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Annual Report 2019/2020

Submission: October 4, 2021



Hamlet of Fort Providence Water Licence MV2016L3-0001

Municipal Water Licence Annual Report

Village of Fort Providence Licence #: MV2016L3-0001 Reporting year: 2019-2020 Expires: July 6, 2026

Part B, item 4: The Licensee shall file an Annual Water Licence Report with the Board not later than **June** 30^{th} of the year following the calendar year reported (April 1 – March 31), which shall contain the following information (as set out in Schedule 1):

a) Water Use

Licensed Water Volume Withdrawal: not to exceed 60,000 m³ annually

Approximate total yearly volume of water used: 28,101.80 m³

Table 1: Monthly and annual water quantities obtained from all sources

Month	Volume from main source: Raw Water intake at Water Supply Facilities (m ³)	Volume from any other source (m ³)	TOTAL Volume (m³)
April	2325.5	-	2325.5
May	2418.1	-	2418.1
June	2276.3	-	2276.3
July	2520.3	-	2520.3
August	2437.6	-	2437.6
September	2296.9	-	2296.9
October	2511.5	-	2511.5
November	2205.2	-	2205.2
December	2352.1	-	2352.1
January	2263.5	-	2263.5
February	2133.7	-	2133.7
March	2361.0	-	2361.0
TOTALS	28,101.80	-	28,101.80
% Increase /	2.23%	-	2.23%
decrease from	2018-2019: 27,490.06 m ³		2018-2019: 27,490.06 m ³
previous year			

Reasons for increase/decrease in water withdrawn:

Between the 2018-2019 and 2019-2020 fiscal years there was a net increase in water consumption of 2.23%. No significant events or changes within the Hamlet's population or operations occurred within the 2019-2020 fiscal year that could have affected the tucked water supply to residents and businesses. The 2.23% increase can be considered to a part of the nominal fluctuations within annual water usage.

Reasons for exceeding licensed withdrawal volumes (if applicable):

Not Applicable

Name and location of other water source used (if any), and reason for its use:

Not Applicable

General information (e.g. information regarding any modifications to the water withdrawal procedure or facilities) should be included here. If necessary, please attach any relevant reports as an appendix to this report.

No modifications or operational changes took place in 2019/2020 year to the water withdrawal facilities or process.

Stantec (consultant) continues working with the Hamlet and the GNWT (MACA) to develop designs for WTP upgrades, intake upgrades/repairs, and wet well repairs.

b) Waste Disposal

i) Solid Waste

Approximate total yearly volume of solid waste deposited: <u>3810.60</u> m³

GNWT – MACA has provided a standard formula for estimating the amount of solid waste deposited into a Solid Waste Facility in the absence of a metered Garbage Truck. The following can be used: **Volume per person per day X number of days X population**

e.g. **0.015 m³** X 30 days X 860 people = 387 m³ of domestic trash deposited into Solid Waste Facility in a 30 day month

Table 2: Monthly and annual quantities of solid waste deposited at the Fort Providence Solid WasteDisposal Facilities

Month	Volume of solid waste deposited (m ³)	Volume of sludge from the Water Supply Facility (m ³)
April	313.20	-

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May	323.64	-
June	313.20	-
July	323.64	-
August	323.64	-
September	313.20	-
October	323.64	-
November	313.20	-
December	323.64	-
January	323.64	-
February	292.32	-
March	323.64	-
TOTALS	3,810.60	-
% Increase / decrease	-2.66%	-
from previous year	2018-2019: 3,914.63m ³	

Reasons for increase / decrease: (e.g. an industrial project close to the Hamlet of Fort Providence, or a large influx of people into town)

Through the 2019-2020 fiscal year no significant changes to the Hamlet's population or solid waste facilities occurred. The 2019-2020 quantities calculated above were based on the above recommended equation and the 2019 estimated population of 696 residents (From the NWT Bureau of Statistics July 1 2020 Population Estimate). The 2.66% decrease in solid waste deposited is directly due to this population estimate for the 2019-2020 year. The 2018-2019 population estimate used was 715 residents which had a 2.66% increase from the 696 residents used to calculate the above 2019/2020 solid waste volumes.

The volume of sludge from the Water Treatment Plant deposited at the Solid Waste Disposal Facilities is not currently being recorded. The Board has previously requested the development of a sludge monitoring process, as defined in Part 7 of the *Water Treatment Plan O&M Plan – Version 3* to provide information on sludge composition, estimated monthly quantities of sludge disposal, and information about how sludge is disposed of. The Hamlet has not been recording this information. Recommended practices are outlined within the Part 10 of the *Water Treatment Plan O&M Plan – Version 3*.

ii) Sewage

Table 3: Monthly and annual quantities of sewage deposited at Fort Providence Sewage DisposalFacilities

Month	Volume of sewage waste deposited (m ³)
April	2079.3

Мау	2091.8
June	2009.7
July	2163.7
August	2085.4
September	2015.4
October	2069.9
November	1841.6
December	1963.9
January	2046.2
February	1772.7
March	2033.5
TOTALS	24,173.07
Is this an estimated volume?	Yes
(yes/no)	
% Increase / decrease from	-3.60%
previous year	2018-2019: 25,075.51 m ³

To calculate monthly sewage waste deposited to the Sewage Disposal Facilities, please provide the above information if metered information is available. If metered information is not available, please fill in the table using the corresponding TOTAL water volumes from Table 1. This provides estimation only and equals water in/sewage out.

Reasons for increase / decrease: (e.g.: an industrial project close to the Hamlet of Fort Providence, or a large influx of people into town)

Between the 2018/2019 and 2019/2020 fiscal years there was a net decrease in sewage waste deposited of -3.60%. No significant events or changes within the Hamlet's population or operations occurred within the 2019/2020 fiscal year that could have affected the sewage volumes. The 2.11% increase is considered to a part of the nominal fluctuations within annual water usage.

iii) Other Waste Sources

Are there any other types or sources of waste that are being deposited at the Hamlet of Fort Providence's Waste Disposal Facilities? Please list the type/source, where it is being deposited, and monthly/annual volumes for each waste.

No other waste sources of waste were deposited into the Hamlet of Fort Providence's Waste Disposal Facilities.

c) Waste Removed from Waste Disposal Facilities

Please list in the table below wastes removed from Waste Disposal Facilities (e.g. recyclables, tires, household hazardous waste, scrap metal, and other wastes that are periodically shipped out.). Add additional columns to Table 4 if necessary.

Month	Waste type 1	Waste type 2	Waste type 3	
	(fill in type)	(iii) (fill in type)	(fill in type)	
January	0	0	0	
February	0	0	0	
March	0	0	0	
April	0	0	0	
May	0	0	0	
June	0	0	0	
July	0	0	0	
August	0	0	0	
September	0	0	0	
October	0	0	0	
November	0	0	0	
December	0	0	0	
TOTALS				
Is this an estimated	No	No	No	
volume? (yes/no)				
% Increase /	0	0	0	
decrease from				
previous year				

Table 4: Monthly and annual quantities of waste removed from the Waste Disposal Facilities by Type

No solid waste was removed from the Waste Disposal Facility in 2019/2020.

d) Waste Volume

Table 5: Monthly waste volumes deposited by commercial and industrial operators working outside the boundaries of Fort Providence

Month	Solid Waste Disposal Facility (m ³)	Sewage Disposal Facility (m ³)	TOTAL (m³)
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0

August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
TOTALS			
Is this an estimated	No	No	No
volume? (yes/no)			
% Increase / decrease	-	-	-
from previous year			

General information:

Information regarding any agreements with outside organizations to be a waste receiving facility should be outlined here along with estimates of the amounts and types of waste to be received.

No major changes were made to the Solid Waste Disposal Facility and no wastes were deposited by commercial or industrial operators working outside of the Hamlet boundaries.

e) Tabular summaries of data generated under the Surveillance Network Program

Tabular summaries of all data generated under the Surveillance Network Program (SNP) should be included using the tables in Appendix A (attached).

Summaries of all data generated under the Surveillance Network Program are found in Appendix A.

f) Laboratory reports for all samples collected for the Surveillance Network Program

All laboratory reports should be attached as Appendix B to this report.

Laboratory reports for the Surveillance Network Program are found in Appendix B.

g) Geographic Coordinates for all Surveillance Network Program stations, and a map showing station locations

Table 6: SNP station details

Station Number	Geographic Coordinates	Effective date	Signage install date
2016-1	61.3499 N;	2016	June 2018
	-117.6373 W		
2016-2	61.3524 N;	2016	June 2018
	117.6185 W		
2016-3	61.3520 N;	2016	June 2018
	117.6166 W		

A map showing the approximate proposed Surveillance Network Program station locations are found in

Appendix C. The map has not been formally finalized and has various proposed locations. A proposal finalizing the SNP locations to be registered within the Water Licence has been submitted and is currently being reviewed for approval by the MVLWB. The Hamlet will ground truth the SNP locations to obtain accurate geographic coordinates.

h) Activities to install and maintain fencing at the Waste Disposal Facilities

Include a summary of any and all activities undertaken to install and maintain fencing at the Solid Waste Disposal Facilities and Sewage Disposal Facilities.

No activities were undertaken to install or maintain the fencing at the Solid Waste Disposal Facilities and Sewage Disposal Facilities in 2019/2020

i) Activities to install and maintain signage at the Waste Disposal Facilities and SNP stations

Include a summary of any and all activities undertaken to install and maintain signage at the:

- Solid Waste Disposal Facilities,
- Sewage Disposal Facilities, and
- Surveillance Network Program stations.

Photos of the Signage at the Solid Waste Disposal Facilities and the Sewage Disposal Facilities can be found below. Please see **Appendix C** for the Map of the proposed SNP locations and municipal facilities.



Signage installed during 2018/2019



Signage at the Solid Waste Facility



Signage was installed in the Solid Waste Facility in 2018/2019.



Signage was installed in the Solid Waste Facility in 2018/2019.

Signage was also installed at the Surveillance Network Program stations during 2018/2019.



Image of signage at SNP 1412-2



Signage installed at SNP 2016-1



Signage installed at SNP 2016-2





Image of signage at SNP

j) Sludge Management Activities

2016-3.

Include a summary of sludge management activities, including results of depth and volume measurements, sludge removal and treatment.

Image of SNP 2016-3

No desludging activities or measurements of depths/volumes of sludge took place in the 2019/2020 fiscal year. Please refer to the updated Sludge Management Plan appended to the Operation and Maintenance Plan: Sewage Disposal Facility – Version 3

k) Construction activities

Include a summary of construction activities conducted in accordance with Part F of this Licence. If there were no construction activities, please make note of that. If required, please attach any as-built drawings or reports as an appendix to this report.

No construction activities took place during 2019/2020.

I) Modifications and major maintenance

Include a summary of Modification activities and major maintenance work conducted on the Water Supply and Waste Disposal Facilities, including all associated structures, in accordance with Part G of the Licence. This includes any changes, repairs and modifications. If any problems occurred during the year, please note them here. If there are no changes, make note of that. If required, please attach any as-built drawings or reports as an appendix to this report.

No modifications or major maintenance took place during 2019/2020. Correspondence with the Inspector occurred on May 27, 2019 discussing some general maintenance items at the Solid Waste Disposal Facility. The Inspector and MVLWB provided guidance on requirements and advising that this work is not considered to be modification under the Water Licence and is a part of the general maintenance of the facility.

²⁰¹⁹⁻²⁰²⁰ Annual Water Licence Report for Fort Providence (MV2016L3-0001)

Following the Hamlets Solid Waste Facilities O&M Plan from October 2018 the community will continue to maintain the sites and contain the solid waste items to better manage the site.

m) Unauthorized Discharges

List and describe all unauthorized discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, and summary of the circumstances and follow-up actions taken, and the status (i.e. open or closed), in accordance with the reporting requirements referred to in Part H, item 4 of the Licence. Please attach copies of spill reports, correspondence with the GNWT Water Resources Officer (Inspector) or any other pertinent documentation as an appendix to this report.

No unauthorized discharges took place during 2019/2020.

n) Spill Training and Communications Exercises

List any spill training and communications exercises that have been carried out during the previous calendar year including courses on spills prevention, waste management, SNP sampling, etc.

No spill training or communication exercises took place within the 2019/2020 year, the Hamlet is planning to do spill training in the near future.

o) Closure and Reclamation Activities

Summarize any closure and reclamation work completed during the year, and an outline of any work anticipated for the next year. Attach any relevant as-built drawings or reports as an appendix to this report.

No closure or reclamation activities took place during 2019/2020.

p) Studies requested by the Board

If the Board has requested that specific studies related to Waste disposal, Water Use or Reclamation be completed, include details of the studies in this section with a summary of the outcome. Also include a brief description of any future studies planned. Include any studies or reports as appendices to the Annual Report.

No studies were requested by the Board related to waste disposal, water use or reclamation during 2019/2020.

q) Actions taken to address concerns, non-conformances, or deficiencies identified by an Inspector

Include any non-compliance items identified in GNWT Water Licence Inspection reports and detail how the Hamlet of Fort Providence is addressing them.

No inspection reports under the Water Licence for the 2019/2020 fiscal year have been filed within the MVLWB public registry to date. No non-compliance items were identified.

r) Updates to Plans

Summarize any updates or revisions to the Spill Contingency Plan, Management Plans and Operations and Maintenance Plans. Add rows to the table if necessary.

Updates to the Water Treatment Plant, Spill Contingency Plan and Sewage Disposal Facilities Operation and Maintenance Plans were requested by the Board on December 4, 2017 and are updated and attached to this annual report. The updated Sludge Management Plan was also updated and appended to the Sewage Disposal Facilities Operation and Maintenance Plan.

Table 7: Updates to Plans

Plan	Summary of revisions made	Effective date
Water Treatment Plant	Updates made based on the December 4,	Version 2 – December
	2017 letter from MVLWB	2018
		Version 3 – October
		2021
Spill Contingency Plan	Updates made based on the December 4,	Version 2 – December
	2017 letter from MVLWB	2018
		Version 3 – June 2
		2021
Sewage Disposal Facilities	Updates made based on the December 4,	Version 2 – December
	2017 letter from MVLWB	2018
		Version 3 – September
	The Sludge Management Plan was also	29 2021
	updated based on March 2021	
	correspondence with the MVLWB and	
	appended to the Sewage Disposal	
	Facilities Plan.	

s) Other Details Requested by the Board

If the Board has requested any other details on Water use, operating procedures, Modifications, maintenance work, or other topics, include details in this section with a summary of the outcome(s). Include any attachments as appendices to the Annual Report.

No other updates were requested by the Board.

Other Information

- Include a summary of correspondence with the Inspector, including inspection dates and identification of any issues of non-compliance. The MVLWB is interested in this information in order to facilitate discussions to resolve any issues.
- Include any other information here that may be valuable to the MVLWB.
- Include details on upcoming studies that will be completed.
- If there are any contaminated soil piles currently in use (land farming), please list the details of containment, remediation and progress in this section.

Inspection Correspondence

No inspection reports under the Water Licence for the 2019/2020 fiscal year have been filed within the MVLWB public registry to date.

Date (mm/dd/yr)	Inspection Correspondence	Hamlet Response
09/23/2019 09/03/2019 07/10/2019 07/11/2019	Taiga Analytical Report(s) shared	-
05/27/2019	Solid Waste Disposal Facility Clean-up – Inspector and the MVLWB provided guidance on requirements and advising that this work is not considered to be modification under the Water Licence and is a part of general facility maintenance.	Hamlet moved forward with approved general maintenance work.
06/04/2019	Inspector advised the Spring 2019 inspection will take place on June 13, 2019.	-
08/09/2019	Inspector approved emergency decant to commence	The Hamlet commenced the emergency decant on June 13, 2019
08/19/2019	Inspector informed emergency decant paused due to accessibility issues and will resume the following day.	-

Appendix A: Tabular summaries of all data generated under the Surveillance Network Program for Fort Providence (MV2016L3-0001)

Surveillance Network Program Lab Results Summary

Surveillance Network Program (SNP) information is to be summarized in a tabular format and shall indicate date of testing, parameters tested for and any other information requested by the GNWT Water Licence Inspector or the MVLWB. Summary tables have been provided below for your convenience. Laboratory analysis results should be appended in Appendix B.

1) SNP Lab Results Summary – Station number 1412-1 (Raw water from the Water Supply Facilities)

This station monitors the monthly and annual quantities of Water withdrawn for municipal purposes. This information is reported in Table 1 of the Annual Report.

2) SNP Lab Results Summary – Station number 1412-2 (Sewage effluent from Sewage Disposal Facilities)

This station is the site of compliance, and monitors final effluent quality prior to discharge to the Receiving Environment.

Water Licence Parameters	Effluent Quality Criteria	June 12	June 13	August 8 (pre-emergency decant)	August 15	August 22
рН	Above 6	8.70	8.34	8.56	9.17	8.98
CBOD ₅	330mg/L	16	22	30	38	44
Total Suspended Solids	300mg/L	28	24	40	25	75
Ammonia	mg/L	14.8	13.9	2.66	1.93	8.69
Total Phosphorus	mg/L	6.30	5.78	4.22	1.67	7.02
Nitrate	mg/L	0.15	0.16	0.17	0.26	0.37

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Nitrite	mg/L	0.08	0.43	< 0.01	0.21	< 0.01
Fecal Coliforms	1x10 ⁵ CFU/100ml	10	18	10	36	< 10
Oil and Grease	5mg/L	2.2	Non- visible *	< 2.0	< 2.0	3.5

*Visual Exam

3) SNP Lab Results Summary – Station number 1412-3 (Raw sewage from pump out truck)

This station has been discontinued.

4) SNP Lab Results Summary – Station number 2016-1 (Sewage effluent flowing through ponded area of wetland)

At issuance, this station's exact location was to be determined with the Inspector. It monitors the quality of effluent discharged from the Sewage Disposal Facilities and determines effectiveness of wetland treatment before final discharge to the Mackenzie River. Sampling frequency is at the beginning (one week following freshet) and end (before freeze-up) of the open water season.

Parameter	Sample 1 (one week following freshet)	Sample 2 (before freeze-up)
	June 13, 2019	
CBOD-(mg/l)	7.12	-
Total Suspended Solids (mg/L)	10	-
Ammonia (mg/L)	0.035	-
Total Phosphorus (mg/L)	0.289	_
Nitrate (mg/L)	0.31*	-
Nitrite (mg/L)		-
Fecal Coliforms (CFU/100mL)	< 1.0	-
Oil and Grease (mg/L)	< 2.0	-

*Nitrate+Nitrite as Nitrogen

5) SNP Lab Results Summary – Station number 2016-2 (Ponded water within or adjacent to domestic waste cells at Solid Waste Disposal Facilities)

At issuance, this station's exact location was to be determined with the Inspector. This station monitors potential impacts of the Solid Waste Disposal Facilities on groundwater and surface Water, and water quality and quantity prior to discharge. Sampling frequency is twice per year in June and September, and prior to discharge of accumulated water. Add additional columns to table if necessary.

	Sample 1	Sample 2	Sample 3	Sample 4
	(June)	(September)	(prior to discharge of	(prior to discharge of
	June 13, 2019		accumulated water)	accumulated water)
Volume of water		-	-	-
discharged (m ³)				
Total Suspended Solids	473	-	-	-
(mg/L)				
Total Cadmium (μg/L)	0.2	-	-	-
Total Chromium (μg/L)	28.7	-	-	-
Total Cobalt (μg/L)	7.7	-	-	-
Total Copper (μg/L)	20.4	-	-	-
Total Iron (μg/L)	16200	-	-	-
Total Lead (µg/L)	4.6	-	-	-
Magnesium (mg/L)	169	-	-	-
Total Manganese (µg/L)	332	-	-	-
Total Mercury (µg/L)		-	-	-
Total Nickel (µg/L)	65.9	-	-	-
Oil and Grease (mg/L)	10.1	-	-	-
Total Petroleum	< 0.2	-	-	-
Hydrocarbons (mg/L)				
BTEX	-	-	-	-
Total Phenols (mg/L)	0.0430*	-	-	-

Total Phosphate	-	-	-	-
Calcium (mg/L)	161	-	-	-
Potassium (mg/L)	295	-	-	-
Sodium (mg/L)	717	-	-	-
Sulphate (mg/L)	196	-	-	-
Total Zinc (μg/L)	234	-	-	-
рН	7.82	-	-	-
Conductivity (μS/cm)	5500	-	-	-

*Detection limit adjusted due to sample matrix effects

6) SNP Lab Results Summary – Station number 2016-3 (Ponded Water within or adjacent to the construction waste cell at the Solid Waste Disposal Facilities)

At issuance, this station's exact location was to be determined with the Inspector. This station monitors potential impacts of the Solid Waste Disposal Facilities on groundwater and surface Water, and monitors water quality and quantity prior to discharge. Sampling frequency is twice per year in June and September, and prior to discharge of accumulated water. Add additional columns to table if necessary.

	Sample 1	Sample 2	Sample 3	Sample 4
	(June)	(September)	(prior to discharge of	(prior to discharge of
	June 13, 2019		accumulated water)	accumulated water)
Volume of water	-	-	-	-
discharged (m ³)				
Total Suspended Solids	10	-	-	-
(mg/L)				
Total Cadmium (μg/L)	< 0.1	-	-	-
Total Chromium (μg/L)	0.2	-	-	-
Total Cobalt (μg/L)	0.1	-	-	-
Total Copper (µg/L)	0.6	-	-	-
Total Iron (μg/L)	179	-	-	-
Total Lead (μg/L)	< 0.1	-	-	-

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Magnesium (mg/L)	25.0	-	-	-
Total Manganese (µg/L)	73.9	-	-	-
Total Mercury (μg/L)		-	-	-
Total Nickel (µg/L)	1.1	-	-	-
Oil and Grease	Non-visible*	-	-	-
Total Petroleum	< 0.2	-	-	-
Hydrocarbons (mg/L)				
BTEX (mg/L)	< 0.002	-	-	-
Total Phenols (mg/L)		-	-	-
Total Phosphate		-	-	-
Calcium (mg/L)	71.6	-	-	-
Potassium (mg/L)	22.4	-	-	-
Sodium (mg/L)	38.9	-	-	-
Sulphate (mg/L)	66	-	-	-
Total Zinc (μg/L)	< 5.0	-	-	-
рН	7.83	-	-	-
Conductivity (μS/cm)	772	-	-	-

*Visual Exam

2019-2020 Annual Water Licence Report for Fort Providence (MV2016L3-0001)

Appendix B: Laboratory reports for all samples collected for the Surveillance Network Program for Fort Providence (MV2016L3-0001)

From:	<u>taiga</u>
То:	Susan Christie (sao@fortprovidence.ca); Erica Janes; Wendy Bidwell
Subject:	Emailing: 190721 - 1920 - FINAL REPORT, 190721 - 1920 - FINAL REPORT
Date:	Monday, September 23, 2019 2:43:49 PM
Attachments:	<u> 190721 - 1920 - FINAL REPORT.pdf</u>
	190 <u>721 - 1920 - FINAL REPORT.xls</u>

Susan,

Please see attached for final report 190721.

Have a good day.

Mársi | Kinanaskomitin | Thank you | Merci | Haį' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsì Glen Hudy Chemist, Quality Assurance Environmental Protection and Waste Management Environment and Natural Resources Government of the Northwest Territories

Taiga Environmental Laboratory PO Box 1320 Yellowknife, NT X1A 2L9

Phone: 867-767-9235 Ext. 53154 Fax: 867-920-8740 www.enr.gov.nt.ca

Survey: https://www.surveymonkey.com/r/TaigaLab

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Taiga Batch No.: 190721

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

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery Fort Providence,NT X0E 0L0

Attn: Susan Christie

Facsimile: (867) 699-4624

Final report has been reviewed and approved by:

Idu

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
 - o Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - Environment Canada
 - o 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.



Taiga Batch No.: 190721

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

Client Project: WMV2016L3-0001 Sample Type: Water Received Date: 16-Aug-19 Sampling Date: 15-Aug-19 Sampling Time: Location: 1412-2 Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	1.93	0.005	mg/L	21-Aug-19	SM4500-NH3:G	
CBOD	38	2	mg/L	16-Aug-19	SM5210:B	
Phosphorous, Total	1.67	0.002	mg/L	22-Aug-19	SM4500-P:D	
Inorganics - Physicals						
pН	9.17		pH units	16-Aug-19	SM4500-H:B	
Solids, Total Suspended	45	3	mg/L	21-Aug-19	SM2540:D	
<u>Major Ions</u>						
Nitrate as Nitrogen	0.26	0.01	mg/L	16-Aug-19	SM4110:B	
Nitrite as Nitrogen	0.21	0.01	mg/L	16-Aug-19	SM4110:B	
<u>Organics</u>						
Hexane Extractable Material	< 2.0	2.0	mg/L	21-Aug-19	EPA1664A	
Subcontracted Microbiology						
Coliforms, Fecal	36	1	MPN/100ml	16-Aug-19	APHA9223B	



Taiga Batch No.: 190721

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

* 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:Monday, September 23, 2019Print Date:Monday, September 23, 2019

From:	<u>taiga</u>
To:	Susan Christie (sao@fortprovidence.ca); Erica Janes; Wendy Bidwell
Subject:	Emailing: 190342 - 1920 - FINAL REPORT, 190342 - 1920 - FINAL REPORT
Date:	Wednesday, July 10, 2019 2:18:35 PM
Attachments:	<u> 190342 - 1920 - FINAL REPORT.pdf</u>
	19 <u>0342 - 1920 - FINAL REPORT.xls</u>

Susan,

Please see attached for final report 190342.

Have a good day.

Mársi | Kinanaskomitin | Thank you | Merci | Haį' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsì Glen Hudy Chemist, Quality Assurance Water Resources Environment and Natural Resources Government of the Northwest Territories

Taiga Environmental Laboratory PO Box 1320 Yellowknife, NT X1A 2L9

Phone: 867-767-9235 Ext. 53154 Fax: 867-920-8740 www.enr.gov.nt.ca

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190342 - 1920 - FINAL REPORT 190342 - 1920 - FINAL REPORT

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Taiga Batch No.: 190342

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

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery Fort Providence,NT X0E 0L0

Attn: Susan Christie

Facsimile: (867) 699-4624

Final report has been reviewed and approved by:

Idu

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
 - o Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - o Environment Canada
 - o 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.



4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9 Tel: (867)-767-9235 Fax: (867)-920-8740 Taiga Batch No.: 190342

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

Client Project:	
Sample Type:	Water
Received Date:	12-Jun-19
Sampling Date:	12-Jun-19
Sampling Time:	11:15
Location:	
Report Status:	Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	14.8	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
CBOD	16	2	mg/L	12-Jun-19	SM5210:B	
Phosphorous, Total	6.30	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
рН	8.70		pH units	13-Jun-19	SM4500-H:B	
Solids, Total Suspended	28	3	mg/L	18-Jun-19	SM2540:D	
<u>Major Ions</u>						
Nitrate as Nitrogen	0.15	0.01	mg/L	13-Jun-19	SM4110:B	
Nitrite as Nitrogen	0.08	0.01	mg/L	13-Jun-19	SM4110:B	
<u>Microbiology</u>						
Coliforms, Fecal	10	10	CFU/100mL	12-Jun-19	SM9222:D	
<u>Organics</u>						
Hexane Extractable Material	2.2	2.0	mg/L	17-Jun-19	EPA1664A	
Subcontracted Organics						
Phenols, Total	0.0015	0.001	mg/L	28-Jun-19	AB ENV.06537	



Taiga Batch No.: 190342

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2 Taiga Sample ID: 001 **Trace Metals, Total** Aluminum 43.7 5 μg/L 24-Jun-19 EPA200.8 Antimony 0.3 0.1 24-Jun-19 μg/L EPA200.8 Arsenic 2.4 0.2 μg/L 24-Jun-19 EPA200.8 Barium 25.6 0.1μg/L 24-Jun-19 EPA200.8 Beryllium < 0.1 0.1 μg/L 24-Jun-19 EPA200.8 Cadmium < 0.1 0.1μg/L 24-Jun-19 EPA200.8 Cesium < 0.1 0.1 μg/L 24-Jun-19 EPA200.8 0.2 Chromium 0.1μg/L 24-Jun-19 EPA200.8 Cobalt 0.5 0.1 24-Jun-19 μg/L EPA200.8 Copper 0.6 0.2 24-Jun-19 μg/L EPA200.8 196 5 Iron μg/L 24-Jun-19 EPA200.8 Lead < 0.1 0.1μg/L 24-Jun-19 EPA200.8 Lithium 16.0 0.2 μg/L 24-Jun-19 EPA200.8 Manganese 58.1 0.1 μg/L 24-Jun-19 EPA200.8 Molybdenum 0.5 0.1 μg/L 24-Jun-19 EPA200.8 Nickel 3.7 0.1 μg/L 24-Jun-19 EPA200.8 Rubidium 20.9 0.1 μg/L 24-Jun-19 EPA200.8 < 0.5 Selenium 0.5 24-Jun-19 EPA200.8 μg/L Silver < 0.1 0.1 24-Jun-19 μg/L EPA200.8 Strontium 316 0.1 μg/L 24-Jun-19 EPA200.8 Thallium < 0.1 0.1 μg/L 24-Jun-19 EPA200.8 Titanium 2.4 0.1 μg/L 24-Jun-19 EPA200.8 Uranium 0.2 0.1 μg/L 24-Jun-19 EPA200.8 Vanadium 0.4 0.124-Jun-19 μg/L EPA200.8

ReportDate: Wednesday, July 10, 2019 Print Date: *Wednesday*, July 10, 2019



Taiga Batch No.: 190342

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2	e ID: 1412-2			Taiga Sample ID: 001			
Zinc	<	5.0	5	μg/L	24-Jun-19	EPA200.8	

ReportDate:Wednesday, July 10, 2019Print Date:Wednesday, July 10, 2019



Taiga Batch No.: 190342

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

* 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 10, 2019Print Date:Wednesday, July 10, 2019

From:	Wendy Bidwell
To:	Erica Janes
Subject:	FW: Emailing: 190345 - 1920 - FINAL REPORT, 190358 - 1920 - FINAL REPORT, 190358 - 1920 - FINAL REPORT, 190345 - 1920 - FINAL REPORT
Date:	Thursday, July 11, 2019 10:25:42 AM
Attachments:	<u>190345 - 1920 - FINAL REPORT.pdf</u> 19 <u>0358 - 1920 - FINAL REPORT.pdf</u>
	19 <u>0358 - 1920 - FINAL REPORT.xls</u> 19 <u>0345 - 1920 - FINAL REPORT.xls</u>

FYI

Wendy

Mársi | Kinanaskomitin | Thank you | Merci | Haį' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsì Wendy Bidwell Water Resource Officer South Slave Region Department of Environment and Natural Resources Government of the Northwest Territories

Highway #5 PO Box 900 Fort Smith, NT X0E 0P0

Phone: 867-872-6421 Cell: 867-446-3775 Fax: 867-872-4250 www.gov.nt.ca

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-----Original Message-----From: taiga Sent: Wednesday, July 10, 2019 2:47 PM To: Wendy Bidwell Subject: Emailing: 190345 - 1920 - FINAL REPORT, 190358 - 1920 - FINAL REPORT, 190358 - 1920 - FINAL REPORT, 190345 - 1920 - FINAL REPORT

Wendy,

Please see attached for final reports 190345 and 190358.

Have a good day.

Mársi | Kinanaskomitin | Thank you | Merci | Hai' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsi Glen Hudy Chemist, Quality Assurance Water Resources Environment and Natural Resources Government of the Northwest Territories

Taiga Environmental Laboratory PO Box 1320 Yellowknife, NT X1A 2L9

Phone: 867-767-9235 Ext. 53154 Fax: 867-920-8740 www.enr.gov.nt.ca

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190345 - 1920 - FINAL REPORT 190358 - 1920 - FINAL REPORT 190358 - 1920 - FINAL REPORT 190345 - 1920 - FINAL REPORT

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Taiga Batch No.: 190358

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

- 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:

Idu

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
 - o Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - o Environment Canada
 - o 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.



4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9 Tel: (867)-767-9235 Fax: (867)-920-8740 Taiga Batch No.: 190358

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-1

Taiga Sample ID: 001

Client Project:Hamlet of Fort ProvidenceSample Type:Raw WaterReceived Date:14-Jun-19Sampling Date:13-Jun-19Sampling Time:7:40Location:WTP and Sewage Lagoon OutflowReport Status:Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
Phosphorous, Total	0.008	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	84.1	0.4	mg/L	14-Jun-19	SM2320:B	
Colour, Apparent	44	5	CU	14-Jun-19	SM2120:B	
Conductivity, Specific (@25C)	231	0.4	μS/cm	14-Jun-19	SM2510:B	
рН	8.19		pH units	14-Jun-19	SM4500-H:B	
Solids, Total Dissolved	146	10	mg/L	20-Jun-19	SM2540:C	
Solids, Total Suspended	8	3	mg/L	20-Jun-19	SM2540:D	
Turbidity	4.61	0.05	NTU	14-Jun-19	SM2130:B	
<u>Major Ions</u>						
Calcium	27.9	0.1	mg/L	14-Jun-19	SM4110:B	
Chloride	7.6	0.7	mg/L	14-Jun-19	SM4110:B	
Fluoride	0.3	0.1	mg/L	14-Jun-19	SM4110:B	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-1 Taiga Sample ID: 001 Hardness 95.5 0.7 mg/L 14-Jun-19 SM4110:B Magnesium 6.3 0.1 mg/L 14-Jun-19 SM4110:B Nitrate as Nitrogen 0.19 0.01 mg/L 14-Jun-19 SM4110:B Nitrate+Nitrite as Nitrogen 0.01 0.19 mg/L 14-Jun-19 SM4110:B Nitrite as Nitrogen < 0.01 0.01 mg/L 14-Jun-19 SM4110:B Potassium 1.0 0.1 mg/L 14-Jun-19 SM4110:B Sodium 8.1 0.1 14-Jun-19 mg/L SM4110:B Sulphate 26 1 mg/L 14-Jun-19 SM4110:B **Trace Metals, Total** Cadmium < 0.04 0.04 25-Jun-19 EPA200.8 µg/L Chromium 0.2 0.1 25-Jun-19 µg/L EPA200.8 Cobalt < 0.1 0.1 25-Jun-19 µg/L EPA200.8 Copper 1.5 0.2 µg/L 25-Jun-19 EPA200.8 Iron 194 5 ug/L 25-Jun-19 EPA200.8 Lead < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 Manganese 5.6 0.1 μg/L 25-Jun-19 EPA200.8 Nickel 1.1 0.1 μg/L 25-Jun-19 EPA200.8 Zinc 27.9 0.4μg/L 25-Jun-19 EPA200.8



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 002

Client Project:Hamlet of Fort ProvidenceSample Type:Treated SewageReceived Date:14-Jun-19Sampling Date:13-Jun-19Sampling Time:8:31Location:WTP and Sewage Lagoon Outflow

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	13.9	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
CBOD	22	2	mg/L	14-Jun-19	SM5210:B	
Phosphorous, Total	5.78	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	311	0.4	mg/L	14-Jun-19	SM2320:B	
Colour, Apparent	321	5	CU	14-Jun-19	SM2120:B	
Conductivity, Specific (@25C)	1020	0.4	µS/cm	14-Jun-19	SM2510:B	
pН	8.34		pH units	14-Jun-19	SM4500-H:B	
Solids, Total Dissolved	576	10	mg/L	20-Jun-19	SM2540:C	
Solids, Total Suspended	24	3	mg/L	20-Jun-19	SM2540:D	
Turbidity	26.1	0.05	NTU	14-Jun-19	SM2130:B	
<u>Major Ions</u>						
Calcium	56.1	0.1	mg/L	14-Jun-19	SM4110:B	
Chloride	103	0.7	mg/L	14-Jun-19	SM4110:B	
Fluoride	0.4	0.1	mg/L	14-Jun-19	SM4110:B	
Hardness	233	0.7	mg/L	14-Jun-19	SM4110:B	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2	Taiga Sample ID: 002				
Magnesium	22.6	0.1	mg/L	14-Jun-19	SM4110:B
Nitrate as Nitrogen	0.16	0.01	mg/L	14-Jun-19	SM4110:B
Nitrate+Nitrite as Nitrogen	0.43	0.01	mg/L	14-Jun-19	SM4110:B
Nitrite as Nitrogen	0.28	0.01	mg/L	14-Jun-19	SM4110:B
Potassium	31.8	0.1	mg/L	14-Jun-19	SM4110:B
Sodium	85.6	0.1	mg/L	14-Jun-19	SM4110:B
Sulphate	61	1	mg/L	14-Jun-19	SM4110:B
<u>Microbiology</u>					
Coliforms, Fecal	18	1	CFU/100mL	14-Jun-19	SM9222:D
Organics					
Hexane Extractable Material	2.1	2.0	mg/L	18-Jun-19	EPA1664A
Oil and Grease, visible	Non-visible			14-Jun-19	Visual Exam
Trace Metals, Total					
Cadmium	< 0.1	0.1	μg/L	25-Jun-19	EPA200.8
Chromium	0.1	0.1	μg/L	25-Jun-19	EPA200.8
Cobalt	0.5	0.1	μg/L	25-Jun-19	EPA200.8
Copper	0.5	0.2	μg/L	25-Jun-19	EPA200.8
Iron	119	5	μg/L	25-Jun-19	EPA200.8
Lead	< 0.1	0.1	μg/L	25-Jun-19	EPA200.8
Manganese	57.9	0.1	μg/L	25-Jun-19	EPA200.8
Nickel	3.8	0.1	μg/L	25-Jun-19	EPA200.8
Zinc	< 5.0	5	μg/L	25-Jun-19	EPA200.8



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-1

Taiga Sample ID: 003

Client Project:	Hamlet of Fort Providence
Sample Type:	Sewage Effluent Post Wetland
Received Date:	14-Jun-19
Sampling Date:	13-Jun-19
Sampling Time:	8:00
Location:	WTP and Sewage Lagoon Outflow
-	T1 1

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.033	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
CBOD	7	2	mg/L	14-Jun-19	SM5210:B	
Phosphorous, Total	0.289	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
pН	7.12		pH units	14-Jun-19	SM4500-H:B	
Solids, Total Suspended	18	3	mg/L	20-Jun-19	SM2540:D	
<u>Major Ions</u>						
Nitrate+Nitrite as Nitrogen	0.31	0.01	mg/L	14-Jun-19	SM4110:B	
<u>Microbiology</u>						
Coliforms, Fecal	< 1	1	CFU/100mL	14-Jun-19	SM9222:D	
<u>Organics</u>						
Hexane Extractable Material	< 2.0	2.0	mg/L	18-Jun-19	EPA1664A	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-2

Taiga Sample ID: 004

Client Project:Hamlet of Fort ProvidenceSample Type:Ponded Leachate at SWDFReceived Date:14-Jun-19Sampling Date:13-Jun-19Sampling Time:9:23Location:WTP and Sewage Lagoon Outflow

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	8.83	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
Phosphorous, Total	2.81	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	1600	0.4	mg/L	14-Jun-19	SM2320:B	
Colour, Apparent	5800	5	CU	14-Jun-19	SM2120:B	
Conductivity, Specific (@25C)	5500	0.4	µS/cm	14-Jun-19	SM2510:B	
pH	7.82		pH units	14-Jun-19	SM4500-H:B	
Solids, Total Dissolved	3650	10	mg/L	20-Jun-19	SM2540:C	
Solids, Total Suspended	473	3	mg/L	20-Jun-19	SM2540:D	
Turbidity	248	0.05	NTU	14-Jun-19	SM2130:B	
<u>Major Ions</u>						
Calcium	161	0.1	mg/L	14-Jun-19	SM4110:B	
Chloride	851	0.7	mg/L	14-Jun-19	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	14-Jun-19	SM4110:B	
Hardness	1100	0.7	mg/L	14-Jun-19	SM4110:B	
Magnesium	169	0.1	mg/L	14-Jun-19	SM4110:B	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-2		Taiga Sample ID: 004					
Nitrate as Nitrogen	0.13	0.01	mg/L	14-Jun-19	SM4110:B		
Nitrate+Nitrite as Nitrogen	0.13	0.01	mg/L	14-Jun-19	SM4110:B		
Nitrite as Nitrogen	< 0.01	0.01	mg/L	14-Jun-19	SM4110:B		
Potassium	295	0.1	mg/L	14-Jun-19	SM4110:B		
Sodium	717	0.1	mg/L	14-Jun-19	SM4110:B		
Sulphate	196	1	mg/L	14-Jun-19	SM4110:B		
<u>Organics</u>							
F2: C10-C16	< 0.2	0.2	mg/L	19-Jun-19	EPA8015B		
F3: C16-C34	< 0.2	0.2	mg/L	19-Jun-19	EPA8015B		
F4: C34-C50	< 0.2	0.2	mg/L	19-Jun-19	EPA8015B		
Hexane Extractable Material	10.1	2.0	mg/L	20-Jun-19	EPA1664A		
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	19-Jun-19	EPA8015B		
Subcontracted Organics							
Benzene	< 0.00050	0.0005	mg/L	28-Jun-19	EPA 5021		
Ethylbenzene	< 0.00050	0.0005	mg/L	28-Jun-19	EPA 5021		
Phenols, Total	0.0430	0.003	mg/L	02-Jul-19	AB ENV.06537	207	
Toluene	0.00330	0.0005	mg/L	28-Jun-19	EPA 5021		
Xylenes	0.00058	0.0005	mg/L	28-Jun-19	EPA 5021		
Trace Metals, Total							
Aluminum	412	5	μg/L	25-Jun-19	EPA200.8		
Antimony	5.6	0.1	μg/L	25-Jun-19	EPA200.8		
Arsenic	19.6	0.2	μg/L	25-Jun-19	EPA200.8		
Barium	317	0.1	μg/L	25-Jun-19	EPA200.8		
Beryllium	< 0.1	0.1	μg/L	25-Jun-19	EPA200.8		
Cadmium	0.2	0.1	μg/L	25-Jun-19	EPA200.8		



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-2	Taiga Sample ID: 004					
Cesium	0.1	0.1	μg/L	25-Jun-19	EPA200.8	
Chromium	28.7	0.1	μg/L	25-Jun-19	EPA200.8	
Cobalt	7.7	0.1	μg/L	25-Jun-19	EPA200.8	
Copper	20.4	0.2	μg/L	25-Jun-19	EPA200.8	
Iron	16200	5	μg/L	25-Jun-19	EPA200.8	
Lead	4.6	0.1	μg/L	25-Jun-19	EPA200.8	
Lithium	87.1	0.2	μg/L	25-Jun-19	EPA200.8	
Manganese	332	0.1	μg/L	25-Jun-19	EPA200.8	
Molybdenum	5.6	0.1	µg/L	25-Jun-19	EPA200.8	
Nickel	65.9	0.1	µg/L	25-Jun-19	EPA200.8	
Rubidium	68.8	0.1	µg/L	25-Jun-19	EPA200.8	
Selenium	2.0	0.5	μg/L	25-Jun-19	EPA200.8	
Silver	< 0.1	0.1	μg/L	25-Jun-19	EPA200.8	
Strontium	1030	0.1	µg/L	25-Jun-19	EPA200.8	
Thallium	< 0.1	0.1	μg/L	25-Jun-19	EPA200.8	
Titanium	20.4	0.1	μg/L	25-Jun-19	EPA200.8	
Uranium	4.5	0.1	µg/L	25-Jun-19	EPA200.8	
Vanadium	14.1	0.1	μg/L	25-Jun-19	EPA200.8	
Zinc	234	5	μg/L	25-Jun-19	EPA200.8	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3

Taiga Sample ID: 005

Client Project:	Hamlet of Fort Providence
Sample Type:	Ponded Leachate at LCWA
Received Date:	14-Jun-19
Sampling Date:	13-Jun-19
Sampling Time:	9:44
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	< 0.005	0.005	mg/L	18-Jun-19	SM4500-NH3:G	
Biochemical Oxygen Demand	5	2	mg/L	14-Jun-19	SM5210:B	
Phosphorous, Total	0.049	0.002	mg/L	20-Jun-19	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	247	0.4	mg/L	14-Jun-19	SM2320:B	
Colour, Apparent	53	5	CU	14-Jun-19	SM2120:B	
Conductivity, Specific (@25C)	772	0.4	µS/cm	14-Jun-19	SM2510:B	
pН	7.83		pH units	14-Jun-19	SM4500-H:B	
Solids, Total Dissolved	454	10	mg/L	20-Jun-19	SM2540:C	
Solids, Total Suspended	10	3	mg/L	20-Jun-19	SM2540:D	
Turbidity	1.18	0.05	NTU	14-Jun-19	SM2130:B	
<u>Major Ions</u>						
Calcium	71.6	0.1	mg/L	14-Jun-19	SM4110:B	
Chloride	63.9	0.7	mg/L	14-Jun-19	SM4110:B	
Fluoride	0.3	0.1	mg/L	14-Jun-19	SM4110:B	
Hardness	282	0.7	mg/L	14-Jun-19	SM4110:B	



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3		Taiga Sample ID: 005			
Magnesium	25.0	0.1	mg/L	14-Jun-19	SM4110:B
Nitrate as Nitrogen	0.50	0.01	mg/L	14-Jun-19	SM4110:B
Nitrate+Nitrite as Nitrogen	0.50	0.01	mg/L	14-Jun-19	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	14-Jun-19	SM4110:B
Potassium	22.4	0.1	mg/L	14-Jun-19	SM4110:B
Sodium	38.9	0.1	mg/L	14-Jun-19	SM4110:B
Sulphate	66	1	mg/L	14-Jun-19	SM4110:B
<u>Microbiology</u>					
Coliforms, Fecal	10	1	CFU/100mL	14-Jun-19	SM9222:D
Organics					
Benzene	< 0.002	0.002	mg/L	20-Jun-19	EPA8260B
Ethylbenzene	< 0.002	0.002	mg/L	20-Jun-19	EPA8260B
F2: C10-C16	< 0.2	0.2	mg/L	26-Jun-19	EPA8015B
F3: C16-C34	< 0.2	0.2	mg/L	26-Jun-19	EPA8015B
F4: C34-C50	< 0.2	0.2	mg/L	26-Jun-19	EPA8015B
Hexane Extractable Material	< 2.0	2.0	mg/L	20-Jun-19	EPA1664A
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	26-Jun-19	EPA8015B
Oil and Grease, visible	Non-visible			14-Jun-19	Visual Exam
Toluene	< 0.002	0.002	mg/L	20-Jun-19	EPA8260B
Xylenes	< 0.002	0.002	mg/L	20-Jun-19	EPA8260B
Trace Metals, Total					
Aluminum	13.4	5	μg/L	25-Jun-19	EPA200.8
Antimony	0.2	0.1	µg/L	25-Jun-19	EPA200.8
Arsenic	1.2	0.2	μg/L	25-Jun-19	EPA200.8
Barium	91.8	0.1	μg/L	25-Jun-19	EPA200.8

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Taiga Batch No.: 190358

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3 Taiga Sample ID: 005 Beryllium < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 Cadmium < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 Cesium < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 0.2 Chromium 0.1μg/L 25-Jun-19 EPA200.8 Cobalt 0.1 0.1 25-Jun-19 EPA200.8 μg/L Copper 0.6 0.2 25-Jun-19 μg/L EPA200.8 179 5 Iron 25-Jun-19 μg/L EPA200.8 Lead < 0.1 0.1μg/L 25-Jun-19 EPA200.8 Lithium 9.2 0.2 25-Jun-19 EPA200.8 μg/L Manganese 73.9 0.1 μg/L 25-Jun-19 EPA200.8 Molybdenum 1.0 0.1 μg/L 25-Jun-19 EPA200.8 Nickel 1.1 0.1μg/L 25-Jun-19 EPA200.8 Rubidium 2.6 0.1 25-Jun-19 μg/L EPA200.8 Selenium < 0.5 0.5 μg/L 25-Jun-19 EPA200.8 Silver < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 Strontium 333 0.1 25-Jun-19 μg/L EPA200.8 Thallium < 0.1 0.1 μg/L 25-Jun-19 EPA200.8 Titanium 0.4 0.1 µg/L 25-Jun-19 EPA200.8 0.9 Uranium 0.1μg/L 25-Jun-19 EPA200.8 Vanadium 0.2 0.1 μg/L 25-Jun-19 EPA200.8 Zinc < 5.0 5 25-Jun-19 EPA200.8 μg/L



Taiga Batch No.: 190358

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 2016-3

Taiga Sample ID: 005

- DATA QUALIFERS -

Data Qualifier Descriptions:207Detection limit adjusted due to sample matrix effects

* 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

From:	<u>taiga</u>
To:	Susan Christie (sao@fortprovidence.ca); Erica Janes; Wendy Bidwell
Subject:	Emailing: 190766 - 1920 - FINAL REPORT, 190766 - 1920 - FINAL REPORT
Date:	Tuesday, September 3, 2019 12:22:48 PM
Attachments:	<u> 190766 - 1920 - FINAL REPORT.pdf</u>
	19 <u>0766 - 1920 - FINAL REPORT.xls</u>

Susan,

Please see attached for final report 190766.

Have a good day.

Mársi | Kinanaskomitin | Thank you | Merci | Haį' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsì Glen Hudy Chemist, Quality Assurance Water Resources Environment and Natural Resources Government of the Northwest Territories

Taiga Environmental Laboratory PO Box 1320 Yellowknife, NT X1A 2L9

Phone: 867-767-9235 Ext. 53154 Fax: 867-920-8740 www.enr.gov.nt.ca

Survey: https://www.surveymonkey.com/r/TaigaLab

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Taiga Batch No.: 190766

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

- FINAL REPORT -

Prepared For: Hamlet of Fort Providence

Address: General Delivery Fort Providence,NT X0E 0L0

Attn: Susan Christie

Facsimile: (867) 699-4624

Final report has been reviewed and approved by:

Idu

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
 - o Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - o Environment Canada
 - o 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.



4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9 Tel: (867)-767-9235 Fax: (867)-920-8740 Taiga Batch No.: 190766

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

Client Project:Sample Type:Sewage LagoonReceived Date:23-Aug-19Sampling Date:22-Aug-19Sampling Time:Location:Report Status:Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	8.69	0.005	mg/L	28-Aug-19	SM4500-NH3:G	
CBOD	44	2	mg/L	24-Aug-19	SM5210:B	
Phosphorous, Total	7.02	0.002	mg/L	29-Aug-19	SM4500-P:D	
Inorganics - Physicals						
рН	8.98		pH units	23-Aug-19	SM4500-H:B	
Solids, Total Suspended	75	3	mg/L	27-Aug-19	SM2540:D	
<u>Major Ions</u>						
Nitrate as Nitrogen	0.37	0.01	mg/L	26-Aug-19	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	26-Aug-19	SM4110:B	
<u>Microbiology</u>						
Coliforms, Fecal	< 10	10	CFU/100mL	23-Aug-19	SM9222:D	
<u>Organics</u>						
Hexane Extractable Material	3.5	2.0	mg/L	30-Aug-19	EPA1664A	



Taiga Batch No.: 190766

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

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 1412-2

Taiga Sample ID: 001

* 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:Tuesday, September 03, 2019Print Date:Tuesday, September 03, 2019

Appendix C: Map showing Surveillance Network Program stations for Fort Providence (MV2016L3-0001)

2019-2020 Annual Water Licence Report for Fort Providence (MV2016L3-0001)



ID	Taiga Lab Colour Codes	SNP1412-1	SNP1412-2	SNP2016-1 (TBD)	SNP2016-2 (TBD)	SNP2016-3 (TBD)
Frequency		Monthly	Prior to discharge and weekly during discharge	Beginning and end of open water season, (i.e. one week following freshnet, and before freeze-up)	Twice per year: (1) during the months of June and September; and (2) prior to discharge of accumulated water	Twice per year: (1) during the months of June and September; and (2) prior to discharge of accumulated water
Volume in m ³		Water withdrawn			Water discharged	Water discharged
Effluent Quality Criteria (EQC)			Part D, item 7			
Parameters						
CBOD ₅	0		~	√		
Ammonia (Nitrogen)			\checkmark	\checkmark		
Total Phosphorous (P)	•		\checkmark	\checkmark		
Total Suspended Solids	0		\checkmark	\checkmark	\checkmark	\checkmark
Faecal Coliform	STERILE		\checkmark	\checkmark		
Calcium (Ca)	0				\checkmark	\checkmark
Conductivity	0				\checkmark	\checkmark
рН			\checkmark	\checkmark	\checkmark	\checkmark
Nitrate (NO₃)			\checkmark	\checkmark		
Nitrite (NO ₂)			~	√		
Total Phosphate					√	\checkmark
Potassium (K)					\checkmark	\checkmark
Sodium (Na)					√	√
Sulphate (SO₄)					√	√
Oil and grease (O+G)	\circ		~	√	√	√
Total Petroleum Hydrocarbons	0				\checkmark	\checkmark
BTEX					\checkmark	\checkmark
Total Phenols	0				\checkmark	\checkmark
Total Cadmium (Cd)					\checkmark	\checkmark
Total Chromium (Cr)					\checkmark	\checkmark
Total Cobalt (Co)					√	√
Total Copper (Cu)					√	√
Total Iron (Fe)					√	√
Total Lead (Pb)					√	√
Magnesium (Mg)					√	√
Total Manganese (Mn)					\checkmark	\checkmark
Total Mercury (Hg)					\checkmark	\checkmark
Total Nickel (Ni)					\checkmark	\checkmark
Total Zinc (Zn)					\checkmark	\checkmark

Map Description:

This map demonstrates the Surveillance Network Program (SNP) stations for the Hamlet of Fort Providence Municipal Water Licence MV2016L3-0001.

This map is for illustrative purposes only. This is not a legal document and should not be treated as such.

Coordinate System: NAD 1983 Northwest Territories Lambert Projection: Lambert Conformal Conic Datum: North American 1983 False Easting: 0.0000 False Northing: 0.0000 Central Meridian: -112.0000 Standard Parallel 1: 62.0000 Standard Parallel 2: 70.0000 Latitude Of Origin: 0.0000 Units: Meter

This map is created by the Mackenzie Valley Land and Water Board. For mapping related questions, please contact:

Jacqueline Ho

Regulatory Specialist Mackenzie Valley Land and Water Board jho@mvlwb.com 1 867 766 7455

For any file related questions, please contact: Erica Janes Regulatory Specialist Mackenzie Valley Land and Water Board ejanes@mvlwb.com 1 867 766 7466

Map Produced: December 19, 2018 Data Source: MACA (accessed June 19, 2017); MV2016L3-0001 Current to: December 4, 2017