



December 21, 2017

School District 68 (Nanaimo-Ladysmith) 395 Wakesiah Road Nanaimo, BC V9R 3K6 ISSUED FOR USE FILE: 704-ENW.VENW03140-01 Via Email: BHackwood@sd68.bc.ca; Chris.Baker@sd68.bc.ca

Attention: Mr. Brian Hackwood, Maintenance Manager

Subject: Domestic Water Testing (Lead) Inventory – Departure Bay Elementary

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained School District 68 Nanaimo-Ladysmith (SD 68) to conduct a domestic water testing inventory at Departure Bay Elementary located in SD 68. Tetra Tech understands that the BC Ministry of Education has issued a directive to protect drinking water. The directive requires that a systematic investigation of public drinking water supplies at select schools in the District be undertaken. The investigation is based on procedures set forth by the Vancouver Island Health Authority (VIHA), modified per Health Canada guidelines, to ascertain risk and mitigation.

Tetra Tech understands that the sampling schedule, collection, testing and reporting of results needs to be completed by December 22, 2017 in order to allow sufficient time for SD 68 to implement mitigation measures prior to its deadline of March 31, 2018.

Carrie McVeigh, of SD 68, provided Tetra Tech with authorization to proceed with the inventory on October 24, 2017.

2.0 METHODOLOGY

Tetra Tech completed the domestic water testing inventory program at Departure Bay Elementary on November 27th and December 11th, 2017. The 2017 sampling program was conducted as per the protocols established during the 2016 program. The methodologies employed during the field program are detailed in the following subsections.

2.1 Sampling Locations

Tetra Tech reviewed plans for the facility prior to commencing the field work to identify potential sampling locations. The facility was then assessed in the field and sampling locations were selected based on the probability of human consumption at a location. The sampling locations included one point that was closest to the location where the water supply enters the building, one that is the furthest point from where the water supply enters the building and from points where human consumption of water occurred or was reasonably likely to occur. The sampling locations for Departure Bay Elementary are shown on the attached Figures 1 and 2.

Drinking fountains and kitchen sinks were all considered to have a high probability of human consumption of water and were always sampled. Sinks with visible evidence of human consumption of water, such as water bottles, cups, or electric kettles were also considered to have a high probability of human consumption of water and were sampled.



Washrooms and utility sinks, unless there was other evidence of human consumption of water (such as an electric kettle) were considered to be a low probability of human consumption of water and only representative samples were collected.

2.2 Drinking Water Sampling

Sampling was conducted in the early hours of Monday, November 27th and December 11th, 2017 in order collect water samples representative of an approximate worse-case scenario of water that had remained in contact with the school's plumbing over the course of a weekend. Two samples were collected at each sample location; during initial sampling the first was collected immediately prior to any water line flushing (0 second sample); the second collected after thirty seconds of water line flushing (30 second sample).

The process for the sequence of analysis for a sample location is as follows:

- Only the pre-flush (0 second) sample is initially submitted for laboratory analysis;
- If the analytical result exceeds the Guidelines for Canadian Drinking Water Quality (GCDWQ) Maximum Allowable Concentration (MAC), the 30 second sample would be submitted for further analysis; and
- If the 30 second sample analytical result exceeds the GCDWQ MAC, additional samples would be collected after flushing with cold water for 2 minutes and 5 minutes at a subsequent sampling event and both samples submitted for analysis.

Water samples were collected directly from the sample point into clean, labeled, new laboratory-supplied containers pre-charged with preservative for total lead. Sampling personnel wore new nitrile gloves prior to collecting each sample. Samples were kept in a cooler with ice after collection until being brought back to Tetra Tech's Nanaimo office, where samples not immediately submitted to the laboratory were stored in refrigerated conditions.

2.3 Analytical Testing

Maxxam is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples using British Columbia Ministry of Environment (MOE)-approved procedures. All water samples submitted were analyzed for total lead.

2.4 Quality Assurance / Quality Control

During the sampling program, Tetra Tech implemented a Quality Assurance/Quality Control (QA/QC) program to ensure the integrity of the sampling methodology and analytical testing. The QA/QC program adhered to Tetra Tech's in-house Quality Management System (QMS), which was designed to generate representative samples, minimize the potential for cross-contamination between sampling locations and samples, and reduce the potential for systematic bias.

The QA/QC program included the following tasks:

- Recording the results of field activities in the field concurrently with the activities;
- Use of clean, new sampling gloves at each sampling location;
- Placing samples into new, labeled laboratory-supplied containers;
- Transporting samples to Maxxam in chilled coolers using chain-of-custody procedures;





- Using a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples using MOE-approved procedures;
- Independently verifying the sample concentrations flagged by Maxxam as being greater than Health Canada guidelines; and
- Conducting a review of this report by a qualified senior Tetra Tech professional to ensure that the report meets Tetra Tech technical and reporting requirements.

Laboratory Quality Assurance / Quality Control Program

Water samples were submitted to Maxxam, a CALA accredited laboratory. Laboratory testing was conducted using methods outlined in the British Columbia Environmental Laboratory Manual. Laboratory QA/QC reports are attached to the laboratory reports presented in Appendix B. Samples included in the QA/QC reports consist of laboratory batches and will include random samples from the lab report and potentially other projects to complete a batch.

The Laboratories noted any sample deficiencies, such as unacceptable headspace, broken jars or bottles, etc. As well, the laboratory measured the temperature of samples received by the laboratory in Burnaby.

3.0 ASSESSMENT STANDARDS

As per the guidance from the Vancouver Island Health Authority (VIHA), Tetra Tech compared the sample analytical results to the *Guidelines for Canadian Drinking Water Quality* (GCDWQ) published by Health Canada, February 2017. The guidelines list a Maximum Acceptable Concentration (MAC) for lead of 10 µg/L (0.010 mg/L). The MAC for lead is based on chronic effects and is intended to apply to average concentrations in water consumed for extended periods. No immediately toxic concentration for lead is listed, however exposure to lead should nevertheless be kept to a minimum.

4.0 ANALYTICAL RESULTS

A total of 18 sample locations were identified; two samples were collected at each location (i.e., 0 second sample and 30 second sample). Tetra Tech collected water 0 and 30 second samples from Departure Bay Elementary on November 27th, 2017. All 18 pre-flush (0 second) samples were submitted for laboratory analysis of total lead.

Five of the 18 pre-flush (0 second samples) contained concentration of total lead greater than the GCDWQ MAC.

Three samples were collected at the west end of the school near the Gymnasium: sample DB12 was collected from the kitchen off the Gymnasium, DB13 was collected from a drinking water fountain outside the Gymnasium, DB14 was collected from a sink in the boy's change room outside the Gymnasium. Two samples were collected at the east end of the school: DB15 was collected from a sink in Classroom 301 and DB16 was collected from a sink in Room 310. The 30 second sample for all these locations was submitted for laboratory analysis of total lead.

The 30 second samples at DB14 and DB15 contained concentrations of total lead greater than the GCDWQ MAC.

Tetra Tech collected 2 minute and 5 minute flush samples from DB14 and DB15 on December 11th and submitted it for laboratory analysis of total lead.



Both the 2 minute and 5 minute samples at DB14 and DB15 contained total lead concentrations less than the GCDWQ MAC.

Sampling locations are shown on Figures 1 and 2. Laboratory testing results for Departure Bay Elementary are summarized in the table below. The complete laboratory certificate is provided as Appendix B.

Sample ID	Sample Date	MAC	Total Lead (µg/L)
	0 Second	Samples	
DB01-0s	11/27/2017		3.23
DB02-0s	11/27/2017		8.49
DB03-0s	11/27/2017		4.75
DB04-0s	11/27/2017		1.55
DB05-0s	11/27/2017		1.20
DB06-0s	11/27/2017		3.92
DB07-0s	11/27/2017		3.65
DB08-0s	11/27/2017		4.72
DB09-0s	11/27/2017	10.00%	0.81
DB10-0s	11/27/2017	10 μg/L	1.19
DB11-0s	11/27/2017		3.08
DB12-0s	11/27/2017		125
DB13-0s	11/27/2017		41.2
DB14-0s	11/27/2017		35.9
DB15-0s	11/27/2017		18.2
DB16-0s	11/27/2017		19.1
DB17-0s	11/27/2017		7.95
DB18-0s	11/27/2017		0.83
	30 Second	d Samples	
DB12-30s	11/27/2017		3.74
DB13-30s	11/27/2017		6.00
DB14-30s	11/27/2017	10 µg/L	11.2
DB15-30s	11/27/2017		14.2
DB16-30s	11/27/2017		2.19
	2 Minute	e Sample	
DB14-2m	12/11/2017	10 μg/L	0.66
DB15-2m	12/11/2017	10 μg/L	0.63
		Sample	
DB14-5m	12/11/2017	10 µg/L	0.92
DB15-5m	12/11/2017	10 µg/L	0.91
Notes:	Grey Fill	Exc	eeds GCDWQ MAC



5.0 DISCUSSION AND RECOMMENDATIONS

Tetra Tech's sampling program was based upon guidance from the Ministry of Health, found in the document *Guidance on Controlling Corrosion in Drinking Water Distribution Systems* (2009). The rationale is that for each sampling point, if the pre-flush (0 second) sample (Tier 1) contained elevated lead concentrations, it could indicate that the faucet or fittings are the source of lead. If a subsequent 30 second flush sample (Tier 2) contained elevated lead concentrations, the source of the lead would likely be the piping (plumbing) leading to the faucet; whereas low lead concentrations in the 30 second sample would further indicate that the source was likely the faucet and fittings. Finally, 2 and 5 minute flush samples (if required) should be drawing water directly from the water supply piping within the building and would indicate if flushing is feasible for lowering the lead concentration in water within the building.

The Health Canada guidance recommend that Tier 2 sampling (30 second samples) take place when Tier 1 sampling identifies more than 10% of sites with lead concentrations above the MAC, and then only at the 10% of sampling sites with the highest lead concentration. Rather, Tetra Tech ran every 30 second sample for locations where the 0 second sample was above the MAC to show that flushing was adequate to lower the lead concentration in the drinking water at each point of concern.

The guidance from the Ministry of Health recommended that samples be collected after the sampling points had been stagnant for a minimum of 8 hours but not longer than 24 hours in order to simulate the worst case daily scenario for lead in drinking water consumption. Based on guidance from VIHA, SD 68 directed Tetra Tech to collect samples Monday mornings prior to any staff or students arriving at the facilities in order to simulate a worst-case scenario for stagnant water. As such, lead concentrations reported represent what could be expected following a weekend and would likely be lower on subsequent weekday mornings.

Five of 18 pre-flush (0 second) samples collected at Departure Bay Elementary contained concentrations of lead greater than the GCDWQ MAC. Lead concentrations at sample locations DB12, DB13 and DB16 exceeded the MAC for the 0 second samples but was below the guideline for the 30 second samples. Lead concentrations at DB14 and DB15 exceeded the MAC for both 0 and 30 second samples but were below in the guideline for the 2 and 5 minute samples.

As previously noted, where lead concentrations are elevated in 0 second samples, the contributing source is likely the fixture (i.e., faucet or fittings). Where the 30 second sample is also elevated the source is likely the plumbing immediately behind the fixture. Since lead concentrations at locations DB12, DB13 and DB16 exceeded the MAC for the 0 second sample but not for the 30 second sample, there is potentially a lead source in the fixture at these locations. At DB14 and DB15 the plumbing behind the fixture may also be a contributing source.

Flushing is adequate to lower the lead concentrations at all sample points in Departure Bay Elementary. Signage stating "Water Quality – First thing in the morning... Run the water for two minutes before drinking. Throughout the day... Let the water run until it is cold before drinking" should be maintained throughout the facility at each point where drinking water could be consumed.

6.0 SUMMARY AND CONCLUSIONS

Five pre-flush (0 second) samples (DB12 through DB16) collected at Departure Bay Elementary contained concentrations of total lead greater than the GCDWQ MAC of 10µg/L (0.010 mg/L). Of those five locations, three had concentrations of lead below the MAC in the corresponding 30 second samples. Samples DB14 and DB15 had



concentrations of lead exceeding the GCDWQ for both the 0 second and 30 second samples but were below for the 2 minute and 5 minute sample.

Tetra Tech recommends that SD 68 continue with its ongoing procedure of conducting a 2 minute flush at each drinking water consumption point each morning; and running taps/faucets until cold prior to consuming water. Signage stating "Water Quality – First thing in the morning... Run the water for two minutes before drinking. Throughout the day... Let the water run until it is cold before drinking" should be maintained at all water consumption points.

Tetra Tech recommends that the facility be inspected on a routine basis to ensure that the above noted signage is present and in good condition at each point where drinking water could be consumed. Tetra Tech further recommends that a bulletin be provided to staff summarizing the drinking water quality results at the facility and reminding them of the above procedure. Staff should then instruct students and visitors in the drinking water procedure.

7.0 CLOSURE

This report has been prepared based on the scope of work and for the use of School District 68, which includes distribution as required for the purposes for which this assessment was commissioned. The assessment has been carried out in accordance with generally accepted professional practice. No other warranty is made, either express or implied. Professional judgment has been applied in developing the recommendations in this report.

This report was prepared by personnel with professional experience in investigations of this nature and who specifically conducted the investigations at this Site. Reference should be made to the 'Geoenvironmental Report – Limitations on the Use of this Document' attached in Appendix A that forms a part of this report.

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted, Tetra Tech Canada Inc.

Malter

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/dr

Attachments: Figure 1 - Departure Bay Elementary Sample Locations (Main and Upper Floors) Figure 2 - Departure Bay Elementary Sample Location (Lower Floor) Appendix A - Limitations on the Use of this Document Appendix B - Laboratory Report

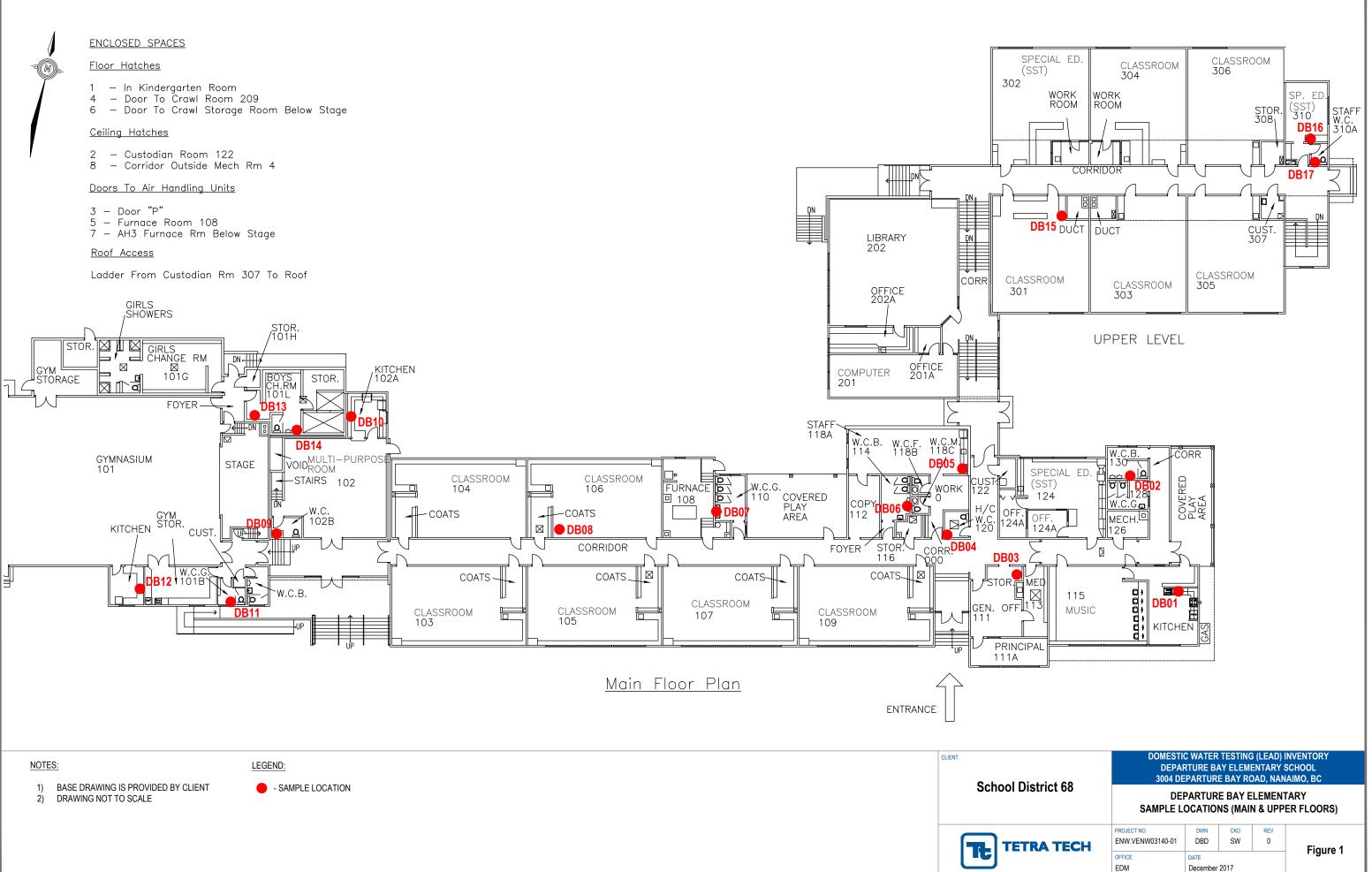


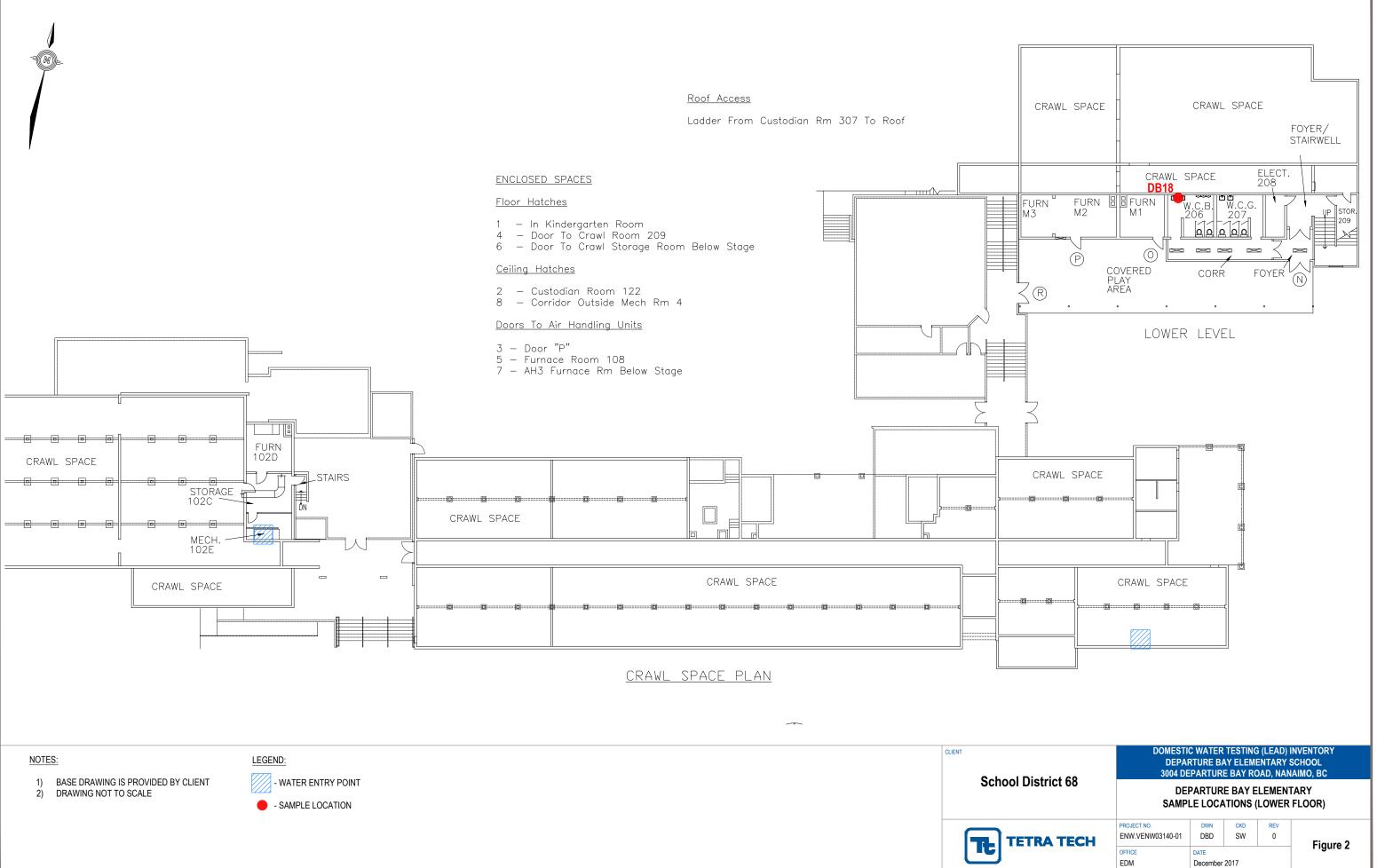


FIGURES

- Figure 1 Departure Bay Elementary Sample Locations (Main and Upper Floors)
- Figure 2 Departure Bay Elementary Sample Location (Lower Floor)









APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT



GEOENVIRONMENTAL

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The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

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While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

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In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.





APPENDIX B

LABORATORY REPORT



Max kam A Bureau Veritas Group Company

> Your Project #: ENW.VENW03140-01 Your C.O.C. #: 541404-03-01

Attention:Shawneen Walker

TETRA TECH CANADA INC. #1 - 4376 BOBAN DRIVE NANAIMO, BC Canada V9T 6A7

> Report Date: 2017/12/14 Report #: R2491584 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7A9892 Received: 2017/12/12, 08:35

Sample Matrix: DRINKING WATER # Samples Received: 8

	Date Date				
Analyses	Quantity	y Extracted	Analyzed	Laboratory Method	Analytical Method
Elements by CRC ICPMS (total)	8	N/A	2017/12/14	4 BBY7SOP-00003,	BCLM2005,EPA6020bR2m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager. Letitia Prefontaine, B.Sc., Senior Project Manager Email: LPrefontaine@maxxam.ca Phone# (604)639-2616

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.

Total Cover Pages : 1 Page 1 of 6



TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: SW

Maxxam ID			SQ8479	SQ8480	SQ8481	SQ8482	SQ8483	SQ8484			
Sampling Date			2017/12/11	2017/12/11	2017/12/11	2017/12/11	2017/12/11	2017/12/11			
COC Number			541404-03-01	541404-03-01	541404-03-01	541404-03-01	541404-03-01	541404-03-01			
	UNITS	MAC	WS23-2M	WS23-5M	SD07-2M	SD07-5M	DB14-2M	DB14-5M	RDL	QC Batch	
Total Metals by ICPMS											
Total Lead (Pb)	ug/L	10	0.64	0.93	0.86	0.80	0.66	0.92	0.20	8861363	
No Fill	No Excee	dance									
Grey	Exceeds 1	L criter	ia policy/level								
Black	ack Exceeds both criteria/levels										
RDL = Reportable Detection Limit											

Maxxam ID				SQ8485	SQ8486					
Sampling Date				2017/12/11	2017/12/11					
COC Number	COC Number			541404-03-01	541404-03-01					
			MAC	DB15-2M	DB15-5M	RDL	QC Batch			
Total Metals by	y ICPMS									
Total Lead (Pb)		ug/L	10	0.63	0.91	0.20	8861363			
No Fill	No Exceeda	nce								
Grey	Exceeds 1 cr	iteria po	olicy/le	evel						
Black	Exceeds both criteria/levels									
RDL = Reportab	Reportable Detection Limit									



Maxxam Job #: B7A9892 Report Date: 2017/12/14

TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: SW

GENERAL COMMENTS

Each t	emperature is the	average of up to t	hree cooler temperatures taken a	t receipt		
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Results relate only to the items tested.



Maxxam Job #: B7A9892 Report Date: 2017/12/14

QUALITY ASSURANCE REPORT

TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: SW

			Matrix Spike			Blank	Method B	lank	RPD			
QC Batch	Parameter	Date	% Recovery	% Recovery QC Limits % Recovery Q			Value	UNITS	Value (%)	QC Limits		
8861363	Total Lead (Pb)	2017/12/14	97	80 - 120	99	80 - 120	<0.20	ug/L	3.6	20		
Duplicate: Pai	Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.											
Matrix Spike:	A sample to which a known amount of the analyte of in	terest has been a	dded. Used to e	valuate sampl	e matrix interfe	rence.						
Spiked Blank:	Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.											
Method Blank	: A blank matrix containing all reagents used in the ana	lytical procedure.	Used to identify	/ laboratory co	ontamination.							



Success Through Science®

Maxxam Job #: B7A9892 Report Date: 2017/12/14 TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: SW

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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		WS23-2n	2	17/12/11		Watar		X							1			
		W523-5n	0	1				1							1			
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-			-							-			_					
_	awneen	Nater	Date: (YY/N		00 00 84			(Signature/P	rint)	Date: (Y)		Time 08:35	# jars used and not submitted	Time Sent	Ten	nperature (°C) on Receipt		Seal intact on Cooler?
					0	~			S. SIGNING OF THIS	_	AV					81217	N/A L	Yes No

Your Project #: ENW.VENW03140-01

Attention:Shawneen Walker

TETRA TECH CANADA INC. #1 - 4376 BOBAN DRIVE NANAIMO, BC Canada V9T 6A7

Your C.O.C. #: 540796-06-01, 540796-07-01, 540796-08-01, 540796-09-01, 540796-10-01, 540796-11-01, 540796-12-01

Report Date: 2017/12/05 Report #: R2486758 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7A6034 Received: 2017/11/28, 08:55

Sample Matrix: DRINKING WATER # Samples Received: 56

		Date	Date		
Analyses	Quantity	y Extracted	Analyzed	Laboratory Method	Analytical Method
Elements by CRC ICPMS (total)	34	N/A	2017/12/02	2 BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Elements by CRC ICPMS (total)	22	N/A	2017/12/04	4 BBY7SOP-00003,	BCLM2005,EPA6020bR2m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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.



Your Project #: ENW.VENW03140-01

Attention:Shawneen Walker

TETRA TECH CANADA INC. #1 - 4376 BOBAN DRIVE NANAIMO, BC Canada V9T 6A7

Your C.O.C. #: 540796-06-01, 540796-07-01, 540796-08-01, 540796-09-

Report Date: 2017/12/05 Report #: R2486758 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7A6034 Received: 2017/11/28, 08:55

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager. Letitia Prefontaine, B.Sc., Senior Project Manager Email: LPrefontaine@maxxam.ca Phone# (604)639-2616 _____

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.



01, 540796-10-01, 540796-11-01, 540796-12-01



TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

Maxxam ID				SO7002		SO7003	SO7004	SO7005			
Sampling Date				2017/11/27		2017/11/27	2017/11/27	2017/11/27			
COC Number				540796-06-01		540796-06-01	540796-06-01	540796-06-01			
		UNITS	MAC	WS01-OS	QC Batch	WS02-OS	WS03-OS	WS04-OS	RDL	QC Batch	
Total Metals by ICPMS											
Total Lead (Pb)		ug/L	10	0.79	8848411	13.0	17.1	9.66	0.20	8848362	
No Fill	No Ex	ceedan	ce								
Grey	Excee	ds 1 cri	teria p	olicy/level							
Black	Exceeds both criteria/levels										
RDL = Reportable Detection Limit											

Maxxam ID			SO7006	SO7007	SO7008	SO7009		SO7010			
Sampling Date			2017/11/27	2017/11/27	2017/11/27	2017/11/27		2017/11/27			
COC Number			540796-06-01	540796-06-01	540796-06-01	540796-06-01		540796-06-01			
	UNITS	MAC	WS05-OS	WS06-OS	WS07-OS	WS08-OS	QC Batch	WS09-OS	RDL	QC Batch	
Total Metals by ICPMS											
Total Lead (Pb)	ug/L	10	9.07	3.66	22.1	0.26	8848333	3.60	0.20	8848362	
No Fill	No Exceed	lance									
Grey	Exceeds 1	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels										
RDL = Reportable Detecti	on Limit										

Maxxam ID			SO7011	SO7016	SO7017	SO7018		SO7019			
Sampling Date			2017/11/27	2017/11/27	2017/11/27	2017/11/27		2017/11/27			
COC Number			540796-06-01	540796-07-01	540796-07-01	540796-07-01		540796-07-01			
	UNI	S MAC	WS10-OS	WS11-OS	WS12-OS	WS13-OS	QC Batch	WS14-OS	RDL	QC Batch	
Total Metals by ICPMS											
Total Lead (Pb)	ug/	. 10	3.42	1.93	0.47	0.22	8848411	1.73	0.20	8848362	
No Fill	No Exce	edance									
Grey	Exceeds 1 criteria policy/level										
Black	Exceeds both criteria/levels										
RDL = Reportable Detect	ion Limit										

Maxxam ID				SO7020		SO7029	SO7030		SO7031		
Sampling Date				2017/11/27		2017/11/27	2017/11/27		2017/11/27		
COC Number				540796-07-01		540796-08-01	540796-08-01		540796-08-01		
	U	JNITS	MAC	WS15-OS	QC Batch	WS22-OS	WS23-OS	QC Batch	WS24-OS	RDL	QC Batch
Total Metals by ICPMS											
Total Lead (Pb)	I	ug/L	10	0.74	8848362	3.56	20.8	8848333	1.25	0.20	8848362
No Fill	No Ex	kceeda	ince								
Grey	Excee	eds 1 c	riteria	policy/level							
Black	Excee	eds bot	th crite	eria/levels							
RDL = Reportable Detec	tion Lim	nit									



TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

Maxxam ID			SO7032		SO7033		SO7034	SO7035		
Sampling Date			2017/11/27		2017/11/27		2017/11/27	2017/11/27		
COC Number			540796-08-01		540796-08-01		540796-08-01	540796-08-01		
	UNI	rs M	C WS25-OS	QC Batch	WS26-OS	QC Batch	WS27-OS	MB01-OS	RDL	QC Batch
Total Metals by ICPMS										
Total Lead (Pb)	ug,	L 1	2.12	8848411	3.70	8848362	0.92	0.77	0.20	8848411
No Fill	No Exce	edance								
Grey	Exceeds	1 crite	ria policy/level							
No FillNo ExceedanceGreyExceeds 1 criteria policy/lBlackExceeds both criteria/leve										
RDL = Reportable Detect	tion Limit									





TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

Maxxam ID				SO7036	SO7	037			SO7042		SO704	3	SO7044			
Sampling Date			2	2017/11/27	2017/	'11/27		2	2017/11/2	27	2017/11,	'27	2017/11/2	7		
COC Number			54	10796-08-0	1 540796	5-08-02	1	54	40796-09	-01 5	40796-0	9-01 5	40796-09-0)1		
	UN	IITS M	AC	MB02-OS	MB0	3-OS	QC Batc	h	MB04-0	S	MB05-0)S	MB06-OS	RD	DL Q	C Bato
Total Metals by ICPM	S															
Total Lead (Pb)	ug	g/L 10	0	17.7	11	L .4	8848362	2	7.24		5.13		4.63	0.2	20 88	84833
No Fill	No Exc	eedanc	e													
Grey	Exceed	ds 1 crit	eria p	olicy/level												
Black	Exceed	ls both	criteri	ia/levels												
RDL = Reportable Det	ection Limit															
		1 1		1		1			i				1	_		i
ixxam ID				07045			07046			SO704			S0704			
npling Date				7/11/27			7/11/27)17/11	-		2017/11			
C Number				96-09-01			96-09-01			0796-0			540796-0			
	UNITS	MAC	M	307-OS	QC Batch	MB	808-OS	QC B	Batch I	VB09-	OS Q	C Batch	MB10-	OS	RDL	QC E
tal Metals by ICPMS																
tal Lead (Pb)	ug/L	10		1.94	8848362	5	8.92	8848	8333	6.20	88	848362	0.32		0.20	884
lo Fill	No Excee															
Brey	Exceeds															
Black	Exceeds	both cr	iteria/	levels												
L = Reportable Detect	ion Limit															
Maxxam ID				SO7049)		SO7050)	SO70	51			\$07052			
Sampling Date				2017/11/	27		2017/11/	27	2017/1	1/27		20	17/11/27			
COC Number				540796-09	-01		540796-09	-01	540796-	09-01		540	796-10-01			
	l	JNITS	МАС	MB11-0	S QC E	Batch	MB12-0	S	MB13	-OS	QC Bate	h N	/B14-OS	RDL	QC B	Batch
Total Metals by ICF	PMS										•					
Total Lead (Pb)		ug/L	10	18.9	884	8411	7.70		0.3	7	884836	2	32.4	0.20	8848	8333
No Fill	No E	xceedar	nce													
Grey	Exce	eds 1 cr	iteria	policy/leve	1											
Black	Exce	eds botl	h crite	eria/levels												
RDL = Reportable D																
					1						1			1	1	
Maxxam ID				SO7053			SO7054		SO70				SO7056			
Sampling Date				2017/11/			2017/11/		2017/1				17/11/27			
COC Number				540796-10			540796-10		540796-				796-10-01			
		JNITS	MAC	MB15-0	S QC E	Batch	DB01-0	S	DB02-	-OS	QC Bate	h C	0B03-OS	RDL	QC B	Batch
Total Metals by ICF								r			1					
Total Lead (Pb)		ug/L	10	13.7	884	8333	3.23		8.49	9	884836	2	4.75	0.20	8848	8411
No Fill	No E	xceedar	nce													
Grey	Exce	eds 1 cr	iteria	policy/leve	I											
Grey Black				policy/leve eria/levels	I											





TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

Maxxam ID				SO7057	SO7058		SO7059		SO7060		
Sampling Date				2017/11/27	2017/11/27		2017/11/27		2017/11/27		
COC Number				540796-10-01	540796-10-01		540796-10-01		540796-10-01		
	L	UNITS	MAC	DB04-OS	DB05-OS	QC Batch	DB06-OS	QC Batch	DB07-OS	RDL	QC Batch
Total Metals by ICPMS											
Total Lead (Pb)		ug/L	10	1.55	1.20	8848362	3.92	8848333	3.65	0.20	8848411
No Fill	No Ex	xceeda	ince								
Grey	Excee	eds 1 c	riteria	policy/level							
GreyExceeds 1 criteria policy/levBlackExceeds both criteria/levels											
RDL = Reportable Detect	tion Lin	nit									





TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

Maxxam ID				SO7061		SO7062	SO7063		SO7064		
Sampling Date				2017/11/27		2017/11/27	2017/11/27		2017/11/27		
COC Number				540796-10-01		540796-11-01	540796-11-01		540796-11-01		
		UNITS	MAC	DB08-OS	QC Batch	DB09-OS	DB10-OS	QC Batch	DB11-OS	RDL	QC Batch
Total Metals by ICPMS											
Total Lead (Pb)		ug/L	10	4.72	8848362	0.81	1.19	8848411	3.08	0.20	8848944
No Fill	No E	xceeda	ince								
Grey	Exce	eds 1 c	riteria	policy/level							
Black	Exce	eds bo	th crite	eria/levels							
RDL = Reportable Detect	tion Lir	mit									
Maxxam ID				SO7065	SO7066		SO7067		SO7068	<u> </u>	
										├───	
Sampling Date				2017/11/27	2017/11/2		2017/11/27		2017/11/27 540796-11-01	<u> </u>	
COC Number				540796-11-01	540796-11	-	540796-11-01	OC Datab			OC Datab
		UNITS	IVIAC	DB12-OS	DB13-09	S QC Batch	DB14-OS	QC Batch	DB15-OS	KDL	QC Batch
Total Metals by ICPMS								-			_
Total Lead (Pb)		ug/L	10	125	41.2	8848944	35.9	8848411	18.2	0.20	8848944
No Fill	No E	xceeda	ince								
Grey	Exce	eds 1 c	riteria	policy/level							
Black	Exce	eds bo	th crite	eria/levels							
RDL = Reportable Detect	tion Lir	mit									

Maxxam ID				SO7069	SO7070		SO7071	SO7072		
Sampling Date				2017/11/27	2017/11/27		2017/11/27	2017/11/27		
COC Number				540796-11-01	540796-11-01		540796-11-01	540796-12-01		
		UNITS	MAC	DB16-OS	DB17-OS	QC Batch	DB18-OS	WS28-OS	RDL	QC Batch
Total Metals by ICPM	S									
Total Lead (Pb)		ug/L	10	19.1	7.95	8848944	0.83	9.57	0.20	8850025
No Fill	No Exc	ceedan	ce							
Grey										
Black	/									
RDL = Reportable Dete	ection Lir	nit								

Maxxam ID				SO7073		
Sampling Da	te			2017/11/27		
COC Numbe	r			540796-12-01		
		UNITS	MAC	WS29-OS	RDL	QC Batch
Total Metals	by ICPMS					
Total Lead (P	b)	ug/L	10	8.73	0.20	8848944
No Fill	No Exceedance	9				
Grey	Exceeds 1 crite	ria polic	xy/leve	I		
Black	Exceeds both c	riteria/l	evels			
RDL = Report	table Detection L	imit				



Maxxam Job #: B7A6034 Report Date: 2017/12/05

TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.7°C
Package 2	10.3°C

Samples in one of the two coolers received were over temperature (past 10 degree average).

Samples received with incomplete Chain of Custody. Sampling times not provided.

All Chain of Custodies except 540796-06-01 were received with no relinquished date, time or signature.

MAC: The guidelines that have been included in this report have been taken from the Canadian Drinking Water Quality Summary Table, February 2017.

Criteria A = Maximum Acceptable Concentration (MAC) / Criteria B = Aesthetic Objectives (AO) / Criteria C = Operational Guidance Values (OG) It is recommended to consult these guidelines when interpreting your data since there are non-numerical guidelines that are not included on this report.

Turbidity Guidelines:

1. Chemically assisted filtration: less than or equal to 0.3 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 1.0 NTU at any time.

2. Slow sand / diatomaceous earth filtration: less than or equal to 1.0 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 3.0 NTU at any time.

3. Membrane filtration: less than or equal to 0.1 NTU in 99% of the measurements made or at least 99% of the time each calendar month. Shall not exceed 0.3 NTU at any time.

Results relate only to the items tested.



Maxxam Job #: B7A6034

Report Date: 2017/12/05

QUALITY ASSURANCE REPORT

TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

			Matrix	Spike	Spiked	Blank	Method E	Blank	RPI	D
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8848333	Total Lead (Pb)	2017/12/04	100	80 - 120	99	80 - 120	<0.20	ug/L	2.0	20
8848362	Total Lead (Pb)	2017/12/02	93	80 - 120	98	80 - 120	<0.20	ug/L	0.22	20
8848411	Total Lead (Pb)	2017/12/02	98	80 - 120	100	80 - 120	<0.20	ug/L	0.76	20
8848944	Total Lead (Pb)	2017/12/04	NC	80 - 120	98	80 - 120	<0.20	ug/L	3.2	20
8850025	Total Lead (Pb)	2017/12/04	99	80 - 120	98	80 - 120	<0.20	ug/L	1.6	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)



Success Through Science®

Maxxam Job #: B7A6034 Report Date: 2017/12/05 TETRA TECH CANADA INC. Client Project #: ENW.VENW03140-01 Sampler Initials: BB

VALIDATION SIGNATURE PAGE

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

prely Æ

Andy Lu, Ph.D., P.Chem., 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.

•2.3 ·		INVOICE TO:				the part of the second	00-563-6 Informat	1000 million (1995)					Project Info	rmation				-	Page
mpany Name	#1433 TETRA	TECH CANADA INC.		Company Nam	NU .			0.115		1.2	Quotation #	-	B60578				HRANK K	P97,815,8111	ottle Order #
A STREET LANDINGS	Shawneen Wall			Contact Name	Shawnee	n Walker			1.1		P.O.#								HINNING
wiego .	#1 - 4376 BOB/	CONTRACTOR AND A CONTRACTOR A		Address							Project #		ENW.VEN	W03140-01		B7	A6034 COC		540796
	NANAIMO BC \				-						Project Name								oject Manage
	250) 756-2256	Fax prest		Phone				_ Fax			Site #					1			Letitia Prefontair
nail <u>s</u>	Shawneen.vval	ker@tetratech.com; EBA.Labd	ata@tetra	Email	Shawnee	n.Walker	Detrat	ech.com	EBA Labdat	a@tetrat	Sampled By		₿ ₿		_		C#540795-06-01		Leoner recently
Regulatory Criter	iac			Special	Instructions					ANALYSIS F	EQUESTED (PL	LEASE B	BE SPECIFIC)	_			Turnaround T	ime (TAT) Requir	red
CSR			-														Please provide adva	ince notice for rush	projects
-																Regular (S	Standard) TAT:		
CCME																1111000000	plied if Rush TAT is not speci	Sector Sector	/
BC Water C	Juality						N)									10.10103150)	TAT = 5-7 Working days for m		•
Other			and the	2010/06/20			5				1 1						te. Standard TAT for certain to fact your Project Manager for		ind Dioxins/Furans i
_ Uner _				読作の			¿ pa				1 1					Job Spec	ific Rush TAT (if applies to	entire submission	ນ
100							-iter									1 DAY	2 Day 3 Day	Date Required	
							eld	6								1.02800 F	Infirmation Number:		
SAMPL	LES MUST BE KEP	T COOL (< 10°C) FROM TIME OF SA	MPLING UNT	L DELIVERY TO	MAXXAM		il si	ea			1 1					Hush Con	semation Number:	(call).	ab for #)
Sample Ba	arcode Label	Sample (Location) Identification	Date	Sampled	Time Sampled	Matrix	Meta	5	_							W of Bottles		Comments	
	_	WS01-05	27	Nou-17		Wak	•	V											
		W502-05		1		1		V											
		W503-05						V											
		W504-05						V								1			
		W505-04	3					V											
		W506-05						V											
		W507-04					-	V											
		W508-0						V											
		W509-0				11		V							6				
		W540-0		/		4		V		-				-			1	-	
· RELINQUIS	SHED BY: (Signature	(Print) Dat	e: (YY/MM/DD	Time	1	RECI	EIVED BY	r: (Signature	(Print)	1	Date: (YY/MM/	100	Time	# jars used and		<u> </u>	Lab Use	Only	
	R.A.	in 1	2/11/2	2 7:00	mand	leraj Ko	u lino	ua MAN	MERAT KALK	CHANA	2017/11/2		HOT M	not submitted	Time Sen	18m	persture (°C) on Receipt		al intact on Cooler?
													8:55			0	9,8 (ICE PRESENT)	N/A TYP	No

10, 10, 11 (ICE N/A)

		INVOICE TO:				Report Inf	formatio	on				0.0	Project la	nformation						11	Page 2
pany Name	#1433 TETRA	TECH CANADA INC.		Company /	lame				- 15.7	411 41	Quotation #		B60578	-	-					Bottl	e Order #
act Name	Shawneen Walk			Contact Na	me Shawneer	Walker			100	1000	P.O.#								17/10/00 11/1	1000	
55	#1 - 4376 BOBA	and the second se		Address				100	1	and the second	Project #		ENW.VE	NW0314	40-01		B7A	6034_COC			40795
	NANAIMO BC \ (250) 756-2256		EC 2000	4	2	-	_		-		Project Name	6		1010		_				Projec	et Mana
•		x Fax (250) 7 ker@tetratech.com; EBA L		Phone Fa Email	Shawnoor	Malkar®t	atrata	Fax:	EBALat	data@tetrat	Site #			BB						Letitia	Prefont
n Inten Ori		ter Brenateen tern, Ebrit	abdata@tot	Litter	ial Instructions	. waikei @i	1 1	ch,con	I, COA.Lat	And the owner of the	Sampled By EQUESTED (DIFACE	and the local division of the local division		_			C#540796-07-0	Time (TAT) Rec	united a	
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BC Wate	r Quality						VIN				1 1						Please not	e: Standard TAT for certain	tests such as BO	D and Dioxint	s/Furan
Other							92(The second second	act your Project Manager M	1925-022-022		erene
							Filtered 7 (Y		Q		1 1						-	ific Rush TAT (if applies 1	-		
							EP	8	V							. 8	1 DAY	2 Day 3 Day	Date Requ	red:	
SAN	PLES MUST BE KEP	T COOL (< 10°C) FROM TIME O	SAMPLING U	NTIL DELIVERY	TO MAXXAM		E E	Lead	40		1 1						Rush Con	firmation Number.		ill lab for #)	
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mpany Name	#1433 TETR	Company Name									B60578									
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ail	(250) 756-2256 x Fax (250) 756-2686 x Shawneen.Walker@tetratech.com; EBA.Labdata@tetra			Phone Emeil	Fax						ite #			11	-	_		Letitia Prefontair		
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	(250) 756-2256		756-2686 x					-	Project Nam	0		10		1			Project Manag				
		ker@tetratech.com; EBA.		tra Email	Shawneen	.Walker@tetr		_Fax:Site # ch.com; EBA.Labdata@tetrat			-			C#540796-10-01		Letitia Prefontaine					
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Maxxam Analytics International Corporation o/a Maxxam Analytics

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