



**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2007**

**Appendix C**

**Water Chemistry Test Results**



Environmental Division

**ANALYTICAL REPORT**

VILLAGE OF LIONS BAY  
ATTN: ALBERTO URRUTIA  
PO BOX 141  
LIONS BAY BC V0N 2E0

Reported On: 18-APR-07 04:33 PM

Lab Work Order #: **L492384**

Date Received: **03-APR-07**

Project P.O. #: \_\_\_\_\_  
Job Reference: RAW AND TREATED WATER  
Legal Site Desc: \_\_\_\_\_  
CofC Numbers: 47792

Other Information:

**Comments:** Please note that the samples in this report were not analyzed for Biochemical Oxygen Demand (BOD) since they had exceeded the recommended holding time.

TIMOTHY GUY CROWTHER  
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

**Paula Shuto**

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L492384-1	L492384-2	L492384-3	L492384-4	L492384-5
		Description	02-APR-07	02-APR-07	02-APR-07	02-APR-07	02-APR-07
		Sampled Date	14:10	13:35	13:20	13:30	13:55
		Sampled Time	MAGNESIA	HARVEY	PRV-3	400,000	PRV-5
		Client ID	CREEK INTAKE	CREEK INTAKE		HARVEY TANK	
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)		9.93	3.93	3.89	3.94	10.0
	pH (pH)		7.34	6.74	6.42	6.25	6.55
	Total Suspended Solids (mg/L)		<4.5	<3.0	<3.0	<3.0	<3.0
	Turbidity (NTU)		0.28	0.17	0.11	0.13	0.22
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		4.1	2.9	3.6	3.7	3.2
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.022	0.052	0.044	0.047	0.026
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		3.24	1.31	1.30	1.32	3.30
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.0019	0.0206	0.0174	0.0068	0.0115
	Iron (Fe)-Total (mg/L)		<0.030	<0.030	<0.030	<0.030	0.090
	Lead (Pb)-Total (mg/L)		<0.0010	0.0015	<0.0010	0.0033	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.45	0.16	0.16	0.16	0.44
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	0.0021
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050	
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)				<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)				<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)				0.0176	0.0198	0.0077
	Dibromochloromethane (mg/L)				<0.0010	<0.0010	<0.0010
	Total THMs (mg/L)				0.0176	0.0198	0.0077
<b>Organic Parameters</b>	Total Organic Carbon (mg/L)		0.79	1.13	1.14	1.13	0.79

## ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L492384-6	L492384-7	L492384-8	L492384-9	L492384-10
<b>Grouping</b>	<b>Analyte</b>					
		02-APR-07 14:15 100,000 MAGNESIA TANK	02-APR-07 14:35 KELVIN GROVE	03-APR-07 08:40 BRUNSWICK BEACH	03-APR-07 07:20 GENERAL STORE CAF	03-APR-07 07:35 KIDDLEY WINKS PRESCHOOL
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO3) (mg/L)	10.3	7.15	10.1	4.42	4.65
	pH (pH)	6.54	6.74	6.58	6.21	6.13
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
	Turbidity (NTU)	0.17	0.20	0.16	0.19	0.12
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO3) (mg/L)	4.2	4.1	3.6	<2.0	2.8
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.010	0.207	<0.010	0.039	0.034
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	0.00048	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	3.40	2.65	3.38	1.52	1.44
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.960	0.279	0.808	0.457	0.478
	Iron (Fe)-Total (mg/L)	<0.030	0.100	1.58	0.036	<0.030
	Lead (Pb)-Total (mg/L)	<0.0010	0.0245	<0.0010	0.0399	0.103
	Magnesium (Mg)-Total (mg/L)	0.45	0.13	0.40	0.15	0.26
	Manganese (Mn)-Total (mg/L)	<0.0020	0.0060	0.0058	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	0.11	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.086	0.099	<0.050	0.279	0.272
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)	0.0077	0.0349	0.0126	0.0226	0.0197
	Dibromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total THMs (mg/L)	0.0077	0.0361	0.0126	0.0226	0.0197
<b>Organic Parameters</b>	Total Organic Carbon (mg/L)	0.78	1.15	0.82	1.20	1.14

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L492384-11	L492384-12	L492384-13	L492384-14	L492384-15	
	03-APR-07 07:55 ELEMENTARY SCHOOL	03-APR-07 07:45 COMMUNITY CENTRE	02-APR-07 14:10 MAGNESIA CREEK INTAKE (AFTER FLUSH)	02-APR-07 13:35 HARVEY CREEK INTAKE (AFTER FLUSH)	02-APR-07 13:20 PRV-3 (AFTER FLUSH)	
<b>Grouping</b>	<b>Analyte</b>					
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	9.99	4.57	10.6	4.16	3.99
	pH (pH)	6.37	6.13			
	Total Suspended Solids (mg/L)	<3.0	<3.0			
	Turbidity (NTU)	0.25	0.20			
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	3.0	<2.0			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	<0.010	0.012	0.021	0.043	0.045
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	3.26	1.58	3.48	1.38	1.34
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	1.34	1.94	0.0026	0.0044	0.0096
	Iron (Fe)-Total (mg/L)	0.100	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	0.0589	0.0236	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.45	0.15	0.47	0.17	0.16
	Manganese (Mn)-Total (mg/L)	0.0033	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.180	0.089	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)	<0.0010	<0.0010			
	Bromoform (mg/L)	<0.0010	<0.0010			
	Chloroform (mg/L)	0.0099	0.0237			
	Dibromochloromethane (mg/L)	<0.0010	<0.0010			
	Total THMs (mg/L)	0.0099	0.0237			
<b>Organic Parameters</b>	Total Organic Carbon (mg/L)	0.78	1.15			

## ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L492384-16	L492384-17	L492384-18	L492384-19	L492384-20
<b>Grouping</b>	<b>Analyte</b>	HARVEY TANK (AFTER FLUSH)	PRV-5 (AFTER FLUSH)	100,000 MAGNESIA TANK (AFTER FLUSH)	KELVIN GROVE (AFTER FLUSH)	BRUNSWICK BEACH (AFTER FLUSH)
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	4.05	10.2	10.4	7.35	10.5
	pH (pH)					
	Total Suspended Solids (mg/L)					
	Turbidity (NTU)					
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)					
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.046	0.027	0.024	0.053	0.024
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	1.35	3.37	3.41	2.72	3.49
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	<0.0010	0.0126	0.0162	0.0129	0.0106
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	0.071	<0.030
	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0013	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.16	0.44	0.45	0.13	0.43
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	0.11
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)					
	Bromoform (mg/L)					
	Chloroform (mg/L)					
	Dibromochloromethane (mg/L)					
	Total THMs (mg/L)					
<b>Organic Parameters</b>	Total Organic Carbon (mg/L)					

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L492384-21	L492384-22	L492384-23	L492384-24
Grouping	Analyte	GENERAL STORE CAF (AFTER FLUSH)	KIDDLEY WINKS PRESCHOOL (AFTER FLUSH)	ELEMENTARY SCHOOL (AFTER FLUSH)	COMMUNITY CENTRE (AFTER FLUSH)
<b>WATER</b>					
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	4.33	3.97	9.86	4.42
	pH (pH)				
	Total Suspended Solids (mg/L)				
	Turbidity (NTU)				
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)				
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.044	0.043	0.022	0.043
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	1.49	1.33	3.25	1.52
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0187	0.0625	0.106	0.0659
	Iron (Fe)-Total (mg/L)	0.056	<0.030	0.066	0.063
	Lead (Pb)-Total (mg/L)	<0.0010	0.0047	0.0014	0.0010
	Magnesium (Mg)-Total (mg/L)	0.15	0.16	0.42	0.15
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)				
	Bromoform (mg/L)				
	Chloroform (mg/L)				
	Dibromochloromethane (mg/L)				
	Total THMs (mg/L)				
<b>Organic Parameters</b>	Total Organic Carbon (mg/L)				

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". All fractions of carbon are determined by the combustion-infrared method. Total carbon includes organic carbon (covalently bonded in organic molecules) and inorganic carbon (carbonate, bicarbonate and dissolved carbon dioxide). Total organic carbon is the calculated difference between the total carbon and the inorganic carbon determination. Dissolved carbon fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
<b>HG-TOT-DW-CVAFS-VA</b>	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
<b>MET-TOT-DW-ICP-VA</b>	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
<b>MET-TOT-DW-MS-VA</b>	Water	Total Metals In Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
<b>PH-MAN-VA</b>	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
<b>THM-PT-MS-VA</b>	Water	VOC (THM) by Purge and Trap with GCMS	EPA SW-846, METHOD 8260
This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the purge and trap extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).			
<b>THM-SUM-CALC-VA</b>	Water	Total Trihalomethane-THM	CALCULATION
<b>TSS-VA</b>	Water	Solids by Gravimetric	APHA 2540 Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.			

## Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
TURB-MET-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

**GLOSSARY OF REPORT TERMS**

**Surr** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.  
 The reported surrogate recovery value provides a measure of method efficiency.  
**mg/kg (units)** - unit of concentration based on mass, parts per million  
**mg/L (units)** - unit of concentration based on volume, parts per million  
**N/A** - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

## ANALYTICAL REPORT

VILLAGE OF LIONS BAY  
ATTN: ALBERTO URRUTIA  
PO BOX 141  
LIONS BAY BC V0N 2E0

Reported On: 11-JUL-07 11:25 AM

Lab Work Order #: L519751

Date Received: 19-JUN-07

Project P.O. #:  
Job Reference: RAW AND TREATED WATER  
Legal Site Desc:  
CofC Numbers: 57247

Other Information:

Comments:

Timothy Guy Crowther  
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

Selam Worku

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 90 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

### ALS Canada Ltd.

Part of the **ALS Laboratory Group**  
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Phone: +1 604 253 4188 Fax: +1 604 253 6700 [www.alsglobal.com](http://www.alsglobal.com)  
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## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L519751-1	L519751-2	L519751-3	L519751-4	L519751-5
		18-JUN-07 13:05 MAGNESIA CREEK INTAKE	18-JUN-07 12:10 HARVEY CREEK INTAKE	18-JUN-07 11:45 PRV-3	18-JUN-07 12:00 400,000 GAL HARVEY TANK	18-JUN-07 12:40 PRV-5
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	6.14	2.80	3.39	2.96	6.38
	pH (pH)	6.89	6.79	6.27	6.22	6.50
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0	<3.0	<3.0
	Turbidity (NTU)	0.45	0.27	0.29	0.51	0.43
Anions and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	2.9	2.7	<2.0	<2.0	<2.0
Total Metals	Aluminum (Al)-Total (mg/L)			0.056	0.056	0.044
	Antimony (Sb)-Total (mg/L)			<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)			<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)			<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)			<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)			<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)			1.02	1.00	2.24
	Chromium (Cr)-Total (mg/L)			<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)			0.0223	0.0039	0.0231
	Iron (Fe)-Total (mg/L)			<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)			<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)			0.12	0.12	0.25
	Manganese (Mn)-Total (mg/L)			<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)			<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)			<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)			<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)			<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)			<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)			<0.050	<0.050	<0.050
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.051	0.066	0.057	0.057	0.044
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Dissolved (mg/L)	1.98	0.93	1.14	0.99	2.15
	Chromium (Cr)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Dissolved (mg/L)	0.0024	0.0028	0.0067	<0.0010	0.0141
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.29	0.12	0.13	0.12	0.24
	Manganese (Mn)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L519751-6	L519751-7	L519751-8	L519751-9	L519751-10
		Description					
		Sampled Date	18-JUN-07	18-JUN-07	18-JUN-07	19-JUN-07	19-JUN-07
		Sampled Time	12:55	11:05	11:25	07:50	07:40
		Client ID	100,000 GAL. MAGNESIA TANK	KELVIN GROVE	BRUNSWICK BEACH	GENERAL STORE/CAF	KIDDLEY WINKS PRESCHOOL
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)		6.36	4.10	7.50	3.62	2.88
	pH (pH)		6.51	6.56	6.65	6.38	6.06
	Total Suspended Solids (mg/L)		<3.0	<3.0	<3.0	<3.0	<3.0
	Turbidity (NTU)		0.46	0.37	0.42	0.38	0.22
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		<2.0	<2.0	2.6	<2.0	<2.0
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.044	0.043	0.019	0.045	0.021
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		2.13	1.65	2.60	1.24	1.03
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.0252	0.205	0.849	0.359	1.39
	Iron (Fe)-Total (mg/L)		<0.030	0.033	0.385	0.048	<0.030
	Lead (Pb)-Total (mg/L)		<0.0010	0.0063	<0.0010	0.0024	0.0312
	Magnesium (Mg)-Total (mg/L)		0.25	0.45	0.27	0.13	0.25
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020	0.0027	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)		<0.050	0.277	<0.050	0.109	<0.050
<b>Dissolved Metals</b>	Aluminum (Al)-Dissolved (mg/L)		0.044	0.052	0.033	0.054	0.056
	Antimony (Sb)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Dissolved (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Dissolved (mg/L)		2.13	1.46	2.57	1.27	0.97
	Chromium (Cr)-Dissolved (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Dissolved (mg/L)		0.0218	0.0226	0.0233	0.0538	0.148
	Iron (Fe)-Dissolved (mg/L)		<0.030	<0.030	0.034	0.058	<0.030
	Lead (Pb)-Dissolved (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	0.0015
	Magnesium (Mg)-Dissolved (mg/L)		0.25	0.11	0.27	0.11	0.11
	Manganese (Mn)-Dissolved (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Dissolved (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Dissolved (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description		L519751-11	L519751-12
Sampled Date		19-JUN-07	19-JUN-07
Sampled Time		08:25	07:20
Client ID		ELEMENTARY SCHOOL	COMMUNITY CENTRE
Grouping	Analyte		
<b>WATER</b>			
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	6.50	4.00
	pH (pH)	6.54	6.51
	Total Suspended Solids (mg/L)	<3.0	<3.0
	Turbidity (NTU)	0.30	0.19
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	2.3	2.1
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	<0.010	0.013
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	2.34	1.41
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	1.88	1.90
	Iron (Fe)-Total (mg/L)	0.081	<0.030
	Lead (Pb)-Total (mg/L)	0.0683	0.0228
	Magnesium (Mg)-Total (mg/L)	0.30	0.11
	Manganese (Mn)-Total (mg/L)	0.0045	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.082	<0.050
<b>Dissolved Metals</b>	Aluminum (Al)-Dissolved (mg/L)	0.036	0.052
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)	<0.020	<0.020
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020
	Calcium (Ca)-Dissolved (mg/L)	2.20	1.42
	Chromium (Cr)-Dissolved (mg/L)	<0.0020	<0.0020
	Copper (Cu)-Dissolved (mg/L)	0.298	0.0863
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.047
	Lead (Pb)-Dissolved (mg/L)	0.0025	0.0016
	Magnesium (Mg)-Dissolved (mg/L)	0.25	0.11
	Manganese (Mn)-Dissolved (mg/L)	<0.0020	<0.0020
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020
Potassium (K)-Dissolved (mg/L)	<0.10	<0.10	

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L519751-1	L519751-2	L519751-3	L519751-4	L519751-5
		Description					
		Sampled Date	18-JUN-07	18-JUN-07	18-JUN-07	18-JUN-07	18-JUN-07
		Sampled Time	13:05	12:10	11:45	12:00	12:40
		Client ID	MAGNESIA	HARVEY	PRV-3	400,000 GAL	PRV-5
Grouping	Analyte		CREEK INTAKE	CREEK INTAKE		HARVEY TANK	
<b>WATER</b>							
<b>Dissolved Metals</b>	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)			<0.0010	<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)			<0.0010	<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)			0.0065	0.0062	0.0039	0.0039
	Dibromochloromethane (mg/L)			<0.0010	<0.0010	<0.0010	<0.0010
	Total THMs (mg/L)			0.0065	0.0062	0.0039	0.0039
<b>Organic Parameters</b>	BOD (mg/L)	<5	<5	<5	<5	<5	<5
	Total Organic Carbon (mg/L)	1.16	1.44	1.26	1.18	1.04	1.04

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L519751-6	L519751-7	L519751-8	L519751-9	L519751-10
		18-JUN-07 12:55 100,000 GAL MAGNESIA TANK	18-JUN-07 11:05 KELVIN GROVE	18-JUN-07 11:25 BRUNSWICK BEACH	19-JUN-07 07:50 GENERAL STORE/CAF	19-JUN-07 07:40 KIDDLEY WINKS PRESCHOOL
Grouping	Analyte					
<b>WATER</b>						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)	0.0035	0.0146	0.0139	0.0176	0.0078
	Dibromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total THMs (mg/L)	0.0035	0.0146	0.0139	0.0176	0.0078
Organic Parameters	BOD (mg/L)	<5	<5	<5	<5	<5
	Total Organic Carbon (mg/L)	1.06	1.12	0.96	1.20	1.34

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L519751-11	L519751-12			
		Description					
		Sampled Date	19-JUN-07	19-JUN-07			
		Sampled Time	08:25	07:20			
		Client ID	ELEMENTARY SCHOOL	COMMUNITY CENTRE			
Grouping	Analyte						
<b>WATER</b>							
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)		<0.0010	<0.0010			
	Sodium (Na)-Dissolved (mg/L)		<2.0	<2.0			
	Uranium (U)-Dissolved (mg/L)		<0.00010	<0.00010			
	Zinc (Zn)-Dissolved (mg/L)		<0.050	<0.050			
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010	<0.0010			
	Bromoform (mg/L)		<0.0010	<0.0010			
	Chloroform (mg/L)		0.0139	0.0223			
	Dibromochloromethane (mg/L)		<0.0010	<0.0010			
	Total THMs (mg/L)		0.0139	0.0223			
Organic Parameters	BOD (mg/L)		<5	<5			
	Total Organic Carbon (mg/L)		1.05	1.17			

## Reference Information

## Methods Listed (If applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
<b>BOD5-VA</b>	Water	Biochemical Oxygen Demand- 5day	APHA 5010 "Biochemical Oxygen Demand"
This analysis is carried out using procedures adapted from APHA Method 5010 "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
<b>HG-DIS-DW-CVAFS-VA</b>	Water	Dissolved Mercury in Water by CVAFS	EPA 3005A/245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
<b>HG-TOT-DW-CVAFS-VA</b>	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
<b>MET-DIS-DW-ICP-VA</b>	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
<b>MET-DIS-DW-MS-VA</b>	Water	Dissolved Metals in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
<b>MET-TOT-DW-ICP-VA</b>	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
<b>MET-TOT-DW-MS-VA</b>	Water	Total Metals in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
<b>PH-PCI-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
THM-PT-MS-VA	Water	VOC (THM) by Purge and Trap with GCMS	EPA SW-846, METHOD 8260
<p>This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the purge and trap extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).</p>			
THM-SUM-CALC-VA	Water	Total Trihalomethane-THM	CALCULATION
TSS-VA	Water	Solids by Gravimetric	APHA 2540 Gravimetric
<p>This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter. TSS is determined by drying the filter at 104 degrees Celsius.</p>			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
<p>This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.</p>			
<p>** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:</p>			
	Laboratory Definition Code	Laboratory Location	Laboratory Definition Code
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

## GLOSSARY OF REPORT TERMS

**-ur** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

MA - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any assigned test reports, forms, or results are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by ALS. The test results are generated by means of computerized quality assurance programs. However, when the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group maintains availability for the use or interpretation of the results.



# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

## ANALYTICAL REPORT

VILLAGE OF LIONS BAY  
ATTN: ALBERTO URRUTIA  
PO BOX 141  
LIONS BAY BC V0N 2E0

Reported On: 11-OCT-07 06:38 PM

Lab Work Order #: **L558339**

Date Received: **25-SEP-07**

Project P.O. #:  
Job Reference: RAW AND TREATED WATER  
Legal Site Desc:  
CofC Numbers: 51052

Other Information:

Comments:

Timothy Guy Crowther  
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

**Selam Worku**

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

### ALS Canada Ltd.

Part of the **ALS Laboratory Group**  
1988 Triumph Street, Vancouver, BC V5L 1K5

Phone: +1 604 253 4188 Fax: +1 604 253 6700 [www.alsglobal.com](http://www.alsglobal.com)

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## ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L558339-1 24-SEP-07 12:30 MAGNESIA CREEK INTAKE	L558339-2 24-SEP-07 12:30 MAGNESIA CREEK INTAKE	L558339-3 24-SEP-07 11:30 HARVEY CREEK INTAKE	L558339-4 24-SEP-07 11:30 HARVEY CREEK INTAKE	L558339-5 24-SEP-07 10:55 PRV-3
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)		17.3		6.91	6.96
	pH (pH)	7.04		7.17		6.97
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.26		<0.10		0.14
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	4.5		5.6		5.7
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.023		0.017	0.019
	Antimony (Sb)-Total (mg/L)		<0.00050		<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		0.00011		<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020		<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10		<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020		<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		5.91		2.28	2.31
	Chromium (Cr)-Total (mg/L)		<0.0020		<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.0011		0.0012	0.0078
	Iron (Fe)-Total (mg/L)		<0.030		<0.030	<0.030
	Lead (Pb)-Total (mg/L)		<0.0010		<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.63		0.29	0.29
	Manganese (Mn)-Total (mg/L)		<0.0020		<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020		<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		0.10		0.13	0.14
	Selenium (Se)-Total (mg/L)		<0.0010		<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0		<2.0	<2.0
	Uranium (U)-Total (mg/L)		<0.00010		<0.00010	<0.00010
Zinc (Zn)-Total (mg/L)		<0.050		<0.050	<0.050	
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)					<0.0010
	Bromoform (mg/L)					<0.0010
	Chloroform (mg/L)					0.0101
	Dibromochloromethane (mg/L)					<0.0010
<b>Organic Parameters</b>	BOD (mg/L)	<5		<5		<5
	Total Organic Carbon (mg/L)	0.59		0.68		0.80

## ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L558339-6	L558339-7	L558339-8	L558339-9	L558339-10
<b>Grouping</b>	<b>Analyte</b>					
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	7.12	7.07	6.94	17.4	17.1
	pH (pH)		7.00		6.88	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.12		0.45	
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		6.4		3.6	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.019	0.020	0.019	0.027	0.026
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00010	0.00011
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	2.37	2.34	2.31	5.95	5.86
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0079	0.0047	<0.0010	0.0291	0.0072
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	0.149	<0.030
	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.29	0.29	0.29	0.60	0.61
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0031	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.14	0.14	0.13	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	2.1
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0109		0.0051	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
<b>Organic Parameters</b>	BOD (mg/L)		<5		<5	
	Total Organic Carbon (mg/L)		0.71		0.58	

## ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L558339-11	L558339-12	L558339-13	L558339-14	L558339-15
<b>Grouping</b>	<b>Analyte</b>	100,000 GAL MAGNESIA TANK	100,000 GAL MAGNESIA TANK	KELVIN GROVE	KELVIN GROVE	BRUNSWICK BEACH
<b>WATER</b>						
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	16.4	16.7	8.10	8.59	17.5
	pH (pH)	6.87		7.11		6.98
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.26		0.17		0.31
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	4.0		6.3		4.2
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	<0.010	0.019	0.091	0.024	0.025
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	0.00010	<0.00010	<0.00010	0.00011
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	5.63	5.70	2.83	3.01	6.02
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.741	0.0194	1.06	0.0221	0.0145
	Iron (Fe)-Total (mg/L)	0.030	<0.030	0.050	0.034	0.035
	Lead (Pb)-Total (mg/L)	<0.0010	<0.0010	0.162	0.0056	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.58	0.60	0.25	0.26	0.60
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	0.0023	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	0.14	0.14	0.12
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.100	<0.050	0.295	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)	<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)	0.0045		0.0184		0.0144
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		<0.0010
<b>Organic Parameters</b>	BOD (mg/L)	<5		<5		<5
	Total Organic Carbon (mg/L)	0.57		0.75		0.63

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L558339-16	L558339-17	L558339-18	L558339-19	L558339-20
Grouping	BRUNSWICK BEACH	GENERAL STORE/CAF+	GENERAL STORE/CAF+	ELEMENTARY SCHOOL	ELEMENTARY SCHOOL
Analyte					
<b>WATER</b>					
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	17.5	7.71	7.40	17.3
	pH (pH)		6.99		6.84
	Total Suspended Solids (mg/L)		<3.0		<3.0
	Turbidity (NTU)		0.21		0.22
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		3.7		4.1
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.025	0.019	0.019	<0.010
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00011	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	6.00	2.62	2.53	5.78
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0125	0.117	0.0254	1.21
	Iron (Fe)-Total (mg/L)	0.036	0.055	0.052	<0.030
	Lead (Pb)-Total (mg/L)	<0.0010	0.0033	<0.0010	0.105
	Magnesium (Mg)-Total (mg/L)	0.60	0.28	0.26	0.70
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.12	0.15	0.13	0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	0.119	<0.050	0.097
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)		<0.0010		<0.0010
	Bromoform (mg/L)		<0.0010		<0.0010
	Chloroform (mg/L)		0.0181		0.0157
	Dibromochloromethane (mg/L)		<0.0010		<0.0010
<b>Organic Parameters</b>	BOD (mg/L)		<5		<5
	Total Organic Carbon (mg/L)		0.71		0.50

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID	L558339-21	L558339-22			
Description					
Sampled Date	24-SEP-07	24-SEP-07			
Sampled Time	14:15	14:15			
Client ID	COMMUNITY CENTRE	COMMUNITY CENTRE			
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)	8.84	7.67		
	pH (pH)	7.00			
	Total Suspended Solids (mg/L)	<3.0			
	Turbidity (NTU)	0.19			
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	4.2			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.014	0.020		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010		
	Barium (Ba)-Total (mg/L)	<0.020	<0.020		
	Boron (B)-Total (mg/L)	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020		
	Calcium (Ca)-Total (mg/L)	2.68	2.65		
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020		
	Copper (Cu)-Total (mg/L)	0.794	0.0616		
	Iron (Fe)-Total (mg/L)	0.042	0.038		
	Lead (Pb)-Total (mg/L)	0.0131	0.0017		
	Magnesium (Mg)-Total (mg/L)	0.52	0.26		
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020		
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020		
	Potassium (K)-Total (mg/L)	0.14	0.14		
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010		
	Sodium (Na)-Total (mg/L)	<2.0	<2.0		
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010		
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050		
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)	<0.0010			
	Bromoform (mg/L)	<0.0010			
	Chloroform (mg/L)	0.0200			
	Dibromochloromethane (mg/L)	<0.0010			
<b>Organic Parameters</b>	BOD (mg/L)	<5			
	Total Organic Carbon (mg/L)	0.72			

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference (Based On)
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
<b>BOD5-VA</b>	Water	Biochemical Oxygen Demand- 5day	APHA 5010 "Biochemical Oxygen Demand"
This analysis is carried out using procedures adapted from APHA Method 5010 "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
<b>HG-TOT-DW-CVAFS-VA</b>	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
<b>MET-TOT-DW-ICP-VA</b>	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
<b>MET-TOT-DW-MS-VA</b>	Water	Total Metals in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
<b>THM-PT-MS-VA</b>	Water	VOC (THM) by Purge and Trap with GCMS	EPA SW-846, METHOD 8260
This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromodichloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the purge and trap extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).			
<b>TSS-VA</b>	Water	Solids by Gravimetric	APHA 2540 Gravimetric
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.			
<b>TURBIDITY-VA</b>	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference (Based On)	
Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location	
VA		ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

## GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.





Environmental Division

**ANALYTICAL REPORT**

VILLAGE OF LIONS BAY  
ATTN: ALBERTO URRUTIA  
PO BOX 141  
LIONS BAY BC V0N 2E0

Reported On: 28-DEC-07 04:08 PM

Lab Work Order #: **L588148**

Date Received: **18-DEC-07**

Project P.O. #:  
Job Reference: RAW AND TREATED WATER  
Legal Site Desc:  
CofC Numbers: 51053

Other Information:

Comments:

  
\_\_\_\_\_  
Joyce Chow  
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

**Selam Worku**

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description	L588148-1	L588148-2	L588148-3	L588148-4	L588148-5
		Sampled Date	17-DEC-07 11:50	17-DEC-07 11:15	17-DEC-07 10:50	17-DEC-07 10:50	17-DEC-07 11:05
		Client ID	MAGNESIA CREEK INTAKE	HARVEY CREEK INTAKE	PRV-3	PRV-3	400,000 GAL HARVEY TANK
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)		12.7	5.51	5.37	5.26	5.26
	pH (pH)		7.87	6.27	6.25		6.21
	Total Suspended Solids (mg/L)		<3.0	<3.0	<3.0		<3.0
	Turbidity (NTU)		0.24	0.16	0.19		0.23
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		4.4	4.2	3.3		3.4
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.038	0.073	0.065	0.065	0.063
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		0.00013	0.00010	0.00011	0.00010	0.00011
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		4.20	1.79	1.77	1.73	1.73
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.0013	0.0033	0.0167	0.0067	0.0195
	Iron (Fe)-Total (mg/L)		<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.54	0.25	0.23	0.23	0.23
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		<0.10	0.10	0.10	0.10	0.10
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)				<0.0010		<0.0010
	Bromoform (mg/L)				<0.0010		<0.0010
	Chloroform (mg/L)				0.0068		0.0071
	Dibromochloromethane (mg/L)				<0.0010		<0.0010
<b>Organic Parameters</b>	BOD (mg/L)		<5	<5	<5		<5
	Total Organic Carbon (mg/L)		1.03	2.09	1.83		1.85

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description	L588148-6	L588148-7	L588148-8	L588148-9	L588148-10
		Sampled Date	17-DEC-07	17-DEC-07	17-DEC-07	17-DEC-07	17-DEC-07
		Sampled Time	11:05	11:30	11:30	11:15	11:15
		Client ID	400,000 GAL HARVEY TANK	PRV-5	PRV-5	100,000 GAL MAGNESIA T	100,000 GAL MAGNESIA T
Grouping	Analyte						
<b>WATER</b>							
Physical Tests	Hardness (as CaCO3) (mg/L)		5.32	11.9	12.1	11.9	12.2
	pH (pH)			6.93		6.84	
	Total Suspended Solids (mg/L)			<3.0		<3.0	
	Turbidity (NTU)			0.31		0.22	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)			4.6		4.5	
Total Metals	Aluminum (Al)-Total (mg/L)		0.065	0.038	0.038	0.036	0.037
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		0.00011	0.00012	0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		1.75	3.94	4.01	3.95	4.04
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		<0.0010	0.0130	0.0081	0.0311	0.0191
	Iron (Fe)-Total (mg/L)		<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.23	0.50	0.50	0.50	0.50
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		0.10	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
Trihalomethanes	Bromodichloromethane (mg/L)			<0.0010		<0.0010	
	Bromoform (mg/L)			<0.0010		<0.0010	
	Chloroform (mg/L)			0.0024		0.0027	
	Dibromochloromethane (mg/L)			<0.0010		<0.0010	
Organic Parameters	BOD (mg/L)			<5		<5	
	Total Organic Carbon (mg/L)			1.14		1.05	

## ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID Description	L588148-11	L588148-12	L588148-13	L588148-14	L588148-15
		Sampled Date	17-DEC-07	17-DEC-07	17-DEC-07	17-DEC-07	18-DEC-07
		Sampled Time	13:00	13:00	12:05	12:05	07:36
		Client ID	KELVIN GROVE	KELVIN GROVE	BRUNSWICK BEACH	BRUNSWICK BEACH	GENERAL STORE
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Hardness (as CaCO <sub>3</sub> ) (mg/L)		5.93	6.01	12.2	12.3	5.59
	pH (pH)		6.27		6.90		6.24
	Total Suspended Solids (mg/L)		<3.0		<3.0		<3.0
	Turbidity (NTU)		0.17		0.22		0.15
<b>Anions and Nutrients</b>	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		4.1		5.2		3.2
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)		0.034	0.053	0.014	0.019	0.048
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		<0.00010	0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		2.04	2.06	4.12	4.15	1.86
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.903	0.0218	0.392	0.0128	0.330
	Iron (Fe)-Total (mg/L)		0.042	0.035	0.070	0.032	<0.030
	Lead (Pb)-Total (mg/L)		0.143	0.0030	<0.0010	<0.0010	0.0153
	Magnesium (Mg)-Total (mg/L)		0.20	0.21	0.46	0.46	0.23
	Manganese (Mn)-Total (mg/L)		0.0028	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		<0.10	<0.10	0.10	0.11	0.11
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Zinc (Zn)-Total (mg/L)		0.118	<0.050	<0.050	<0.050	0.251	
<b>Trihalomethanes</b>	Bromodichloromethane (mg/L)		<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)		<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)		0.0141		0.0119		0.0113
	Dibromochloromethane (mg/L)		<0.0010		<0.0010		<0.0010
<b>Organic Parameters</b>	BOD (mg/L)		<5		<5		80
	Total Organic Carbon (mg/L)		1.64		0.74		1.82

## ALS LABORATORY GROUP ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L588148-16	L588148-17	L588148-18	L588148-19	L588148-20
Grouping	Analyte	18-DEC-07 07:35 GENERAL STORE	18-DEC-07 08:15 ELEMENTARY SCHOOL	18-DEC-07 08:15 ELEMENTARY SCHOOL	17-DEC-07 14:50 COMMUNITY CENTRE	17-DEC-07 14:50 COMMUNITY CENTRE
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	5.62	11.1	12.0	5.63	5.30
	pH (pH)		6.69		6.26	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.23		0.20	
Anions and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		3.5		3.3	
Total Metals	Aluminum (Al)-Total (mg/L)	0.060	<0.010	0.031	0.030	0.057
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	1.89	3.55	4.01	1.81	1.78
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0381	1.25	0.156	1.23	0.0511
	Iron (Fe)-Total (mg/L)	0.035	0.060	0.072	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.0010	0.0593	0.0014	0.0188	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.22	0.55	0.49	0.32	0.21
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	<0.10	0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)-Total (mg/L)	<0.050	0.155	<0.050	<0.050	<0.050	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0094		0.0110	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
Organic Parameters	BOD (mg/L)		7		<5	
	Total Organic Carbon (mg/L)		1.10		1.76	

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
<b>BOD5-VA</b>	Water	Biochemical Oxygen Demand- 5day	APHA 5010 "Biochemical Oxygen Demand"
This analysis is carried out using procedures adapted from APHA Method 5010 "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
<b>HG-TOT-DW-CVAFS-VA</b>	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
<b>MET-TOT-DW-ICP-VA</b>	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
<b>MET-TOT-DW-MS-VA</b>	Water	Total Metals in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
<b>PH-MAN-VA</b>	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.			
<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
<b>THM-PT-MS-VA</b>	Water	VOC (THM) by Purge and Trap with GCMS	EPA SW-846, METHOD 8260
This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the purge and trap extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).			

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
TSS-VA	Water	Solids by Gravimetric	APHA 2540 Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
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This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

**\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

## GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2007**

**Appendix D**

**Emergency Response Plan**

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### **FIRE IN THE WATERSHED**

In the event of a forest fire in the watershed:

- ❖ Notify the Works Manager or his designate,
- ❖ Notify BC Department of Forest,
- ❖ Call 911 and let them dispatch the affected Fire Department,
- ❖ Shut down the system at the affected intake,
- ❖ Notify Vancouver Coastal Health Authority,
- ❖ Notify Council,
- ❖ Monitor Raw Water for any contaminants, and
- ❖ Let BC Forest service know that we have an intake below and that we need to know if they are going to water bomb with any chemicals.

### **WATER PUMP FAILURE**

In the event of a pump failure:

- ❖ Shut down the affected pump,
- ❖ Notify the Works Manager or his designate,
- ❖ Notify all affected residents, and
- ❖ Change or repair pump and flush the affected area with treated water.

### **CHEMICAL CONTAMINATION**

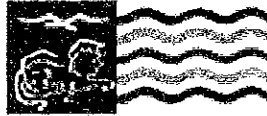
In the event of Chemical contamination such as oil, fuel, pesticides or any other type of substance that gets into or threatens to get into our water system including forest fire fighting activities:

- ❖ Shut down the affected intake or line,
- ❖ Begin determining the extent of contamination,
- ❖ Notify Vancouver Coastal Health Authority who will issue a "No Use Order",
- ❖ Notify the Works Manager or his designate,
- ❖ Call the listed radio and television stations and have them broadcast a "No Use Order" to the affected area,
- ❖ Hand deliver "Do Not Use Water" notices to the affected areas,
- ❖ Remedy the problem to the satisfaction of the Vancouver Coastal Health Authority, and
- ❖ Notify all those affected that the water is now safe to use again.

### **DISINFECTION INTERRUPTION**

In the event of an interruption of CL2 system:

- ❖ Check and record the free CL2 in the affected water tank,
- ❖ Shut down and make safe the CL2 injector,
- ❖ Shut down the intake valve for the water tank,



- ❖ Determine the amount of down time that is available before we need to refill the water tank,
- ❖ Notify the Works Manager or his designate,
- ❖ Begin repairs on the unit,
- ❖ If the downtime is going to be too long and we have to fill the tank, notify Vancouver Coastal Health Authority and issue a BWA (not necessary if do manual feed), and
- ❖ Add chlorine to reservoir manually and check residual on ongoing basis.

### **LOSS OF PRESSURE**

In the event of a system pressure loss due to high demand from high fire flow or a severe leak:

- ❖ Notify the Works Manager or his designate,
- ❖ Determine if there was a negative pressure or if there was always positive pressure,
- ❖ If a negative pressure is suspected, notify Vancouver Coastal Health Authority who will determine if we need to issue a BWA, and
- ❖ Flush the affected area and record the results and give them to the Health Inspector.

### **TURBIDITY EVENTS**

If the Turbidity is in the range of 1-3 NTU, increase monitoring. If the Turbidity reaches 4 NTU prepare to Take Off the system. If the Turbidity reaches 5 NTU or more:

- ❖ Notify the Works Manager or his designate,
- ❖ Contact Vancouver Coastal Health Authority and possibly issue a BWA,
- ❖ Check and record the free CL2 that is present at the same site as the turbidity sample was taken,
- ❖ Adjust the CL2 at the injection point if necessary, and
- ❖ Check with other purveyors like the District of West Vancouver to see at what point high turbidity events correlate with positive water samples.

### **WATER LINE BREAKS**

In the event of a water line break, where water pressure has maintained until the leak has been exposed so that there is no danger of any material flowing back into the break, there will be no need for any special condition to be applied. Flush the repair area with treated water before placing that area back in service.

In the event that the broken line is suspected of having a negative pressure:

- ❖ Notify the Works Manager or his delegate,
- ❖ Notify the Vancouver Coastal Health Authority for a possible BWA,
- ❖ Repair the break and flush the area with treated water, and
- ❖ Rescind the BWA if necessary.



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2007**

**Appendix E**

**Sample Boil Water Advisory**

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THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

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# NOTICE TO RESIDENTS

A water sample from a collection site on the Magnesia Creek water system was analyzed and found to contain a total coliform count of 1-6 per 100 ml and a faecal coliform count of 1-3 per 100 ml.

Consequently North Shore Health Region has placed part of Lions Bay on a

## **BOIL WATER ADVISORY**

until further notice.

**The Boil Water Advisory affects residents on:  
Sunset Drive, Mountain Drive from 100 – 300,  
Bayview Road from 200 – 249,  
Stewart Road and Brunswick Beach.**

Residents can disinfect their water by either:

1. Boiling the water for 2 minutes, or
2. Adding 4 drops of household bleach per gallon of water (8 drops if water is cloudy), stirring and waiting for 20 minutes before consumption.

This includes water used for brushing teeth, cooking, washing dishes, and washing ready-to-eat fruit and vegetables.

The Village is required to have 3 negative samples for fecal and total coliform before the Boil Water Advisory will be lifted. The Village will be sending water samples to the lab to be tested on Thursday, Friday and next Tuesday. If they all come back with acceptable results then the Boil Water Advisory will likely be lifted on Wednesday, October 15, 2003. A notice will be posted in the Post Office when the advisory is lifted.

Should you have any questions or have had any symptoms of diarrhea, stomach cramping or nausea, please contact Rod Schluter at 604-904-6254 at North Shore Health.

Village of Lions Bay  
October 8, 2003



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2007**

**Appendix F**

**EOCP Facility Classification**

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**ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM**  
**Facility Classification**

THIS IS TO CERTIFY THAT

***Village of Lions Bay***  
***Water System***

has been classified by the Environmental Operators Certification Program in accordance  
with the guidelines established in co-operation with the Association of Boards of Certification (A.B.C.) as

**Class II**

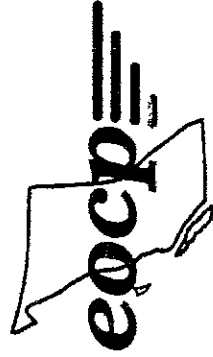
Dated at Burnaby, B.C. on July 28, 2003

*Bernie Johnson*

Secretary - Certification Board

*J.A.M. Howard*

Chairman - Certification Board



**CERTIFICATE NO. 675**

MEMBER OF ASSOCIATION OF BOARDS OF CERTIFICATION  
AFFILIATE OF B.C. WATER AND WASTE ASSOCIATION  
A Society Incorporated under the Society Act, S.B.C. S-28724



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2007**

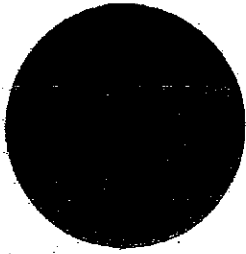
**Appendix G**

**EOCP Operator Certificates**

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**ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM**



**Certificate of Qualification**

This is to certify that:

**Alberto Urrutia**

By Examination Has Qualified As A

**Water Distribution System Operator**

and certifies that he/she has met the established qualifications and has the ability to efficiently operate and maintain a specified maximum size and type of water distribution system designated as follows:

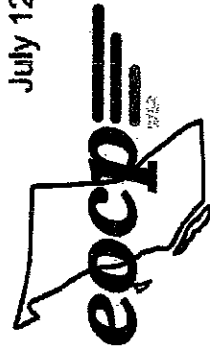
**Level II**

Secretary - Certification Board

Chairman - Certification Board

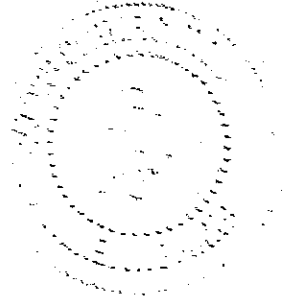
July 12, 2006

Certificate No: 4766



Member of Association of Boards of Certification  
Affiliate of B.C. Water and Waste Association

This certificate shall be in full force and effect when accompanied by an annual renewal seal  
A Society incorporated under the Society Act, S.B.C. S-28724



**ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM**

**Course Completion Certificate**

This is to certify that

***Alberto Urrutia***

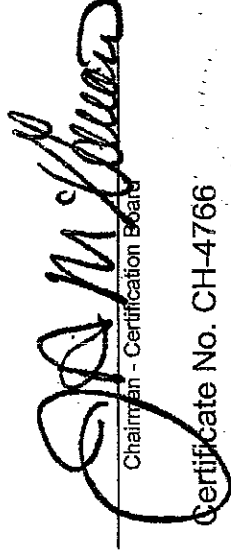
By Examination Has Qualified As A

**Chlorine Handler**



Secretary - Certification Board

May 6, 2005



Chairman - Certification Board

Certificate No. CH-4756

