

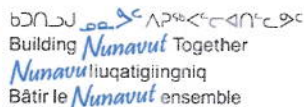


**Date: October 07, 2014**

## GN Project # 10-4008 – Gjoa Haven Waste Treatment Facilities

*a. This plan shall specify the proposed method to manage the Sewage and Wastewater effluent and/or the planned works to be undertaken at the Gjoa Haven Community Sewage Lagoon and shall include a detailed chronology of the short and long term progress, measures and activities that have and will be taken and provide dates when each progress measure and activity was initiated and concluded such that the Gjoa Haven Community Sewage Lagoon may be reclaimed and all deposits of waste will be compliant with the Water Licence (as it may be amended, renewed or replaced from time to time), and the Act.*

1. The community will only use the new lagoon for waste water disposal. This lagoon was completed and commissioned in September 2013. The effluent from the lagoon will be discharged on an annual basis to the current effluent discharge location.
2. It is understood that the new lagoon is not specifically identified in the existing community Water Licence. The Community will submit the required Water Licence Amendment documentation prior to January 31, 2015 for review and approval by the Nunavut Water Board.
3. The Abandonment and restoration plan for the old lagoon is currently being amended and will be submitted to the Nunavut Water Board (NWB) for review and approval no later than October 14<sup>th</sup>, 2015. The revisions will take into account comments received from AANDC and NWB.
4. The GN has budgeted funding for the intended works that are described in the Abandonment and Restoration (A&R) plan of the old lagoon. These works will be completed after the plan is approved by the NWB in the spring, summer and fall of 2015. While the final A&R plan needs to be approved by the NWB prior to implementation, it is expected that the A&R plan will include;



- a. Repatriation of the materials used from the berms of the old lagoon for the road works;
- b. Monitoring of the remaining effluent in the old lagoon, and release of effluent meeting the current Water Licence requirements;
- c. Consolidation and entombment of the remaining sludge in the old lagoon;
- d. Area grading to prevent ponding water;
- e. Long term monitoring of the restored site.

5. Training of the Hamlet staff in 2015 on the operation of the discharge system for the new lagoon.
6. Training of the Hamlet staff in 2015 on the effluent sampling and downstream monitoring requirements for the new lagoon and the restored old lagoon.



CC: Shane Slifka, Regional Project Manager, CGS  
Shawn Stuckey, Senior Administrative Officer, Gjoa Haven  
Phyllis Beaulieu, Manager of Licensing, NWB  
Ralph Ruediger, Director of Community Development  
Shah Alam, Municipal Planning Engineer, CGS

# PLAN FOR COMPLIANCE

Licence Number: NWB3GJO-0409

HAMLET OF GJOA HAVEN

Date of Issuance: January 08, 2004

Date of Expiry: January 31, 2009

Date of Preparation: Dec 12, 2012

Prepared by: Shah Alam, P. Eng.

Printed



Signature

Date of Submission: December 12, 2012



December 12, 2012

Nunavut Water Board

PO Box 119

Gjoa Haven, Nunavut, X0B 1J0

Attention: Phyllis Beaulieu, Manager of Licensing

RE: Water Licence Compliance Plan for Hamlet of Gjoa Haven, NU (Licence No. NWB-3GJO-0409)

Dear Ms. Beaulieu,

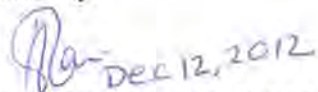
On behalf of the Hamlet of Gjoa Haven I am pleased to submit to Nunavut Water Board the attached application package for the compliance plan of its Licence No. NWB-3GJO-0409. Copies of required reports are attached herewith as requested for your review and requirements.

We realize that it has been late in submitting our compliance plan; however, a separate compliance plan has been submitted by Dillon Consulting on behalf of the Hamlet of Gjoa Haven on July 15, 2011 in support to the renewal of its Water Licence. We also refer to your respond to Bill Westwell (Senior Municipal Planning Engineer) dated Sep 07, 2011 to the application for renewal and plan for compliance which comprises some clarification and outstanding information to be updated with the Board. We are forwarding this package of 'plan for compliance' which will cover most of the information including monitoring program, annual reports, training for operator, operation and maintenance of facilities, QA/QC plan and abandonment & restoration plan as requested by the Board.

With the help of Government of Nunavut through Community and Government Services, we have undertaken a comprehensive waste management monitoring program which has led to the improvement of sewage and solid waste site facilities, wetland and effluent discharges. Our annual monitoring program for water, sewage and solid waste has been in effect since summer 2012. Sample tests result has shown excellent control on contamination parameters within allowable limits comprising BOD, TSS, E-coli and Toxicity components. There is no change in Operation and Maintenance plan for water supply; however remediation measures has been taken for current sewage leakage and freeboard issues and separation/segregation/piling of solid waste dumps. We are looking forward to have an updated manual for sewage facility and solid waste site which is a priority to the scope of consultants (Dillon consulting and EXP) hired by GN. Such updating will be submitted to NWB once ready.

We hope that Nunavut Water Board will find our supporting documents valuable to the compliance plan in regards to the Water Licence Renewal process. In anticipation of the need to consider the Licence renewal application, we are requesting for re-installation of the current Licence status in order to submit necessary amendments to the Board to have the full Water Licence. We all admit that water supply and waste management are the top priority in adherence to public safety and environmental protection.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Shah Alam', with the date 'Dec 12, 2012' written below it.

(Shah Alam, M. Eng. P. Eng.)

Municipal Planning Engineer,

Kitikmeot Region, Cambridge Bay, Nunavut

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## **APPENDICES**

<b>Annual Reports water &amp; sewage 2011 and 2012</b>	<b>Appendix 'A' (6 pages)</b>
<b>Annual monitoring Results (Taiga Lab and Stanton Lab)</b>	<b>Appendix 'B'</b>

## Executive Summary

The Hamlet of Gjoa Haven is responsible for the disposal of sewage and solid waste generated from the community. These facilities are currently operating without a water licence active. Current sewage lagoon is undersized and went through some repairs due to leakage issue, inadequate freeboard height, and possibility of sewage overflow during summer time if discharge flute fails to sewage out properly. Leakage through the berm may weaken the confinement of raw sewage and possible runoff onto wetland that finally discharge onto ocean without proper treatment. DIAND and Environment Canada had notified the issue in 2010. Solid waste site facility had issues over the year in terms of operation & maintenance manual updating, control of metal and hazardous materials leachate mixing onto water through wetland, poor segregation & piling of waste dumps, illegal dumping outside the facility, poor signage & monitoring at the facility, broken spots of protection fence and poor performance of operators due to lack of training.

In order to obtain the Water Licence through the Nunavut Water Board, improvements were required to the sewage lagoon and solid waste site facilities. The hamlet of Gjoa Haven with the help of GN had taken certain measures over the year in compliance to the requirements for water licence renewal, but due to incomplete information of the compliance plan and time specific confirmation of outstanding items (O & M manual, abandonment & restoration plan of facilities, annual reports of water drawn & sewage disposal and monitoring schedule for sampling & training) the community water licence status still remains unchanged. However, NWB has outlined some items to be updated with the Board and submit a short term plan and a long term plan of compliance. This report of compliance plan is prepared with the confirmation of most items requested in the letter of NWB in respond to earlier submissions by GN and by Dillon Consulting.

The community has repaired the leakage issue of current sewage lagoon and raised the berm height to reinstall enough freeboard (current freeboard height more than 1.5 m). However, construction contract for a new full engineered lagoon already awarded and expecting completion by end of 2013, which will be used for sewage disposal of the community, then current lagoon will be in the abandonment plan. Monitoring of current solid waste facility has been started since summer 2012 comprising segregation of metal dump and hazardous waste and piling up in separate cells, picking up paper boards & wood pieces from household dump, isolation of batteries and waste oil, repair of broken fence and removal of illegal dump outside of the facility. Signage has been installed on the location of sampling stations (GJO-2, GJO-3 & GJO-4) with GPS locators. Comprehensive monitoring of solid waste facility will be continued during the summer 2013 including signage, pictures, leachate retention from hazardous & metal cells, drainage for effluent runoff and retention sump, improvement of wetland flows and operators practical training. GN has retained EXP consultants to help the community in compliance with requirements requested by the Board.

CGS of GN will continue the monthly monitoring and sampling program for water, sewage and solid waste effluent from April 2013 to fall. Monitoring and sampling program also included in hand training, sample preservation, packaging, transportation, communication with laboratory for testing and recording of sample results for Annual Reporting to the Board.

## **PLAN FOR COMPLIANCE**

### **PART 'B': General Conditions: Item 1- Annual Report with the Board containing**

- (i) Monitoring Program in tabular summaries**
- (ii) Monthly Annual quantities in cubic meters of fresh water obtained**
- (iii) Monthly and annual quantities in cubic meters of waste discharged**
- (iv) Summary of modifications and/or major maintenance work carried out on facilities**
- (v) List of unauthorized discharged and summary of follow up**
- (vi) Summary of abandonment and restoration work completed or anticipated next year**
- (vii) Summary of any studies, reports and plan**
- (viii) Any other request on water use or waste disposal requested by the Board**

#### **Water monitoring and Annual Reports:**

During the last summer and the fall, water and waste samples were collected from each monitoring stations and tested in the approved laboratory. Water samples were taken from station GJO-1 located at Swan Lake where raw water were taking through twin intakes and treated at the treatment plant close near the community of Hamlet of Gjoa Haven. Treated water distribute by truck-fill to the water tank at the resident and at the business places. Annual quantity of water obtained from intake source Swan Lake was 31,300 m<sup>3</sup> during the year 2011 and estimated 33,000 m<sup>3</sup> for the year 2012(attached Annual Reports 2011 and 2012). Water samples results has shown the constituents parameters within allowable limits. No trace of Total coliform and E. coli in the water (results attached).

#### **Waste monitoring and Annual Reports:**

As per guidelines and conditions set out in the Water Licence, runoff from solid waste facility and leachate from metal dump were monitored like every year and sampling for test during the summer and the fall. Samples were taken during the summer and the fall 2012 from these monitoring stations GJO-2 and GJO-4 as identified in the licence. Results of these samples 2012 are attached. The annual quantity of waste disposal were within the allowable limit based on the number of trucks collected and deposited at the facility, no specific measurement was possible to confirm exact volume.

Samples will be taken at least once a month during the period of May–September for next year and hereafter every year and send to Taiga Lab at Yellowknife for tests. Results will be updated with NWB time to time and with Annual Report.

#### **Future Monitoring program details for Solid waste site facility:**

Samples will be collected from the deposit of runoff and leachate at designated station Gjo-2 (Effluent discharge point from final discharge point of the solid waste disposal facility).



Water sample will be tested to analyze the following parameters:

Parameters	Test Requires	Parameters	Test Requires
BOD	✓	Faecal Coliforms	✓
PH	✓	Conductivity	✓
TSS	✓	Amonia Nitrogen	✓
Nitrate-Nitrite	✓	Oil and Grease	✓
Total Phenols	✓	Sulphate	✓
Sodium	✓	Potassium	✓
Magnesium	✓	Calcium	✓
Total Arsenic	✓	Total Cadmium	✓
Total Copper	✓	Total Chromium	✓
Total Iron	✓	Total Lead	✓
Total Mercury	✓	Total Nickel	✓
Total Zinc	✓		

**Note:** *Hamlet of Gjoa Haven has carried such sampling program during the year 2012, tested the samples at Taiga lab and summarized the results in the Tabular Form-attached with this Report.*

#### **Abandonment and Restoration:**

There was no abandonment & restoration of water, sewage or solid waste facility during the year 2012 and in between the duration 2009-2011. Construction of a new liner bedding and sides engineered lagoon has awarded and contractor has started mobilization of construction materials and equipment at site. The new Lagoon will be constructed at the close vicinity to the existing lagoon and will be connected to the existing wetland facility. Expected completion of the new lagoon by the end of Dec 2013 and will be available in operation in early 2014. Plan for abandonment and restoration of existing sewage lagoon will be submitted to the Board by Oct 2013.

Existing water intake facility has been in operation since 2009 and drawing water from Swan Lake. Searching for an alternate source also in plan for any interruption or emergency require. GN has hired William Engineers to look into an alternate source for every community within the Region. Information will be updated with the Board once such report available to GN or Hamlet.

Community's only solid waste site has been in operation since last 14 years. Hamlet and GN are aware of the capacity and maintenance of this facility. Large scale maintenance including protection berm, higher fence, peripheral surface drain (gradient), runoff and leachate retention sump, decant facility and on site composting of waste are in plan provided capital support. GN has already hired EXP consultant to find out the current situation and summarize reports including Operation and Maintenance (O & M) manual of existing facility and Training of Hamlet operators. Such report and manual will be submitted to the Board once ready, expected by end of 2013.



**The QA/QC plan for Solid Waste Monitoring program:**

This plan includes sample collection procedures for grab samples from designated runoff retention location near the wetland area-outside of the facility. Hamlet operators are responsible for sample collection and arrangement with Taiga Lab prior to sample collection to ensure they have the proper instructions and get the lab ready to receive the sample on time. Hamlet has also obtained a certificate from the lab stating that the lab is certified as a CAEL laboratory.

**Site Records:**

Copies of records of operation and monitoring of solid waste site will be kept at Hamlet office with the knowledge of SAO. Records will be included with the information of:

- Volume of dump received during the year
- Volume/quantity of dumps transferred or buried / composted during the year
- Volume/quantity of hazardous waste deposited at site and steps in monitoring
- Copies of spill reports and regulatory guidelines

**Site Access Control:**

The solid waste site is enclosed with a fence and an unlocked gate with the facility of dumping year round to the public. A watchman fence will be constructed at the entrance to the metal dump facility to mark the start of the facility. Hamlet operator will visit the facility inside and all around on a routine basis and carry out any immediate maintenance as required. During the CGS monitoring program 2012, several spots of fence has been identified as broken and shaky, however, hamlet operators has re-installed those spots and tightened the security of the facility. Hamlet remains responsible to carry out any such occurrence in the coming year during the operation of this facility.

**Operational Procedure**

The purpose of the solid waste facility is to collect waste from Hamlet of Gjoa Haven and dispose in a designated safe, secure and all weathered accessible environmentally conscious manner. The types of waste disposable to the solid waste facility and operation procedure are as follows:

Hamlet operator will ensure that the solid dump site will accepts only the materials for those the facility has been designed to handle and deposited in the designated areas. Any exception will be reviewed and approved by the Board.

The following items will be accepted for the disposal to the solid waste site facility:

- General household waste comprising non-recyclable plastic, metal, paper waste, packaging, cardboard, food waste, glass, wood, lather etc.
- Organic vegetable, animal waste, clothing, textile, broken and unused furniture, electrics
- Wood and wooden furniture (broken or unused), plastic sheet, insulation sheet/fiber, still piece/sheet metal, home repair salvage, paint etc.

- Broken or salvage auto parts, waste oil, batteries, body parts, ATV, bike, motor cycle, tires
- Construction repair, demolition waste, grocery stores

Waste which consider a danger at the solid waste facility are not acceptable for disposal at the dump such as pathological wastes, radioactive wastes, asbestos and hazardous waste etc. special arrangement for transporting these materials with licensed handler to the designated industry should be maintained.

Hamlet of Gjoa Haven has contacted KBL of Yellowknife for handling such materials for the next year and after. Any other materials not listed as acceptable or conditionally acceptable with the approval of the SAO or an officer in charge by the hamlet.

The solid waste site facility has been divided into cells for disposal facilities if different types of wastes and identified with signage such as:

- General household, grocery stores and office cleaning waste
- Cardboard, wood product, solid plastic sheet and similar items
- Steel section, steel sheet and metal pieces
- Animal carcasses and similar products
- Batteries and waste oil products
- Hazardous materials

Management of dumps by Hamlet crews:

- Hamlet operator/maintenance worker collect wastes twice a week from designated dump bin placed in front or nearby to the house, shop or business centre, transport with covered truck and dispose at the designated location inside the dump area.
- Residents are encouraged to deposit wood products, cardboard, metal piece etc. to the designated area for recycle and for others uses. Hamlet crews are scheduled twice a week to pick up these products throughout the summer and the fall. Any illegal or inappropriate dump outside the designated place will be removed and piled in proper location by the hamlet crews.

#### **Signage:**

The solid waste facility will be identified with signage at the entrance with direction arrows for public with information of the facility uses. The sign will contain the basic information:

(i) site name, (ii) acceptable materials for waste and recycle, (iii) non-acceptable materials and (iv) penalties for inappropriate dumping, (v) operational hours and (vi) contact number. Signage also will be placed at the cell of different types of disposal at designated location in English and Inuktitut language. Hamlet has the plan to put picture of waste type acceptable and non-acceptable within the facility. Hamlet has already placed some signage at the solid waste site and sampling station. Any missing signage with full requirements and languages conversion will be provided by the Hamlet during the summer 2013. CGS and EXP consultant will cooperate with hamlet in establishing full placed signage facility and the Board will be informed updating by July 2013.

**Waste Inspection:**

The hamlet operator will carry random check of the waste entering and depositing at the facility. Hamlet operator will be watchful for potential hazardous wastes during unloading or depositing at the site and dumping will be ceased from potential suspected people or vehicle. The site operator will record as much information as possible about such dumper and possible banned from the site for a period by the SAO.

The Hamlet SAO is responsible for overall operation of the facility. Two to three (2-3) peoples are employed by the hamlet to operate the waste collection vehicle and depositing wastes at site facility. SAO will supervise the hamlet crews and will coordinate with clients and regulatory Board. Duties and responsibilities of the SAO will include:

- Perform operations of the facility and its maintenance in accordance with the guidelines by NWB
- Ensure only the acceptable waste deposited at site facility and segregate according to the types.
- Prepare facility operation and maintenance schedule and budget
- Ensure the annual monitoring program and sampling operation.
- Ensure operator training and workshop useful to the profession and compliance with regulatory organization and board.

Contact information of hamlet team and crews are as follows:

SAO (Senior Administrative Officer) – core point of contact: 867-360-7141

Hamlet Foreman – will lead the crews of 2-3 regular employment: 867-360-7141/ 867-360-4648 (request)

Crew members – full time employee by the hamlet: 867-360-7141 (operator request)

CGS operator – site representative for any contact to GN: 867-360-4648

**PART 'C': Condition to Water Use: Item 2- Annual Report with water uses**

Raw water is pumped from Swan Lake using twin intake pump system, transport to Water Treatment Plant and distribute treated and disinfected water by truck-fill. The 3.0 km buried water transportation line has re-heat stations in between for heat recharging to the hot water recirculation line inside the water carrier line to protect water from winter freeze up. Water is treated through pressure filters and stored in a two-celled tank inside the plant. Chlorine is added to the treated water both before stored in the tank and is pumped into the water distribution truck using a chlorine injection dosimeter. The pressure filters are cleaned by backwashing the treated water from storage tank and disposed to exterior sum pit which then evaporate and ex-filtrate naturally.

Intake pump house comprises two active pumps with additional two backup pumps, two generators and emergency truck-fill arms outside. SCADA monitoring control system including HMU and PLC, installed at the treatment plant which monitors the flow rate, temperature and pressure inside the pipeline and automate the on/off activities of intake pumps remotely.

Annual quantity of water drawn are shown in 'Annual Reports 2011 and 2012' attached with this report shows the water consumption 31,300 cubic metres and 33,000 cubic metres respectively (calculated by truck load) which are within the allowable limit of not exceeding 62,000 cubic meters.

Contacts about treatment plant, pump house and water line: Phone: 867-360-7063, Fax: 867-360-7064

Water distribution by hamlet at: phone: 867-360-4648, Fax: 867-360-4647

**PART 'D': Conditions for waste disposal: Items 3, 5,7,8- Freeboard limit, sewage & solid waste disposal**

The current sewage lagoon of the community consists of a single cell with design capacity 22,700 cubic metres. Annual Reports 2011 and 2012 shows amount of sewage disposal within 31,000 cubic metres and 35,000 cubic metres respectively. Summer decanting/discharge flume facilitate the continuity of sewage retention inside the cell for up to 22,000 cubic metres at any time. Based on annual disposal and allowable limit (60,000 cubic metres), current lagoon is at its capacity, stated in DIAND report 2011. Community has planned for a new engineered lagoon with larger capacity which construction in progress and expected operation by winter 2013. Community still will operate the current lagoon and monitor effluent discharge.

Repairs of leakage issue, freeboard height and lagoon berm has been completed early 2012. After such repair, no issues of leakage or overflow notified. Effluent discharge from current lagoon has been monitored during the summer 2012 which was notified an issue by DIAND and Environment Canada in regards of quality and operation. Effluent discharge result shows the parameters within allowable limit and excellent improvement in recipient of BOD and reduction in toxicity during on wetland (attached effluent monitoring results 2012). Hamlet will continue the monitoring of effluent discharge and inspection of sewage facility during the summer period 2013 (April- September).

Current solid waste facility has been in operation since last 14 years. Hamlet is aware of its current situation of its capacity and major maintenance works. With the help of GN, hamlet has intensive plan of improving the facility and its operation maintenance in coming years. Hamlet also has done some of these necessary improvement during the summer 2012 comprising segregation of metals and hazardous dumps, piling of dumps in respective location based on types, protection of leachate from metals & hazardous materials (issues reported in DIAND Reports 2010) and protection of discharge from solid waste site onto wetland and finally onto ocean. Annual monitoring 2012 found the effluent results within the allowable limit as outlined in the following Table by the Board (sample from station GJO-4). It was noticed insufficient drainage scope for leachate and effluent collection into a retention pond. Hamlet has a plan to improve this facility in next year 2013 as well as operation and training to the operator, security of facility with isolation cells, discharge protection berm, signage and fencing. GN has retained EXP consultant to guide and improve this facility in 2013, a training program already has taken place during Oct 2012 as part of their scope where Hamlet operator has received the training and will continue again in April 2013. EXP also will help the community in preparation of updated O & M manual for solid waste facility and will be updated the Board with such manual once ready.



Effluent quality from sewage disposal facility at monitoring station GJO-4

Parameter	Maximum Average Concentration (MAC limit)
Faecal Coliform	$1 \times 10^4$ CFU/dl
BOD <sub>5</sub>	80 mg/L
Total Suspended Solids (TSS)	100 mg/L
Oil and Grease	No visible sheen
p <sup>H</sup>	Between 6 and 9

**PART 'G': Conditions for applying: Item 1- Abandonment and Restoration for any facility**

The Hamlet had no plan for abandonment and restoration of any facility during the year 2012. However, construction of a new lagoon only in plan for 2013 which will be replaced the operation of current sewage lagoon, expecting in winter 2013. Dillon Consulting has been retained by GN for this facility, abandonment and restoration application of this facility will be submitted to the Board sometime in Oct 2013 once the confirmation of substantial completion of the new lagoon obtained.

**PART 'H': Conditions for applying Monitoring Program: Items 1, 2,3**

Hamlet has carried out monthly monitoring program for water, sewage and solid waste facilities during the year 2012. Samples are available at stations GJO-2, GJo-3 and GJO-4 only during April – August. However, only water sampling (Truck-fill) possible for the remaining months of the year. Following are the results:

GPS location of the sample point is shown in the **Table below** as stated in the Water Licence.

Station	Latitude	Longitude	Identity Description
GJO-1			Raw Water supply at the Swan Lake prior to treatment
GJO-2	5W 0384462	UTM 7614362	Effluent from final discharge point of solid waste site
GJO-3			Raw sewage at truck offload point
GJO-4	15W 0384509	UTM 7614712	Effluent discharge from final sewage discharge point

**Part H: Monitoring program.**

Item No.1: Four monitoring stations: - (i) GJO-1 (Raw Water at Swan lake)  
(ii) GJO-2 (Effluent from Solid waste site (iii) GJO-3: (Raw Sewage at truck offload and (iv) GJO-4: (Effluent Final discharge point)

**item 2: samples at monitoring stations:**

samples collected on July 16, Aug 24 and Sep 17, 2012 and tested results

**Wastewater/Sewage parameters**

Parameter	MAC	Units	July 16,2012		Aug 24,2012		17-Sep-12	
	Limits		GJO-2	GJO-4	GJO-2	GJO-4	GJO-2	GJO-4
Alkalinity		mg/L	327	314	312	358	288	317
Conductivity		µS/cm	2650	1020	1000	1100	910	989
p <sup>H</sup>	6-9		6.92	7.5	7.74	7.4	7.78	7.74
TSS	100	mg/L	86	12	18	106	<3	4
Ammonia N2	80	mg/L	8.77	11.3	12.8	17.0	4.31	9.45
BOD		mg/L	77	5			3	4
Organic Carbon		mg/L	150	51.6	52	67.5	62.5	80
Nitrate N2		mg/L	<0.01	0.02	1		0.94	1.02
Calcium		mg/L	352	40.2	43.6	44.6	48.3	41.7
Chloride		mg/L	194	137	123	132	120	130
Hardness		mg/L	1120	224	238	240	254	233
Magnesium		mg/L	58.1	30	31.4	31.4	32.3	31.4
Potassium		mg/L	44.3	17.4	14.1	18.3	11.7	16.6
Sodium		mg/L	171	112	98	112	89.7	109
Sulphate		mg/L	892	4	1	2	11	8
Fecal Coliform	10000	CFU/100mL	820	125			124	48
Oil and Gas	5000	µg/L	non-vis	non-vis	non-vis	non-vis	non-vis	non-vis
Aluminium		µg/L	87	45.6	30.6	103	19.4	30.2
Arsenic	100	µg/L	12.9	7.7	7.4	27.1	3.8	6.3
Cadmium	10	µg/L	1.1	<0.1	<0.05	<0.1	<0.05	<0.05
Chromium	100	µg/L	3.4	0.3	0.7	1.1	1.2	0.5
Cobalt	50	µg/L	7.1	<0.1	3.1	2.4	2.3	4.0
Copper	200	µg/L	88.9	0.7	4.4	3.3	4.3	7.1
Iron		µg/L	25800	3130	2400	16400	1600	2540
Lead	50	µg/L	54.5	0.2	0.4	0.4	<0.1	<0.1
Manganese		µg/L	1090	155	193	279	122	167
Nickel	200	µg/L	22.7	6.8	9.4	7.9	9.2	12.8
Zinc	500	µg/L	826	<5	7	<0.4	11.9	0.8
Mercury	0.6	µg/L	0.12	0.03	<0.01	<0.01	0.02	0.01
PCB	1000	µg/L						
Phenols	20	µg/L						



# Hamlet of Gjoa Haven Chlorine Logs - 2012

Date	Received		Avg. Free Chlorine	Date	Received		Avg. Free Chlorine
Ending	Yes	No		Ending	Yes	No	
Jan 2-8		X		July 2-8	✓		0.25
Jan 9-15		X		July 9-15	✓		0.41
Jan 16-22		X		July 16-22	✓		0.42
Jan 23-29		X		July 23-29	✓		0.34
Jan 30-Feb 5		X		July 30-Aug 5		X	
Feb 6-12		X		Aug 6-12	✓		0.42
Feb 13-19		X		Aug 13-19	✓		0.48
Feb 20-26		X		Aug 20-26	✓		0.44
Feb 27-Mar 4		X		Aug 27-Sept 2	✓		0.45
Mar 5-11		X		Sept 3-9	✓		0.43
Mar 12-18		X		Sept 10-16	✓		0.45
Mar 19-25		X		Sept 17-23	✓		0.45
Mar 26-Apr 1		X		Sept 24-30		X	
Apr 2-8		X		Oct 1-7		X	
Apr 9-15		X		Oct 8-14	✓		0.53
Apr 16-22	✓		0.08	Oct 15-21	✓		0.44
Apr 23-29	✓		0.12	Oct 22-28	✓		0.40
Apr 30-May 6	✓		0.19	Oct 29-Nov 4	✓		0.43
May 7-13	✓		0.16	Nov 5-11	✓		0.38
May 14-20	✓		0.14	Nov 12-18	✓		0.37
May 21-27	✓		0.27	Nov 19-25	✓		0.78
May 28-June 3	✓		0.38	Nov 26-Dec 2	✓		0.68
June 4-10	✓		0.24	Dec 3-9	✓		0.44
June 11-17	✓		0.24				
June 18-24	✓		0.22				
June 25-July 1	✓		0.18				

Note: unit of chlorine measures in **mg/L** of sample water  
Recommended Free Chlorine limits; between **0.2 to 0.5 mg/L**

Note: CGS has started the Monitoring program effecting from April 2012

### Hamlet of Gjoa Haven Bacteriological Tests - 2012

Date	Sample Date	Results	
		Total coliform	E. Coli
January			
February			
March			
April			
May			
June			
July			
August	01-Aug-12	Absent	Absent
September			
October	01-Oct-12	Absent	Absent
November	27-Nov-12	Absent	Absent
December			

Note: Bacterial Tests conducts for identifying existence of  
(i) **Total Coliform** and (ii) **E. coli** in potable water supply

CGS has started the Monitoring program from Apr 2012



# PLAN FOR COMPLIANCE LICENCE NO. NWB-3GJO-0409 (EXPIRED)

Licence Condition		Status of Compliance	Short Term Compliance	Schedule for Implementation of Short Term Plan (including funding status where applicable to municipal developments)	Long Term Plan of Compliance (including funding status where applicable)
Part B	General Conditions				
B-1	<p>The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:</p> <ol style="list-style-type: none"> <li>tabular summaries of all data generated under the "Monitoring Program";</li> <li>the monthly and annual quantities in cubic metres of fresh water obtained from all sources;</li> <li>the monthly and annual quantities in cubic metres of each and all waste discharged</li> </ol>	<p>Non compliance</p> <p>- Hamlet Annual reports from 2004-2010 still outstanding</p>	<p>Annual Monitoring program already in effect and implemented summer 2012. CGS with the help of Hamlet operators has carried the following activities:</p> <ul style="list-style-type: none"> <li>Raw water samples taken from Swan Lake and tested in laboratory for water composition parameters.</li> <li>CGS intention to ensure the Monitoring and sampling program, continue summer and fall 2013.</li> <li>Annual quantities in cubic meters drawn reported in the Annual Reports</li> </ul>	<ul style="list-style-type: none"> <li>sampling results 2012 submitting</li> <li>Hamlets Operation and sampling schedule will be provided by March 31, 2013</li> <li>Annual Report 2011 already submitted</li> <li>Annual report 2012 also attached</li> <li>Submission of Annual Report will be continued for each calendar year.</li> </ul>	<p>Continue the Monitoring Program and Annual Report submission within time frame requested by the Board.</p>
B-2	<p>The Licensee shall comply with the "Monitoring Program" described in this Licence, and any amendments to the "Monitoring Program" as may be made from time to time, pursuant to the conditions of this Licence</p>	<p>Non compliance</p> <p>- Please refer to section H for specific compliance issues</p>	<p>CGS has lead the waste sampling program effective from summer 2012 and will continue such program for next year 2013. Samples were taken from stations as marked with GPS locator and identified in the water licence. Collected samples were transported to the prescribed accredited laboratories in YK, tested for parameters and recorded Test Results.</p>	<ul style="list-style-type: none"> <li>Samples results 2012 submitting</li> <li>Samples results of each year will be send to the Board within the timeline.</li> <li>Action Plan including procedures and QA/QC protocols explained in the compliance plan. Full QA/Qc plan will be provided to board by Oct, 2013</li> <li>Training program started Oct 2012, will be continued summer 2013 by EXP</li> <li>CGS of GN also will carry on site sampling training in summer 2012.</li> </ul>	<p>Dillon consulting will provide Training and QA/QC plan for new sewage lagoon and wetland once ready at the end of 2013</p> <p>A training plan for a TRAIN THE TRAINER to be delivered in 2013/14 for GN staff review</p>



# PLAN FOR COMPLIANCE LICENCE NO. NWB-3GIO-0409 (EXPIRED)

	Licence Condition	Status of Compliance	Short Term Plan for Compliance	Schedule for Implementation of Short Term Plan for Compliance	Long Term Plan for Compliance
B-5	The Licensee shall, within ninety (90) days after the first visit of the Inspector, post the necessary signs, where possible, to identify the stations of the "Monitoring Program." All signage postings shall be in the Official Languages of Nunavut, and shall be located and maintained to the satisfaction of an Inspector.	Non compliance as per 2011 inspection reports, signed, sent off and posted	Signage at monitoring stations has been installed summer 2012 and will continue to maintain in next year. Signage for solid waste site in by Aug 2013.  As part of the community visit, EXP, will verify the signage. EXP will prepare a tender document for procurement of required signs with installation by Hamlet staff	<ul style="list-style-type: none"> <li>CGS of GN will monitor the signage</li> <li>Site visit by exp will identify deficiencies and signage for the monitoring sites will be reported by March 31, 2013.</li> <li>Procurement of signage prior to June 30<sup>th</sup>, 2013</li> <li>Signs will be installed by August 31, 2013</li> </ul>	Monitoring Stations will be placed on the inspection checklist for the MTO (Municipal Technical Officer) to be identified if this reverts back to non-compliance  GN will carry regular or routine inspection.
B-9	The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut	Non compliance	exp will review with the NWB to identify the existing outstanding items and submissions	Community site visit will report status of outstanding reports, and will be issued by March 31, 2013, Any available reports studies, or plans to be submitted prior to June 1 <sup>st</sup> , 2013	CGS will request additional funding to ensure communities have the resources to complete reports and studies in both languages.
Part C	Conditions Applying To Water Use				
C-2	The annual quantity of water used for all purposes shall not exceed 62,000 cubic metres.	Compliant	2011 Annual report shows consumption of 31,300 cubic metres 2012 Annual Report attached for NWB showing annual quantity: 35,600 m3	Hamlet/CGS will submit annual water consumption and sewage quantity in every annual report to NWB.	GN will look any alternate way of measuring volume of sewage discharge-might require additional funding for that.
Part D	Conditions Applying To Waste Disposal				
D-3	A Freeboard limit of 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board, shall be maintained at all dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.	Non compliance as per the 2011 inspection report	Free board limit maintained more than 1.5m at the dyke. 2012 visit shows the compliance of this issue.	New lagoon will follow this compliance once ready and operable by 2014.	Dillon consulting will ensure the freeboard status with lagoon completion final report expecting by Dec 2013.



# PLAN FOR COMPLIANCE LICENCE NO. NWB-3GJO-0409 (EXPIRED)

Licence Condition		Status of Compliance	Short Term Plan for Compliance	Schedule for Implementation of Short Term Plan for Compliance (including funding status where applicable to municipal developments)	Long Term Plan for Compliance
D-5	The Sewage Disposal Facility shall be maintained and operated, to the satisfaction of an Inspector in such a manner as to prevent structural failure	Non compliance	New sewage lagoon expecting in operation from winter 2013. Repairs of berm and freeboard for current lagoon has carried in 2011 which prevented leakage issue and overflow possibilities.	<ul style="list-style-type: none"> <li>July 2013 A&amp;R plan for old lagoon</li> <li>Community site visit report will be reissued by March 31st, 2013.</li> <li>Recommendations delivered by, September 1<sup>st</sup>, 2013</li> </ul>	New lagoon will be only in operation. Current lagoon will go for abandonment and remediation process. Dillon consulting will provide the report and O & M manual.
D-7	The Licensee shall implement measures to ensure hazardous materials and/or leachate from the Solid Waste Disposal Facility does not enter water	Non compliances as per 2009 & 2008 inspector's reports sewage effluent flows passed the metal dump & mixing of sewage and landfill effluent occur	Separation of hazardous metals has started summer 2012 and will continue in 2013 by Hamlet operators. EXP's visit of the solid waste facility and practices will be undertaken in report and recommendations in regards to compliance will be updated to the Board.	<ul style="list-style-type: none"> <li>Community site visit February 28, 2013</li> <li>Community visit report March 31, 2013</li> <li>Action &amp; recommendation by Oct, 2013</li> </ul>	The development of the new Solid Waste Strategy and the Capital Action Plan July 31 <sup>st</sup> 2013.
D-8	The Licensee shall submit to the Board for review within six (6) months of the issuance of this license a report identifying each Final Discharge Point. The report shall at least include: a. Plans, specifications and a general description of each Final Discharge Point together with its specific geo-referenced location b. A description of how each Final Discharge Point is designed, maintained	Non compliance	GPS locator identifies locations of each discharge point, recorded during summer 2012, mentioned in the report. Exp's site visit will verify final discharge points for sewage lagoon and solid waste site and will record geo-reference locations. Report will be submitted to the Board with overall plan and location of each discharge point, specific geo-reference locations and a description of design and maintenance information.	<ul style="list-style-type: none"> <li>Issuance of final discharge point report June 1<sup>st</sup>, 2013 by RXP</li> </ul>	
Part G	Conditions Applying to Abandonment and Restoration				
G-1	The Licensee shall submit to the Board for approval an Abandonment and Restoration Plan at least six (6) months prior to abandoning any	Compliant	No planned abandonment within 6 months for current facilities. New sewage lagoon is being constructed A&R plan to be developed.	Implement A&R after the new Lagoon is commissioned	An A and R plan will be developed prior to decommissioning the existing lagoon. A draft

# PLAN FOR COMPLIANCE LICENCE NO. NWB-3GJO-0409 (EXPIRED)

	facilities and the construction of new facilities to replace existing ones. The Plan shall include, but not be limited to where applicable:				abandonment and restoration plan will be submitted for review by March 2014
Part H	Conditions Applying To The Monitoring Program				
H-1	The Licensee shall maintain Monitoring Stations at the following locations:	Non compliance as per 2011 inspection reports, signed, sent off and posted	Monitoring stations already located during summer 2012 and will be reviewed in summer 2013. Exp will verify monitoring station status, signage and will prepare a tender document for procurement of required signs with installation by Hamlet staff	<ul style="list-style-type: none"> <li>Report by exp which will be issued prior to March 31<sup>st</sup>, 2013.</li> <li>Procurement of signage by Jun30, 2013</li> <li>Signs will be installed by Aug 31, 2013</li> </ul>	Monitoring Stations will be placed on the inspection checklist for the MTO to be identified if this reverts back to non-compliance
H-2	The Licensee shall sample monthly at Monitoring Station GJO-2 and GJO-4 during the months of May to August, or as water flow permits	Non compliance as per 2011 inspection	<ul style="list-style-type: none"> <li>Samples were taken from May-Aug 2012 and results compiled to NWB</li> <li>Training for the monitoring program started last Oct 2012 and will be continued next year 2013 by EXP</li> </ul>	<ul style="list-style-type: none"> <li>Train municipal staff in sampling during summer 2013</li> </ul>	Ongoing training for the monitoring program with a 100K from GAS TAX CAPACITY BUILDING through the MTO.
H-3	The Licensee shall measure and record in cubic metres the monthly and annual quantities of water pumped from Monitoring Station GJO-1 for all purposes.		It is CGS's intention to ensure the communities submit the Annual Reports with all available information	<ul style="list-style-type: none"> <li>exp will be travelling to meet with Hamlet staff to determine what works are required to assist them in ensuring the requirements of the water licence.</li> <li>exp will prepare a report to CGS outlining recommended course of action and annual reports. Visit by exp is intended end of February 2013 with a subsequent report prior to March, 2013</li> </ul>	Water monitoring group meeting under the support of the Regional Directors use GN staff to support municipalities, follow monitoring and submissions of reports due to NWB.



## APPENDIX-‘A’

Annual Reports: 2011 and 2012
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Hamlet of Gjoa Haven

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## ANNUAL REPORT

**YEAR BEING REPORTED: 2011**

The following information is compiled pursuant to the requirements of **Part B, Item 1** of Water Licence # **NWB3GJO-0409** issued to the **Gjoa Haven**

i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	3,119,195	Same
February	2,723,180	Same
March	3,045,389	Same
April	2,891,030	Same
May	2,943,596	Same
June	2,850,732	Same
July	2,941,163	Same
August	2,841,695	Same
September	2,836,964	Same
October	2,913,852	Same
November	2,420,308	Same
December	2,539,230	Same
<b>ANNUAL TOTAL</b>	<b>31,229,370</b>	<b>Same</b>

---

## ANNUAL REPORT-2011

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iv. a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;

---

- Existing water supply system in operation, SCADA updating and pumps at intake system maintained with the feedback time to time.
  - New sewage lagoon facility in design stage including wetland connection. Lagoon berm repair and increasing in Free-board height has been carried during the year 2010-11. Such repair prevents the possibility of overflow and prevents leakage of sewage effluent from the current Lagoon during the summer time. Also increase in height increases the ability of the Lagoon in full capacity as it was designed for.
- 

v. a list of unauthorized discharges and summary of follow-up action taken;

---

- No unauthorized discharge listed during this year.
  - No unauthorized discharge also happened during the period 2009-2010
- 

vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

---

No abandoned or restoration for water system, sewage waste and solid waste facilities for this year, but expecting an abandonment & restoration plan for current sewage lagoon sometime in summer 2013 once the new sewage lagoon be completed and operation.

---

Vii. A summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;

---

Existing Lagoon was losing capacity due to erosion of the berm and lowering freeboard. Board requested to review the Lagoon situation and effluent quality discharging into wetland (INAC report 2010)

---

Viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

---

Water Licence remains expired with NWB as reported by INAC report 2011 for non-Compliance of certain items such as 'Monitoring program, annual reports with quantity of water drawn and waste disposal, QA/QC plan for sewage and solid waste sites, Operation and Maintenance manual of sewage and solid waste facilities, spill contingency and emergency response plan on existing sewage lagoon and solid waste site.



## ANNUAL REPORT- 2011

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ix. updates or revisions to the approved Operation and Maintenance Plans.

---

Existing Operation and Maintenance manuals are still in effect. But Board has notified the Hamlet that such O & M manual not yet submitted. Licence condition requires the O & M manual to be submitted with the Board within six months of the Licence approval. Since long time expires of the License status, the hamlet is proposing to have updated manuals instead for facilities those were upgraded by this time.

---

### **ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:**

---

Dillon Consultants has been working on sewage lagoon issue which has been addressed for water licensing renewal requirements. Reports requiring lagoon improvement as well as water licensing information expecting to be received by the end of 2012

---

### **FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:**

---

Attempted for waste sampling in compliance with the regulation, but too late for this season



**YEAR BEING REPORTED: 2012**

The following information is compiled pursuant to the requirements of **Part B, Item 1** of Water Licence Number **NWB3GJO-0409** issued to the **Gjoa Haven**

- i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	2,769,115	Same
February	2,820,137	Same
March	2,817,192	Same
April	3,162,236	Same
May	2,875,617	Same
June	2,578,271	Same
July	3,072,103	Same
August	3,225,301	Same
September	2,999,728	Same
October	3,440,088	Same
November	3,152,038	Same
December	(estd.) 3,140,530	Same
<b>ANNUAL TOTAL</b>	32,911,826	Same

Note: Tabular summaries of all data generated under "Monitoring Program" are attached with this Report in separate pages. (Refer to the attached files)

- iv. a summary of **modifications** and/or major **maintenance work** carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities:
- Existing water supply system, transmission line, re-heating stations and treatment system remains in operation with same as below and volume of water uses:

- Water intake from Swan lake, 2-standalone generator sets, two pumps with remotely off/on system from Treatment plant using SCADA monitoring, twin truck-fill facility at the treatment plant and alternate emergency truck-fill facility at the outside of intake pumphouse. 150mm diameter HDPE transmission line housed in another 50 mm diameter hot water circulation line, two re-heating station in between and two re-heating facilities at the pumphouse & at the entrance of water to treatment plant.
- New sewage lagoon facility in design stage including wet land extension for effluent discharge from new Lagoon.
- v. a list of unauthorized discharges and summary of follow-up action taken;
- No unauthorized discharge listed by the Board to follow up
- vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
- No abandoned or restoration work completed during the year 2012.  
But construction for new sewage lagoon and improvement of wet land in process starting late 2012 and expected completion in 2013. Decommissioning of existing sewage lagoon will take place once new lagoon start in operation.
- vii. a summary of any studies requested by the Board that relate to **waste disposal, water use** or reclamation, and a brief description of any future studies planned;
- NWB has advised to propose for a 'Short Term Plan and undertaking with regard to the part G, item 1, for Abandonment & Restoration plan, O & M manual for Sewage lagoon and Solid Waste Sites, Spill contingency Plan be completed six (6) months prior to decommissioning of existing lagoon.
  - Capital program for new sewage lagoon construction project expected completion by end of 2013. Construction of new sewage lagoon still in progress, so as Operation and Maintenance Plan and other plans. Once finally determined the completion date, abandonment and restoration plan of existing sewage lagoon will be completed and submitted to NWB for review. Meanwhile, preparation for "short Term Plan for compliance" is compiling to the Board.
  - Capital program is not included the Solid Waste facility improvement, unless a separate project undertaken which are already in proposal and waiting for Federal Funding or Donor assistance. However, annual monitoring and maintenance are continued since summer 2012 including waste dump separation, segregation of metals and toxic materials, retention of leachate & effluent, sampling/decant of leachate/effluent, prevention of illegal dumping and security of facility access. Short Term Plan will be covered also such activities and comprehensive training.
- viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported;
- Water licence remains expired with NWB since February 01, 2009 as reported without



amendment and extension for non-compliances. The Board has requested to submit the Annual Reports (missing since 2010), O & M update for sewage & solid waste site and operators training schedule as a part of monthly monitoring program. Hamlet is submitting such reports with the Board for review.

ix updates or revisions to the approved Operation and Maintenance Plans.

Not at this stage, but expecting a new O & M manual for sewage and solid waste site facilities by the end of Dec 2013 once new sewage lagoon will start operation and EXP complete the survey & preparation of O & M manual for solid waste site including full training program for operators.

---

**ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:**

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Dillon Consultants has been working on current sewage lagoon abandonment and restoration plan; activities of this current lagoon will be taken over by the new engineered lagoon which is currently under construction. Such abandonment and restoration plan will be updated with the Board by Oct 2013 once the new lagoon construction completion expected by the end of Dec 2013.

**FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:**

---

Annual Reports 2011 and 2012 of water drawn and sewage disposal are submitting to the Board for review which has been missing and were not included in the previous reports of INAC (AANDC) and NWB. Also details of last monitoring program, sample results and information on training schedule are submitting with the compliance plan for board review.

---

## APPENDIX-B

### Annual Monitoring Results: 2012

Water, sewage and Solid waste

Hamlet of Gjoa Haven





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
120517

**- FINAL REPORT -**

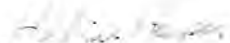
**Prepared For:** Hamlet of Gjoa Haven

**Address:** P.O. Box 200  
Gjoa Haven, NU  
X0B 1T0

**Attn:** Jacob Keanik

**Facsimile:** (867) 360-6309

**Final report has been reviewed and approved by:**

  
**Helene Harper**  
Manager

**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) 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:** Thursday, July 26, 2012  
**Print Date:** Thursday, July 26, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
120517

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** GJO-2

**Taiga Sample ID:** 001

**Client Project:** NWB3GJ00409  
**Sample Type:** Landfill  
**Received Date:** 17-Jul-12  
**Sampling Date:** 16-Jul-12  
**Sampling Time:** 10:00  
**Location:** Gjoa Haven, NU  
**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Organics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	327	0.4	mg/L	17-Jul-12	SM2320:B	
Conductivity, Specific (@ 25°C)	2650	0.4	µS/cm	17-Jul-12	SM2510:B	
pH	6.92		pH units	17-Jul-12	SM4500-H:B	
Solids, Total Suspended	86	3	mg/L	18-Jul-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	8.77	0.01	mg/L	20-Jul-12	SM4500-NI13:	
Biochemical Oxygen Demand	77	2	mg/L	18-Jul-12	SM5210:B	
Organic Carbon, Total	150	0.5	mg/L	19-Jul-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	352	0.1	mg/L	17-Jul-12	SM4110:B	
Chloride	194	0.7	mg/L	17-Jul-12	SM4110:B	
Hardness	1120	0.7	mg/L	17-Jul-12	SM2340:B	
Magnesium	58.1	0.1	mg/L	17-Jul-12	SM4110:B	
Nitrate as Nitrogen	< 0.01	0.01	mg/L	17-Jul-12	SM4110:B	

**Report Date:** Thursday, July 26, 2012  
**Print Date:** Thursday, July 26, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
120517

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** GJO-2

**Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/l.	17-Jul-12	SM4110:B
Potassium	44.3	0.1	mg/L	17-Jul-12	SM4110:B
Sodium	171	0.1	mg/l.	17-Jul-12	SM4110:B
Sulphate	892	1	mg/L	17-Jul-12	SM4110:B

**Microbiology**

Coliforms, Fecal	820	10	CFU/100ml.	17-Jul-12	SM9222:D
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**Organics**

Oil and Grease, visible	Non-visible			23-Jul-12	Visual Exam
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**Trace Metals, Total**

Aluminum	87	5	µg/L	20-Jul-12	EPA200.8
Arsenic	12.9	0.2	µg/l.	20-Jul-12	EPA200.8
Cadmium	1.1	0.1	µg/l.	20-Jul-12	EPA200.8
Chromium	3.4	0.1	µg/l.	20-Jul-12	EPA200.8
Cobalt	7.1	0.1	µg/l.	20-Jul-12	EPA200.8
Copper	88.9	0.2	µg/L	20-Jul-12	EPA200.8
Iron	25800	5	µg/l.	20-Jul-12	EPA200.8
Lead	54.5	0.1	µg/L	20-Jul-12	EPA200.8
Manganese	1090	0.1	µg/L	20-Jul-12	EPA200.8
Mercury	0.12	0.01	µg/l.	20-Jul-12	EPA200.8
Nickel	22.7	0.1	µg/L	20-Jul-12	EPA200.8
Zinc	826	5	µg/L	20-Jul-12	EPA200.8

**ReportDate:** Thursday, July 26, 2012  
**Print Date:** Thursday, July 26, 2012





## Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3

Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:

120517

### - CERTIFICATE OF ANALYSIS -

Client Sample ID: **GJO-4**

Taiga Sample ID: 002

Client Project: NWB3GJ00409

Sample Type: Sewage

Received Date: 17-Jul-12

Sampling Date: **16-Jul-12**

Sampling Time: 10:00

Location: Gjoa Haven, NU

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	314	0.4	mg/L	17-Jul-12	SM2320:B	
Conductivity, Specific (@ 25°C)	1020	0.4	µS/cm	17-Jul-12	SM2510:B	
pH	7.50		pH units	17-Jul-12	SM4500-H:B	
Solids, Total Suspended	12	3	mg/L	18-Jul-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	11.3	0.01	mg/L	20-Jul-12	SM4500-NH3:	
Biochemical Oxygen Demand	5	2	mg/L	18-Jul-12	SM5210:B	
Organic Carbon, Total	51.6	0.5	mg/L	19-Jul-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	40.2	0.1	mg/L	17-Jul-12	SM4110:B	
Chloride	137	0.7	mg/L	17-Jul-12	SM4110:B	
Hardness	224	0.7	mg/L	17-Jul-12	SM2340:B	
Magnesium	30.0	0.1	mg/L	17-Jul-12	SM4110:B	
Nitrate as Nitrogen	0.28	0.01	mg/L	17-Jul-12	SM4110:B	
Nitrite as Nitrogen	0.03	0.01	mg/L	17-Jul-12	SM4110:B	

Report Date: Thursday, July 26, 2012

Print Date: Thursday, July 26, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120517**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** **GJO-4**

**Taiga Sample ID:** 002

Potassium	17.4	0.1	mg/L	17-Jul-12	SM4110:B
Sodium	112	0.1	mg/L	17-Jul-12	SM4110:B
Sulphate	4	1	mg/L	17-Jul-12	SM4110:B

**Microbiology**

Coliforms, Fecal	125	1	CFU/100ml.	17-Jul-12	SM9222:D
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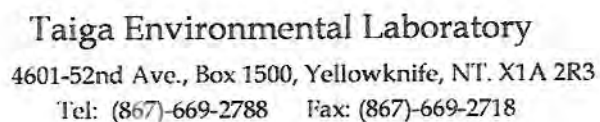
**Organics**

Oil and Grease, visible	Non-visible	23-Jul-12	Visual Exam
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**Trace Metals, Total**

Aluminum	45.6	0.6	µg/L	20-Jul-12	EPA200.8
Arsenic	7.7	0.2	µg/L	20-Jul-12	EPA200.8
Cadmium	< 0.1	0.1	µg/L	20-Jul-12	EPA200.8
Chromium	0.7	0.1	µg/L	20-Jul-12	EPA200.8
Cobalt	1.9	0.1	µg/L	20-Jul-12	EPA200.8
Copper	2.8	0.2	µg/L	20-Jul-12	EPA200.8
Iron	3130	5	µg/L	20-Jul-12	EPA200.8
Lead	0.2	0.1	µg/L	20-Jul-12	EPA200.8
Manganese	155	0.1	µg/L	20-Jul-12	EPA200.8
Mercury	0.03	0.01	µg/L	20-Jul-12	EPA200.8
Nickel	6.8	0.1	µg/L	20-Jul-12	EPA200.8
Zinc	< 5	5	µg/L	20-Jul-12	EPA200.8

**Report Date:** Thursday, July 26, 2012  
**Print Date:** Thursday, July 26, 2012



**Taiga Batch No.:**  
120517

Client Sample ID: GJO-4

Taiga Sample ID: 002

*Data Qualifier Descriptions:*

\* 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





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120725**

## **- FINAL REPORT -**

**Prepared For:** Hamlet of Gjoa Haven

**Address:** P.O. Box 200  
Gjoa Haven, NU  
X0B 1J0

**Attn:** Jacob Keanik

**Facsimile:** (867) 360-6309

**Final report has been reviewed and approved by:**

  
**Helene Harper**  
Manager

### **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) 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:** Monday, September 10, 2012

**Print Date:** Monday, September 10, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120725**

## **- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** GJO-2

**Taiga Sample ID:** 001

**Client Project:**

**Sample Type:** Unknown Water

**Received Date:** 27-Aug-12

**Sampling Date:** 24-Aug-12

**Sampling Time:** 13:26

**Location:**

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	312	0.4	mg/L	27-Aug-12	SM2320:B	
Conductivity, Specific (@ 25°C)	1000	0.4	µS/cm	27-Aug-12	SM2510:B	
pH	7.74		pH units	27-Aug-12	SM4500-H:B	
Solids, Total Suspended	18	3	mg/L	06-Sep-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	12.8	0.005	mg/L	04-Sep-12	SM4500-NH3:	
Biochemical Oxygen Demand			mg/L		SM5210:B	105
Organic Carbon, Total	52.0	0.5	mg/L	30-Aug-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	43.6	0.1	mg/L	27-Aug-12	SM4110:B	
Chloride	123	0.7	mg/L	27-Aug-12	SM4110:B	
Hardness	238	0.7	mg/L	27-Aug-12	SM2340:B	
Magnesium	31.4	0.1	mg/L	27-Aug-12	SM4110:B	
Nitrate as Nitrogen	1.00	0.01	mg/L	27-Aug-12	SM4110:B	

**ReportDate:** Monday, September 10, 2012

**Print Date:** Monday, September 10, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120725**

## **- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: GJO-2**

**Taiga Sample ID: 001**

Nitrite as Nitrogen	< 0.01	0.01	mg/L	27-Aug-12	SM4110:B
Potassium	14.1	0.1	mg/L	27-Aug-12	SM4110:B
Sodium	98.0	0.1	mg/L	27-Aug-12	SM4110:B
Sulphate	1	1	mg/L	27-Aug-12	SM4110:B

### **Microbiology**

Coliforms, Fecal	CFU/100mL	SM9222:D
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105

### **Organics**

Oil and Grease, visible	Non-visible	31-Aug-12	Visual Exam
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### **Trace Metals, Total**

Aluminum	30.6	0.6	µg/L	29-Aug-12	EPA200.8
Arsenic	7.4	0.2	µg/L	29-Aug-12	EPA200.8
Cadmium	< 0.05	0.05	µg/L	29-Aug-12	EPA200.8
Chromium	0.7	0.1	µg/L	29-Aug-12	EPA200.8
Cobalt	3.1	0.1	µg/L	29-Aug-12	EPA200.8
Copper	4.4	0.2	µg/L	29-Aug-12	EPA200.8
Iron	2400	5	µg/L	29-Aug-12	EPA200.8
Lead	0.4	0.1	µg/L	29-Aug-12	EPA200.8
Manganese	193	0.1	µg/L	29-Aug-12	EPA200.8
Mercury	< 0.01	0.01	µg/L	29-Aug-12	EPA200.8
Nickel	9.4	0.1	µg/L	29-Aug-12	EPA200.8
Zinc	7.0	0.4	µg/L	29-Aug-12	EPA200.8

**ReportDate:** Monday, September 10, 2012

**Print Date:** Monday, September 10, 2012





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120725**

## - CERTIFICATE OF ANALYSIS -

**Client Sample ID:** GJO-4

**Taiga Sample ID:** 002

**Client Project:**

**Sample Type:** Unknown Water

**Received Date:** 27-Aug-12

**Sampling Date:** 24-Aug-12

**Sampling Time:** 13:26

**Location:**

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	358	0.4	mg/L	27-Aug-12	SM2320:B	
Conductivity, Specific (@ 25°C)	1100	0.4	µS/cm	27-Aug-12	SM2510:B	
pH	7.40		pH units	27-Aug-12	SM4500-H:B	
Solids, Total Suspended	106	3	mg/L	05-Sep-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	17.0	0.005	mg/L	04-Sep-12	SM4500-NH <sub>3</sub> :	
Biochemical Oxygen Demand			mg/L		SM5210:B	105
Organic Carbon, Total	67.5	0.5	mg/L	30-Aug-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	44.6	0.1	mg/L	27-Aug-12	SM4110:B	
Chloride	132	0.7	mg/L	27-Aug-12	SM4110:B	
Hardness	240	0.7	mg/L	27-Aug-12	SM2340:B	
Magnesium	31.4	0.1	mg/L	27-Aug-12	SM4110:B	
Nitrate as Nitrogen	0.04	0.01	mg/L	27-Aug-12	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	27-Aug-12	SM4110:B	

**ReportDate:** Monday, September 10, 2012

**Print Date:** Monday, September 10, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120725**

## **- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: GJO-4**

**Taiga Sample ID: 002**

Potassium	18.3	0.1	mg/L	27-Aug-12	SM4110:B
Sodium	112	0.1	mg/L	27-Aug-12	SM4110:B
Sulphate	2	1	mg/L	27-Aug-12	SM4110:B

### **Microbiology**

Coliforms, Fecal		CFU/100mL	SM9222:D	105
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### **Organics**

Oil and Grease, visible	Non-visible	31-Aug-12	Visual Exam
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### **Trace Metals, Total**

Aluminum	103	5	µg/L	29-Aug-12	EPA200.8
Arsenic	27.1	0.2	µg/L	29-Aug-12	EPA200.8
Cadmium	< 0.1	0.1	µg/L	29-Aug-12	EPA200.8
Chromium	1.1	0.1	µg/L	29-Aug-12	EPA200.8
Cobalt	2.4	0.1	µg/L	29-Aug-12	EPA200.8
Copper	3.3	0.2	µg/L	29-Aug-12	EPA200.8
Iron	16400	5	µg/L	29-Aug-12	EPA200.8
Lead	0.4	0.1	µg/L	29-Aug-12	EPA200.8
Manganese	279	0.1	µg/L	29-Aug-12	EPA200.8
Mercury	< 0.01	0.01	µg/L	29-Aug-12	EPA200.8
Nickel	7.9	0.1	µg/L	29-Aug-12	EPA200.8
Zinc	< 0.4	0.4	µg/L	29-Aug-12	EPA200.8

**ReportDate:** Monday, September 10, 2012

Page 5 of 6

**Print Date:** Monday, September 10, 2012



Taiga Environmental Laboratory  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:  
**120725**

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**- CERTIFICATE OF ANALYSIS -**

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Client Sample ID: **GJO-4**

Taiga Sample ID: 002

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**- DATA QUALIFIERS -**

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*Data Qualifier Descriptions:*

**105**     *Samples received past hold time; analysis not possible.*

**\* 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 10, 2012

**Print Date:** Monday, September 10, 2012





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

## **- FINAL REPORT -**


**Prepared For:** Hamlet of Gjoa Haven

**Address:** P.O. Box 200  
Gjoa Haven, NU  
X0B 1J0

**Attn:** Jacob Keanik

**Facsimile:** (867) 360-6309

**Final report has been reviewed and approved by:**

  
**Helene Harper**  
Manager

### **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) 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:** Thursday, September 27, 2012

**Print Date:** Thursday, September 27, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** GJO-2

**Taiga Sample ID:** 001

**Client Project:**

**Sample Type:** Unknown Water

**Received Date:** 18-Sep-12

**Sampling Date:** 17-Sep-12

**Sampling Time:** 11:30

**Location:** Gjoa Haven

**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	288	0.4	mg/L	20-Sep-12	SM2320:B	
Conductivity, Specific (@ 25°C)	910	0.4	µS/cm	20-Sep-12	SM2510:B	
pH	7.78		pH units	20-Sep-12	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	20-Sep-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	4.31	0.005	mg/L	24-Sep-12	SM4500-NH3:	
Biochemical Oxygen Demand	3	2	mg/L	18-Sep-12	SM5210:B	
Organic Carbon, Total	62.5	0.5	mg/L	20-Sep-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	48.3	0.1	mg/L	18-Sep-12	SM4110:B	
Chloride	120	0.7	mg/L	18-Sep-12	SM4110:B	
Hardness	254	0.7	mg/L	18-Sep-12	SM2340:B	
Magnesium	32.3	0.1	mg/L	18-Sep-12	SM4110:B	
Nitrate as Nitrogen	0.94	0.01	mg/L	18-Sep-12	SM4110:B	

**ReportDate:** Thursday, September 27, 2012

**Print Date:** Thursday, September 27, 2012



**Taiga Environmental Laboratory**  
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
 Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

## - CERTIFICATE OF ANALYSIS -

**Client Sample ID:** GJO-2

**Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/L	18-Sep-12	SM4110:B
Potassium	11.7	0.1	mg/L	18-Sep-12	SM4110:B
Sodium	89.7	0.1	mg/L	18-Sep-12	SM4110:B
Sulphate	11	1	mg/L	18-Sep-12	SM4110:B

### Microbiology

Coliforms, Fecal	124	1	CFU/100mL	18-Sep-12	SM9222:D
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### Organics

Oil and Grease, visible	Non-visible			21-Sep-12	Visual Exam
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### Trace Metals, Total

Aluminum	19.4	0.6	µg/L	22-Sep-12	EPA200.8
Arsenic	3.8	0.2	µg/L	22-Sep-12	EPA200.8
Cadmium	< 0.05	0.05	µg/L	22-Sep-12	EPA200.8
Chromium	1.2	0.1	µg/L	22-Sep-12	EPA200.8
Cobalt	2.3	0.1	µg/L	22-Sep-12	EPA200.8
Copper	4.3	0.2	µg/L	22-Sep-12	EPA200.8
Iron	1600	5	µg/L	22-Sep-12	EPA200.8
Lead	< 0.1	0.1	µg/L	22-Sep-12	EPA200.8
Manganese	122	0.1	µg/L	22-Sep-12	EPA200.8
Mercury	0.02	0.01	µg/L	22-Sep-12	EPA200.8
Nickel	9.2	0.1	µg/L	22-Sep-12	EPA200.8
Zinc	11.9	0.4	µg/L	22-Sep-12	EPA200.8

**ReportDate:** Thursday, September 27, 2012

**Print Date:** Thursday, September 27, 2012





**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID:** GJO-4

**Taiga Sample ID:** 002

**Client Project:**  
**Sample Type:** Unknown Water  
**Received Date:** 18-Sep-12  
**Sampling Date:** 17-Sep-12  
**Sampling Time:** 11:30  
**Location:** Gjoa Haven  
**Report Status:** Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<b><u>Inorganics - Physicals</u></b>						
Alkalinity, Total (as CaCO <sub>3</sub> )	317	0.4	mg/L	20-Sep-12	SM2320:B	
Conductivity, Specific (@ 25°C)	989	0.4	µS/cm	20-Sep-12	SM2510:B	
pH	7.74		pH units	20-Sep-12	SM4500-H:B	
Solids, Total Suspended	4	3	mg/L	20-Sep-12	SM2540:D	
<b><u>Inorganics - Nutrients</u></b>						
Ammonia as Nitrogen	9.45	0.005	mg/L	24-Sep-12	SM4500-NH3:	
Biochemical Oxygen Demand	4	2	mg/L	18-Sep-12	SM5210:B	
Organic Carbon, Total	80.0	0.5	mg/L	20-Sep-12	SM5310:B	
<b><u>Major Ions</u></b>						
Calcium	41.7	0.1	mg/L	18-Sep-12	SM4110:B	
Chloride	130	0.7	mg/L	18-Sep-12	SM4110:B	
Hardness	233	0.7	mg/L	18-Sep-12	SM2340:B	
Magnesium	31.4	0.1	mg/L	18-Sep-12	SM4110:B	
Nitrate as Nitrogen	1.02	0.01	mg/L	18-Sep-12	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	18-Sep-12	SM4110:B	

**Report Date:** Thursday, September 27, 2012  
**Print Date:** Thursday, September 27, 2012



**Taiga Environmental Laboratory**  
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3  
Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

**- CERTIFICATE OF ANALYSIS -**

**Client Sample ID: GJO-4**

**Taiga Sample ID: 002**

Potassium	16.6	0.1	mg/L	18-Sep-12	SM4110:B
Sodium	109	0.1	mg/L	18-Sep-12	SM4110:B
Sulphate	8	1	mg/L	18-Sep-12	SM4110:B

**Microbiology**

Coliforms, Fecal	48	1	CFU/100mL	18-Sep-12	SM9222:D
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**Organics**

Oil and Grease, visible	Non-visible			21-Sep-12	Visual Exam
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**Trace Metals, Total**

Aluminum	30.2	0.6	µg/L	22-Sep-12	EPA200.8
Arsenic	6.3	0.2	µg/L	22-Sep-12	EPA200.8
Cadmium	< 0.05	0.05	µg/L	22-Sep-12	EPA200.8
Chromium	0.5	0.1	µg/L	22-Sep-12	EPA200.8
Cobalt	4.0	0.1	µg/L	22-Sep-12	EPA200.8
Copper	7.1	0.2	µg/L	22-Sep-12	EPA200.8
Iron	2540	5	µg/L	22-Sep-12	EPA200.8
Lead	< 0.1	0.1	µg/L	22-Sep-12	EPA200.8
Manganese	167	0.1	µg/L	22-Sep-12	EPA200.8
Mercury	0.01	0.01	µg/L	22-Sep-12	EPA200.8
Nickel	12.8	0.1	µg/L	22-Sep-12	EPA200.8
Zinc	0.8	0.4	µg/L	22-Sep-12	EPA200.8

**ReportDate:** Thursday, September 27, 2012  
**Print Date:** Thursday, September 27, 2012



## Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3

Tel: (867)-669-2788 Fax: (867)-669-2718

**Taiga Batch No.:**  
**120843**

### - CERTIFICATE OF ANALYSIS -

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**Client Sample ID:** GJO-4

**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

**ReportDate:** Thursday, September 27, 2012

**Print Date:** Thursday, September 27, 2012





**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No. 20020178

Patient: **GLOA HAVEN, HAMLET OF**  
DOB: Age: 50 Sex: N  
HCN: Client ID: HX00000032  
Stanton Chart No:  
Pt. Phone: 8676694162  
Location: **FEO - KITIKMEOT**  
Room: Adm. Date: 05/12/11

Encounter: WX0000000032  
Attending Pract.: **PHYSICIAN, NOT**  
Requested by: **PHYSICIAN, NOT**  
Send to: **KITIKMEOT REGIONAL ENGINEER**  
Copy to: **KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL**

Test: Water

**MICROBIOLOGY**

Requested on: 02/08/12 11:39

Status:

KITIKMEOT REGIONAL ENGINEER, KRI: Cambridge Bay N.L.

Source: **Water truck H7660**  
Order#: **20020178**

Collected: **01/08/12 06:01**  
Received: **02/08/12 11:39**

No Date and/or Time of Collection Indicated.

**TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLILERT METHOD)**

**03/08/12 15:01**

03/08/12 **TOTAL COLIFORM: absent  
E.COLI: absent**

*Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set*

SCC

STATUS  
Page 1 of 1

Printed: 08/03/12 14:04



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No. 20020181

Patient: CLIOA HAVEN, HAMLET OF  
DOB: Age: 50 Sex: N  
HCN: Client ID: HX00000032  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000032  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

TxL Water

**MICROBIOLOGY**

Requested on: 08/08/12 11:40

Status

KITIKMEOT REGIONAL ENGINEER KRI: Cambridge Bay NU,

Source: Water Truck# H7449  
Order#: 20020181

Collected: 01/08/12 00:01  
Received: 02/08/12 11:40

No Date and/or Time of Collection Indicated.

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL.  
COLILERT METHOD)

03/08/12 15:01

03/08/12 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

Printed: 08/03/12 15:09



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Hymn Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No. 20020183

Patient: GJOA HAVEN, HAMLET OF  
DOB: Age: 50 Sex: M  
HCN: Client ID: HX00000032  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room Adm. Date: 05/12/11

Encounter: WX0000000032  
Attending Pract: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Requested on: 02/08/12 13:47

KITIKMEOT REGIONAL ENGINEER, KRP - Cambridge Bay NU.

Source: Water PTH1 Return  
Order#: 20020183

Collected: 02/08/12 00:01  
Received: 02/08/12 11:41

No Date and/or Time of Collection Indicated.

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLILERT METHOD)

03/08/12 15:01

03/08/12 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

Printed: 08/03/12 15:09





**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 20220332

Patient: GLIDA HAVEN, HAMLET OF  
DOB: Age: 50 Sex: N  
TCN: Client ID: HXG0000032  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: FHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000032  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN, NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Request: 23/08/12 13:33

KITIKMEOT REGIONAL ENGINEER, KRF Cambridge Bay N.L.

Source: Lake Water Water Truck #7448

Collected: 20/08/12 13:32

Order#: 20220332

Received: 22/08/12 14:48

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
COLIBERT METHOD)

23/08/12 13:33

23/08/12 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after Final Status set

SCC

STATUS  
Page 1 of 1

Printed: 08/23/12 13:39



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**

550 Byrne Road, P.O. Box 10

Yellowknife, NT X1A 2N1

Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 20220333

Patient: GIOA HAVEN, HAMLET OF

DOB:

Age: 50

Sex: N

IICN:

Client ID: HX00000032

Stanton Chart No:

Pl. Phone: 8676694162

Location: EHO - KITIKMEOT

Room:

Adm. Date: 05/12/11

Encounter: WX0000000032

Attending Pract.: PHYSICIAN, NOT

Requested by: PHYSICIAN, NOT

Send to: KITIKMEOT REGIONAL ENGINEER

Copy to: KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Request on: 22/08/12 14:48

Status

KITIKMEOT REGIONAL ENGINEER, KRE Cambridge Bay NU.

Source: Lake Water Water truck H7449

Collected: 20/08/12 13:32

Order#: 20220333

Received: 22/08/12 14:48

TOTAL COLIFORM & E.COLI TESTING (P/A \* FINAL  
(MILLERT METHOD)

23/08/12 13:33

23/08/12 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after Final status set

SCC

STATUS  
Page 1 of 1

File: 0819102

Printed: 08/23/12 13:59



**LABORATORY REPORT**  
**Stanton Territorial Hospital Laboratory**  
550 Byrne Road, P.O. Box 10  
Yellowknife, NT X1A 2N1  
Phone: 867-669-4163 Fax: 867-669-4141

Lab No: 20220331

Patient: GJOA HAVEN, HAMLET OF  
DOB: Age: 50 Sex: N  
HCN: Client ID: HX00000032  
Stanton Chart No:  
Pl. Phone: 8676694162  
Location: EHO - KITIKMEOT  
Room: Adm. Date: 05/12/11

Encounter: WX0000000032  
Attending Pract.: PHYSICIAN, NOT  
Requested by: PHYSICIAN NOT  
Send to: KITIKMEOT REGIONAL ENGINEER  
Copy to: KITIKMEOT REGIONAL  
KITIKMEOT MUNICIPAL

Test: Water

**MICROBIOLOGY**

Requested on: 20/08/12

Status:

KITIKMEOT REGIONAL ENGINEER, KRC - Cambridge Bay NU,

Source: Lake Water Water track HT660  
Order#: 20220331

Collected: 20/08/12 13:32  
Received: 22/08/12 14:47

TOTAL COLIFORM & E.COLI TESTING (T/A \* FINAL  
COLIFERT METHOD)

23/08/12 13:33

23/08/12 TOTAL COLIFORM: absent  
E.COLI: absent

Micro Key for Results: \* - New Results \*\* - Result was modified after final status set