

Riverton Water Supply

Raw Water

Parameter	Unit	Min	Max	Ave
GENERAL				
Total hardness	as mg/L CaCO3	140	205	181
Turbidity	NTU	2.15	3.64	3.6
pH		7.3	7.94	7.64
Alkalinity	mg/L	190	201	196
UVT	%	93.7	97.3	95.2
Conductivity	uS/cm	442	480	456
TDS	mg/L	220	296	252
TSS	mg/L	0	0	<2.5
Ca hardness	mg/L as CaCO3	140	170	161
Mg hardness	mg/L as CaCO3	15	35	22
Colour	CPU	<0.5	0.9	0.5
CATIONS				
Total Iron	mg/L	0.34	0.66 ⁽³⁾	0.51
Total Mn	mg/L	0.042	0.054 ⁽⁴⁾	0.05
Ca	mg/L	41.1	69	62.5
Mg	mg/L	7.5	9.1	8.1
Iron (sol)	mg/L	<0.002	0.021	0.01
Na	mg/L	21	23	21.5
As	mg/L	0.0021	0.0021	0.0021
K	mg/L	0.93	0.94	0.935
Silica (reactive)	mg/L	25	27	26
Sr	mg/L	0.36	0.4	0.38
Al	mg/L	<0.06	<0.06	<0.06
Ba	mg/L	0.0028	0.0038	0.0033
Silica (total)	mg/L	28	29	28.5
Cd	mg/L	<0.001	<0.001	<0.001
Cr	mg/L	<0.01	<0.01	<0.01
Cu	mg/L	<0.01	<0.01	<0.01
Pb	mg/L	<0.002	<0.002	<0.002
Ni	mg/L	<0.01	<0.01	<0.01
Zn	mg/L	<0.02	<0.02	<0.02
ANIONS				
Sulphide	mg/L	<0.1	<0.1	<0.1
Cl	mg/L	15	34	29
Ammoniacal Nitrogen	mg/LN	0.01	0.031	0.02
Nitrate N	mg/LN	0.15	0.35	0.21
SO4	mg/L	12	14	12.7
Br	mg/L	0.08	0.08	0.08
Fl	mg/L	0.11	0.15	0.13
PO4	mg/L	<0.4	<0.4	<0.4
P	mg/L	0.06	0.07	0.07
S	mg/L	3.3	8.7	6
B	mg/L	<0.1	<0.1	<0.1

Sample Taken at site 4 own after start up.

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349

(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 180615-164

Attention:	Bevan McKenzie	Final Report:	275419-0
Client:	SOUTHLAND DISTRICT COUNCIL	Report Issue Date:	27-Jun-2018
Address:	PO Box 903, Invercargill, 9840	Received Date:	19-Jun-2018
Client Reference:	Riverton	Sampled By:	Bevan
Purchase Order:	138656	Quote Reference :	3199

Sample Details	WATERS	WATERS	WATERS
Lab Sample ID:	180615-164-1	180615-164-2	180615-164-3
Client Sample ID:		ex Sand Filter	ex NF
Sample Date/Time:	15/06/2018	15/06/2018	15/06/2018
Description:	Riverton Water Treatment Plant	Riverton	Riverton

General Testing		WATERS	WATERS	WATERS
Conductivity (at 25 °C)	mS/m	46.6	47.0	-
Langelier Index (at 20 °C)		0.5 *	0.6 *	-
pH (at room temp c. 20 °C)	pH unit	7.9	8.0	-
Total Alkalinity (as CaCO3)	mg/L	170	170	-

Metals		WATERS	WATERS	WATERS
Total Metals by ICP-MS—Trace (Default Digest)				
Calcium (Total)	mg/L	60	59	11
Calcium Hardness (as CaCO3) (Total)	mg/L	-	-	29
Magnesium (Total)	mg/L	-	-	1.2
Magnesium Hardness (as CaCO3) (Total)	mg/L	-	-	5.1
Total Hardness (as CaCO3)	mg/L	-	-	34

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
General Testing				
Conductivity (at 25 °C) by Electrode	APHA (online edition) 2510 B	0.5 mS/m	1, 2	Auckland
Langelier Index (at 20 °C) by Calculation	APHA (online edition) 2330 B	-500	1, 2	Auckland
pH (at room temp c. 20 °C) by Electrode	APHA (online edition) 4500-H B	0.1 pH unit	1, 2	Auckland
Total Alkalinity (as CaCO3) by Titration	APHA (online edition) 2320 B	1 mg/L	1, 2	Auckland
Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Calcium (Total)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Calcium Hardness (as CaCO3) (Total)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	3	Auckland
Magnesium (Total)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	3	Auckland
Magnesium Hardness (as CaCO3) (Total)	APHA (online edition) 3125 B by ICPMS	0.004 mg/L	3	Auckland
Total Hardness (as CaCO3)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	3	Auckland
Preparations				
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 27/06/2018

A handwritten signature in black ink, appearing to read 'Chandra Sharma', is written over a horizontal line.

Chandra Sharma
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,

(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 170927-189

Attention:	Bevan Mckenzie	Final Report:	243580-0
Client:	SOUTHLAND DISTRICT COUNCIL	Report Issue Date:	05-Oct-2017
Address:	PO Box 903, Invercargill, 9840	Received Date:	27-Sep-2017
Client Reference:	Riverton	Sampled By:	Bevan
Purchase Order:	133576	Quote Reference :	3199

Sample Details	WATERS	WATERS	WATERS	WATERS
Lab Sample ID:	170927-189-1	170927-189-2	170927-189-3	170927-189-4
Client Sample ID:	Raw DW1	Ex Sand Filter	Treated Water	East RW
Sample Date/Time:	27/09/2017	27/09/2017	27/09/2017	27/09/2017
Description:	Riverton	Riverton	Riverton	Riverton

Metals					
Total Metals by ICP-MS—Trace (Default Digest)					
Calcium (Total)	mg/L	-	57	15	61
Calcium Hardness (as CaCO ₃) (Total)	mg/L	-	140	37	150
Magnesium (Total)	mg/L	-	7.8	2.1	8.3
Magnesium Hardness (as CaCO ₃) (Total)	mg/L	-	32	8.5	34
Total Hardness (as CaCO ₃)	mg/L	-	170	46	190

Microbiology					
Escherichia coli by MPN(Colilert-18)					
Escherichia coli (Colilert-18)	MPN/100 mL	<1.0	-	-	-

Sample Details	WATERS	WATERS	WATERS
Lab Sample ID:	170927-189-5	170927-189-6	170927-189-7
Client Sample ID:	ex Sand Filter	Treated Water	ex NF Plant
Sample Date/Time:	27/09/2017	27/09/2017	27/09/2017
Description:	Riverton	Riverton	Riverton

Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Iron (Total)	mg/L	0.017	0.0025	<0.002

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Calcium (Total)	In House based on EPA 200.8 by ICPMS	0.010 mg/L	2, 3, 4	Auckland
Calcium Hardness (as CaCO ₃) (Total)	In House based on EPA 200.8 by ICPMS	0.03 mg/L	2, 3, 4	Auckland
Iron (Total)	In House based on EPA 200.8 by ICPMS	0.002 mg/L	5, 6, 7	Auckland
Magnesium (Total)	In House based on EPA 200.8 by ICPMS	0.001 mg/L	2, 3, 4	Auckland
Magnesium Hardness (as CaCO ₃) (Total)	In House based on EPA 200.8 by ICPMS	0.004 mg/L	2, 3, 4	Auckland
Total Hardness (as CaCO ₃)	In House based on EPA 200.8 by ICPMS	0.03 mg/L	2, 3, 4	Auckland

Microbiology				
Escherichia coli by MPN(Colilert-18)				
Escherichia coli (Colilert-18)	APHA (online edition) 9223 B Colilert Quantitray	1 MPN/100 mL	1	Invercargill

Preparations				
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		2, 3, 4, 5, 6, 7	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher.

For more information please contact the Operations Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 05/10/2017

A handwritten signature in blue ink, appearing to read 'Rachel Hwang'.

Rachel Hwang
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150
Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840
(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349
(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 181015-174

Attention: Bevan Mckenzie
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton Water Supply
Purchase Order: 141130

Final Report: 291381-0
Report Issue Date: 02-Nov-2018
Received Date: 19-Oct-2018
Sampled By: Tim Duechraas
Quote Reference: 3199

NB: No sample Temperature provided.

Sample Details

	WATERS	WATERS	WATERS	WATERS
Lab Sample ID:	181015-174-1	181015-174-2	181015-174-3	181015-174-4
Client Sample ID:		Plant,sink	125 Havekock Street	9 Voilet street
Sample Date/Time:	18/10/2018 12:10	18/10/2018 10:50	18/10/2018 11:03	18/10/2018 11:30
Description:	ex NF Plant	Water to Town	Riverton town side	Rocks side

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

	mg/L	mg/L	mg/L	mg/L
Chloride	15	19	19	20
Nitrate (as N)	0.0029	0.0057	0.005	0.0057
Sulphate	0.11	2.4	2.4	3.2

on Balance (Anions/Cations) by Calculation

	meq/L	meq/L	meq/L	meq/L
Anion Total	1.5 *	2.2 *	2.1 *	2.4 *
Cation Total	1.4 *	2.1 *	2.0 *	2.1 *
meq/L Difference	0.14 *	0.58e-1 *	0.11 *	0.33 *
Percent Difference	4.6 *	1.4 *	2.7 *	7.4 *
Sum of Anions + Cations	3.0 *	4.2 *	4.2 *	4.4 *

General Testing

	mg/L	mg/L	mg/L	mg/L
Ammoniacal Nitrogen (as N)	<0.005	<0.005	<0.005	<0.005
Bicarbonate Alkalinity (as HCO ₃)	69	96	95	110
Carbonate Alkalinity (as CO ₃)	<1.0	<1.0	<1.0	<1.0
Conductivity (at 25 °C)	15.9	21.5	21.6	23.9
Hydroxide Alkalinity (as CaCO ₃)	<1.0	<1.0	<1.0	<1.0
Langelier Index (at 20 °C)	-1.0 *	-0.5 *	-0.4 *	-0.2 *
Monoxide Reactive Silica (as SiO ₂)	15	17	17	18
pH (at room temp c. 20 °C)	7.4	7.6	7.7	7.8
Total Alkalinity (as CaCO ₃)	56	78	78	88
Total Dissolved Solids	100	140	140	160

Metals

Dissolved Metals by ICP-MS—Trace

	mg/L	mg/L	mg/L	mg/L
Calcium (Dissolved)	14	24	23	24
Iron (Dissolved)	<0.002	<0.002	<0.002	<0.002
Magnesium (Dissolved)	1.5	2.7	2.6	2.7
Potassium (Dissolved)	0.48	0.62	0.57	0.55
Sodium (Dissolved)	13	15	15	15

Total Metals by ICP-MS—Trace (Default Digest)

	mg/L	mg/L	mg/L	mg/L
Calcium (Total)	15	23	23	27
Calcium Hardness (as CaCO ₃) (Total)	38	57	58	68
Iron (Total)	<0.002	0.0032	0.0031	0.0059
Magnesium Hardness (as CaCO ₃) (Total)	6.7	11	11	12
Sodium (Total)	13	15	15	16

Sample Details		WATERS	
Lab Sample ID:		181015-174-5	
Client Sample ID:		no 76	
Sample Date/Time:		18/10/2018 11:44	
Description:		Orepuiki Riveton HWY	

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)			
Chloride	mg/L	19	
Nitrate (as N)	mg/L	0.0048	
Sulphate	mg/L	2.6	

on Balance (Anions/Cations) by Calculation			
Anion Total	meq/L	2.2 *	
Cation Total	meq/L	1.9 *	
meq/L Difference	meq/L	0.29 *	
Percent Difference	%	7.0 *	
Sum of Anions + Cations	meq/L	4.1 *	

General Testing			
Ammoniacal Nitrogen (as N)	mg/L	<0.005	
Bicarbonate Alkalinity (as HCO ₃)	mg/L	100	
Carbonate Alkalinity (as CO ₃)	mg/L	<1.0	
Conductivity (at 25 °C)	mS/m	22.5	
Hydroxide Alkalinity (as CaCO ₃)	mg/L	<1.0	
Langelier Index (at 20 °C)		-0.4 *	
Molybdate Reactive Silica (as SiO ₂)	mg/L	17	
pH (at room temp c. 20 °C)	pH unit	7.7	
Total Alkalinity (as CaCO ₃)	mg/L	82	
Total Dissolved Solids	mg/L	130	

Metals

Dissolved Metals by ICP-MS—Trace			
Calcium (Dissolved)	mg/L	22	
Iron (Dissolved)	mg/L	<0.002	
Magnesium (Dissolved)	mg/L	2.4	
Potassium (Dissolved)	mg/L	0.58	
Sodium (Dissolved)	mg/L	14	

Total Metals by ICP-MS—Trace (Default Digest)			
Calcium (Total)	mg/L	24	
Calcium Hardness (as CaCO ₃) (Total)	mg/L	61	
Iron (Total)	mg/L	0.44	
Magnesium Hardness (as CaCO ₃) (Total)	mg/L	11	
Sodium (Total)	mg/L	15	

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
---------	------------------	-----	---------	----------

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)				
Chloride	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland
Nitrate (as N)	In House based on APHA (online edition) 4110 B and EPA 300.0	0.002 mg/L	All	Auckland
Sulphate	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland

on Balance (Anions/Cations) by Calculation				
Anion Total	APHA (online edition) 1030 E	meq/L	All	Invercargill
Cation Total	APHA (online edition) 1030 E	meq/L	All	Invercargill
meq/L Difference	APHA (online edition) 1030 E	meq/L	All	Invercargill
Percent Difference	APHA (online edition) 1030 E		All	Invercargill
Sum of Anions + Cations	APHA (online edition) 1030 E		All	Invercargill

General Testing				
Ammoniacal Nitrogen (as N) by Flow Analysis	APHA (online edition) 4500-NH ₃ H	0.005 mg/L	All	Auckland
Bicarbonate Alkalinity (as HCO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Carbonate Alkalinity (as CO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Conductivity (at 25 °C) by Electrode	APHA (online edition) 2510 B	0.5 mS/m	All	Auckland

General Testing

Hydroxide Alkalinity (as CaCO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Langlier Index (at 20 °C) by Calculation	APHA (online edition) 2330 B	-500	All	Invercargill
Molybdate Reactive Silica (as SiO ₂) by Colorimetry/Discrete Analyser	APHA (online edition) 4500-SiO ₂ F	1 mg/L	All	Auckland
pH (at room temp c. 20 °C) by Electrode	APHA (online edition) 4500-H B	0.1 pH unit	All	Auckland
Total Alkalinity (as CaCO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Total Dissolved Solids by Gravimetry	APHA (online edition) 2540 C (Modified: Dried at 103 - 105 °C)	15 mg/L	All	Auckland

Metals**Dissolved Metals by ICP-MS—Trace**

Calcium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Iron (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	All	Auckland
Potassium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.05 mg/L	All	Auckland
Sodium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.1 mg/L	All	Auckland

Total Metals by ICP-MS—Trace (Default Digest)

Calcium (Total)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Calcium Hardness (as CaCO ₃) (Total)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	All	Auckland
Iron (Total)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium Hardness (as CaCO ₃) (Total)	APHA (online edition) 3125 B by ICPMS	0.004 mg/L	All	Auckland
Sodium (Total)	APHA (online edition) 3125 B by ICPMS	0.1 mg/L	All	Auckland

Preparations

0.45 µm Filtration for Dissolved Metals	APHA (online edition) 3010B (modified)		All	Auckland
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		All	Auckland
Glass Fibre Filtration (1.2 µm)	APHA (online edition) 2540 C (Filtration)		All	Auckland
Membrane Filtration (0.45 µm)	APHA (online edition) 4500-P B (preliminary filtration)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

amples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 02/11/2018

S Money

Stephen Money
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150
Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840
(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349
(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 190124-102

Attention: Bevan Mckenzie
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton
Purchase Order: 142900

Final Report: 303160-0
Report Issue Date: 01-Feb-2019
Received Date: 24-Jan-2019
Sampled By: BM
Quote Reference: 3199

Sample Details

	WATERS	WATERS
Lab Sample ID:	190124-102-1	190124-102-2
Client Sample ID:	Palmerston st	Palmerston st
Sample Date/Time:	23/01/2019 13:00	23/01/2019 13:00
Description:	(House) Filter Water	Town Water

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

Sulphate	mg/L	2.8	2.9
----------	------	-----	-----

General Testing

Conductivity (at 25 °C)	uS/cm	197	196
pH (at room temp c. 20 °C)	pH unit	7.30	7.46
Total Alkalinity (as CaCO ₃)	mg/L	63	110
Total Suspended Solids	mg/L	<2.7	<3.3

Metals

Dissolved Metals by ICP-MS—Trace

Calcium (Dissolved)	mg/L	21	18
Iron (Dissolved)	mg/L	0.0021	<0.002
Magnesium (Dissolved)	mg/L	2.6	2.3

Total Metals by ICP-MS—Trace (Default Digest)

Calcium (Total)	mg/L	21	21
Copper (Total)	mg/L	0.0018	0.0018
Iron (Total)	mg/L	<0.002	0.022
Magnesium (Total)	mg/L	2.6	2.6
Manganese (Total)	mg/L	<0.0005	0.1
Sodium (Total)	mg/L	14	14
Total Hardness (as CaCO ₃)	mg/L	63	63

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
---------	------------------	-----	---------	----------

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

Sulphate	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland
----------	--	-----------	-----	----------

General Testing

Conductivity (at 25 °C) by Electrode	APHA (online edition) 2510 B	2 uS/cm	All	Invercargill
pH (at room temp c. 20 °C) by Electrode	APHA (online edition) 4500-H B (Tested beyond 15 minute APHA holding time)	0.1 pH unit	All	Invercargill
Total Alkalinity (as CaCO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Total Suspended Solids by Gravimetry	APHA (online edition) 2540 D	2.5 mg/L	All	Invercargill

Metals

Dissolved Metals by ICP-MS—Trace

Calcium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Iron (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	All	Auckland

Total Metals by ICP-MS—Trace (Default Digest)

Calcium (Total)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
-----------------	---------------------------------------	------------	-----	----------

Metals**Total Metals by ICP-MS—Trace (Default Digest)**

Copper (Total)	APHA (online edition) 3125 B by ICPMS	0.0002 mg/L	All	Auckland
Iron (Total)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium (Total)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	All	Auckland
Manganese (Total)	APHA (online edition) 3125 B by ICPMS	0.0005 mg/L	All	Auckland
Sodium (Total)	APHA (online edition) 3125 B by ICPMS	0.1 mg/L	All	Auckland
Total Hardness (as CaCO ₃)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	All	Auckland

Preparations

0.45 µm Filtration for Dissolved Metals	APHA (online edition) 3010B (modified)		All	Auckland
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		All	Auckland
Membrane Filtration (0.45 µm)	APHA (online edition) 4500-P B (preliminary filtration)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 01/02/2019

Zum Nguyen
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349
(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 171116-133

Attention: Paul Reid
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton Potable Water
Purchase Order: 133574

Final Report: 249322-0
Report Issue Date: 22-Nov-2017
Received Date: 17-Nov-2017
Sampled By: Bevan McKenzie
Quote Reference: 3199

Sample Details

	WATERS	WATERS	WATERS
Lab Sample ID:	171116-133-1	171116-133-2	171116-133-3
Client Sample ID:			
Sample Date/Time:	13/11/2017 14:40	13/11/2017 14:40	13/11/2017 14:40
Description:	Riverton Town Water	Riverton Ex NF Filter	Riverton Ex Sand Filter

Metals

Total Metals by ICP-MS—Trace (Default Digest)

Analyte	mg/L	mg/L	mg/L
Iron (Total)	-	-	0.014
Total Hardness (as CaCO ₃)	57	27	-

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Iron (Total)	In House based on EPA 200.8 by ICPMS	0.002 mg/L	3	Auckland
Total Hardness (as CaCO ₃)	In House based on EPA 200.8 by ICPMS	0.03 mg/L	1, 2	Auckland

Preparations

Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)	All	Auckland
------------------------------------	---	-----	----------

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

amples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 22/11/2017

A handwritten signature in black ink, appearing to read 'Rachel Hwang'.

Rachel Hwang
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

Tel: (03) 214 4040
Fax: (03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,

Tel: (03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 170929-103

Attention: Bevan Mckenzie
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton
Purchase Order: 133574

Final Report: 243745-0
Report Issue Date: 09-Oct-2017
Received Date: 29-Sep-2017
Sampled By: Bevan
Quote Reference: 3199

Sample Details	WATERS	WATERS	WATERS	WATERS
Lab Sample ID:	170929-103-1	170929-103-2	170929-103-3	170929-103-4
Client Sample ID:				
Sample Date/Time:	29/09/2017	29/09/2017	29/09/2017	29/09/2017
Description:	Riverton Bore 1	Riverton Town	Riverton xPlant	Riverton NF Plant

Metals					
Metals by ICP-MS—Screen (Default Digest)					
Calcium (Total)	mg/L	-	15	-	5.3
Calcium Hardness (as CaCO ₃) (Total)	mg/L	-	38	-	13
Magnesium (Total)	mg/L	-	2.0	-	0.64
Magnesium Hardness (as CaCO ₃) (Total)	mg/L	-	8.1	-	2.6
Total Hardness (as CaCO ₃)	mg/L	-	46	-	16

Total Metals by ICP-MS—Trace (Default Digest)					
Iron (Total)	mg/L	-	-	0.0027	<0.002

Microbiology					
Escherichia coli by MPN(Colilert-18)					
Escherichia coli (Colilert-18)	MPN/100 mL	<1.0	-	-	-

Sample Details	WATERS
Lab Sample ID:	170929-103-5
Client Sample ID:	
Sample Date/Time:	29/09/2017
Description:	Riverton X Sand Filter

Metals		
Total Metals by ICP-MS—Trace (Default Digest)		
Iron (Total)	mg/L	0.0046

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Total Metals by ICP-MS—Screen (Default Digest)				
Calcium (Total)	In House based on EPA 200.8 by ICPMS	0.5 mg/L	2, 4	Auckland
Calcium Hardness (as CaCO ₃) (Total)	In House based on EPA 200.8 by ICPMS	1 mg/L	2, 4	Auckland
Magnesium (Total)	In House based on EPA 200.8 by ICPMS	0.2 mg/L	2, 4	Auckland
Magnesium Hardness (as CaCO ₃) (Total)	In House based on EPA 200.8 by ICPMS	0.8 mg/L	2, 4	Auckland
Total Hardness (as CaCO ₃)	In House based on EPA 200.8 by ICPMS	2 mg/L	2, 4	Auckland
Total Metals by ICP-MS—Trace (Default Digest)				
Iron (Total)	In House based on EPA 200.8 by ICPMS	0.002 mg/L	3, 4, 5	Auckland

Microbiology				
Escherichia coli by MPN(Colilert-18)				
Escherichia coli (Colilert-18)	APHA (online edition) 9223 B Colilert Quantitray	1 MPN/100 mL	1	Invercargill

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher.

For more information please contact the Operations Manager.

amples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 09/10/2017

A handwritten signature in black ink, appearing to read 'Rachel Hwang'.

Rachel Hwang
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150
Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840
(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349
(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 180917-127

Attention: Bevan Mckenzie
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton Town Supply
Purchase Order: 140593

Final Report: 286492-0
Report Issue Date: 25-Sep-2018
Received Date: 18-Sep-2018
Sampled By: Bevan
Quote Reference: 7022

Sample Details

	WATERS	WATERS	WATERS
Lab Sample ID:	180917-127-1	180917-127-2	180917-127-3
Client Sample ID:			
Sample Date/Time:	14/09/2018 14:40	14/09/2018 14:40	14/09/2018 14:40
Description:	ex Sandfilter	ex NF Plant	Water to Town

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

Anion	Unit	180917-127-1	180917-127-2	180917-127-3
Chloride	mg/L	32	9.7	19
Nitrate (as N)	mg/L	0.0083	0.0062	0.011
Sulphate	mg/L	12	0.2	2.3

Ion Balance (Anions/Cations) by Calculation

Parameter	Unit	180917-127-1	180917-127-2	180917-127-3
Anion Total	meq/L	3.7 *	0.92 *	1.9 *
Cation Total	meq/L	3.6 *	0.93 *	1.9 *
meq/L Difference	meq/L	0.13 *	0.98e-2 *	0.25e-1 *
Percent Difference	%	1.8 *	0.53 *	0.67 *
Sum of Anions + Cations	meq/L	7.3 *	1.9 *	3.7 *

General Testing

Parameter	Unit	180917-127-1	180917-127-2	180917-127-3
Ammoniacal Nitrogen (as N)	mg/L	<0.005	0.011	0.014
Bicarbonate Alkalinity (as HCO ₃) by Calc	mg/L	160 *	39 *	79 *
Carbonate Alkalinity (as CO ₃)	mg/L	<0.6 *	<0.6 *	<0.6 *
Conductivity (at 25 °C)	mS/m	38.6	10.2	20.1
Hydroxide Alkalinity (as CaCO ₃)	mg/L	<1.0 *	<1.0 *	<1.0 *
Langelier Index (at 20 °C)		0.2 *	-0.9 *	-0.2 *
pH (at room temp c. 20 °C)	pH unit	7.7	7.8	8.0
Total Alkalinity (as CaCO ₃)	mg/L	130	33	66
Total Dissolved Solids	mg/L	190	97	120

Metals

Dissolved Metals by ICP-MS—Trace

Element	Unit	180917-127-1	180917-127-2	180917-127-3
Calcium (Dissolved)	mg/L	40	9.6	19
Iron (Dissolved)	mg/L	<0.002	<0.002	<0.002
Magnesium (Dissolved)	mg/L	7.9	1.1	2.9
Potassium (Dissolved)	mg/L	0.8	0.3	0.53
Sodium (Dissolved)	mg/L	21	8.1	14

Total Metals by ICP-MS—Trace (Default Digest)

Element	Unit	180917-127-1	180917-127-2	180917-127-3
Calcium (Total)	mg/L	63	14	22
Calcium Hardness (as CaCO ₃) (Total)	mg/L	160	35	56
Iron (Total)	mg/L	0.017	<0.002	0.044
Magnesium Hardness (as CaCO ₃) (Total)	mg/L	33	6.8	12

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
---------	------------------	-----	---------	----------

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

Chemistry Detailed

Anions by Ion Chromatography (0.45 µm Filtered)

Chloride	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland
Nitrate (as N)	In House based on APHA (online edition) 4110 B and EPA 300.0	0.002 mg/L	All	Auckland
Sulphate	In House based on APHA (online edition) 4110 B and EPA 300.0	0.02 mg/L	All	Auckland

on Balance (Anions/Cations) by Calculation

Anion Total	APHA (online edition) 1030 E	meq/L	All	Auckland
Cation Total	APHA (online edition) 1030 E	meq/L	All	Auckland
meq/L Difference	APHA (online edition) 1030 E	meq/L	All	Auckland
Percent Difference	APHA (online edition) 1030 E		All	Auckland
Sum of Anions + Cations	APHA (online edition) 1030 E		All	Auckland

General Testing

Ammoniacal Nitrogen (as N) by Flow Analysis	APHA (online edition) 4500-NH3 H	0.005 mg/L	All	Auckland
Bicarbonate Alkalinity (as HCO ₃) by Calculation	APHA (online edition) 4500-CO2 D	1 mg/L	All	Auckland
Carbonate Alkalinity (as CO ₃) by Calculation	APHA (online edition) 4500-CO2 D	1 mg/L	All	Auckland
Conductivity (at 25 °C) by Electrode	APHA (online edition) 2510 B	0.5 mS/m	All	Auckland
Hydroxide Alkalinity (as CaCO ₃) by Calculation	APHA (online edition) 4500-CO2 D	1 mg/L	All	Auckland
Langlier Index (at 20 °C) by Calculation	APHA (online edition) 2330 B	-500	All	Auckland
pH (at room temp c. 20 °C) by Electrode	APHA (online edition) 4500-H B	0.1 pH unit	All	Auckland
Total Alkalinity (as CaCO ₃) by Titration	APHA (online edition) 2320 B	1 mg/L	All	Auckland
Total Dissolved Solids by Gravimetry	APHA (online edition) 2540 C (Modified: Dried at 103 - 105 °C)	15 mg/L	All	Auckland

Metals

Dissolved Metals by ICP-MS—Trace

Calcium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Iron (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.001 mg/L	All	Auckland
Potassium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.05 mg/L	All	Auckland
Sodium (Dissolved)	APHA (online edition) 3125 B by ICPMS	0.1 mg/L	All	Auckland

Total Metals by ICP-MS—Trace (Default Digest)

Calcium (Total)	APHA (online edition) 3125 B by ICPMS	0.010 mg/L	All	Auckland
Calcium Hardness (as CaCO ₃) (Total)	APHA (online edition) 3125 B by ICPMS	0.03 mg/L	All	Auckland
Iron (Total)	APHA (online edition) 3125 B by ICPMS	0.002 mg/L	All	Auckland
Magnesium Hardness (as CaCO ₃) (Total)	APHA (online edition) 3125 B by ICPMS	0.004 mg/L	All	Auckland

Preparations

0.45 µm Filtration for Dissolved Metals	APHA (online edition) 3010B (modified)	All	Auckland
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)	All	Auckland
Glass Fibre Filtration (1.2 µm)	APHA (online edition) 2540 C (Filtration)	All	Auckland
Membrane Filtration (0.45 µm)	APHA (online edition) 4500-P B (preliminary filtration)	All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,

(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference: 171002-120

Attention: Paul Reid
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton Water Supply
Purchase Order: 133544

Final Report: 243961-0
Report Issue Date: 10-Oct-2017
Received Date: 02-Oct-2017
Sampled By: Bevan McKenzie
Quote Reference: 3199

Sample Details

	WATERS	WATERS	WATERS	WATERS
Lab Sample ID:	171002-120-1	171002-120-2	171002-120-3	171002-120-4
Client Sample ID:				
Sample Date/Time:	02/10/2017 13:05	02/10/2017 13:05	02/10/2017 13:05	02/10/2017 13:05
Description:	Ex Sand Filter	Treated Water	Treated Water	Bore 1

Metals

Total Metals by ICP-MS—Screen (Default Digest)

Analyte	Unit	171002-120-1	171002-120-2	171002-120-3	171002-120-4
Total Hardness (as CaCO ₃)	mg/L	-	-	44	-

Total Metals by ICP-MS—Trace (Default Digest)

Analyte	Unit	171002-120-1	171002-120-2	171002-120-3	171002-120-4
Iron (Total)	mg/L	0.052	0.0042	-	-

Microbiology

Escherichia coli by MPN(Colilert-18)

Analyte	Unit	171002-120-1	171002-120-2	171002-120-3	171002-120-4
Escherichia coli (Colilert-18)	MPN/100 mL	-	-	-	<1.0

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Total Metals by ICP-MS—Screen (Default Digest)				
Total Hardness (as CaCO ₃)	In House based on EPA 200.8 by ICPMS	2 mg/L	3	Auckland
Total Metals by ICP-MS—Trace (Default Digest)				
Iron (Total)	In House based on EPA 200.8 by ICPMS	0.002 mg/L	1, 2	Auckland
Microbiology				
Escherichia coli by MPN(Colilert-18)				
Escherichia coli (Colilert-18)	APHA (online edition) 9223 B Colilert Quantitray	1 MPN/100 mL	4	Invercargill
Preparations				
Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)		1, 2, 3	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher.

For more information please contact the Operations Manager

amples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 10/10/2017

A handwritten signature in black ink, appearing to be 'Rachel Hwang', written in a cursive style.

Rachel Hwang
KTP Signatory

Watercare

Laboratory Services

Auckland
52 Aintree Ave,
PO Box 107028,
Auckland Airport,
Auckland, 2150

Tel: (09) 539 7614
Fax: (09) 539 7601

Invercargill
142 Esk Street,
PO Box 747,
Invercargill, 9840

(03) 214 4040
(03) 214 4041

Queenstown
74 Glenda Drive,
PO Box 2614,
Wakatipu,
Queenstown, 9349

(03) 409 0559

www.watercarelabs.co.nz

clientsupport@water.co.nz

Certificate of Analysis

Laboratory Reference:171116-133

Attention: Paul Reid
Client: SOUTHLAND DISTRICT COUNCIL
Address: PO Box 903, Invercargill, 9840
Client Reference: Riverton Potable Water
Purchase Order: 133574

Final Report: 249322-0
Report Issue Date: 22-Nov-2017
Received Date: 17-Nov-2017
Sampled By: Bevan McKenzie
Quote Reference: 3199

Sample Details

	WATERS	WATERS	WATERS
Lab Sample ID:	171116-133-1	171116-133-2	171116-133-3
Client Sample ID:			
Sample Date/Time:	13/11/2017 14:40	13/11/2017 14:40	13/11/2017 14:40
Description:	Riverton Town Water	Riverton Ex NF Filter	Riverton Ex Sand Filter

Metals

Total Metals by ICP-MS—Trace (Default Digest)

Iron (Total) mg/L	-	-	0.014
Total Hardness (as CaCO3) mg/L	57	27	-

Results marked with * are not accredited to International Accreditation New Zealand

Where samples have been supplied by the client they are tested as received. A dash indicates no test performed.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Total Metals by ICP-MS—Trace (Default Digest)				
Iron (Total)	In House based on EPA 200.8 by ICPMS	0.002 mg/L	3	Auckland
Total Hardness (as CaCO3)	In House based on EPA 200.8 by ICPMS	0.03 mg/L	1, 2	Auckland

Preparations

Digest for Total Metals in Liquids	APHA (online edition) 3030 E (modified, 4:1 Nitric:Hydrochloric Acid)	All	Auckland
------------------------------------	---	-----	----------

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Operations Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

This report may not be reproduced, except in full, without the written authority of the Operations Manager.



Report Signatory 22/11/2017

A handwritten signature in blue ink, appearing to read 'Rachel Hwang'.

Rachel Hwang
KTP Signatory