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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

ᓄᓇᓕᖕᓂ ᒐᕙᒪᒃᑯᓐᓂᓪᓗ ᐱᕕᖃᖅᑎᒃᑯᑦ
Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Taloyoak Water Licence: 3BM-TAL 0813 **Respond to NWB letter June 02, 2014**

Sep 16, 2014

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1L0

RE: Respond to NWB letter June 02, 2014 – Taloyoak Water Licence 3BM-TAL 0813

Dear Ms. Phyllis,

The Hamlet of Taloyoak acknowledged the recipient of the letter dated June 02, 2014 by Erik Skiby (NWB Assistant Technical Advisor) and is pleased to submit to Nunavut Water Board the explanation of the letter as requested.

GN-CGS (Community and Government Services) is pleased to assist the Licensee (here, Hamlet of Taloyoak) in submitting documents and responding any technical issues as policies by GN with the Hamlet. The Licensee remains responsible for requirements as outlined in the Licence where under taken in practicing for water, sewage and waste management activities and submission of Annual Report.

Currently, the Licence 3BM-TAL0813 remains expired since Sep 30, 2013. An Amendment Application duly submitted on Aug 22, 2013 and follow up information on several dates as requested by the Board.

Please find following information and documents as requested in the letter of June 02, 2014:

1. Explanation of issues of waste disposal and management items 1- 3 (with sub-items)
2. Plan of Compliance (updated Sep 16, 2014)
3. Samples Test results from Monitoring Stations.

We hope that Nunavut Water Board will find these information effective for processing the Amendment Licence.

Best Regards,

Shah Alam, P. Eng.

Municipal Planning Engineer,
Government of Nunavut
Community and Government Services
Kitikmeot Region, Cambridge Bay, Nu
Phone: 867-983-4156, fax: 867-983-4124, salam@gov.nu.ca

CC: Karén Kharatyan, Ph. D, Technical Advisor, Nunavut Water Board

Explanation and respond to NWB letter dated June 02, 2014

1. **Waste Disposal facilities**: (sewage disposal, lagoon retention time)

- The Hamlet of Taloyoak provides sewage trucked pickup service and transport it to the lagoon.
- Raw sewage discharge into the lagoon primary cell through a discharge flume and retain them within the cell where a primary treatment happened to raw sewage before it move to the secondary cell when melts in summer and fall.
- Raw sewage stay in the primary cell for the full winter, October - July (of following year) until it thaw and melt sufficient to flow to secondary cell over a submerged berm in between. For the summer discharge from July - September, the heavier part of raw sewage still move down to the bottom of the lagoon and watery part only can make a move to the secondary cell where still participate the natural treatment before a final run to the wetland, generally, it remains in the secondary cell for another year where next summer thaw starts. This treatment and remediation is a continuous process (last in last out) and only run onto wetland during July-September. Additional treatment continues during the effluent traverses through the vegetation enriched long meandering (900 m) natural wetland before final run into Stanners Harbour. Natural sunlight, green vegetation and open air Oxygen helps the additional treatment process tremendously over in wetland. Effluent sampling results from Taiga Lab confirmed the parameters of contamination within lower range of Maximum Allowable Limits (MAC).

- The lagoon is designed to receive municipal sewage only as outlined in the water licence and termed as sewage and sanitary wastes-both grey water and black water.

2.1 **Wetland area:**

Summer vegetation enriched wide area wetland is part of additional treatment for Taloyoak sewage effluent, serving the job for long time. Each year, samples collected from flowing effluents over in wetland at designated monitoring stations, test for parameters to Taiga Lab in Yellowknife and compile results to the Board. See the pictures for wetland and test results of effluent samples.

2.2 **Management Plan**:

The Hamlet's SAO, Forman & operators are responsible for overall operation of sewage collection, transportation, disposal and maintenance of sewage and solid waste facilities. One person is employed to operate each truck and another person connects house tank outlet to the hose at the vacuum truck for each team of two, daily 8:00 am to 5:00 P M. The Hamlet is operating such two trucks with two full time drivers and one truck as backup. Regular 5 days a week service with overtime operation during Saturday and Sunday in the case of emergency. In absence of a regular employee, a casual hiring from local people with appropriate training. To assist in such filling and to create sufficient local employee, hamlet keeps a plan in creating jobs for local operators.

Contact person for any information and action as below:

Operators Name	Title	contact number
Chester Porter	Forman	867-561-5112
Mike Ukuqtunnuaq	Operator	867-561-5112
Greg Holitizki	SAO	867-561-2302

2.2.1 Monitoring Plan

Daily: A brief check of the lagoon carries daily when raw sewage discharge into the lagoon. Site and weather conditions are noted and reported to the hamlet as any activities carried out that day.

Weekly: During snow-free period in summer and fall, integrity of discharge chute, flute tie and support, pad of the sewage lagoon and condition of wetland inspected by the operator and note the date and any issues identified. The truck discharge point and surrounding area examined weekly for signs of cracking, sliding or other operational issues.

Effluent sampling: Grab samples are taking from monitoring stations TAL-2, TAL-3 and TAL-4 during the period July - September from available flow of effluents. TAL-2 sample represent the effluent from secondary cell of sewage lagoon, TAL-3 sample of Solid waste runoff and TAL-4 sample represent the final runoff of combined effluents before meeting into Stanners Harbour (see Monitoring Stations location). Sample results are attached for information.

Toxicity Test: Taloyoak Water Licence is not included the requirement of Toxicity Test since not any reported concern of rainbow trout and raw water source is a Lake, which is far away on the other side of the sewage facility and wetland.

Lagoon decanting and erosion of berm: Taloyoak Sewage lagoon composed of a series of two main cells divided by a natural semi-submerged berm and with no man made berm around. Lagoon sides are naturally built with sedimentary rocks (carbonates, shale's and sandstones); therefore, not a concern for erosion of berms. No decanting requires as the only natural discharge from the secondary cell into wetland when detained sewage thaws in summer.

Sewage Lagoon and wetland Feasibility Study: CGS has already completed the evaluation process for hiring a consultant to complete a study and assessment of current sewage lagoon and a design development report for the improvement of the lagoon or a new system if requires. Such study will take place shortly in this year and expecting a complete report before next summer. Once receive a report and opinion with long time benefit, the Board will be notified for the inclusion of such measure to the current Amendment Licence.

2.2.2 Spill Contingency Plan:

Sewage spills impacts normal living and causes nuisance to habitats. In general, sewage spills, environmental impacts are lower during the winter as snow is a natural sorbent and ice forms a barrier lining for limiting soil or water contamination. Spills can be more readily recovered when identified and reported. The spill can be caused to:

- human and wildlife health hazard and unsightly appearance and
- high nutrient concentrations could negatively impact to water bodies and runoff into water

The worst case scenario is if full sewage truck releases all of its contents onto ground or surrounding environment or substantial failure of the sewage lagoon berm that releases the entire contents of lagoon sewage uncontrolled into the surrounding environment.

Measures: A trench or collection pit could be constructed downstream to collect the spill, if not able to manage the spill, an emergency response team would then to be called with appropriate equipment to deal with the spill. A details Spill contingency Plan including training, spill kits and emergency measure is illustrated in the O&M manual submitted to the Board on Aug 10, 2014.

The sewage lagoon system is a series of natural cell lakes and no man made berm around, therefore, not subjected to breaching or erosion of sides. Capacity of the lagoon was considered in the design. Current study project involve the lagoon capacity assessment and wetland treatment evaluation.

Spills on Snow: Spills on snow can be managed more easily and visible. Snow acts as a natural sorbent for spills. Spill on snow will be shoveled into empty drums or barrels for proper disposal. If the spill is migrating around in down gradient, a snow dyke will be constructed to contain the spill. A plastic tarp will be placed at the base of the dyke where spills can be pooled. The collected spill and impacted snow will be removed with absorbent materials or shoveled into barrels for disposal.

Spills on Ice: Spill on ice layer is impermeable and easy to clean up. Spills will be cleaned by placing absorbent materials on top of the ice. Impacted snow and slush will then be removed by shovels and placing in barrels for disposal.

2.2.3 Hazardous Waste Management Plan

Taloyoak Solid waste facility is not included a liner cell for hazardous storage, but a separate area within the waste facility. The community is using wooden boxes on crate with plastic sheet all around for batteries storage, keeping inside the facility until a shipment arranged. Waste paint and fuel drums are keeping inside old land farm area with fence around. The community has a plan for shipping out those hazardous materials by contracting a licensed contractor.
Leachate runoff from solid waste site collects in the ponding area outside of the facility (as seen in picture). With a stopover in the ponding area, overflow leachate runs onto the shallow stream on wetland where meets with sewage effluent and finally run to Stanners Harbour.

3.1 The Operation and maintenance (O&M) plan:

The operation and maintenance manual for sewage facility including QA/QC, Spill contingency plan has been submitted to the Board on Aug 10, 2014. The O&M manual for solid waste facility under way and will be submitted within this month. A feasibility study project for sewage waste and wetland treatment is ready for awarding to the consultant. The scope included to find the current status and design for best option for waste containment and treatment process. Once such improvement works take place, an updated operational manual will be submitted to the Board.

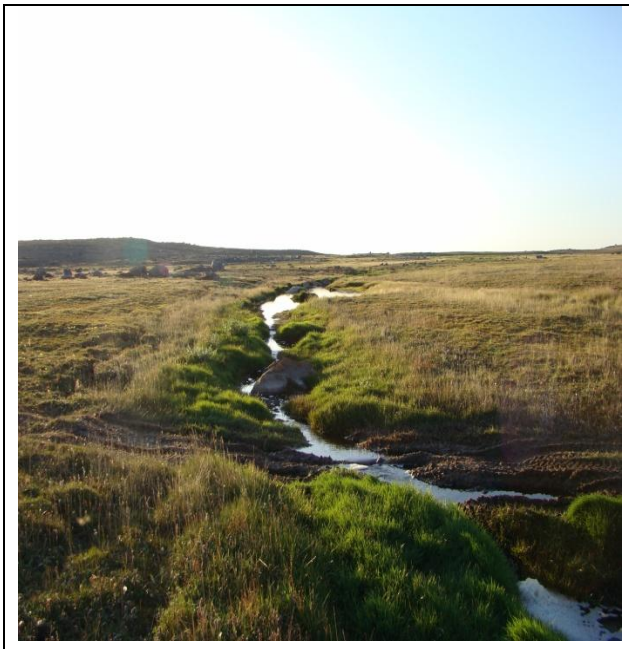
3.2 Solid waste facility run-off

The solid waste facility is on an area of sloping topography – metal dump at one end and municipal solid waste at the other lower sloped end, secured with perimeter fence. Down the slopping area outside of the facility, a shallow sump pond for leachate runoff storage before overflow onto wide area wetland and finally merge with sewage effluent in the shallow drains (as seen in the picture). Grab sample are collecting from the available runoff storage sump (outside the solid waste fence) and test for parameters. Such runoff mostly available during the summer when snow melts and water helps the runoff flow, generally not available after the summer months.

3.3.1 NWB plan for compliance:

As per requirement of Part B, of the water Licence, a **Plan for compliance** was submitted on Sep 30, 2013 to the Board. With some updating information and development of monitoring issues, a **revised Plan of Compliance** was submitted on January 21, 2014.

Summer 2014 Comprehensive waste reduction in solid waste facility made remarkable improvement of monitoring and compliances. Therefore, an updating of the **Compliance Plan** becomes useful. Here, an updating of the **Compliance Plan** also included which would be useful for the Board in processing the Amendment Licence.



Picture 1: Taloyoak Wetland (900 m long)

Picture 2: Monitoring Station TAL-4 for sampling

Picture 3: Green vegetation at Taloyoak Wetland

Picture 4: natural drainage for effluent flow

Picture 5: solid waste run-off storage sump

Picture 6: Solid waste runoff mixing with effluent

Picture 7: Taloyoak Solid waste site

Picture 8: Taloyoak Solid waste on down gradient

Taloyoak Water Licence 3BM-TAL 0813

Sewage effluent and waste runoff samples results

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140728

- FINAL REPORT -

Prepared For: Hamlet of Taloyoak

Address: P.O. Box 8
Taloyoak, NU,X0E 1B0

Attn: **Grant Scott** **Facsimile: 867-561-5057**

Final report has been reviewed and approved by:

Judy Mah
Client Service 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: Tuesday, September 09, 2014
Print Date: ***Tuesday, September 09, 2014***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-2 **Taiga Sample ID:** 001

Client Project: TAL2014-08
Sample Type: Wetland (Sewage)
Received Date: 22-Aug-14
Sampling Date: 22-Aug-14
Sampling Time: 10:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.828	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	55	2	mg/L	22-Aug-14	SM5210:B	
CBOD	65	2	mg/L	22-Aug-14	SM5210:B	
Organic Carbon, Total	47.4	0.5	mg/L	27-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	193	0.4	mg/L	25-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	748	0.4	µS/cm	25-Aug-14	SM2510:B	
pH	9.26		pH units	25-Aug-14	SM4500-H:B	
Solids, Total Suspended	104	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	42.0	0.1	mg/L	26-Aug-14	SM4110:B	
Chloride	105	0.7	mg/L	26-Aug-14	SM4110:B	
Hardness	205	0.7	mg/L	26-Aug-14	SM4110:B	
Magnesium	24.2	0.1	mg/L	26-Aug-14	SM4110:B	

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Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-2 **Taiga Sample ID:** 001

Nitrate as Nitrogen	0.52	0.01	mg/L	26-Aug-14	SM4110:B
Nitrate+Nitrite as Nitrogen	0.88	0.01	mg/L	26-Aug-14	SM4110:B
Nitrite as Nitrogen	0.35	0.01	mg/L	26-Aug-14	SM4110:B
Potassium	17.4	0.1	mg/L	26-Aug-14	SM4110:B
Sodium	79.5	0.1	mg/L	26-Aug-14	SM4110:B
Sulphate	50	1	mg/L	26-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	10	10	CFU/100mL	23-Aug-14	SM9222:D
Organics					
Hexane Extractable Material	2.3	2.0	mg/L	08-Sep-14	EPA1664A
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Subcontracted Organics					
Phenols, Total	0.0059	0.001	mg/L	03-Sep-14	AB ENV.06537
Trace Metals					
Aluminum	111	5	µg/L	04-Sep-14	EPA200.8
Antimony	0.7	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	1.2	0.2	µg/L	04-Sep-14	EPA200.8
Barium	6.1	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	1.1	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	0.3	0.1	µg/L	04-Sep-14	EPA200.8
Copper	8.7	0.2	µg/L	04-Sep-14	EPA200.8
Iron	188	5	µg/L	04-Sep-14	EPA200.8

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Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-2 **Taiga Sample ID:** 001

Lead	0.2	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	8.2	0.2	µg/L	04-Sep-14	EPA200.8
Manganese	32.2	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	1.0	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	1.9	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	16.1	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	81.5	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	3.3	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	1.0	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	14.2	5	µg/L	04-Sep-14	EPA200.8

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Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-3 **Taiga Sample ID:** 002

Client Project: TAL2014-08
Sample Type: Dump Run-off
Received Date: 22-Aug-14
Sampling Date: 22-Aug-14
Sampling Time: 10:30
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.062	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	4	2	mg/L	22-Aug-14	SM5210:B	
CBOD	5	2	mg/L	22-Aug-14	SM5210:B	
Organic Carbon, Total	27.5	0.5	mg/L	27-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	315	0.4	mg/L	25-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	2480	0.4	µS/cm	25-Aug-14	SM2510:B	
pH	7.51		pH units	25-Aug-14	SM4500-H:B	
Solids, Total Suspended	12	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	341	0.1	mg/L	26-Aug-14	SM4110:B	
Chloride	186	0.7	mg/L	26-Aug-14	SM4110:B	
Hardness	1180	0.7	mg/L	26-Aug-14	SM4110:B	
Magnesium	79.1	0.1	mg/L	26-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.18	0.01	mg/L	26-Aug-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.18	0.01	mg/L	26-Aug-14	SM4110:B	

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Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-3 **Taiga Sample ID:** 002

Nitrite as Nitrogen	< 0.01	0.01	mg/L	26-Aug-14	SM4110:B
Potassium	47.2	0.1	mg/L	26-Aug-14	SM4110:B
Sodium	135	0.1	mg/L	26-Aug-14	SM4110:B
Sulphate	939	1	mg/L	26-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	47	1	CFU/100mL	22-Aug-14	SM9222:D
Organics					
Hexane Extractable Material	< 2.0	2.0	mg/L	08-Sep-14	EPA1664A
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Subcontracted Organics					
Phenols, Total	0.0043	0.001	mg/L	03-Sep-14	AB ENV.06537
Trace Metals					
Aluminum	17.0	5	µg/L	04-Sep-14	EPA200.8
Antimony	4.9	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	0.9	0.2	µg/L	04-Sep-14	EPA200.8
Barium	46.9	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	0.7	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	0.5	0.1	µg/L	04-Sep-14	EPA200.8
Copper	1.0	0.2	µg/L	04-Sep-14	EPA200.8
Iron	1100	5	µg/L	04-Sep-14	EPA200.8
Lead	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	40.8	0.2	µg/L	04-Sep-14	EPA200.8

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-3 **Taiga Sample ID:** 002

Manganese	551	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	6.2	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	3.0	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	1720	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	0.9	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	1.4	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	0.3	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	22.4	5	µg/L	04-Sep-14	EPA200.8

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Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-4 **Taiga Sample ID:** 003

Client Project: TAL2014-08
Sample Type: End of Wetland
Received Date: 22-Aug-14
Sampling Date: 22-Aug-14
Sampling Time: 10:30
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.503	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	17	2	mg/L	22-Aug-14	SM5210:B	
CBOD	16	2	mg/L	22-Aug-14	SM5210:B	
Organic Carbon, Total	28.1	0.5	mg/L	27-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	219	0.4	mg/L	25-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	1030	0.4	µS/cm	25-Aug-14	SM2510:B	
pH	7.93		pH units	25-Aug-14	SM4500-H:B	
Solids, Total Suspended	20	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	72.0	0.1	mg/L	26-Aug-14	SM4110:B	
Chloride	130	0.7	mg/L	26-Aug-14	SM4110:B	
Hardness	332	0.7	mg/L	26-Aug-14	SM4110:B	
Magnesium	37.1	0.1	mg/L	26-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.34	0.01	mg/L	26-Aug-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.38	0.01	mg/L	26-Aug-14	SM4110:B	

ReportDate: Tuesday, September 09, 2014
Print Date: ***Tuesday, September 09, 2014***

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Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-4 **Taiga Sample ID:** 003

Nitrite as Nitrogen	0.04	0.01	mg/L	26-Aug-14	SM4110:B
Potassium	10.4	0.1	mg/L	26-Aug-14	SM4110:B
Sodium	89.7	0.1	mg/L	26-Aug-14	SM4110:B
Sulphate	129	1	mg/L	26-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	90	10	CFU/100mL	23-Aug-14	SM9222:D
Organics					
Hexane Extractable Material	< 2.0	2.0	mg/L	08-Sep-14	EPA1664A
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Subcontracted Organics					
Phenols, Total	0.0048	0.001	mg/L	03-Sep-14	AB ENV.06537
Trace Metals					
Aluminum	32.5	5	µg/L	04-Sep-14	EPA200.8
Antimony	0.3	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	0.8	0.2	µg/L	04-Sep-14	EPA200.8
Barium	15.9	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	0.4	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Copper	2.0	0.2	µg/L	04-Sep-14	EPA200.8
Iron	310	5	µg/L	04-Sep-14	EPA200.8
Lead	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	10.7	0.2	µg/L	04-Sep-14	EPA200.8

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Taiga Batch No.: 140728

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TAL-4 **Taiga Sample ID:** 003

Manganese	27.7	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	0.8	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	1.1	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	6.9	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	116	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	1.3	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	1.0	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	< 5.0	5	µg/L	04-Sep-14	EPA200.8

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*** 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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