From:	Erica Janes
To:	Permits
Cc:	Heather Scott
Subject:	FW: Fort Providence Annual Report 2017-2018
Date:	October 4, 2018 2:00:13 PM
Attachments:	2017-18 WL Annual Report.pdf Hamlet of Fort Providence - 2017 SWDF Action Report - VERSION 2.pdf Fort Providence - SWDF Letter and O&M Plan.pdf

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Please post email with each of the three attachments to: MV2016L3-0001 – Ft Providence…

1. 2017-18 WL Annual Report: 5 Reports and Studies / Annual Reports – 2017-18 Annual Report – Oct4-18
2. Hamlet of Fort Providence - 2017 SWDF Action Report: 6 Management Plans / Assorted – SWDF Action Plan Version 2 – Oct4-18
3. Fort Providence – SWDF Letter and O&M Plan: 6 Management Plans / Muni Ops & Maintenance – SWDF O&M Plan Version 2 – Oct41-8

Thanks!
Erica

From: Juffermans, Logan <ljuffermans@dillon.ca>
Sent: Thursday, October 4, 2018 9:49 AM
To: Erica Janes <ejanes@mvlwb.com>
Cc: sao@fortprovidence.ca
Subject: Fort Providence Annual Report 2017-2018

Good morning Ms. Janes,

Thank you for your guidance on the submission of the Fort Providence Annual Report and associated Hamlet Licence documents. In discussion with our client the Hamlet of Fort Providence I would like to now submit the following:

- 2017-2018 Annual Water Licence Report
- Hamlet of Fort Providence - 2017 SWDF Capacity Assessment and Action Report - VERSION 2
- Fort Providence Updated SWDF O&M Plan with Support Letter

This is our final submission for the 2017-2018 Annual Report to the MVLWB, and at the Board's direction we are including the submission of our Capacity Assessment and Action Plan for the SWDF with updates as required by the board. Additionally, I have attached The updated SWDF O&M Plan with comments noting deficiencies and actions being taken to rectify these.

We understand that an updated WTP and Spill Contingency O&M Plan were requested by the Board and also due at this time. We are working with our client to address these requirements. If you can confirm that this is all that remains to be completed at this time, we will endeavour to provide these documents to the MVLWB as soon as possible.

Thank you,

Logan Juffermans

Logan Juffermans
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Hamlet of Fort Providence 2017/2018 Annual Water Licence MV2016L3-0001 Report

Annual Water Licence Report

Hamlet of Fort Providence

17-5876

Crystal Sabel - Project Manager

Prepared by

Dillon Consulting Limited

Report Contents

The following table identifies the content required for the Annual Water Licence Report, and the section in which it can be found:

Report Requirement	Section	Content Discussed
Fresh Water Usage	Section 2.1	• Approximate volume of water used • Table with monthly and annual water quantities from all sources • Reasons for increase/decrease in water withdrawn • General info (modifications, relevant reports, etc.)
Waste Generated	Section 2.2	• Total quantity and table with monthly and annual quantities of sewage deposited • Reasons for increase/decrease • Estimate of solid waste quantity and expected life span of solid waste disposal facility • Comments on other waste deposited at the Hamlet of Fort Providence's Waste Disposal Facilities (type, source, where is it deposited, monthly/annual volumes)
Waste Removal	Section 2.2.1 and 2.2.2	• Discussion of waste removed from waste disposal facilities (recyclables, tires, household hazardous waste, scrap metal, etc.)
Surveillance Network Program	Section 2.4	• Tables to summarize station locations and data from the SNP
Desludging	Section 2.2.1	• Discussion of sludge-management activities
Construction Activities	Section 2.3.3	• Discussion of construction activities in accordance with Part F of the Licence
Modifications and Maintenance	Section 2.3.1, 2.3.2, 2.3.3	• Summary of future modification activities and major maintenance work conducted on the water supply and waste disposal facilities
Unauthorized Discharges	Section 2.5	• Discussion of no unauthorized discharges
Spill Training and Communication Exercises	Section 2.6	• Discussion of spill training/communication exercises planned
Closure and Reclamation Activities	Section 2.7 and 2.11	• Summarize any current or planned closure and reclamation work completed during the year, or anticipated for the next year
Studies Requested by the Board	Section 2.8	• Discussion of studies specifically requested by the board and any anticipated studies
Updates to Plans	Section 2.12 and 2.13	• Summarize any updates or revisions to the Spill Contingency Plan, Management Plans and Operations and Maintenance Plans in a table
Other Details	Section 2.9	• Discussion of any additional relevant information

Table of Contents

Tables

Appendices

1.0 INTRODUCTION

This report fulfills the requirements of Part B, Section 4 of the Water Licence for the Hamlet of Fort Providence, MV2016L3-0001. It covers the activities from April 1, 2017 to March 31, 2018. Information is tracked on a fiscal year basis as has been the practice since 2006/2007 and as specified in the Water Licence.

Water Licence MV2016L3-0001 came into effect July 7, 2016, replacing the expired licence MV2006L3-0002. The current licence is valid until July 6, 2026 and has been used as a reference for reporting requirements.

2.0 REQUIREMENTS OF ANNUAL REPORT

2.1 Quantity of Fresh Water

During the 2017/2018 fiscal year, a total of 28,263 m^3 (28,263,320.7 L) of domestic water was delivered to residents and businesses in Fort Providence. This is a 1.5% decrease in trucked water usage from the 2016/2017 fiscal year. This nominal decrease is not due to any significant changes in the community population or operations. The Hamlet remains within the maximum water usage limit of 60,000 m^3. **Appendix A** shows the monthly break down of water use in the community.

2.2 Quantity of Waste Generated

A total of 24,557 m^3 (6,487,400 US gallons) of sewage was deposited into the Fort Providence sewage lagoon during the 2017/2018 fiscal year (see **Appendix B**). This volume is for sewage services provided through the Hamlet's service contract with Digaa Enterprises Ltd. to truck sewage to the sewage lagoon, and is less than a 1% decrease from the 2016/2017 fiscal year. This nominal decrease is similar to the reductions in water use over the same period.

The Hamlet does not currently track the volume of waste being deposited at the Solid Waste Disposal Facility (SWDF). To estimate a value, an average residential volume of 0.015 m^3 per person per day (m^3 /c/d) was assumed in accordance with the Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories (Kent et al, 2003). A population growth rate of 0.5% was used in accordance with MACA recommendations as the NWT Bureau of Statistics projects a declining population. The total estimated solid waste generation for a 30 year period was then calculated to be 88,500 – 67,000 m^3, or the equivalent of 2,500 – 3,000 m^3 per year. Regular compaction of wastes has the potential to reduce waste volumes by 1/3 and it is assumed that regular covering of waste increases the volume by a factor of 1.1 (i.e. 10 m^3 of cover per 100 m^3 of waste). The estimated volume of 25,000 – 32,500 m^3, or the equivalent of 800 – 1,000 m^3 per year, was used to estimate the remaining life of the SWDF. The lifespan was estimated at 8.5- 12 years in 2017.

Aside from residential waste, the SWDF did not accept waste from additional sources. Reportedly, sewage and solid waste was not accepted from commercial or industrial operators from outside of the Hamlets municipal boundaries during 2017/2018.

2.2.1 Quantities of Wastewater Removed from Lagoons

Decanting operations were initiated on August 8th, of 2017/2018, with operations taking approximately one month. Approval for this activity was provided through ENR. Each year the volume of fluid in the lagoons nears the required minimum of 1 m of freeboard. Decanting was once again planned for and undertaken in June of fiscal year 2018/2019 and will be reported within the 2018-2019 Annual Report. Desludging did not occur in 2017/2018.

2.2.2 Quantities of Waste Removed from Solid Waste Disposal Facility

The Hamlet commenced the use of the area method for the SWDF in 2012, as recommended. In May 2017 the SWDF areas being used for domestic waste disposal were 1/2-2/3 full. The maximum height of the berm and waste was observed to be within the 2 m maximum as recommended by Kent, Marshall, & Hawke (2003). To maximize the available space for solid waste, It was reported that compaction occurs as needed; approximately every two years. Scrap vehicles had been hauled off site to an appropriate scrap vehicle recycling facility as recommended in the 2012 evaluation report, increasing available space for domestic waste. Hazardous waste is removed from the site as needed through KBL Environmental. Construction waste remains adjacent to the SWDF area.

2.3 Summary of Modifications

2.3.1 Water Treatment Facility

Regular maintenance and operations of the water treatment plant were carried out by Hamlet personnel during the 2017/2018 fiscal year.

For a number of years the Hamlet has experienced operational problems with the twin intake system installed in 2004, intended to replace the original intake constructed in 1976. The 2004 system has reportedly been abandoned, and the Hamlet is currently relying exclusively on the old gravity fed wet well system for intake service. A Condition Assessment Report (ARKTIS 2014) and subsequent Options Analysis Report (ARKTIS 2015) outline alternatives for Hamlet consideration. The preferred alternative has not yet been determined. The Hamlet is currently working with consultants to complete studies required to confirm the preferred intake design options. In the next 5 years the Hamlet anticipates the following work will be completed: River Engineering Analysis, Geotechnical Investigation, Construction Risk Analysis, Construction Feasibility Report, Design and Tender document preparation.

No inspection of the Water Treatment Plant was completed by regulators this fiscal year. The crack in the floor of the Generator Room noted in previous inspection reports remains, and although the Hamlet has attempted to repair the crack they have had problems finding a suitable product.

2.3.2 Sewage Lagoon

Routine maintenance of the sewage lagoon was provided by Hamlet personnel during the fiscal year, including ongoing monitoring and sampling of discharge, routine maintenance of the monarch pump and preparation for retention over the winter months. This latter task involves the pump-out of the lagoon system, to create enough storage space for the winter sewage volume. No modifications to the sewage lagoon were made in the reporting period. The lagoon was last de-sludged in September 2012.

2.3.3 Solid Waste Facility

The Hamlet provides waste pick-up, delivery and routine maintenance of the Fort Providence Landfill site. This includes regular visits to the area, collection of wind-blown debris from the fencing surrounding the domestic waste, general clean-up including pushing back domestic refuse and backfilling (by a local contractor) as required.

A review of the SWDF occurs every five years to assess opportunities for continual improvement, and to address changing needs and priorities of the community (ECCC, 2017). Planning for an expanded or relocated site should begin from 3 to 5 years before the active landfill reaches capacity. The action plan presented in **Table 1** was developed assuming planning for a new or expanded SWDF will need to commence, at the earliest, by 2020 based on current lifespan projections.

Table 1: SWDF Action Plan

Action Item	Description	Recommended Schedule
Improve waste management practices	Compaction, monitoring, and promotion	Commence in January 2018
Complete existing site improvements	Constructing new hazardous waste area	April to July 2018
Include new SWDF project in capital plan	Identify total budget, cash flow, and funding sources	March 2020
Confirm site	Use decision matrix and consider public involvement	September 2022
RFP for engineering design services	Prepare and issue RFP, evaluate proposals and award contract	November 2022
Pre-design work	Confirm waste volumes, operational practices	April to August 2023

Site Investigations	Surveys, soil conditions, drainage investigations (may be part of Engineering Design Services)	April to August 2023
Community engagement	Introduce project, review regulatory requirements and waste management practices	September 2023
Design	Site layout, components to be constructed (fencing, liners, sedimentation ponds, signs, etc.)	August to November 2023
Regulatory submissions	Submit construction documents to MVLWB	November 2023
Bidding	Advertise, issue tender documents, evaluate bids and award contract	February to April 2024
Construction	Includes contractor start up and construction work commencing following approvals by MVLWB	March to September 2024
Post construction	Submit as-built documents to MVLWB, and commence operations at new site	October 2024
Close existing site	Develop and implement C&R Plan as required by MVLWB	December 2024

In 2017 the capacity of the waste disposal site was reassessed since its original assessment in 2012. Based on the intention of installing additional berms to increase the disposal area, the lifespan of the SWDF increased significantly. The estimated remaining lifespan of the Fort Providence SWDF is 8.5-12 years; therefore, it is projected that the site will reach capacity between 2025 and 2029. This indicates that the immediate need to expand the current site or relocate the landfill to a new site is not as pressing as stated in the 2012 report.

Since the current projection shows that the existing site has the capacity to remain in operation for 8.5-12 years, the Hamlet will adopt a program of continuous improvement guided by the Solid Waste Management for Northern and Remote Communities Planning and Technical Guidance Document (ECCC, 2017). Both waste management practices and site improvements will better protect public health and the environment until a new site is available. Further expansion will still be considered but is not predicted to be required until 2025.

2.4 SNP Data

See **Appendix C** for details of the SNP station locations. Sampling at station 1412-1 consists of documenting monthly amounts of water withdrawn for municipal purposes. A raw water sample was collected at 1412-1 on June 27th, 2017.

Samples were collected from SNP Station 1412-2 on June 27th, and November 28th, 2017 in accordance with Part D, Item 8 of the Water Licence. Further samples were taken at 2016-1 and 2016-3 on June 27th. **Appendix D** summarizes analytical results of samples taken from the lagoons

during the open water season in 2017/2018. Sample results are found attached to this document in **Appendix E**.

Concentrations have been compared to the maximum allowable concentrations for effluent from the waste disposal facilities at the surveillance network program station 1412-2 as laid out in Part D, condition 7 of the Water Licence.

Sampling at station 2016-2 was not conducted in the 2017/2018 fiscal year as exact locations have yet to be determined. As part of the Solid Waste Disposal Facilities Operations and Maintenance Plan, the Hamlet will work with the Government of the Northwest Territories Inspectors to determine suitable locations for these SNP locations as per Annex A, Part B, condition 2. The Government of the Northwest Territories planned to inspect in June of the 2018/2019 fiscal year.

2.5 Unauthorized Discharges

No unauthorized discharges were reported for the Hamlet facilities in the Hazardous Materials Spill Database for the 2017/2018 fiscal year.

2.6 Spill Training and Communication Exercises

Spill training and communication exercises were not carried out with Hamlet personnel in the 2017/2018 fiscal year due to staffing changes. Spill kits and training are to be provided to the operator during 2018/2019.

2.7 Summary of Closure and Reclamation Work and Outline of Planned Work

No closure and reclamation work was carried out in 2017/2018. Part I of the Water Licence stipulates that the Hamlet should engage in progressive reclamation at the sewage and solid waste facilities whenever practical. As indicated in the Water Licence, Part I, Item 2, the Hamlet will submit to the Board for approval of an Abandonment & Restoration plan at least six months prior to abandoning any sewage or solid waste facilities.

2.8 Summary of Studies Requested by Water Board

No studies were requested by the Water Board. In addition, details related to water use, operating procedures, modifications, and maintenance work were not requested by the MVLWB prior to November 1 of the reporting year.

2.9 Other Details Requested by Water Board

Plans to be prepared/revised within one year of issuance (by July 7, 2017) as conditions of MV2016L3-0001 are listed in **Table 2** below. Details related to water use, operating procedures, modifications, and maintenance work were not requested by the MVLWB prior to November 1 of the reporting year.

Table 2: Details Requested by the Land and Water Board

Study or Plan	Applicable Water Licence Section
Solid Waste Disposal Facilities Operation and Maintenance Plan	Part E, Item 2 Schedule 2, Item 1
Sewage Disposal Facilities Operation and Maintenance Plan (including sludge management plan)	Part E, Item 3 Schedule 2, Item 2
Spill Contingency Plan (revision)	Part H, Item 2
Water Treatment Plan Operation and Maintenance Plan	Part E, Item 4 Schedule 2, Item 3
Solid Waste Disposal Facilities Action Plan	Part D, Item 22

2.10 Revisions to Contingency Plan

No revisions to the Spill Contingency Plan were made during the 2017/2018 fiscal year.

2.11 Revisions to A&R Plan

The Hamlet does not currently have a Closure and Reclamation Plan (also known as an Abandonment and Restoration or A&R Plan).

2.12 Update/Revisions to O&M Plan

No revisions to the Sewage or Solid Waste Disposal Facilities Operation and Maintenance Plans were made during the 2017/2018 fiscal year.

2.13 Site Inspections

In June 2018, the Government of the Northwest Territories planned a site visit to the Hamlet of Fort Providence. Records of the inspection were not available at the time this report was prepared. It is unknown if concerns, non-conformances, or deficiencies were identified during the inspection and if potential concerns, non-conformances, or deficiencies were addressed.

3.0 SUMMARY

The Hamlet of Fort Providence was issued a Water Licence, MV2016L3-0001 on July 7, 2016. The current Water Licence is valid for eight years, to July 6, 2026.

No major changes were made to the water treatment facility in the 2017/2018 reporting period. Studies are ongoing to determine alternatives for the water intake.

No major changes were made to the sewage lagoon in the 2017/2018 reporting period. SNP samples taken in November at Station 1412-2 indicated the various levels of inorganics, metals, organics, etc. A new SNP station was established in MW2016L3-0001 to monitor the quality of effluent discharged from the sewage lagoon and to help determine the effectiveness of the wetland treatment.

No major changes were made to the solid waste disposal facility in the 2017/2018 reporting period aside from the removal of scrap vehicles and hazardous waste. Regular SNP sampling was conducted in the 2017/2018 fiscal year.

Appendix A

2017/2018 Fort Providence Water Data

Month	Residential T1	Commercial T2	Government T3	Bulk Water Z1	Hamlet	Total Water (L):
Apr.	1,270,458.6	173,087.0	677,179.2	8,900.0	12,043.7	2,141,668.5
May	1,503,093.0	247,966.4	839,316.4	3,300.0	12,099.8	2,605,775.6
Jun.	1,402.227.0	321,018.4	802,230.4	3,000.0	28,548.9	2,557,024.7
Jul.	1,275,763.5	351,816.8	764,244.5	1,500.0	14,182.6	2,407,507.4
Aug.	1,414,238.0	380,529.6	783,907.9	25,000.0	5,145.2	2,608,820.7
Sep.	1,217,738.0	272,199.5	651,983.8	4,200.0	8,901.9	2,155,023.2
Oct.	1,272,583.9	320,273.4	726,956.1	3,500.0	12,941.5	2,336,254.9
Nov.	1,252,377.5	203,171.1	715,665.7	6,100.0	47,445.7	2,224,760.0
Dec.	1,239,818.1	162,189.5	695,371.4	2,400.0	27,340.8	2,127,119.8
Jan.	1,357,792.8	206,018.2	775,065.5	1,700.0	21,467.8	2,362,044.3
Feb.	1,357,792.8	206,018.2	775,065.5	3,000.0	28,555.3	2,370,431.8
Mar.	1,357,792.8	206,018.2	775,065.5	3,000.0	25,013.3	2,366,889.8
Total:	**15,921,676.0**	**3,050,306.3**	**8,982,051.9**	**65,600.0**	**243,686.5**	**28,263,320.7**

Appendix B

2017/2018 Fort Providence Sewage Disposal Data

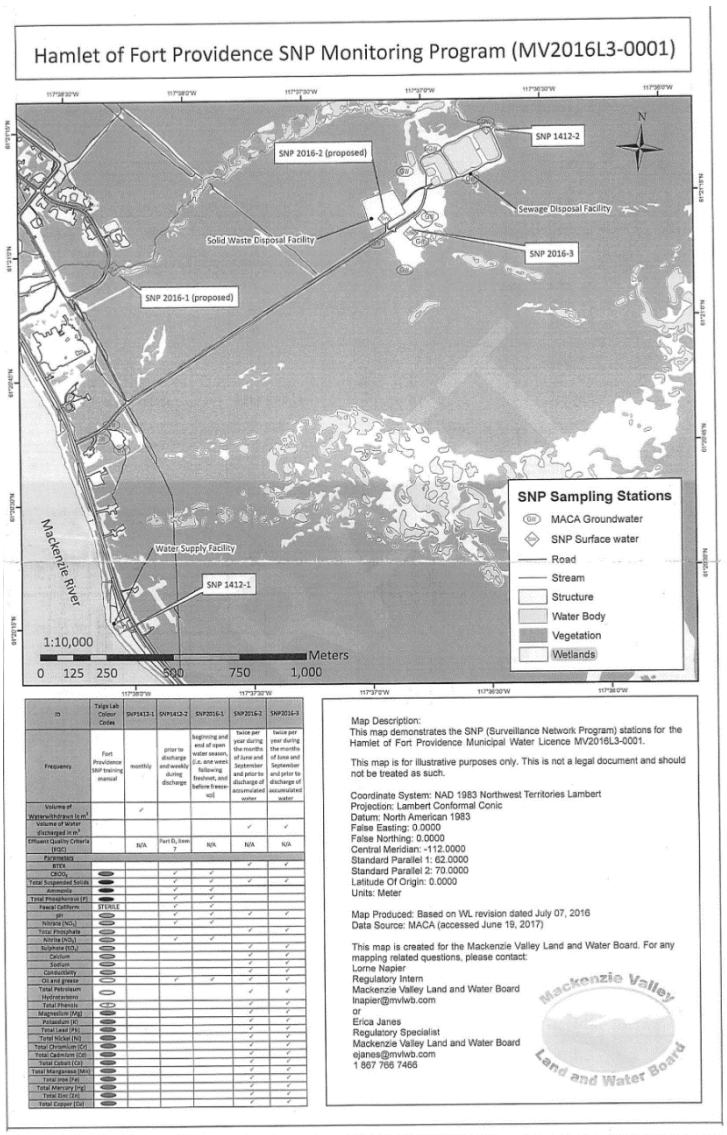
2017/2018

Month	Volume (US Gallon)	Volume (m^3)
Apr.	514,100	1,946
May	722,600	2,735
Jun.	607,700	2,300
Jul.	564,800	2,138
Aug.	590,000	2,233
Sep.	479,800	1,816
Oct.	520,600	1,971
Nov.	495,600	1,876
Dec.	479,400	1,815
Jan.	533,300	2,019
Feb.	463,400	1,754
Mar.	516,100	1,954
Total:	**6,487,400**	**24,557**

Appendix C

2017/2018 SNP Station Locations

Station Number	Geographic Coordinates	Location Description
1412-1	61.33921° N 117.63425° W	Raw water intake line at the Water Supply Facilities
1412-2	61.35571° N 117.6118° W	Sewage effluent from the Sewage Disposal Facilities
1412-3	**Discontinued**	
2016-1	Exact location(s) to be determined with the Inspector	Sewage effluent flowing through the ponded area of the wetland
2016-2	Exact location(s) to be determined with the Inspector	Ponded water within or adjacent to the domestic waste cells at the Solid Waste Disposal Facilities in June and September
2016-3	Exact location(s) to be determined with the Inspector	Ponded water within or adjacent to the construction waste cell at the Solid Waste Disposal Facilities in June and September



Appendix D

2017/2018 SNP Sample Results

Notes: NS – Not Specified
NT – Not Tested

Date				27-Jun-17	27-Jun-17	27-Jun-17	27-Jun-17	28-Nov-17	28-Nov-17
Sample Location				1412-1	1412-2	2016-3	2016-1	1412-2	1412-2
Test Parameter	Units	Detection Limits	Water Licence Requirement	Raw Water Sample 001	Treated Sewage Sample 002	Ponded Water Sample 003	Treated Sewage Effluent Sample 004	Treated H_2O Sample 001	Raw Water Sample 002
Inorganics-Nutrients									
Organic Carbon, Dissolved	mg/L	0.5	NS	NT	NT	NT	NT	2.7	4.5
Organic Carbon, Total	mg/L	0.5	NS	NT	NT	NT	NT	3.6	5.3
Inorganics- Physicals									
Alkalinity, Total (as CaCO3)	mg/L	0.4	NS	80.3	188	NT	87.0	63.3	86.3
Colour, Apparent	CU	5	NS	89	225	NT		10	39
pH	pH Units		NS	8.20	10.2	7.60	6.92	7.27	7.91
Solids, Total Dissolved	mg/L	10	NS	457	473	NT		141	145
Solids, Total Suspended	mg/L	3	NS	22	22	7	42	<3	3
Turbidity	NTU	0.05	NS	12.2	20.6	NT	3.21	0.61	3.72
Major Ions									
Chloride	mg/L	0.7	NS	7.9	97.9	NT	19.4	9.5	9.1
Fluoride	mg/L	0.1	NS	<0.1	<0.1	NT	<0.1	0.1	<0.1
Hardness	mg/L	0.7	NS	97.5	159	NT	275	108	111
Nitrate as Nitrogen	mg/L	0.01	NS	<0.01	0.40	NT	0.18	0.19	0.18
Sodium	mg/L	0.1	NS	8.1	81.5	51.0	20.4	9.7	9.2
Sulphate	mg/L	1	NS	25	52	NT	180	49	28
Subcontracted Organics									
Cyanide, Weak Acid Dissociable	mg/L	0.001	NS	NT	NT	NT	NT	<0.001	<0.001
Trace Metals, Total									
Aluminum	µg/L	0.6	NS	NT	NT	5.9	NT	62.3	468
Arsenic	µg/L	0.2	NS	NT	NT	1.6	NT	<0.2	0.3
Barium	µg/L	0.1	NS	NT	NT	109	NT	45.8	50.9
Cadmium	µg/L	0.04	NS	<0.1	<0.1	<0.01	<0.1	<0.04	<0.1
Chromium	µg/L	0.1	NS	1.7	0.3	0.1	0.3	<0.1	0.2
Copper	µg/L	0.2	NS	2.4	0.6	<0.2	<0.2	9.5	1.2
Iron	µg/L	5	NS	926	103	165	219	122	101
Lead	µg/L	0.1	NS	0.4	<0.1	<0.1	<0.1	0.1	<0.1
Manganese	µg/L	0.1	NS	23.1	8.6	125	137	2.1	2.5
Mercury	µg/L	0.01	NS	NT	NT	NT	NT	<0.01	<0.01
Selenium	µg/L	0.3	NS	NT	NT	<0.5	NT	<0.3	<0.5
Uranium	µg/L	0.1	NS	NT	NT	0.7	NT	<0.1	0.5
Zinc	µg/L	0.4/5	NS	8.8	<5.0	<5.0	<5.0	10.4	<5

Appendix E

2017/2018 Taiga Environmental Laboratory SNP Results

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 170430

- FINAL REPORT -

Prepared For: Fort Smith District Office

Address: Box 900
Fort Smith,NT
X0E 0P0

Attn: **Wendy Bidwell** **Facsimile: (867) 872-4250**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Wednesday, July 26, 2017
Print Date: ***Wednesday, July 26, 2017***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-1 **Taiga Sample ID:** 001

Client Project: Hamlet of Fort Providence
Sample Type: Raw Water
Received Date: 28-Jun-17
Sampling Date: 27-Jun-17
Sampling Time: 11:15
Location: WTP and Sewage Lagoon Outflow
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	10-Jul-17	SM4500-NH3:G	
Phosphorous, Total	0.018	0.002	mg/L	06-Jul-17	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	80.3	0.4	mg/L	28-Jun-17	SM2320:B	
Colour, Apparent	89	5	CU	28-Jun-17	SM2120:B	
Conductivity, Specific (@25C)	232	0.4	µS/cm	28-Jun-17	SM2510:B	
pH	8.20		pH units	28-Jun-17	SM4500-H:B	
Solids, Total Dissolved	457	10	mg/L	30-Jun-17	SM2540:C	
Solids, Total Suspended	22	3	mg/L	30-Jun-17	SM2540:D	
Turbidity	12.2	0.05	NTU	28-Jun-17	SM2130:B	
Major Ions						
Calcium	28.4	0.1	mg/L	29-Jun-17	SM4110:B	
Chloride	7.9	0.7	mg/L	29-Jun-17	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	29-Jun-17	SM4110:B	

ReportDate: Wednesday, July 26, 2017
Print Date: *Wednesday, July 26, 2017*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-1 **Taiga Sample ID:** 001

Hardness	97.5	0.7	mg/L	29-Jun-17	SM4110:B
Magnesium	6.5	0.1	mg/L	29-Jun-17	SM4110:B
Nitrate as Nitrogen	0.14	0.01	mg/L	29-Jun-17	SM4110:B
Nitrate+Nitrite as Nitrogen	0.14	0.01	mg/L	29-Jun-17	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	29-Jun-17	SM4110:B
Potassium	1.0	0.1	mg/L	29-Jun-17	SM4110:B
Sodium	8.1	0.1	mg/L	29-Jun-17	SM4110:B
Sulphate	25	1	mg/L	29-Jun-17	SM4110:B
Trace Metals, Total					
Cadmium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Chromium	1.7	0.1	µg/L	05-Jul-17	EPA200.8
Cobalt	0.4	0.1	µg/L	05-Jul-17	EPA200.8
Copper	2.4	0.2	µg/L	05-Jul-17	EPA200.8
Iron	926	5	µg/L	05-Jul-17	EPA200.8
Lead	0.4	0.1	µg/L	05-Jul-17	EPA200.8
Manganese	23.1	0.1	µg/L	05-Jul-17	EPA200.8
Nickel	2.1	0.1	µg/L	05-Jul-17	EPA200.8
Zinc	8.8	5	µg/L	05-Jul-17	EPA200.8

ReportDate: Wednesday, July 26, 2017
Print Date: *Wednesday, July 26, 2017*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 002

Client Project: Hamlet of Fort Providence
Sample Type: Treated Sewage
Received Date: 28-Jun-17
Sampling Date: 27-Jun-17
Sampling Time: 11:44
Location: WTP and Sewage Lagoon Outflow
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	1.55	0.005	mg/L	10-Jul-17	SM4500-NH3:G	
Biochemical Oxygen Demand	6	2	mg/L	29-Jun-17	SM5210:B	
Phosphorous, Total	1.28	0.002	mg/L	06-Jul-17	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	188	0.4	mg/L	28-Jun-17	SM2320:B	
Colour, Apparent	225	5	CU	28-Jun-17	SM2120:B	
Conductivity, Specific (@25C)	753	0.4	µS/cm	28-Jun-17	SM2510:B	
pH	10.2		pH units	28-Jun-17	SM4500-H:B	
Solids, Total Dissolved	473	10	mg/L	30-Jun-17	SM2540:C	
Solids, Total Suspended	22	3	mg/L	30-Jun-17	SM2540:D	
Turbidity	20.6	0.05	NTU	28-Jun-17	SM2130:B	
Major Ions						
Calcium	37.6	0.1	mg/L	29-Jun-17	SM4110:B	
Chloride	97.9	0.7	mg/L	29-Jun-17	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	29-Jun-17	SM4110:B	
Hardness	159	0.7	mg/L	29-Jun-17	SM4110:B	

ReportDate: Wednesday, July 26, 2017
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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 **Taiga Sample ID:** 002

Magnesium	15.9	0.1	mg/L	29-Jun-17	SM4110:B
Nitrate as Nitrogen	0.40	0.01	mg/L	29-Jun-17	SM4110:B
Nitrate+Nitrite as Nitrogen	2.74	0.01	mg/L	29-Jun-17	SM4110:B
Nitrite as Nitrogen	2.34	0.01	mg/L	29-Jun-17	SM4110:B
Potassium	27.6	0.1	mg/L	29-Jun-17	SM4110:B
Sodium	81.5	0.1	mg/L	29-Jun-17	SM4110:B
Sulphate	52	1	mg/L	29-Jun-17	SM4110:B
Microbiology					
Coliforms, Fecal	< 10	10	CFU/100mL	28-Jun-17	SM9222:D
Trace Metals, Total					
Cadmium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Chromium	0.3	0.1	µg/L	05-Jul-17	EPA200.8
Cobalt	0.4	0.1	µg/L	05-Jul-17	EPA200.8
Copper	0.6	0.2	µg/L	05-Jul-17	EPA200.8
Iron	103	5	µg/L	05-Jul-17	EPA200.8
Lead	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Manganese	8.6	0.1	µg/L	05-Jul-17	EPA200.8
Nickel	3.1	0.1	µg/L	05-Jul-17	EPA200.8
Zinc	< 5.0	5	µg/L	05-Jul-17	EPA200.8

ReportDate: Wednesday, July 26, 2017
Print Date: *Wednesday, July 26, 2017*

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3 **Taiga Sample ID:** 003

Client Project: Hamlet of Fort Providence
Sample Type: Ponded Water
Received Date: 28-Jun-17
Sampling Date: 27-Jun-17
Sampling Time: 12:50
Location: Construction Waste Site
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	2	2	mg/L	29-Jun-17	SM5210:B	
Phosphorous, Total	0.053	0.002	mg/L	06-Jul-17	SM4500-P:D	
Inorganics - Physicals						
Conductivity, Specific (@25C)	908	0.4	µS/cm	28-Jun-17	SM2510:B	
pH	7.60		pH units	28-Jun-17	SM4500-H:B	
Solids, Total Suspended	7	3	mg/L	30-Jun-17	SM2540:D	
Major Ions						
Calcium	87.0	0.1	mg/L	29-Jun-17	SM4110:B	
Nitrate+Nitrite as Nitrogen	2.76	0.01	mg/L	29-Jun-17	SM4110:B	
Potassium	20.6	0.1	mg/L	29-Jun-17	SM4110:B	
Sodium	51.0	0.1	mg/L	29-Jun-17	SM4110:B	
Microbiology						
Coliforms, Fecal	12	1	CFU/100mL	28-Jun-17	SM9222:D	
Organics						
Benzene	< 0.002	0.002	mg/L	12-Jul-17	EPA8260B	
Ethylbenzene	< 0.002	0.002	mg/L	12-Jul-17	EPA8260B	

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3 **Taiga Sample ID:** 003

Hexane Extractable Material	< 2.0	2.0	mg/L	12-Jul-17	EPA1664A
Toluene	< 0.002	0.002	mg/L	12-Jul-17	EPA8260B
Xylenes	< 0.002	0.002	mg/L	12-Jul-17	EPA8260B
Subcontracted Organics					
Phenols, Total	< 0.0010	0.001	mg/L	17-Jul-17	AB ENV.06537
Trace Metals, Dissolved					
Aluminum	1.2	0.6	µg/L	06-Jul-17	EPA200.8
Antimony	0.2	0.1	µg/L	06-Jul-17	EPA200.8
Arsenic	1.5	0.2	µg/L	06-Jul-17	EPA200.8
Barium	115	0.1	µg/L	06-Jul-17	EPA200.8
Beryllium	< 0.1	0.1	µg/L	06-Jul-17	EPA200.8
Cadmium	< 0.04	0.04	µg/L	06-Jul-17	EPA200.8
Cesium	< 0.1	0.1	µg/L	06-Jul-17	EPA200.8
Chromium	0.1	0.1	µg/L	06-Jul-17	EPA200.8
Cobalt	0.1	0.1	µg/L	06-Jul-17	EPA200.8
Copper	< 0.2	0.2	µg/L	06-Jul-17	EPA200.8
Iron	106	5	µg/L	06-Jul-17	EPA200.8
Lead	< 0.1	0.1	µg/L	06-Jul-17	EPA200.8
Lithium	11.6	0.2	µg/L	06-Jul-17	EPA200.8
Manganese	89.7	0.1	µg/L	06-Jul-17	EPA200.8
Molybdenum	0.5	0.1	µg/L	06-Jul-17	EPA200.8
Nickel	1.1	0.1	µg/L	06-Jul-17	EPA200.8
Rubidium	3.1	0.1	µg/L	06-Jul-17	EPA200.8
Selenium	< 0.3	0.3	µg/L	06-Jul-17	EPA200.8
Silver	< 0.1	0.1	µg/L	06-Jul-17	EPA200.8

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3 **Taiga Sample ID:** 003

Strontium	419	0.1	µg/L	06-Jul-17	EPA200.8
Thallium	< 0.1	0.1	µg/L	06-Jul-17	EPA200.8
Titanium	0.2	0.1	µg/L	06-Jul-17	EPA200.8
Uranium	0.7	0.1	µg/L	06-Jul-17	EPA200.8
Vanadium	0.2	0.1	µg/L	06-Jul-17	EPA200.8
Zinc	< 0.4	0.4	µg/L	06-Jul-17	EPA200.8
Trace Metals, Total					
Aluminum	5.9	5	µg/L	05-Jul-17	EPA200.8
Antimony	0.2	0.1	µg/L	05-Jul-17	EPA200.8
Arsenic	1.6	0.2	µg/L	05-Jul-17	EPA200.8
Barium	109	0.1	µg/L	05-Jul-17	EPA200.8
Beryllium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Cadmium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Cesium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Chromium	0.1	0.1	µg/L	05-Jul-17	EPA200.8
Cobalt	0.1	0.1	µg/L	05-Jul-17	EPA200.8
Copper	< 0.2	0.2	µg/L	05-Jul-17	EPA200.8
Iron	165	5	µg/L	05-Jul-17	EPA200.8
Lead	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Lithium	10.6	0.2	µg/L	05-Jul-17	EPA200.8
Manganese	125	0.1	µg/L	05-Jul-17	EPA200.8
Molybdenum	0.6	0.1	µg/L	05-Jul-17	EPA200.8
Nickel	1.2	0.1	µg/L	05-Jul-17	EPA200.8
Rubidium	3.1	0.1	µg/L	05-Jul-17	EPA200.8
Selenium	< 0.5	0.5	µg/L	05-Jul-17	EPA200.8

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3 **Taiga Sample ID:** 003

Silver	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Strontium	405	0.1	µg/L	05-Jul-17	EPA200.8
Thallium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Titanium	0.3	0.1	µg/L	05-Jul-17	EPA200.8
Uranium	0.7	0.1	µg/L	05-Jul-17	EPA200.8
Vanadium	0.2	0.1	µg/L	05-Jul-17	EPA200.8
Zinc	< 5.0	5	µg/L	05-Jul-17	EPA200.8

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-1 **Taiga Sample ID:** 004

Client Project: Hamlet of Fort Providence
Sample Type: Treated Sewage Effluent
Received Date: 28-Jun-17
Sampling Date: 27-Jun-17
Sampling Time: 13:30
Location: 2016-1-Fort Providence
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.036	0.005	mg/L	10-Jul-17	SM4500-NH3:G	
Biochemical Oxygen Demand	5	2	mg/L	29-Jun-17	SM5210:B	
CBOD	5	2	mg/L	29-Jun-17	SM5210:B	
Phosphorous, Total	0.851	0.002	mg/L	06-Jul-17	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	87.0	0.4	mg/L	28-Jun-17	SM2320:B	
Conductivity, Specific (@25C)	612	0.4	µS/cm	28-Jun-17	SM2510:B	
pH	6.92		pH units	28-Jun-17	SM4500-H:B	
Solids, Total Suspended	42	3	mg/L	30-Jun-17	SM2540:D	
Turbidity	3.21	0.05	NTU	28-Jun-17	SM2130:B	
Major Ions						
Calcium	60.6	0.1	mg/L	29-Jun-17	SM4110:B	
Chloride	19.4	0.7	mg/L	29-Jun-17	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	29-Jun-17	SM4110:B	
Hardness	275	0.7	mg/L	29-Jun-17	SM4110:B	
Magnesium	30.2	0.1	mg/L	29-Jun-17	SM4110:B	

ReportDate: Wednesday, July 26, 2017
Print Date: ***Wednesday, July 26, 2017***

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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-1 **Taiga Sample ID:** 004

Nitrate as Nitrogen	0.18	0.01	mg/L	29-Jun-17	SM4110:B
Nitrate+Nitrite as Nitrogen	0.18	0.01	mg/L	29-Jun-17	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	29-Jun-17	SM4110:B
Potassium	14.3	0.1	mg/L	29-Jun-17	SM4110:B
Sodium	20.4	0.1	mg/L	29-Jun-17	SM4110:B
Sulphate	180	1	mg/L	29-Jun-17	SM4110:B
Microbiology					
Coliforms, Fecal	< 1	1	CFU/100mL	28-Jun-17	SM9222:D
Coliforms, Total	>2420	1.0	MPN/100ml	28-Jun-17	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	28-Jun-17	SM9223:B
Fecal streptococcus	13.4	1.0	MPN/100mL	28-Jun-17	SM9223:B
Organics					
Oil and Grease, visible	Non-visible			29-Jun-17	Visual Exam
Trace Metals, Total					
Cadmium	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Chromium	0.3	0.1	µg/L	05-Jul-17	EPA200.8
Cobalt	0.5	0.1	µg/L	05-Jul-17	EPA200.8
Copper	< 0.2	0.2	µg/L	05-Jul-17	EPA200.8
Iron	219	5	µg/L	05-Jul-17	EPA200.8
Lead	< 0.1	0.1	µg/L	05-Jul-17	EPA200.8
Manganese	137	0.1	µg/L	05-Jul-17	EPA200.8
Nickel	0.8	0.1	µg/L	05-Jul-17	EPA200.8
Zinc	< 5.0	5	µg/L	05-Jul-17	EPA200.8

ReportDate: Wednesday, July 26, 2017
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Taiga Batch No.: 170430

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-1 **Taiga Sample ID:** 004

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Wednesday, July 26, 2017

Print Date: *Wednesday, July 26, 2017*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:
171179

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery
Fort Providence,NT
X0E 0L0

Attn: Cliff McLeod **Facsimile:** (867) 699-4624

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Wednesday, December 06, 2017
Print Date: *Wednesday, December 06, 2017*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 171179

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Treated H2O **Taiga Sample ID:** 001

Client Project: Annual Drinking Water
Sample Type: Water
Received Date: 28-Nov-17
Sampling Date: 28-Nov-17
Sampling Time: 8:50
Location: Fort Providence
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.7	0.5	mg/L	30-Nov-17	SM5310:B	
Organic Carbon, Total	3.6	0.5	mg/L	30-Nov-17	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	63.3	0.4	mg/L	28-Nov-17	SM2320:B	
Colour, Apparent	10	5	CU	28-Nov-17	SM2120:B	
pH	7.27		pH units	28-Nov-17	SM4500-H:B	
Solids, Total Dissolved	141	10	mg/L	06-Dec-17	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	06-Dec-17	SM2540:D	
Turbidity	0.61	0.05	NTU	28-Nov-17	SM2130:B	
Major Ions						
Chloride	9.5	0.7	mg/L	30-Nov-17	SM4110:B	
Fluoride	0.1	0.1	mg/L	30-Nov-17	SM4110:B	
Hardness	108	0.7	mg/L	30-Nov-17	SM4110:B	
Nitrate as Nitrogen	0.19	0.01	mg/L	30-Nov-17	SM4110:B	

ReportDate: Wednesday, December 06, 2017
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 171179

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Treated H2O **Taiga Sample ID: 001**

Sodium	9.7	0.1	mg/L	30-Nov-17	SM4110:B
Sulphate	49	1	mg/L	30-Nov-17	SM4110:B
Subcontracted Organics					
Cyanide, Weak Acid Dissociable	< 0.0010	0.001	mg/L	30-Nov-17	APHA4500-CN
Trace Metals, Total					
Aluminum	62.3	0.6	µg/L	01-Dec-17	EPA200.8
Arsenic	< 0.2	0.2	µg/L	01-Dec-17	EPA200.8
Barium	45.8	0.1	µg/L	01-Dec-17	EPA200.8
Cadmium	< 0.04	0.04	µg/L	01-Dec-17	EPA200.8
Chromium	< 0.1	0.1	µg/L	01-Dec-17	EPA200.8
Copper	9.5	0.2	µg/L	01-Dec-17	EPA200.8
Iron	122	5	ug/L	01-Dec-17	EPA200.8
Lead	0.1	0.1	µg/L	01-Dec-17	EPA200.8
Manganese	2.1	0.1	µg/L	01-Dec-17	EPA200.8
Mercury	< 0.01	0.01	µg/L	01-Dec-17	EPA200.8
Selenium	< 0.3	0.3	µg/L	01-Dec-17	EPA200.8
Uranium	< 0.1	0.1	µg/L	01-Dec-17	EPA200.8
Zinc	10.4	0.4	µg/L	01-Dec-17	EPA200.8

ReportDate: Wednesday, December 06, 2017
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Taiga Batch No.: 171179

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Raw H2O **Taiga Sample ID:** 002

Client Project: Annual Drinking Water
Sample Type: Water
Received Date: 28-Nov-17
Sampling Date: 28-Nov-17
Sampling Time: 8:50
Location: Fort Providence
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	4.5	0.5	mg/L	30-Nov-17	SM5310:B	
Organic Carbon, Total	5.3	0.5	mg/L	30-Nov-17	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	86.3	0.4	mg/L	28-Nov-17	SM2320:B	
Colour, Apparent	39	5	CU	28-Nov-17	SM2120:B	
pH	7.91		pH units	28-Nov-17	SM4500-H:B	
Solids, Total Dissolved	145	10	mg/L	06-Dec-17	SM2540:C	
Solids, Total Suspended	3	3	mg/L	06-Dec-17	SM2540:D	
Turbidity	3.72	0.05	NTU	28-Nov-17	SM2130:B	
Major Ions						
Chloride	9.1	0.7	mg/L	30-Nov-17	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	30-Nov-17	SM4110:B	
Hardness	111	0.7	mg/L	30-Nov-17	SM4110:B	
Nitrate as Nitrogen	0.18	0.01	mg/L	30-Nov-17	SM4110:B	
Sodium	9.2	0.1	mg/L	30-Nov-17	SM4110:B	
Sulphate	28	1	mg/L	30-Nov-17	SM4110:B	

ReportDate: Wednesday, December 06, 2017
Print Date: *Wednesday, December 06, 2017*

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 171179

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Raw H2O **Taiga Sample ID: 002**

Subcontracted Organics					
Cyanide, Weak Acid Dissociable	< 0.0010	0.001	mg/L	30-Nov-17	APHA4500-CN
Trace Metals, Total					
Aluminum	468	5	µg/L	01-Dec-17	EPA200.8
Arsenic	0.3	0.2	µg/L	01-Dec-17	EPA200.8
Barium	50.9	0.1	µg/L	01-Dec-17	EPA200.8
Cadmium	< 0.1	0.1	µg/L	01-Dec-17	EPA200.8
Chromium	0.2	0.1	µg/L	01-Dec-17	EPA200.8
Copper	1.2	0.2	µg/L	01-Dec-17	EPA200.8
Iron	101	5	µg/L	01-Dec-17	EPA200.8
Lead	< 0.1	0.1	µg/L	01-Dec-17	EPA200.8
Manganese	2.5	0.1	µg/L	01-Dec-17	EPA200.8
Mercury	< 0.01	0.01	µg/L	01-Dec-17	EPA200.8
Selenium	< 0.5	0.5	µg/L	01-Dec-17	EPA200.8
Uranium	0.5	0.1	µg/L	01-Dec-17	EPA200.8
Zinc	< 5.0	5	µg/L	01-Dec-17	EPA200.8

ReportDate: Wednesday, December 06, 2017
Print Date: *Wednesday, December 06, 2017*

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Taiga Batch No.: 171179

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Raw H2O **Taiga Sample ID:** 002

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

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