Village of Cumberland Drinking Water 2017 Annual Report

Reporting Period:	2017
Operating Permit Number:	1414314
Drinking Water System Owner:	Corporation of the Village of Cumberland
Drinking Water System Contact:	
Name:	Gavin Murgatroyd
Phone No:	(250) 336-2291 Cell: 250-792-1593
Email:	publicworks@cumberland.ca

1. Microbiological testing completed during this reporting period:

a) bacteriological results attached to this report. ☐None detected

b) adverse bacteriological results: ☒ Listed in table below:

Adverse Results:

Date	Site #	Total Coliform	E.Coli	Reason	Corrective Action
August 21, 2017	2	3.1		Chlorine gas system temporarily offline for annual maintenance	Re-sampled

2. Chemical results for this reporting period:

a) most recent chemical analysis attached to this report.

b) chemical parameters listed in *The Guidelines for Canadian Drinking Water Quality (GCDWQ)* are: ☒ all within the GCDWQ

☐ above the GCDWQ and are listed below:

Parameters above the Guidelines:

Parameter	Result	Max. Acceptable Concentration	Aesthetic Objective	Treatment/Corrective Action
pH – Site 1	6.90		7.0-10.5	
Cumberland Creek – True colour	16.3		15	
Allen Lake – True colour	19.3		15	
Allen Lake – Total Iron	417		300	

3. Summarize additional testing and sampling carried out in accordance with the requirement of a Water Source approval, Written Order or as per the conditions of your *Operating Permit.*

☐ No additional testing
☒ Additional testing listed below:

Additional testing:

Description of parameter & reason for sampling	Health parameter or non-health related parameter	Corrective action necessary (Y/N?)	Corrective action taken
UVT	Continued monitoring in preparation for new WTP	N	

4. Water Quality Complaints:

During the course of the year, the water system:

☐ Did not receive water quality complaints (ie taste, odour, colour, etc)
☒ Received water quality complaints and are listed below:

Water Quality Complaints:

Date	Water Quality Complaint	Corrective Action Taken
December 1, 2017	Discoloured water/entrained air due to supply line twinning project	Flushed until clear

5. Adverse results: Total number of adverse results during this reporting period for insufficient water supply, malfunction of disinfection equipment or elevated turbidity:

☒ No adverse results
☐ Adverse results listed below:

Adverse Results

Incident Date	Incident	Corrective Action

6. **Description of the system:**

Sources of raw water:

- ☒ Groundwater
- ☒ Surface water
- ☐ Other (specify): _____

Does the drinking water system have disinfection? ☒Yes ☐No Disinfection methods (check boxes that apply):

- ☒ Chlorination
- ☐ Ultraviolet light
- ☐ Ozonation
- ☐ Other (specify): _____

Does the drinking water system have treatment? ☐ Yes ☒No treatment type (check boxes that apply):

- ☐ Particulate cartridge filters
- ☐ Membrane filtration
- ☐ Carbon filter
- ☐ Sand filtration
- ☐ Reverse osmosis
- ☐ Other (specify): _____

7. Major expenses incurred during the period covered by the report:

To purchase or install required equipment:	
To repair equipment:	
To replace equipment:	
To complete annual maintenance of system: *(system flushing, replacement of carbon filters, etc)*	
To complete specialist report (specify):	

8. Further communication with users:

a) Indicate how you notified system users that your annual report is available, and is free of charge:

- ☐ hand delivered
- ☒ public access/notice via web
- ☒ public access/notice via government office
- ☐ public access/notice via newspaper
- ☐ public access/notice via bill stuffier
- ☐ public access/notice via other method (specify):

_____

b) Improvements or remedial actions required by the Drinking Water Officer:

☐ no action required
☐ drinking Water Officer inspection report attached to report
☒ actions required by Drinking Water Officer listed below:

Improvements/Remedial Action

Required Action	Completion Date
Post 2015 and 2016 annual reports	November 22, 2017
Provide watershed protection plan update as per Appendix A	January 25, 2018

c) Future water system improvements:

☐ no improvements planned
☒ improvements listed below:

Future Improvements

Future plans	Planned Completion Date
Supply line twinning project completed	December 2017
Upgraded water main – Bevan Road/Cumberland Road	August 2017
Construction of the new water treatment plant and 2500 m3 reservoir	March 2019

d) Emergency Response Plan can be accessed by:

☐ posting on web
☐ posting at nearest government office
☒ contacting water system owner
☒ other (specify): Rachel Parker – Corporate Officer (250-336-2291)

DRINKING WATER SYSTEM INSPECTION REPORT

VANCOUVER ISLAND health authority

Health Protection

SYSTEM NAME: Village of Cumberland W.S. | E.H.O. NAME: David Cherry

ADDRESS: 2673 Dunsmuir Ave | POSTAL CODE: | SYSTEM NUMBER: 1414314

OPERATOR: Village of Cumberland | INSPECTION DATE (DMY): 15/11/17 | TIME SPENT (Hrs. - nearest 1/4): 5.0

SYSTEM TYPE (CHECK One)

- [ ] > 20,000 (DWP)
- [ ] 10,001 - 20,000 (DWM)
- [x] 301 - 10,000 (DWT)
- [ ] 15 - 300 (DWC)
- [ ] 2 - 14 (DWS)
- [ ] 1 - SERVES PUBLIC (DWQ)
- [ ] 1 HAULER (DWH)

TYPE OF INSPECTION

- [ ] INITIAL
- [x] ROUTINE
- [ ] COMPLAINT
- [ ] FOLLOW-UP

CRITICAL HAZARD

These items relate to Public Health Safety & **MUST RECEIVE IMMEDIATE ATTENTION**

Microbiological Contamination of Raw Water Supply Due to:

- [ ] 301 Flood
- [ ] 302 Sewage
- [ ] 303 Industrial
- [ ] 304 Agriculture
- [ ] 305 Other (Specify) _____
- [ ] 306 Chemical Contamination of Raw Water Suply
- [ ] 307 Contamination of Finished Water - Reservoir
- [ ] 308 Contamination of Finished Water - Mains
- [ ] 309 Cross-Connection
- [ ] 310 Use of Unapproved Source
- [ ] 311 Interruption of Treatment
- [ ] 312 Inadequate Treatment
- [ ] 313 Other (Specify) _____

SANITATION & MAINTENANCE

These items must be corrected within a designated time period

- [ ] 314 Improper Maintenance of Distribution Sytsem
- [ ] 315 Improper or No Disinfection of New or Repaired Main
- [ ] 316 Source Unprotected and Subject to Contamination
- [ ] 317 Inadequate or Improper Construction of Water Works
- [ ] 318 Inadequate Microbiological Analysis Data
- [ ] 319 Inadequate Chemical Analysis Data
- [ ] 320 Interruption of Treatment
- [ ] 321 Inadequate Treatment
- [ ] 322 Emergency Response Plan
- [x] 323 Other (Specify) Watershed protection p/a WM

CODE	FINDINGS AND ACTIONS REQUIRED
	- Emergency response plan has been updated - Replacement parts onsite in pumphouse - Upgrades to water system to meet surface water treatment objectives, progressing well and ahead of schedule - Post 2015 and 2016 annual reports for water system to Village website - Develop flushing program when treatment project completed
323	Provide watershed protection plan update as per Appendix A requirement. ie improved signage, turbidity reduction strategies, vehicle barriers, trail improvements.
	- Operator training ongoing and up to date.

At the time of inspection this system has a hazard rating of [ ] HIGH [ ] MODERATE [x] LOW [ ] Issue Permit [ ] Conditions of Permit

FOLLOW UP ☐ VISIT ☐ PHONE Date / /

RECEIVED BY | PRINT NAME: GAVIN MURCATROYD | E.H.O.

ANNUAL FULL SPECTRUM - TREATED 2017 WATER ANALYSIS

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 17-15
Your Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your C.O.C. #: 08441214

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/12/05
Report #: R2486769
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7A5682
Received: 2017/11/28, 14:45

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	1	2017/11/29	2017/11/29	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry (1)	1	N/A	2017/11/29	BBY6SOP-00011	SM 22 4500-Cl- E m
Colour (True) by Kone Lab (1)	1	N/A	2017/11/29	BBY6SOP-00057	SM 22 2120 C m
Coliforms & E.coli by Quantitray (MPN)	1	N/A	2017/11/28	CTYSOP-00002	Based on SM-9223
Conductance - water (1)	1	2017/11/29	2017/11/29	BBY6SOP-00026	SM 22 2510 B m
Fluoride (1)	1	N/A	2017/11/29	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1, 2)	1	N/A	2017/12/05	BBY WI-00033	Auto Calc
Mercury (Total) by CVAF (1)	1	2017/11/30	2017/11/30	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2017/12/05	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total) (1)	1	N/A	2017/12/04	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrate + Nitrite (N) (1)	1	N/A	2017/11/29	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA (1)	1	N/A	2017/11/29	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N) (1)	1	N/A	2017/11/30	BBY WI-00033	Auto Calc
pH Water (1, 3)	1	2017/11/29	2017/11/29	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry (1)	1	N/A	2017/11/29	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue) (1)	1	2017/11/30	2017/12/01	BBY6SOP-00033	SM 22 2540 C m
Total Trihalomethanes Calculation (1)	1	N/A	2017/11/30	BBY WI-00033	BC MOE Lab Method
Turbidity (1)	1	N/A	2017/11/29	BBY6SOP-00027	SM 22 2130 B m
Field Residual Chlorine (1)	1	N/A	2017/11/29		
VOCs, VH, F1, LH in Water by HS GC/MS (1)	1	N/A	2017/11/29	BBY8SOP-00009/11/12	BC Lab Manual 2017 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver
(2) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(3) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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Your P.O. #: 17-15
Your Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your C.O.C. #: 08441214

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/12/05
Report #: R2486769
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7A5682
Received: 2017/11/28, 14:45

Encryption Key

Maxxam
05 Dec 2017 12:25:17

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa McIntosh, Project Manager
Email: MMcIntosh@maxxam.ca
Phone# (250) 338 7786

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Success Through Science®

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

RESULTS OF CHEMICAL ANALYSES OF DRINKING WATER

Maxxam ID					SO5337	
Sampling Date					2017/11/28 14:00	
COC Number					08441214	
	UNITS	MAC	AO	OG	SITE #1	RDL
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050
Calculated Parameters						
Nitrate (N)	mg/L	10	-	-	<0.020	0.020
Field Parameters						
Field Residual Chlorine	mg/L	-	-	-	0.56	N/A
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.023	0.020
Alkalinity (Total as CaCO3)	mg/L	-	-	-	5.1	1.0
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<1.0	1.0
Bicarbonate (HCO3)	mg/L	-	-	-	6.2	1.0
Carbonate (CO3)	mg/L	-	-	-	<1.0	1.0
Hydroxide (OH)	mg/L	-	-	-	<1.0	1.0
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	<1.0	1.0
Dissolved Chloride (Cl)	mg/L	-	250	-	1.8	1.0
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	<5.0	5.0
Nutrients						
Nitrate plus Nitrite (N)	mg/L	-	-	-	<0.020	0.020
Physical Properties						
Conductivity	uS/cm	-	-	-	18.3	2.0
pH	pH	-	7.0:10.5	-	6.90	
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	<10	10
Turbidity	NTU	see remark	see remark	see remark	0.27	0.10

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
N/A = Not Applicable

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

VOLATILE ORGANICS BY GC-MS (DRINKING WATER)

Maxxam ID			SO5337	
Sampling Date			2017/11/28 14:00	
COC Number			08441214	
	UNITS	MAC	SITE #1	RDL
Volatiles				
Total Trihalomethanes	ug/L	100	28	1.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

MICROBIOLOGY (DRINKING WATER)

Maxxam ID			SO5337
Sampling Date			2017/11/28 14:00
COC Number			08441214
	UNITS	MAC	SITE #1
Microbiological Param.			
Total Coliforms (QT)	MPN/100mL	0	0
E. coli (QT)	MPN/100mL	0	0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					SO5337	
Sampling Date					2017/11/28 14:00	
COC Number					08441214	
	UNITS	MAC	AO	OG	SITE #1	RDL
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	6.65	0.50
Elements						
Total Mercury (Hg)	ug/L	1	-	-	<0.010	0.010
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	-	-	100	55.4	3.0
Total Antimony (Sb)	ug/L	6	-	-	<0.50	0.50
Total Arsenic (As)	ug/L	10	-	-	<0.10	0.10
Total Barium (Ba)	ug/L	1000	-	-	<1.0	1.0
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0
Total Boron (B)	ug/L	5000	-	-	<50	50
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	0.010
Total Chromium (Cr)	ug/L	50	-	-	<1.0	1.0
Total Cobalt (Co)	ug/L	-	-	-	<0.20	0.20
Total Copper (Cu)	ug/L	-	1000	-	8.11	0.20
Total Iron (Fe)	ug/L	-	300	-	52.5	5.0
Total Lead (Pb)	ug/L	10	-	-	0.54	0.20
Total Manganese (Mn)	ug/L	-	50	-	5.5	1.0
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0
Total Selenium (Se)	ug/L	50	-	-	<0.10	0.10
Total Silicon (Si)	ug/L	-	-	-	2210	100
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020
Total Strontium (Sr)	ug/L	-	-	-	3.8	1.0
Total Thallium (Tl)	ug/L	-	-	-	<0.010	0.010
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0
Total Uranium (U)	ug/L	20	-	-	<0.10	0.10
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0
Total Zinc (Zn)	ug/L	-	5000	-	11.2	5.0
Total Zirconium (Zr)	ug/L	-	-	-	0.11	0.10

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					SO5337	
Sampling Date					2017/11/28 14:00	
COC Number					08441214	
	UNITS	MAC	AO	OG	SITE #1	RDL
Total Calcium (Ca)	mg/L	-	-	-	1.76	0.050
Total Magnesium (Mg)	mg/L	-	-	-	0.550	0.050
Total Potassium (K)	mg/L	-	-	-	0.054	0.050
Total Sodium (Na)	mg/L	-	200	-	0.648	0.050
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

TRIHALOMETHANES (THM) IN WATER

Maxxam ID		SO5337	
Sampling Date		2017/11/28 14:00	
COC Number		08441214	
	UNITS	SITE #1	RDL
Volatiles			
Chloroform	ug/L	28	1.0
Chlorodibromomethane	ug/L	<1.0	1.0
Bromodichloromethane	ug/L	<1.0	1.0
Bromoform	ug/L	<1.0	1.0
Surrogate Recovery (%)			
1,4-Difluorobenzene (sur.)	%	97	
4-Bromofluorobenzene (sur.)	%	91	
D4-1,2-Dichloroethane (sur.)	%	106	
RDL = Reportable Detection Limit			

Maxxam Job #: B7A5682
Report Date: 2017/12/05

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #1
Your P.O. #: 17-15

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam
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FULL SPEC ANALYSIS
ALLEN LAKE
RAW JAN 2017

Success Through Science®

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your C.O.C. #: 08429588

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336826
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703617
Received: 2017/01/18, 10:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	1	2017/01/19	2017/01/19	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00011	SM 22 4500-Cl- E m
Colour (True) by Kone Lab (1)	1	N/A	2017/01/19	BBY6SOP-00057	SM 22 2120 C m
Coliforms & E.coli by Quantitray (MPN)	1	N/A	2017/01/18	CTYSOP-00002	Based on SM-9223
ductance - water (1)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 2510 B m
ride (1)	1	N/A	2017/01/20	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1)	1	N/A	2017/01/20	BBY WI-00033	Auto Calc
Mercury (Total) by CVAF (1)	1	2017/01/23	2017/01/23	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrate + Nitrite (N) (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N) (1)	1	N/A	2017/01/20	BBY6SOP-00010	SM 22 4500-NO3 I m
pH Water (1, 2)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue) (1)	1	2017/01/20	2017/01/21	BBY6SOP-00033	SM 22 2540 C m
Turbidity (1)	1	N/A	2017/01/19	BBY6SOP-00027	SM 22 2130 B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your C.O.C. #: 08429588

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336826
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703617
Received: 2017/01/18, 10:30

Encryption Key

Maxxam
24 Jan 2017 12:16:41

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa McIntosh, Project Manager
Email: MMcIntosh@maxxam.ca
Phone# (250) 338 7786

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Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID					QK2476	
Sampling Date					2017/01/18 09:15	
COC Number					08429588	
	UNITS	MAC	AO	OG	ALLEN LAKE	RDL
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050
Calculated Parameters						
Nitrate (N)	mg/L	10	-	-	<0.020	0.020
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.017	0.010
Alkalinity (Total as CaCO3)	mg/L	-	-	-	9.69	0.50
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.50	0.50
Bicarbonate (HCO3)	mg/L	-	-	-	11.8	0.50
Carbonate (CO3)	mg/L	-	-	-	<0.50	0.50
Hydroxide (OH)	mg/L	-	-	-	<0.50	0.50
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	<0.50	0.50
Dissolved Chloride (Cl)	mg/L	-	250	-	0.85	0.50
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	**19.3**	5.0
Nutrients						
Nitrate plus Nitrite (N)	mg/L	-	-	-	<0.020	0.020
Physical Properties						
Conductivity	uS/cm	-	-	-	25.3	1.0
pH	pH	-	6.5:8.5	-	7.06	
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	20	10
Turbidity	NTU	see remark	see remark	see remark	1.97	0.10

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

MICROBIOLOGY (WATER)

Maxxam ID			QK2476	
Sampling Date			2017/01/18 09:15	
COC Number			08429588	
	UNITS	**MAC**	**ALLEN LAKE**	**RDL**
Microbiological Param.				
Total Coliforms	MPN/100mL	<1	36.4	1
E. coli	MPN/100mL	<1	<1	1

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (WATER)

Maxxam ID					QK2476	
Sampling Date					2017/01/18 09:15	
COC Number					08429588	
	UNITS	MAC	AO	OG	ALLEN LAKE	RDL
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	10.6	0.50
Elements						
Total Mercury (Hg)	ug/L	1	-	-	<0.010	0.010
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	-	-	100	53.8	3.0
Total Antimony (Sb)	ug/L	6	-	-	<0.50	0.50
Total Arsenic (As)	ug/L	10	-	-	<0.10	0.10
Total Barium (Ba)	ug/L	1000	-	-	1.4	1.0
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0
Total Boron (B)	ug/L	5000	-	-	<50	50
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	0.010
Total Chromium (Cr)	ug/L	50	-	-	<1.0	1.0
Total Cobalt (Co)	ug/L	-	-	-	<0.50	0.50
Total Copper (Cu)	ug/L	-	1000	-	12.0	0.20
Total Iron (Fe)	ug/L	-	300	-	**417**	5.0
Total Lead (Pb)	ug/L	10	-	-	1.17	0.20
Total Manganese (Mn)	ug/L	-	50	-	38.5	1.0
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0
Total Selenium (Se)	ug/L	50	-	-	<0.10	0.10
Total Silicon (Si)	ug/L	-	-	-	3470	100
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020
Total Strontium (Sr)	ug/L	-	-	-	6.5	1.0
Total Thallium (Tl)	ug/L	-	-	-	<0.050	0.050
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0
Total Uranium (U)	ug/L	20	-	-	<0.10	0.10
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0
Total Zinc (Zn)	ug/L	-	5000	-	7.9	5.0
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	0.50

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (WATER)

Maxxam ID					QK2476	
Sampling Date					2017/01/18 09:15	
COC Number					08429588	
	UNITS	MAC	AO	OG	ALLEN LAKE	RDL
Total Calcium (Ca)	mg/L	-	-	-	2.81	0.050
Total Magnesium (Mg)	mg/L	-	-	-	0.869	0.050
Total Potassium (K)	mg/L	-	-	-	0.083	0.050
Total Sodium (Na)	mg/L	-	200	-	0.940	0.050
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

GENERAL COMMENTS

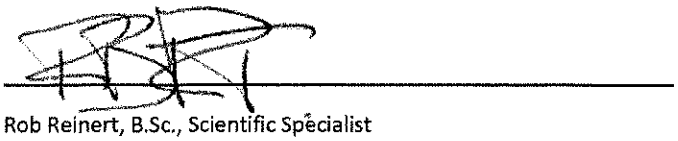
Results relate only to the items tested.

Maxxam Job #: B703617
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: ALLEN LAKE
Your P.O. #: 16-1114

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, B.Sc., Scientific Specialist

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Maxxam
A Bureau Veritas Group Company

FULL SPEC ANALYSIS
SITE # 8 WELL
RAW JAN 2017

Success Through Science®

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your C.O.C. #: 08429587

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336824
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703609
Received: 2017/01/18, 10:30

Sample Matrix: DRINKING WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	1	2017/01/19	2017/01/19	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00011	SM 22 4500-Cl- E m
Colour (True) by Kone Lab (1)	1	N/A	2017/01/19	BBY6SOP-00057	SM 22 2120 C m
Coliforms & E.coli by Quantitray (MPN)	1	N/A	2017/01/18	CTYSOP-00002	Based on SM-9223
ductance - water (1)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 2510 B m
oride (1)	1	N/A	2017/01/20	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1)	1	N/A	2017/01/20	BBY WI-00033	Auto Calc
Mercury (Total) by CVAF (1)	1	2017/01/23	2017/01/23	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrate + Nitrite (N) (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N) (1)	1	N/A	2017/01/20	BBY6SOP-00010	SM 22 4500-NO3 I m
pH Water (1, 2)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue) (1)	1	2017/01/20	2017/01/21	BBY6SOP-00033	SM 22 2540 C m
Turbidity (1)	1	N/A	2017/01/19	BBY6SOP-00027	SM 22 2130 B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your C.O.C. #: 08429587

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336824
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703609
Received: 2017/01/18, 10:30

Encryption Key

Maxxam
24 Jan 2017 12:16:16

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa McIntosh, Project Manager
Email: MMcIntosh@maxxam.ca
Phone# (250) 338 7786

==========

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Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

RESULTS OF CHEMICAL ANALYSES OF DRINKING WATER

Maxxam ID					QK2435	
Sampling Date					2017/01/18 08:45	
COC Number					08429587	
	UNITS	MAC	AO	OG	SITE #8 WELL	RDL
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050
Calculated Parameters						
Nitrate (N)	mg/L	10	-	-	0.075	0.020
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.028	0.010
Alkalinity (Total as CaCO3)	mg/L	-	-	-	44.9	0.50
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.50	0.50
Bicarbonate (HCO3)	mg/L	-	-	-	54.7	0.50
Carbonate (CO3)	mg/L	-	-	-	<0.50	0.50
Hydroxide (OH)	mg/L	-	-	-	<0.50	0.50
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	7.18	0.50
Dissolved Chloride (Cl)	mg/L	-	250	-	12	0.50
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	<5.0	5.0
Nutrients						
Nitrate plus Nitrite (N)	mg/L	-	-	-	0.075	0.020
Physical Properties						
Conductivity	uS/cm	-	-	-	146	1.0
pH	pH	-	6.5:8.5	-	7.53	
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	68	10
Turbidity	NTU	see remark	see remark	see remark	0.13	0.10

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

MICROBIOLOGY (DRINKING WATER)

Maxxam ID			QK2435	
Sampling Date			2017/01/18 08:45	
COC Number			08429587	
	UNITS	MAC	SITE #8 WELL	RDL
Microbiological Param.				
Total Coliforms	MPN/100mL	<1	<1	1
E. coli	MPN/100mL	<1	<1	1

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					QK2435	
Sampling Date					2017/01/18 08:45	
COC Number					08429587	
	UNITS	**MAC**	**AO**	**OG**	**SITE #8 WELL**	**RDL**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	44.6	0.50
Elements						
Total Mercury (Hg)	ug/L	1	-	-	<0.010	0.010
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	-	-	100	<3.0	3.0
Total Antimony (Sb)	ug/L	6	-	-	<0.50	0.50
Total Arsenic (As)	ug/L	10	-	-	<0.10	0.10
Total Barium (Ba)	ug/L	1000	-	-	2.2	1.0
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0
Total Boron (B)	ug/L	5000	-	-	231	50
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	0.010
Total Chromium (Cr)	ug/L	50	-	-	1.6	1.0
Total Cobalt (Co)	ug/L	-	-	-	<0.50	0.50
Total Copper (Cu)	ug/L	-	1000	-	<0.20	0.20
Total Iron (Fe)	ug/L	-	300	-	14.3	5.0
Total Lead (Pb)	ug/L	10	-	-	<0.20	0.20
Total Manganese (Mn)	ug/L	-	50	-	<1.0	1.0
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0
Total Selenium (Se)	ug/L	50	-	-	<0.10	0.10
Total Silicon (Si)	ug/L	-	-	-	6130	100
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020
Total Strontium (Sr)	ug/L	-	-	-	41.7	1.0
Total Thallium (Tl)	ug/L	-	-	-	<0.050	0.050
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0
Total Uranium (U)	ug/L	20	-	-	<0.10	0.10
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0
Total Zinc (Zn)	ug/L	-	5000	-	<5.0	5.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					QK2435	
Sampling Date					2017/01/18 08:45	
COC Number					08429587	
	UNITS	MAC	AO	OG	SITE #8 WELL	RDL
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	0.50
Total Calcium (Ca)	mg/L	-	-	-	12.7	0.050
Total Magnesium (Mg)	mg/L	-	-	-	3.14	0.050
Total Potassium (K)	mg/L	-	-	-	0.367	0.050
Total Sodium (Na)	mg/L	-	200	-	11.2	0.050
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

GENERAL COMMENTS

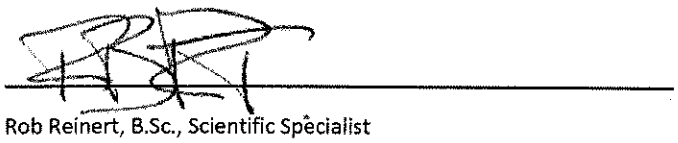
Results relate only to the items tested.

Maxxam Job #: B703609
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: SITE #8 WELL
Your P.O. #: 16-1114

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, B.Sc., Scientific Specialist

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FULL SPEC ANALYSIS
HENDERSON RAW
JAN 2017

Success Through Science®

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your C.O.C. #: 08429592

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336825
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703612
Received: 2017/01/18, 10:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water (1)	1	2017/01/19	2017/01/19	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00011	SM 22 4500-Cl- E m
Colour (True) by Kone Lab (1)	1	N/A	2017/01/19	BBY6SOP-00057	SM 22 2120 C m
Coliforms & E.coli by Quantitray (MPN)	1	N/A	2017/01/18	CTYSOP-00002	Based on SM-9223
Conductance - water (1)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 2510 B m
Fluoride (1)	1	N/A	2017/01/20	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3) (1)	1	N/A	2017/01/20	BBY WI-00033	Auto Calc
Mercury (Total) by CVAF (1)	1	2017/01/23	2017/01/23	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total) (1)	1	N/A	2017/01/20	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrate + Nitrite (N) (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA (1)	1	N/A	2017/01/19	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N) (1)	1	N/A	2017/01/20	BBY6SOP-00010	SM 22 4500-NO3 I m
pH Water (1, 2)	1	N/A	2017/01/19	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry (1)	1	N/A	2017/01/19	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue) (1)	1	2017/01/20	2017/01/21	BBY6SOP-00033	SM 22 2540 C m
Turbidity (1)	1	N/A	2017/01/19	BBY6SOP-00027	SM 22 2130 B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

(2) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Your P.O. #: 16-1114
Your Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your C.O.C. #: 08429592

Attention:MARK SPRINGFORD

VILLAGE OF CUMBERLAND
PO BOX 340
CUMBERLAND, BC
CANADA V0R 1S0

Report Date: 2017/01/24
Report #: R2336825
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B703612
Received: 2017/01/18, 10:30

Encryption Key

Maxxam
24 Jan 2017 12:16:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa McIntosh, Project Manager
Email: MMcIntosh@maxxam.ca
Phone# (250) 338 7786

==========

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Maxxam Job #: B703612
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your P.O. #: 16-1114

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID					QK2450	
Sampling Date					2017/01/18 09:00	
COC Number					08429592	
	UNITS	MAC	AO	OG	HENDERSON DAM	RDL
ANIONS						
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050
Calculated Parameters						
Nitrate (N)	mg/L	10	-	-	0.022	0.020
Misc. Inorganics						
Fluoride (F)	mg/L	1.5	-	-	0.015	0.010
Alkalinity (Total as CaCO3)	mg/L	-	-	-	6.05	0.50
Alkalinity (PP as CaCO3)	mg/L	-	-	-	<0.50	0.50
Bicarbonate (HCO3)	mg/L	-	-	-	7.38	0.50
Carbonate (CO3)	mg/L	-	-	-	<0.50	0.50
Hydroxide (OH)	mg/L	-	-	-	<0.50	0.50
Anions						
Dissolved Sulphate (SO4)	mg/L	-	500	-	<0.50	0.50
Dissolved Chloride (Cl)	mg/L	-	250	-	0.76	0.50
MISCELLANEOUS						
True Colour	Col. Unit	-	15	-	**16.3**	5.0
Nutrients						
Nitrate plus Nitrite (N)	mg/L	-	-	-	0.022	0.020
Physical Properties						
Conductivity	uS/cm	-	-	-	15.3	1.0
pH	pH	-	6.5:8.5	-	7.03	
Physical Properties						
Total Dissolved Solids	mg/L	-	500	-	14	10
Turbidity	NTU	see remark	see remark	see remark	0.91	0.10

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703612
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your P.O. #: 16-1114

MICROBIOLOGY (WATER)

Maxxam ID			QK2450	
Sampling Date			2017/01/18 09:00	
COC Number			08429592	
	UNITS	MAC	HENDERSON DAM	RDL
Microbiological Param.				
Total Coliforms	MPN/100mL	<1	>200.5	1
E. coli	MPN/100mL	<1	4.2	1

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703612
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (WATER)

Maxxam ID					QK2450	
Sampling Date					2017/01/18 09:00	
COC Number					08429592	
	UNITS	MAC	AO	OG	HENDERSON DAM	RDL
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	-	-	-	6.27	0.50
Elements						
Total Mercury (Hg)	ug/L	1	-	-	<0.010	0.010
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	-	-	100	88.8	3.0
Total Antimony (Sb)	ug/L	6	-	-	<0.50	0.50
Total Arsenic (As)	ug/L	10	-	-	<0.10	0.10
Total Barium (Ba)	ug/L	1000	-	-	<1.0	1.0
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0
Total Boron (B)	ug/L	5000	-	-	<50	50
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	0.010
Total Chromium (Cr)	ug/L	50	-	-	<1.0	1.0
Total Cobalt (Co)	ug/L	-	-	-	<0.50	0.50
Total Copper (Cu)	ug/L	-	1000	-	2.24	0.20
Total Iron (Fe)	ug/L	-	300	-	56.2	5.0
Total Lead (Pb)	ug/L	10	-	-	<0.20	0.20
Total Manganese (Mn)	ug/L	-	50	-	3.7	1.0
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0
Total Selenium (Se)	ug/L	50	-	-	<0.10	0.10
Total Silicon (Si)	ug/L	-	-	-	2040	100
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020
Total Strontium (Sr)	ug/L	-	-	-	3.5	1.0
Total Thallium (Tl)	ug/L	-	-	-	<0.050	0.050
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0
Total Uranium (U)	ug/L	20	-	-	<0.10	0.10
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0
Total Zinc (Zn)	ug/L	-	5000	-	<5.0	5.0
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	0.50

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

Maxxam Job #: B703612
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your P.O. #: 16-1114

TOT. METALS W/ CV HG FOR DRINKING WATER (WATER)

Maxxam ID					QK2450	
Sampling Date					2017/01/18 09:00	
COC Number					08429592	
	UNITS	MAC	AO	OG	HENDERSON DAM	RDL
Total Calcium (Ca)	mg/L	-	-	-	1.63	0.050
Total Magnesium (Mg)	mg/L	-	-	-	0.534	0.050
Total Potassium (K)	mg/L	-	-	-	<0.050	0.050
Total Sodium (Na)	mg/L	-	200	-	0.557	0.050
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

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Maxxam Job #: B703612
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VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
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GENERAL COMMENTS

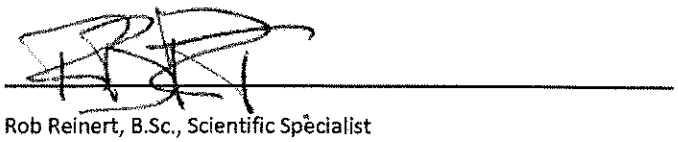
Results relate only to the items tested.

Maxxam Job #: B703612
Report Date: 2017/01/24

VILLAGE OF CUMBERLAND
Client Project #: ANNUAL DRINKING WATER
Site Location: HENDERSON DAM
Your P.O. #: 16-1114

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, B.Sc., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.