.0004 ± 0.00023	0.08	No
Dibromochloromethane	g/m ³ < 0.0004 ± 0.00015	0.15	No
1,2-Dibromoethane (ethylene dibromide, EDB)	g/m ³ < 0.0003 ± 0.00020	0.0004	No
1,1-Dichloro-2-propanone	g/m ³ < 0.0004 ± 0.00023	-	-
Dichloroacetonitrile	g/m ³ 0.00237 ± 0.00082	0.02	No
Tetrachloroethene (tetrachloroethylene)	g/m ³ < 0.0004 ± 0.00013	0.05	No
1,1,1-Trichloro-2-propanone	g/m ³ 0.00181 ± 0.00068	-	-
Trichloroacetonitrile	g/m ³ < 0.0004 ± 0.00023	-	-
1,1,1-Trichloroethane	g/m ³ < 0.0004 ± 0.00014	-	-
Trichloroethene (trichloroethylene)	g/m ³ < 0.0004 ± 0.00012	0.02	No
Total Trihalomethanes (THM)	g/m ³ 0.028 ± 0.011	-	-
Chloroform MAV ratio	0.064 ± 0.030	-	-
Bromodichloromethane MAV ratio	0.044 ± 0.017	-	-
Dibromochloromethane MAV ratio	< 0.003 ± 0.001	-	-
Bromoform MAV ratio	< 0.004 ± 0.002	-	-
Sum of THM MAV ratios (NZ DW Stds)	0.108 ± 0.034	1	No
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)	0.118 ± 0.041	1	No



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.

The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Aqueous				
Sample Name:	HAN001HA - Hanmer - Tarndale Rd 16-Nov-2021 12:53 pm		Maximum Acceptable Value	Outside Limit
Lab Number:	2769288.2			
Individual Tests				
Monochloramine	g/m ³	< 0.05	3	No
Halogenated Acetic Acids in Water by GC-MS				
Bromochloroacetic acid	g/m ³	< 0.004 ± 0.0013	-	-
Dibromoacetic acid	g/m ³	< 0.004 ± 0.0014	-	-
Dichloroacetic acid	g/m ³	< 0.004 ± 0.0014	0.05	No
Monobromoacetic acid	g/m ³	< 0.004 ± 0.0013	-	-
Monochloroacetic acid	g/m ³	< 0.005 ± 0.0034	0.02	No
Trichloroacetic acid	g/m ³	0.0054 ± 0.0021	0.2	No
Total HAA	g/m ³	< 0.03 ± 0.0047	-	-
Sum of HAA DWSNZ MAV ratios		< 0.3 ± 0.17	1	No
Halogenated Volatile Disinfection By-Products in Water by GCMS				
Bromochloroacetonitrile	g/m ³	< 0.0004 ± 0.00019	-	-
Bromodichloromethane	g/m ³	0.00102 ± 0.00039	0.06	No
Bromoform (tribromomethane)	g/m ³	< 0.0004 ± 0.00013	0.1	No
Carbon tetrachloride	g/m ³	< 0.0007 ± 0.00047	0.005	No
Chloroform (Trichloromethane)	g/m ³	0.0088 ± 0.0053	0.4	No
Chloropicrin	g/m ³	< 0.0004 ± 0.00023	-	-
1,2-Dibromo-3-chloropropane	g/m ³	< 0.0004 ± 0.00022	0.001	No
Dibromoacetonitrile	g/m ³	< 0.0004 ± 0.00023	0.08	No
Dibromochloromethane	g/m ³	< 0.0004 ± 0.00015	0.15	No
1,2-Dibromoethane (ethylene dibromide, EDB)	g/m ³	< 0.0003 ± 0.00020	0.0004	No
1,1-Dichloro-2-propanone	g/m ³	< 0.0004 ± 0.00023	-	-
Dichloroacetonitrile	g/m ³	0.00065 ± 0.00029	0.02	No
Tetrachloroethene (tetrachloroethylene)	g/m ³	< 0.0004 ± 0.00013	0.05	No
1,1,1-Trichloro-2-propanone	g/m ³	0.00069 ± 0.00031	-	-
Trichloroacetonitrile	g/m ³	< 0.0004 ± 0.00023	-	-
1,1,1-Trichloroethane	g/m ³	< 0.0004 ± 0.00014	-	-
Trichloroethene (trichloroethylene)	g/m ³	< 0.0004 ± 0.00012	0.02	No
Total Trihalomethanes (THM)	g/m ³	0.0098 ± 0.0045	-	-
Chloroform MAV ratio		0.022 ± 0.014	-	-
Bromodichloromethane MAV ratio		0.017 ± 0.007	-	-
Dibromochloromethane MAV ratio		< 0.003 ± 0.001	-	-
Bromoform MAV ratio		< 0.004 ± 0.002	-	-
Sum of THM MAV ratios (NZ DW Stds)		0.039 ± 0.015	1	No
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)		0.033 ± 0.015	1	No

Sample Name:	WAI026WT - Waiau Township - School 16-Nov-2021 2:17 pm		Maximum Acceptable Value	Outside Limit
Lab Number:	2769288.3			
Individual Tests				
Monochloramine	g/m ³	< 0.05	3	No
Halogenated Acetic Acids in Water by GC-MS				
Bromochloroacetic acid	g/m ³	< 0.004 ± 0.0013	-	-
Dibromoacetic acid	g/m ³	< 0.004 ± 0.0014	-	-
Dichloroacetic acid	g/m ³	< 0.004 ± 0.0014	0.05	No
Monobromoacetic acid	g/m ³	< 0.004 ± 0.0013	-	-
Monochloroacetic acid	g/m ³	< 0.005 ± 0.0034	0.02	No
Trichloroacetic acid	g/m ³	< 0.004 ± 0.0016	0.2	No
Total HAA	g/m ³	< 0.03 ± 0.0046	-	-
Sum of HAA DWSNZ MAV ratios		< 0.3 ± 0.17	1	No
Halogenated Volatile Disinfection By-Products in Water by GCMS				
Bromochloroacetonitrile	g/m ³	< 0.0004 ± 0.00019	-	-
Bromodichloromethane	g/m ³	0.00249 ± 0.00095	0.06	No
Bromoform (tribromomethane)	g/m ³	< 0.0004 ± 0.00013	0.1	No

Sample Type: Aqueous					
Sample Name:		WAI026WT - Waiau Township - School 16-Nov-2021 2:17 pm		Maximum Acceptable Value	Outside Limit
Lab Number:		2769288.3			
Halogenated Volatile Disinfection By-Products in Water by GCMS					
Carbon tetrachloride	g/m ³	< 0.0007 ± 0.00047	0.005	No	
Chloroform (Trichloromethane)	g/m ³	< 0.007 ± 0.0047	0.4	No	
Chloropicrin	g/m ³	< 0.0004 ± 0.00023	-	-	
1,2-Dibromo-3-chloropropane	g/m ³	< 0.0004 ± 0.00022	0.001	No	
Dibromoacetonitrile	g/m ³	< 0.0004 ± 0.00023	0.08	No	
Dibromochloromethane	g/m ³	0.00087 ± 0.00032	0.15	No	
1,2-Dibromoethane (ethylene dibromide, EDB)	g/m ³	< 0.0003 ± 0.00020	0.0004	No	
1,1-Dichloro-2-propanone	g/m ³	< 0.0004 ± 0.00023	-	-	
Dichloroacetonitrile	g/m ³	0.00049 ± 0.00024	0.02	No	
Tetrachloroethene (tetrachloroethylene)	g/m ³	< 0.0004 ± 0.00013	0.05	No	
1,1,1-Trichloro-2-propanone	g/m ³	< 0.0004 ± 0.00023	-	-	
Trichloroacetonitrile	g/m ³	< 0.0004 ± 0.00023	-	-	
1,1,1-Trichloroethane	g/m ³	< 0.0004 ± 0.00014	-	-	
Trichloroethene (trichloroethylene)	g/m ³	< 0.0004 ± 0.00012	0.02	No	
Total Trihalomethanes (THM)	g/m ³	0.0075 ± 0.0039	-	-	
Chloroform MAV ratio		< 0.018 ± 0.012	-	-	
Bromodichloromethane MAV ratio		0.042 ± 0.016	-	-	
Dibromochloromethane MAV ratio		0.006 ± 0.003	-	-	
Bromoform MAV ratio		< 0.004 ± 0.002	-	-	
Sum of THM MAV ratios (NZ DW Stds)		0.059 ± 0.020	1	No	
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)		0.026 ± 0.013	1	No	
Sample Name:		AMU001RO - Amuri - Cnr George St 16-Nov-2021 1:55 pm		Maximum Acceptable Value	Outside Limit
Lab Number:		2769288.4			
Individual Tests					
Monochloramine	g/m ³	< 0.05	3	No	
Halogenated Acetic Acids in Water by GC-MS					
Bromochloroacetic acid	g/m ³	< 0.004 ± 0.0013	-	-	
Dibromoacetic acid	g/m ³	< 0.004 ± 0.0014	-	-	
Dichloroacetic acid	g/m ³	< 0.004 ± 0.0014	0.05	No	
Monobromoacetic acid	g/m ³	< 0.004 ± 0.0013	-	-	
Monochloroacetic acid	g/m ³	< 0.005 ± 0.0034	0.02	No	
Trichloroacetic acid	g/m ³	< 0.004 ± 0.0016	0.2	No	
Total HAA	g/m ³	< 0.03 ± 0.0046	-	-	
Sum of HAA DWSNZ MAV ratios		< 0.3 ± 0.17	1	No	
Halogenated Volatile Disinfection By-Products in Water by GCMS					
Bromochloroacetonitrile	g/m ³	< 0.0004 ± 0.00019	-	-	
Bromodichloromethane	g/m ³	0.00049 ± 0.00019	0.06	No	
Bromoform (tribromomethane)	g/m ³	< 0.0004 ± 0.00013	0.1	No	
Carbon tetrachloride	g/m ³	< 0.0007 ± 0.00047	0.005	No	
Chloroform (Trichloromethane)	g/m ³	< 0.007 ± 0.0047	0.4	No	
Chloropicrin	g/m ³	< 0.0004 ± 0.00023	-	-	
1,2-Dibromo-3-chloropropane	g/m ³	< 0.0004 ± 0.00022	0.001	No	
Dibromoacetonitrile	g/m ³	< 0.0004 ± 0.00023	0.08	No	
Dibromochloromethane	g/m ³	< 0.0004 ± 0.00015	0.15	No	
1,2-Dibromoethane (ethylene dibromide, EDB)	g/m ³	< 0.0003 ± 0.00020	0.0004	No	
1,1-Dichloro-2-propanone	g/m ³	< 0.0004 ± 0.00023	-	-	
Dichloroacetonitrile	g/m ³	< 0.0004 ± 0.00022	0.02	No	
Tetrachloroethene (tetrachloroethylene)	g/m ³	< 0.0004 ± 0.00013	0.05	No	
1,1,1-Trichloro-2-propanone	g/m ³	< 0.0004 ± 0.00023	-	-	
Trichloroacetonitrile	g/m ³	< 0.0004 ± 0.00023	-	-	
1,1,1-Trichloroethane	g/m ³	< 0.0004 ± 0.00014	-	-	

Sample Type: Aqueous				
Sample Name:		AMU001RO - Amuri - Cnr George St 16-Nov-2021 1:55 pm	Maximum Acceptable Value	Outside Limit
Lab Number:		2769288.4		
Halogenated Volatile Disinfection By-Products in Water by GCMS				
Trichloroethene (trichloroethylene)	g/m ³	< 0.0004 ± 0.00012	0.02	No
Total Trihalomethanes (THM)	g/m ³	< 0.007 ± 0.0037	-	-
Chloroform MAV ratio		< 0.018 ± 0.012	-	-
Bromodichloromethane MAV ratio		0.008 ± 0.004	-	-
Dibromochloromethane MAV ratio		< 0.003 ± 0.001	-	-
Bromoform MAV ratio		< 0.004 ± 0.002	-	-
Sum of THM MAV ratios (NZ DW Stds)		< 0.02 ± 0.013	1	No
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)		< 0.03 ± 0.012	1	No

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.

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
Halogenated Acetic Acids in Water by GC-MS	Solvent extraction, derivitisation, GC-MS analysis. In-house based on US EPA 552.	-	1-4
Halogenated Volatile Disinfection By-Products in Water by GCMS	Solvent extraction, GC-MS analysis. In-house based on US EPA 551.	-	1-4
Monochloramine	Colorimetric. APHA 4500-Cl G 23 rd ed. 2017.	0.05 g/m ³	1-4
Sum of HAA DWSNZ MAV ratios	Calculated as the sum of the individual haloacetic acids specified in DWSNZ (monochloroacetic acid, dichloroacetic acid and trichloroacetic acid) to their respective Maximum Allowable Values (MAVs). Drinking-water Standards for New Zealand 2005 (Revised 2018).	0.001	1-4
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)	Calculated as the sum of the individual haloacetonitriles specified in DWSNZ (dibromoacetonitrile & dichloroacetonitrile) to their respective Maximum Allowable Values (MAVs). Drinking-water Standards for New Zealand 2005 (Revised 2018).	-	1-4

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

Testing was completed between 17-Nov-2021 and 26-Nov-2021. 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.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

A handwritten signature in blue ink, consisting of several overlapping, stylized strokes.

Ara Heron BSc (Tech)
Client Services Manager - Environmental