



## ANALYSIS REPORT

<b>Client:</b>	Marlborough District Council	<b>Lab No:</b>	1756101	DWUPV1
<b>Contact:</b>	M Davies C/- Marlborough District Council PO Box 443 Blenheim 7240	<b>Date Received:</b>	10-Apr-2017	
		<b>Date Reported:</b>	19-Jun-2017	
		<b>Quote No:</b>	83919	
		<b>Order No:</b>	51493 Chu	
		<b>Client Reference:</b>		
		<b>Submitted By:</b>	Robert Watson	

### Sample Type: Aqueous

Sample Name:	Well Source (combined) 10-Apr-2017 8:15 am	Renwick After Treatment 10-Apr-2017 8:20 am	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:	1756101.1	1756101.2		
<b>Individual Tests</b>				
Total Antimony	g/m <sup>3</sup>	< 0.00021 ± 0.00014	-	0.02
Total Arsenic	g/m <sup>3</sup>	< 0.0011 ± 0.00074	-	0.01
Total Barium	g/m <sup>3</sup>	0.0201 ± 0.0017	-	0.7
Total Boron	g/m <sup>3</sup>	0.0272 ± 0.0052	-	1.4
Total Cadmium	g/m <sup>3</sup>	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m <sup>3</sup>	< 0.00053 ± 0.00036	-	0.05
Total Copper	g/m <sup>3</sup>	0.00183 ± 0.00040	< 1	2
Total Lead	g/m <sup>3</sup>	< 0.00011 ± 0.000074	-	0.01
Total Manganese	g/m <sup>3</sup>	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Mercury	g/m <sup>3</sup>	< 0.00008 ± 0.000053	-	0.007
Total Molybdenum	g/m <sup>3</sup>	< 0.00021 ± 0.00015	-	0.07
Total Nickel	g/m <sup>3</sup>	< 0.00053 ± 0.00036	-	0.08
Total Selenium	g/m <sup>3</sup>	< 0.0011 ± 0.00074	-	0.01
Total Uranium	g/m <sup>3</sup>	< 0.000021 ± 0.000014	-	0.02
Bromate	g/m <sup>3</sup>	< 0.005 ± 0.0034	-	0.01
Total Cyanide	g/m <sup>3</sup>	< 0.0010 ± 0.00067	-	0.6
Monochloramine	g/m <sup>3</sup>	-	< 0.05	3
Chlorite	g/m <sup>3</sup>	-	< 0.005 ± 0.0034	0.8
Chlorate	g/m <sup>3</sup>	-	< 0.005 ± 0.0034	0.8
Fluoride	g/m <sup>3</sup>	0.113 ± 0.043	-	1.5
Nitrite	g/m <sup>3</sup>	< 0.007	-	0.2 3 (short term)
Nitrate	g/m <sup>3</sup>	4.86 ± 0.59	-	50
<b>Halogenated Acetic Acids in Water by GC-MS</b>				
Bromochloroacetic acid	g/m <sup>3</sup>	-	0.00095 ± 0.00042	-
Dibromoacetic acid	g/m <sup>3</sup>	-	0.00098 ± 0.00044	-
Dichloroacetic acid	g/m <sup>3</sup>	-	0.00063 ± 0.00036	0.05
Monobromoacetic acid	g/m <sup>3</sup>	-	< 0.0005 ± 0.00034	-
Monochloroacetic acid	g/m <sup>3</sup>	-	< 0.005 ± 0.0034	0.02
Trichloroacetic acid	g/m <sup>3</sup>	-	< 0.0010 ± 0.00067	0.2
Total HAA	g/m <sup>3</sup>	-	< 0.010 ± 0.011	-
Sum of HAA DWSNZ MAV ratios		-	< 0.3 ± 0.17	1
<b>Halogenated Volatile Disinfection By-Products in Water by GCMS</b>				
Bromochloroacetonitrile	g/m <sup>3</sup>	-	0.000158 ± 0.000087	-
Bromodichloromethane	g/m <sup>3</sup>	-	0.00067 ± 0.00026	0.06
Bromoform (tribromomethane)	g/m <sup>3</sup>	-	0.000125 ± 0.000057	0.1
Carbon tetrachloride	g/m <sup>3</sup>	-	< 0.0007 ± 0.00047	0.005



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Halogenated Volatile Disinfection By-Products in Water by GCMS					
Chloroform (Trichloromethane)	g/m <sup>3</sup>	-	< 0.007 ± 0.0047	-	0.4
Chloropicrin	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	-
1,2-Dibromo-3-chloropropane	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	0.001
Dibromoacetonitrile	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	0.08
Dibromochloromethane	g/m <sup>3</sup>	-	0.00063 ± 0.00023	-	0.15
1,2-Dibromoethane (ethylene dibromide, EDB)	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	0.0004
1,1-Dichloro-2-propanone	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	-
Dichloroacetonitrile	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	0.02
Tetrachloroethene (tetrachloroethylene)	g/m <sup>3</sup>	-	< 0.00014 ± 0.000045	-	0.05
1,1,1-Trichloro-2-propanone	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	-
Trichloroacetonitrile	g/m <sup>3</sup>	-	< 0.0003 ± 0.00020	-	-
1,1,1-Trichloroethane	g/m <sup>3</sup>	-	< 0.00014 ± 0.000072	-	-
Trichloroethene (trichloroethylene)	g/m <sup>3</sup>	-	< 0.00007 ± 0.000047	-	0.02
Total Trihalomethanes (THM)	g/m <sup>3</sup>	-	< 0.007 ± 0.0037	-	-
Chloroform MAV ratio		-	< 0.018 ± 0.012	-	-
Bromodichloromethane MAV ratio		-	0.011 ± 0.005	-	-
Dibromochloromethane MAV ratio		-	0.004 ± 0.002	-	-
Bromoform MAV ratio		-	0.001 ± 0.001	-	-
Sum of THM MAV ratios (NZ DW Stds)		-	0.022 ± 0.013	-	1
Sum of Haloacetonitriles MAV ratios (NZ DW Stds)		-	< 0.016 ± 0.011	-	1

**Note:** The Guideline Values and Maximum Acceptable Values (MAV) are taken from the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2008)', Ministry of Health. Copies of this publication are available from <http://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2008>

The Maximum Acceptable Values (MAVs) have been defined by the Ministry of Health for parameters of health significance and should not be exceeded. The Guideline Values are the limits for aesthetic determinands that, if exceeded, may render the water unattractive to consumers.

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: [www.hill-laboratories.com/files/Intro\\_To\\_UOM.pdf](http://www.hill-laboratories.com/files/Intro_To_UOM.pdf), or contact the laboratory.

Note that the units g/m<sup>3</sup> 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 clean 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.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Halogenated Acetic Acids in Water by GC-MS*	Solvent extraction, methylation, GC-MS SIM analysis	-	2
Halogenated Volatile Disinfection By-Products in Water by GCMS	Solvent extraction, GC-MS SIM analysis	-	2
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1
Total Digestion	Nitric acid digestion. APHA 3030 E 22 <sup>nd</sup> ed. 2012 (modified).	-	1
Total Cyanide Distillation	Distillation following the addition of sulphuric acid, alkaline trapping solution. APHA 4500-CN- C (modified) 22 <sup>nd</sup> ed. 2012.	-	1
Total Antimony	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00021 g/m <sup>3</sup>	1
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.0011 g/m <sup>3</sup>	1
Total Barium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.0053 g/m <sup>3</sup>	1
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012.	0.0053 g/m <sup>3</sup>	1

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Cadmium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.000053 g/m <sup>3</sup>	1
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00053 g/m <sup>3</sup>	1
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00053 g/m <sup>3</sup>	1
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00011 g/m <sup>3</sup>	1
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00053 g/m <sup>3</sup>	1
Total Mercury	Bromine Oxidation followed by Atomic Fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m <sup>3</sup>	1
Total Molybdenum	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00021 g/m <sup>3</sup>	1
Total Nickel	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.00053 g/m <sup>3</sup>	1
Total Selenium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.0011 g/m <sup>3</sup>	1
Total Uranium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 22 <sup>nd</sup> ed. 2012 / US EPA 200.8.	0.000021 g/m <sup>3</sup>	1
Bromate	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B.	0.005 g/m <sup>3</sup>	1
Total Cyanide	Distillation, colorimetry. APHA 4500-CN: C (modified) & E (modified) 22 <sup>nd</sup> ed. 2012.	0.0010 g/m <sup>3</sup>	1
Monochloramine	Colorimetric. APHA 4500-Cl G 22 <sup>nd</sup> ed. 2012.	0.05 g/m <sup>3</sup>	2
Chlorite	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B.	0.005 g/m <sup>3</sup>	2
Chlorate	Sample analysed as received, filtered if required. Ion Chromatography. US EPA Method 300.1 Part B.	0.005 g/m <sup>3</sup>	2
Fluoride	Direct measurement, ion selective electrode. APHA 4500-F: C 22 <sup>nd</sup> ed. 2012.	0.05 g/m <sup>3</sup>	1
Nitrite	Calculation from Nitrite-N.	0.007 g/m <sup>3</sup>	1
Nitrate	Calculation from Nitrate-N.	0.010 g/m <sup>3</sup>	1
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 2008), Section 8.2.1.1.	0.001	2
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).	0	2

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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