Annual Report -2014

Water Licence: 3BM-CAM 0914

Hamlet of Cambridge Bay, Nu

Submitted by: Shah Alam, P. Eng.

Municipal Planning Engineer,

Government of Nunavut

Community and Government Services

Cambridge Bay, Nu

Date submitted: February 10, 2015

Cambridge Bay Water Licence 3BM-CAM 0914

Annual Report 2014

Hamlet of Cambridge Bay, Nunavut

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

Cambridge Bay Water Licence: 3BM-CAM 0914 — Annual Report 2014

February 10, 2015

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

Attention: Phyllis Beaulieu, Manager of Licensing

RE: 3BM-CAM 0914 - Annual Report 2014, Hamlet of Cambridge Bay

Dear Ms. Phyllis,

The Hamlet of Cambridge Bay is pleased to submit to Nunavut Water Board the attached file of "**Annual Report 2014**" of water uses and sewage solid waste disposal as required and directed under the compliance of Water Licence; 3BM-CAM-0914 as stated above. Copies of required tests reports are attached herewith (Appendix- B) as requested for your references.

Samples test result shown excellent remediation of contamination parameters within allowable limits comprising BOD, TSS, E-coli and Toxicity components and quality control on sewage and solid waste effluent before discharging out. We summarized those conditions and requirements outlined in Part B through part H as below:

Part B: General conditions:

Item1. (a through i):

- Tabular Form of Annual water consumption and sewage disposal are duly filled-up
- Quantities were measured on daily basis of water distribution and sewage disposal
- New sewage disposal point on new splash pad at the main cell of sewage lagoon started
- No unauthorized discharge or disposal to solid waste.
- O&M manual, QA/QC plan for sewage and solid waste facilities submitted to NWB.

Items 2-7:

- Monitoring stations re-checked and corrected on site using GPS locator.
- No device Meter was used for volume measurement, however, truck-fill measurement uses as precise in taking the volume of water, sewage and solid waste.
- No Spill or emergency occurrences happened and reported during this period.
- No changes in Monitoring program as reported in QA/QC plan and Plan for Compliance.

Part C: Water Use:

- Water drawn from the Water Lake using twin intake lines and annual intake not exceeding 78,952 m3 remains within the allowable annual limit of 88,000 m3. The Licensee has requested for increase in annual amount in the Amendment Application which is with NWB.
- Screen with 2.54 mm slot, #60 wedge screen and 62.5% opening area remains with new intake system, 406 mm x 452 mm diameter with 3 mm cap plate and weld ring.
- No erosion detected at the new intake line and new pumphouse, but plan remains with the Phase-1 works warranty period once substantially completed.

Part D: Waste Disposal

- Raw sewage waste collect from household sewage tank by hamlet operated vacuum trucks.
- Sewage and effluent samples taken during July and Aug 2014, tested in accredited laboratory and noted parameters contamination within allowable limits (Appendix A & B)
- No changes in Final Discharge point CAM-6 that identified for ongoing years.
- Freeboard at sewage lagoon maintained minimum 1.0m and discharge into secondary cell by pump with a capacity of not exceeding 1600 L/min.
- Test results shown the effluent from Final Discharge Point CAM-6 within limiting values for BOD, TSS, Coliform, p^H meeting quality standards and guidelines.

Part E-G: Modification, construction, operation, abandonment and restoration

- The licensee has submitted the as-built drawings for new pumphouse and construction drawings for Phase-2 treatment Plant. Diversion of delivery from new pumphouse through newly installed vault-16 will be connected once the new PH commissioned, expecting in summer 2015.
- Abandonment of current PH will be decommissioned once new pumphouse starts operation.

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

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Ministère des Services Communautaires et gouvernementaux

Part H: Monitoring Program

- Annual monitoring of sewage and solid waste effluent carried from Stations CAM-3, CAM-4, CAM-5, and CAM-6 during the summer and fall. Samples were taken from monitoring stations where available and convenient, and tested for parameters at Taiga Laboratory at Yellowknife, NWT (CALA approved).
- Raw sewage collects by vacuum suction from household sewage tank using hamlet operated truck, haul to 1 km away sewage lagoon and offload on splash pad to lagoon. Number of truck load recorded on daily basis measures quantity of monthly and annually.
- Location of monitoring stations marked on map with GPS coordinates.

We hope that Nunavut Water Board will find this report and enclosed test results valuable to Annual Report in operating the Water Licence for water, sewage and solid waste facilities. CGS is submitting this Annual Report on behalf of the Licensee, the Hamlet of Cambridge Bay.

Best Regards,

Shah Alam, P. Eng.
Municipal Planning Engineer,
Government of Nunavut
Community and Government Services
Kitikmeot Region, Cambridge Bay, Nu
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MUNICIPALITY OF CAMBRIDGE BAY

February 11, 2015

Shah Alam
Municipal Planning Engineer
Community and Government Services
Government of Nunavut
Bag 200
Cambridge Bay, Nunavut X0B 0C0

Re: Authorization to Act on Behalf of the Hamlet

Dear Shah:

I hereby authorize you, Shah Alam, to act on behalf of the Municipality of Cambridge Bay in regards to our 2014 Annual Report to the Nunavut Water Board.

Regards,

Stephen King
Senior Administrative Officer

ANNUAL REPORT

YEAR BEING REPORTED: 2014

The following information is compiled pursuant to the requirements of **Part B**, Item 1 of Water Licence **3BM-CAM 0914** issued to the **Hamlet of Cambridge Bay**
.

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 by Fluid Manager and quantities of sewage waste based on discharged on daily basis.

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	6,515,624.67	Same
February	5,872,844.68	Same
March	7,089,255.84	Same
April	6,546,712.00	Same
May	7,247,871.84	Same
June	6,561,071.56	Same
July	6,817,063.60	Same
August	6,614,866.21	Same
September	6,981,409.18	Same
October	6,268,007.60	Same
November	6,130,889.70	Same
December	6,306,203.00	Same
ANNUAL TOTAL	**78,951,819.88**	Same

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**:

Water Supply:

New intake pumphouse (IPH) installed on site close near to the old pumphouse which was prefabricated outside and shipped on site in summer 2013 and integrated with new twin intake lines. Twin intake lines connected with new PH and insulated delivery line connected with newly placed vault #16.

Water leaking detected to the north of Vault-15 in late December 2013, monitored the leak for couple of days from top surface above the buried line. After confirmation of the leak, excavated the pipe section close near the Vault-15 and found the leak at the joint of spool pipe with the main HDPE pipe. New spool pipe replaced on January 20, 2014 and covered the new joint with 6 inch rigid insulation, left the portion open for monitoring and observation until final closing of that section on Jan 24, 2014. The water supply to the community continued from the overhead storage tank in town and wasn't disrupted at all during the repair period. After the repair, water supply continued smoothly without any further issue.

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

No unauthorized discharges during the period of the year 2014.

VI. Summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

The old pumphouse was scheduled to be abandoned in November 2014, but due to a winter freezing risk to water intake and supply, the abandonment of old PH is now re-scheduled to summer 2015. Abandonment of old PH will include the portion of buried line which is connected between old PH to existing Vault #15.

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 imposed the requirement of submission a "**Sewage Sludge Management Plan**" as commended by EC (Environment Canada) prior to removal of sludge from the lagoon. Hamlet has no plan currently for sewage sludge removal, but will submit a plan to NWB for approval if require in near future.*

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

Annual decanting of sewage effluent carried out during the periods Aug 28-Sep 05 and Sep 08-14, 2014 continuous operation and approximate 334 hours in total with a decant pump of flow-rate about 1,600 L/minute. Calculation shows approximately 32,064,000L or about 32,064 m3 of sewage decanted outside during the year 2014.
The Licensee has contacted AANDC inspector in written (email) and decanting carried with the approval of the inspector in accordance with the requirement in the Licence.

IX Updates or revisions to the approved Operation and Maintenance Plans

New version of Operation and Maintenance (O&M) manuals for sewage and solid waste facilities submitted to the Board including QA/QC plan as requested.

X ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

The Licensee has carried a program in managing the MSW and Metal dump segregation, isolation and securement, part of which is hazardous materials separation including batteries, waste oil, spills, paints and vehicle accessories. Wooden box were used for batteries housing inside on plastic sheet all around, covered and wire tied outside and ready for shipping out.
A recycling program is waiting for implementation with approval of communication plan.
A pilot program by Federal Government funded project for waste to energy (waste reduction) started summer 2014. Implementation of waste reduction can be planned followed by the successful and funding arrangement.
Annual Water consumption 2014 about 79,000 m3 seems close to allowable limit of 88,000 m3 annually. The Licensee likes to suggest for increase allowable limits to 100,000 m3 annually which will not impact the Licence Type (Type -B).

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

The Licensee has plan for putting and installation of:

- *a monitoring gate and metal fence from free entry to the metal dump site,*
- *a leachate collection sump outside of metal dump site for protecting leachate free-flow to wetland (secondary pond)*
- *a soil remediation cell for spills materials and contaminated soils*

Part H: Monitoring Program:

Samples taken on July 19 and Aug 18, 2014 from monitoring stations CAM-3, CAM-4, CAM-5 and CAM-6

	MAC	units	July 19, 2014				Aug 18, 2014			
Parameter	Limits		CAM-3	CAM 4	CAM-5	CAM-6	CAM-3	CAM-4	CAM-5	CAM-6
Alkalinity, as CaCo3		mg/L	258	425	216	222	269		211	230
Conductivity		µS/cm	869	3290	1100	1040	921		1310	1290
P^H	6-9	number	7.95	7.57	9.08	7.87	7.98	7.6	9.87	7.93
TSS	120	mg/L	40	107	28	8	26	96	66	18
Ammonia as N2	80	mg/L	14.5		0.90	0.023	12.2		0.066	
BOD	100	mg/L	64	<99.5	32	26	<18	42	30	<13.32
Organic Carbon, total		mg/L	45.3		47.2	38.3	43.7		46	41.7
Nitrate as N2		mg/L	0.57	0.12	0.19	0.09	0.93		0.19	0.09
Phosphorous, Total		mg/L		0.70				0.69		
Calcium		mg/L	40	446	52.5	52.9	44.8		46.1	55.2
Chloride		mg/L	106	349	182	157	114	730	240	217
Fluoride		mg/L						0.7		
Hardness		mg/L	222	1520	308	310	242		327	346
Magnesium		mg/L	29.5	98	43	43.1	31.7		51.4	50.7
Nitrite as N2		mg/L	0.22	<0.01	0.06	<0.01	0.14		0.07	<0.01
Potassium		mg/L	17.4	70.3	17.2	13.7	18.6		20.3	17
Sodium		mg/L	72.6	172	111	97.4	18.6		149	130
Sulphate		mg/L	22	1070	93	80	25	1160	135	114
Organic, Hexane		mg/L		<2.0				2.4		
Fecal Coliform	$1x10^6$	CFU/100mL	5100		<10	<10	7400		<10	<10
Oil and Gas	5000	µg/L	None		None	None	None		none	
Aluminium		µg/L	42.5	132	50.2	12.8	19.9	136	62.7	17.7
Arsenic	100	µg/L	17	5.6	4.4	3.4	1.7	7.3	5.4	3.7
Barium		µg/L	15.9	56.5	52.1	79.4		36		
Cadmium	10	µg/L	<0.1	0.35	<0.1	<0.10	<0.1	0.4	<0.1	<0.1
Chromium	100	µg/L	0.5	5.8	0.4	0.6	0.5	6.1	0.5	0.5
Cobalt	50	µg/L	0.3	7.9	0.6	0.4	0.3		0.8	0.5
Copper	200	µg/L	14.8	64.6	4.7	1.8	9.1		3.2	0.9
Iron		µg/L	460	23000	598	819	520	11600	835	753
Lead	50	µg/L	0.5	13.8	1.7	0.6	0.1	17.6	1.3	0.8
Manganese		µg/L	63.6	1100	48.6	103	68.8		49.5	124
Nickel	200	µg/L	24	37.5	5.2	3.5	2.3	26.7	5.9	4
Zinc	500	µg/L	12.4	304	22.7	5.5	9.3	475	11	5.1
Mercury	0.6	µg/L	<0.01	0.08	<0.01	<0.013.5	<0.01	0.07	<0.01	<0.01
Cyanide, Total		mg/L		0.03				<0.05		
Phenols, total		mg/L		0.067				0.075		

Appendix- A

Cambridge Bay Water Licence 3BM-CAM0914

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No.: 3BM-CAM0914

April 30, 2009

Stephen King
Senior Administrative Officer
Hamlet of Cambridge Bay
P.O. Box 16
Cambridge Bay, Nunavut X0B 0C0

Email: sking@cambridgebay.ca

RE: NWB Licence No. 3BM-CAM0914

Dear Mr. King,

Please find attached Licence No. 3BM-CAM0914 issued to the Hamlet of Cambridge Bay by the Nunavut Water Board (NWB) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the *Nunavut Land Claims Agreement* (NLCA) and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA). However, the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence. The NWB recommends that an application for the renewal of this Licence be filed at least three months prior to the Licence expiry date.

If the Licensee contemplates or requires an amendment to this licence, the NWB may decide, in the public interest, to hold a public hearing. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process and timing may vary depending on the scope of the amendment, however a minimum of sixty (60) days is required from the time of acceptance by the NWB. It is the responsibility of the Licensee to ensure that all application materials have been received and

acknowledged by the Manager of Licensing.

The NWB strongly recommends that the Licensee consult the comments received by interested persons on issues identified[1]. This information is attached for your consideration.

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/db

Enclosure: Licence No. 3BM-CAM0914
Comments INAC, EC, GN-DoE and GN-DoCLEY

cc: Kitikmeot Distribution List

[1] Indian and Northern Affairs Canada (INAC) dated October 3, 2008 and November 4, 2008; Environment Canada (EC) dated October 3, 2008; Government of Nunavut Department of Environment (GN-DoE) dated October 3, 2008; Government of Nunavut Department of Culture, Language, Elders and Youth (GN-CLEY) dated September 4, 2008.

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

DECISION

LICENCE NUMBER: 3BM-CAM0914

This is the decision of the Nunavut Water Board (NWB) with respect to an application dated August 3, 2007 for a Licence amendment and renewal made by:

Hamlet of Cambridge Bay

to allow for the use of water and disposal of waste for the Hamlet of Cambridge Bay, located within the Kitikmeot Region, Nunavut. With respect to this application, the NWB gave notice to the public that the Hamlet had filed an application for a water licence amendment and renewal.

DECISION

After having been satisfied that the application was exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with S. 12.3.2 of the *Nunavut Land Claims Agreement* (NLCA), the NWB decided that the application could proceed through the regulatory process. After reviewing the full submission of the Applicant and written comments expressed by interested parties, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA), decided to waive the requirement to hold a public hearing and determined that:

Licence Number 3BM-CAM0914 be issued subject to the terms and conditions contained therein. (Motion #: 2008-10-L08)

SIGNED this 30th day of April, 2009 at Gjoa Haven, NU.

_____

Thomas Kabloona
Nunavut Water Board
Chair

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I. BACKGROUND

The Hamlet of Cambridge Bay has a population of 1,477 (2006) and is located at the coordinates of 69°7'1" north latitude and 105°3'15" west longitude on the south shore of Victoria Island within the Kitikmeot Region of Nunavut. The Hamlet overlooks Dease Strait between Coronation Gulf to the West and Queen Maud Gulf to the East.

The Hamlet of Cambridge Bay is situated in an area of continuous permafrost. The reported ground temperature below 3m of depth averages –9°C. The thickness of active layer varies from 0.3 m in poorly drained areas to over 2 m in well-drained areas. The local geography is dominated by sags and swells, knolls of dry debris and depressions filled with snow or water.

The bedrock geology of the Cambridge Bay area comprises Paleozoic sedimentary rocks (carbonates, shales and sandstones). Bedrock is generally exposed at sporadic locations close to sea level. Where exposed, the bedrock comprises layers of dolomite and shale, and is jointed and frost shattered. (EBA, 2006).

II. PROCEDURAL HISTORY

The NWB first issued a municipal water licence to the Hamlet of Cambridge Bay on September 1, 2002, to allow for the use of water and disposal of waste. This Licence had an expiry date of August 31, 2007.

On June 29, 2004 the NWB received an application for an amendment to the previous Licence to allow for the operation of a landfarm to treat hydrocarbon impacted soils in the Hamlet of Cambridge Bay. On February 16, 2005 the Licence was amended to allow for the construction and operation of a landfarm by the Hamlet.

Derrick Anderson, the acting Senior Administrative Officer for Cambridge Bay, with the technical support of Earth Tech (Canada) Inc., a consultant for the Hamlet, submitted originally on August 23, 2007, an application for water licence renewal to the NWB. Following a preliminary review of the application and the additional information submitted by August 1, 2008, the NWB concluded that the application met the requirements of section 48(1) of the *Nunavut Waters and Surface Rights Tribunal Act* (the Act) and advised the Applicant and distribution list accordingly on September 2, 2008 of receipt of the application and requested a technical review.

The renewal application that was distributed for review consisted of the following information:

- Application cover letter, received on August 30, 2007;
- Hamlet of Cambridge Bay, Nunavut; Background Report for Water Licence Renewal; prepared by Earth Tech (Canada) Inc., received on August 30, 2007;

- NWB Licence renewal application received on August 31, 2007;
- NWB Municipal licence questionnaire, received on September 2, 2007;
- Hamlet of Cambridge Bay, NU Waste Facility Improvements (GN Project No.04-4897) Detailed Design Report for Redevelopment of Existing Waste Facilities; prepared by Earth Tech (Canada) Inc., received on April 17, 2008;
- Geotechnical Evaluation for Municipal Waste Facilities Cambridge Bay, NU, prepared by EBA Engineering Consultants Ltd., December 2006; received on April 17, 2008;
- Cambridge Bay Wetland Planning Study, prepared by Wetland Management Services and Earth Tech (Canada) Inc.; April 2008.
- Cambridge Bay Sewage and Solid Waste Facilities, Issued for 95% Submission Engineered Drawings, April 21, 2008; received on May 5, 2008;
- Hamlet of Cambridge Bay Clarification of Soil Landfarm Treatment Facility, prepared by Earth Tech (Canada) Inc. July 2008; received on August 1, 2008;
- Hamlet of Cambridge Bay Lagoon Operations and Maintenance Manual, prepared by Earth Tech (Canada) Inc. July 2008; received on August 1, 2008;
- Hamlet of Cambridge Bay Landfill Operations and Maintenance Manual, prepared by Earth Tech (Canada) Inc., July 2008; received on August 1, 2008;
- Hamlet of Cambridge Bay Quality Assurance Control Plan, prepared by Earth Tech (Canada) Inc., July 2008; received on August 19, 2008;
- Spill Contingency Plan Hamlet of Cambridge Bay, prepared by Earth Tech (Canada) Inc., July 24, 2008; received on August 1, 2008; and
- Hamlet of Cambridge Bay Subsurface Water Monitoring Plan, prepared by Earth Tech (Canada) Inc., July 17, 2008; received on August 1, 2008.

In addition to the above, the NWB received, on October 23, 2008, the "Cambridge Bay Sewage and Solid Waste Facilities, Issued for Regulatory Review", Engineered Drawings, dated October 3, 2008.

The scope of the renewal application includes 1) ongoing operation of the existing Sewage Disposal Facility and Solid Waste Disposal Facility, and 2) the redesigning and enhancement of the current Sewage Disposal Facilities and Solid Waste Disposal Facility and the construction of a Sewage Wetland leading to an outfall east of the current outfall.

The proposed redevelopment of the Sewage Disposal Facilities would involve the construction of berms to divert run-off around the facilities. The Sewage Disposal Facilities would also be enhanced through the construction of a two cells that will increase hydraulic retention time and increase the capacity of the facilities. The redesigned facilities would move the discharge of the lagoons further east, away from the community and through a constructed wetland. Similarly, the Hamlet of Cambridge Bay is also planning to modify the Solid Waste Disposal Facilities. Berms will be built around the facilities to divert over-land flow away from the facilities as well as direct run-off from the facilities to a sump. The sump will be discharged periodically into the proposed Retention Sewage Lagoon which is the second cell in the Sewage Disposal Facilities.

There are also plans to segregate waste into proposed cells in the landfill. The proposed cells are for hazardous, carcass/honeybag, metal and solid municipal waste.

The Nunavut Water Board publicly posted notice of this application, in accordance with Section 55.1 of the *Act* and Article 13 of the *Nunavut Land Claims Agreement* (NLCA), on September 2, 2008. This assessment process included the referral of the application to a variety of Federal, Territorial and local organizations for review and comment.

As no public concern was expressed, the NWB waived the requirement to hold a public hearing and proceeded with the application process.

The NWB received comments on the application from interested parties, including Indian and Northern Affairs Canada (INAC), Environment Canada (EC), the Government of Nunavut Department of Environment (GN-DoE) and the Government of Nunavut Department of Culture, Language, Elders and Youth (GN-DoCLEY) on or prior to October 3, 2008.

Based upon the results of the detailed assessment, including consideration of any potential accidents, malfunctions, or impacts to water that the overall project might have in the area, the Board approved the application and has issued Licence 3BM-CAM0914.

III. ISSUES

Term of Licence

In accordance with Section 45 of the *Act*, the NWB may issue a licence for a term not exceeding twenty-five years. In determining an appropriate term of a water licence, the Board considers a number of factors, including, but not limited to, the results of INAC site inspections and the compliance record of the Applicant. In review of the previous water licence 3BM-CAM0207 inspection reports and administrative requirements set out in the licence, the NWB has noted that there were several issues of non-compliance and other related problems which include:

i. No fence around the Municipal Waste Management area;
ii. Chlorine buckets with bulging lids;
iii. Missing spill kits at the water supply and fuel storage facilities;
iv. No annual reports filed until requested by the NWB at the time of renewal;
v. Evidence of erosion and seepages at the Sewage Disposal Facilities; and
vi. No landfill segregation.

In review of the application and the comments received from interested parties, there were no comments provided with respect to the Hamlet's request for a term of five (5) years for the Licence renewal. The NWB has decided on a five (5) year term for the Licence. Although the Board has recently issued municipal licences for terms of two (2) years where compliance issues have been of a concern, the Board finds that a five (5) year term is warranted in this case, as

numerous plans and additional information requested by the Manager of Licensing in a letter dated September 6, 2007, had been submitted as part of the application.

Annual Report

The NWB has imposed on the Licensee, the requirement to produce an Annual Report not later than March 31st of the year following the calendar year reported. This same requirement was imposed in the previous Licence. During the term of the previous Licence, the NWB did not receive any Annual Reports until requested to do so by the Manager of Licensing in a letter dated September 6, 2007, which was sent in response to the application for Licence renewal. The requirement to produce Annual Reports is to ensure that the NWB has an accurate and timely annual update of municipal activities during a calendar year. This information is maintained on the public registry and is available to interested parties upon request. A *"Standardized Form for Annual Reporting"* is available for use from the NWB file transfer protocol (FTP) site under the Public Registry link at the NWB Website.

Link: ftp://nunavutwaterboard.org/ADMINISTRATION/Standardized%20Forms/

Operational Plans

The NWB notes that the Licensee has submitted with the application the following Operation and Maintenance Manuals which were a requirement under the previous Licence:

i. *Hamlet of Cambridge Bay Lagoon Operation and Maintenance Manual*;
ii. *Hamlet of Cambridge Bay Landfill Operation and Maintenance Manual*;
iii. *Hamlet of Cambridge Bay Quality Assurance Control Plan*; and,
iv. *Spill Contingency Plan Hamlet of Cambridge Bay*.

These plans have been reviewed and will need to be updated with minor addendums. The required revisions are intended to address deficiencies in the plans and will need to be submitted within ninety (90) days of the issuance on this Licence. The details on the requirements for the revised O&M Manual can be found under Part F Item 1.

Water Use

The Hamlet of Cambridge Bay currently utilizes the Water Supply Lake as a source of potable water with the quantity used not exceeding 70,000 cubic metres annually. The renewal/ amendment application requested an increase in volume to 88,000 cubic metres annually. No concerns were raised by the parties in their written submissions as to the amount of water required by the Hamlet, the manner in which it is obtained or the manner in which this water will be used. The NWB has renewed the terms and conditions associated with water use by the Hamlet and increased the water volume accordingly.

Sewage

The Hamlet of Cambridge Bay currently provides trucked sewage services for the Community's residents, businesses and institutions. The trucked sewage is discharged to the Sewage Disposal Facilities, where primary treatment occurs in a series of ponds and is ultimately discharged into the ocean.

On July 4, 2008 an inspector observed seepages at the Sewage Treatment area and on July 11, 2008 issued a direction to the Hamlet to develop a plan to deal with the seepages and other deficiencies in the Sewage Treatment Facilities.

The submitted application details a proposed alteration to the current ponds that would result in an increased retention time for the effluent, as well as increased facility capacity.

Increased capacity will be achieved through the construction of new retention berms and reinforcing the existing berms. The new berms will allow for a 10m water level in the lagoon which will result in a storage volume of 190,000 cubic meters which is 118,000 cubic meters more than the current 72,000 cubic meters of capacity. Effluent retention time will be increased by constructing a two-cell sewage treatment system separated by a common submerged berm. The first cell, or Primary Sewage Lagoon, receives the raw sewage and will facilitate the settling and decomposition of some of the effluent. In the second cell, or Retention Sewage Lagoon, further settling and decomposition will take place prior to discharge to the Sewage Wetland. The total hydraulic retention time for the two lagoons would be approximately 360 days. Discharging of the second cell will take place seasonally in the summer and be directed to a Sewage Wetland directly below the second cell. Ultimately effluent from the Sewage Wetland will discharge into Cambridge Bay. The Sewage Wetland will be created through the construction of diversion berms and regrading. The Sewage Wetland will further treat the effluent and ultimately result in an outfall location further east from the community than the current outfall. Runoff diversion berms will also be constructed around the sewage lagoons.

EC commented that effluent standards for sewage treatment should, at the very least, meet the parameters set in the '*Guidelines for the discharge of treated municipal wastewater in the Northwest Territories*' and that these parameters should be met at the final discharge point for the Sewage Lagoon (end-of-pipe) and not at the end of the wetland. The NWB agrees that the last point of control for effluent would be at the discharge point for the Sewage Lagoon and as such, this is the point where effluent standards are to be met. In addition, the application provided expect effluent quality limits for the lagoon discharge that were consistent with the previous licence. No further comments were received regarding the applicability of the Guideline effluent limits and the NWB has therefore set these limits consistent with the previous licence.

EC also commented that the point of discharge from the wetland should be monitored to determine the effectiveness of the wetland as a supplementary treatment system. The NWB also

agrees with this recommendation and has incorporated the appropriate monitoring conditions into the Licence.

With respect to sewage sludge, EC recommended that prior to the removal of sludge from the lagoon, the Licensee should submit for approval, a Sewage Sludge Management Plan that clearly outlines the chemical composition of the sludge, and how sludge will be stored, treated and eventually disposed. The NWB concurs with this recommendation, and has imposed this requirement in the Licence.

Solid Waste

According to the renewal application, the Hamlet is currently using a Solid Waste Disposal Site located approximately 0.9km east of the community. The site covers an area of approximately 28,000m^2.

During an inspection on September 4, 2003 the INAC inspector observed that drums of hazardous wastes were present in the solid municipal waste facilities and issued a direction on September 15, 2003 that the drums were to be removed immediately. On July 4, 2008 an inspector observed that the Solid Waste Disposal Facilities were unfenced and on July 11, 2008 issued a direction to the Hamlet to install fencing by November 30, 2008.

The existing landfill is to be redeveloped to increase its capacity and to facilitate better waste management procedures such as segregation of different waste streams.

Segregation will be achieved through the construction of specific cells for the disposal of hazardous waste and honeybag/carcass. Designated areas will also be set aside for tire disposal, a burn pit, a metal dump, and equipment storage. A metal storage area near the Sewage Wetland will be moved and added to the scrap metal dump that is adjacent to the Sewage Wetland. An isolation berm will be constructed between the metal dump and the Sewage Wetland to isolate the two facilities. Solid municipal wastes will be placed in one of four cells that will be developed and operated in an organized fashion. Runoff from the landfill will be collected in an on-site runoff detention pond and periodically discharged to the Retention Sewage Lagoon. Off-site runoff will be prevented from entering the landfill area through the construction of berms around the landfill which will also serve to direct on-site runoff to the on-site runoff detention pond. Fencing around the Solid Waste Disposal Facilities will be erected to prevent windblown litter and control access to the site.

The improvement to the Solid Waste Disposal Facilities will accommodate the Hamlet's waste disposal need for ten years.

The GN-DoE commented that the run-off from the landfill facilities should meet effluent standards as set out in the Department of Environment *Environmental Guideline for Industrial Waste Discharges,* Schedule I, before being released into the Wastewater Lagoon System. The

NWB agrees with this recommendation as it is the last point of control for landfill effluent. The NWB will require that effluent from the landfill meet Schedule I standards prior to discharge to the Wastewater Lagoon System for further treatment.

Landfarm

During the previous licence term, the NWB issued an amendment to the licence for the operation of a landfarm for treating hydrocarbon contaminated soils. According to the document entitled "Hamlet of Cambridge Bay Clarification of Soil Landfarm Treatment Facility" that was received as additional information with the renewal application, a landfarm treatment facility was never completely built or in operation. Furthermore the letter indicates that the application for the landfarm was not made by the municipality but by a private operator with no connections to the municipality. The municipality has indicated that it has prohibited the operation of the landfarm by the private operator. As the result, this renewal licence does not cover the construction or operation of a landfarm facility. If, in the future the Hamlet requires a landfarm, then an amendment application will need to be filed with the NWB complete with final design, stamped and signed for construction drawings and an operations and maintenance manual.

Abandonment and Restoration

To ensure that all existing end-of-life facilities are reclaimed in an appropriate manner, the NWB requires Licensees to submit an *Abandonment and Restoration Plan*. This Plan is to be submitted at least six (6) months prior to final closure of any licensed facility or upon submission of the final design drawings for the construction of new facilities to replace existing ones. The requirements for the Plan are outlined in Part G, Item 1 of this Licence.

Monitoring Program

The volume of water taken at the raw water intake is to be measured and reported annually in order for the NWB to have an accurate and timely update on the volume of water use by the Hamlet.

The effluent outfall for the Existing Sewage Disposal Facilities is located in a small bay south of pond 6 as seen on Figure 4 of the Background Report for Water Licence Renewal, Hamlet of Cambridge Bay, NU, EarthTech. August 2007. The proposed new outfall at the end of the constructed wetland will be to the east of the current outfall and discharge directly to Cambridge Bay. Since both outfalls discharges' are ultimately to Cambridge Bay the NWB has decided to implement one effluent standard for both outfalls. Sampling is to take place 3 (three) times annually, once each at the beginning, middle and end of the open water season. The sampling results are to be included in the annual report to the NWB.

In order to ensure that the Licensee is inspecting the sampling points for flow occurances, the Licence includes a requirement to inspect weekly for observed flow from May to October. The

results of these inspections are to be recorded and made available to an Inspector upon request.

All effluent from the sump in the Solid Waste Disposal Facilities directed to the Retention Sewage Lagoon shall not exceed Schedule I of the *Environmental Guideline for Industrial Waste Discharges* prior to discharge. Each discharge from the sump is to be sampled and the results included in the annual report to the NWB.

Although the NWB has not included the requirement for toxicity testing within this Licence, the Licensee should be aware of EC's comments which states that all effluent discharged from the Sewage Disposal Facilities' final discharge point must be in compliance with Section 36(3) of the Fisheries Act. According to Section 36(3) of the Fisheries Act, the deposition of deleterious substances of any type, under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter such water, is prohibited. The Licensee is advised that compliance with this Licence does not absolve the Licensee from the responsibility to comply with other applicable legislation.

IV. LICENCE 3BM-CAM0914

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

HAMLET OF CAMBRIDGE BAY

(Licensee)

of

P.O. BOX 16, CAMBRIDGE BAY, NUNAVUT X0B 0C0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this Licence:

Licence Number	**3BM-CAM0914**
Water Management Area	**NUNAVUT 04**
Location	**CAMBRIDGE BAY, KITIKMEOT REGION, NU (Latitude 69°7'1"N and Longitude 105°3'15"W)**
Purpose	**WATER USE AND WASTE DISPOSAL**
Description	**MUNICIPAL UNDERTAKINGS**
Quantity of Water Not to Exceed	**88,000 CUBIC METRES ANNUALLY**
Date of Licence	**APRIL 30, 2009**
Expiry Date of Licence	**MARCH 31, 2014**

Dated this 30th day of April, 2009 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

PART A: SCOPE AND DEFINITIONS

1. Scope

a. This Licence allows for the use of water and the disposal of waste for municipal undertakings at the Hamlet of Cambridge Bay, Kitikmeot Region, Nunavut (69°7'1" N; 105°3'15"W);

b. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Nunavut Waters and Nunavut Surface Rights Tribunal Act, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and

c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

In this Licence: **3BM-CAM0914**

"Act" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Amendment" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

''Appurtenant undertaking'' means an undertaking in relation to which a use of waters or a deposit of waste is permitted by a licence issued by the Board;

"Board" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement*;

"Effluent" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond or a treatment plant;

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the *Engineering, Geological and Geophysical Act (Nunavut)* S.N.W.T. 1998, c.38, s.5;

"Existing Sewage Disposal Facilities" comprises Pond 1, Pond 2, Pond 3, Pond 4, Pond 5 and Pond 6 as identified on Figure 4, Background Report for Water Licence Renewal, Hamlet of Cambridge Bay, NU. Earth Tech. August 2007;

"Existing Solid Waste Disposal Facilities" means the facilities designated for the disposal of solid waste, as identified on Drawing No. C-O1, C-02 and C-04, Government of Nunavut Cambridge Bay Waste Facilities, prior to the planned modifications proposed in the renewal application dated August 3, 2007 and supplementary documents submitted with that application;

"Final Discharge Point" in respect of an effluent means an identifiable discharge point of a facility beyond which the operator of the facility no longer exercises control over the quality of the effluent;

"Freeboard" means the vertical distance between water line and the designed maximum operating height on the crest of a dam or dyke's upstream slope;

"Geotechnical Engineer" means a professional engineer registered with the Association of Professional Engineers, Geologist and Geophysicists of Nunavut and whose principal field of specialization with the engineering properties of earth materials in dealing with man-made structures and earthworks that will be built on a site. These can include shallow and deep foundations, retaining walls, dams, and embankments;

"Grab Sample" means an undiluted single water or wastewater sample, collected at a particular time and place that may be representative of the total substance being sampled, at the time and place it was collected.

"Greywater" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"**Inspector**" means an Inspector designated by the Minister under Section 85 (1) of the Act;
"Licensee" means the holder of this Licence;

"Modification" means an alteration to a physical work that introduces new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion, and changes to the operating system that are consistent with the terms of this Licence and do not require amendment;

"Modified Sewage Disposal Facilities" comprises the Primary Sewage Lagoon and Retention Sewage Lagoon as identified on Drawing No. C-O1, C-02 and C-04, Government of Nunavut Cambridge Bay Waste Facilities, October 3, 2008;

"Modified Solid Waste Disposal Facilities" means the facilities designated for the disposal of solid waste, as identified on Drawing No. C-O1, C-02 and C-04, Government of Nunavut Cambridge Bay Waste Facilities, October 3, 2008 and modified as described in the renewal application dated August 3, 2007 and supplementary documents submitted with that application;

"Monitoring Program" means a monitoring program established to collect data on surface water and groundwater quality, to assess impacts of an appurtenant undertaking to the freshwater aquatic environment.

"Nunavut Land Claims Agreement" (NLCA) means the "*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"Retention Sewage Lagoon" is the secondary cell of the Modified Sewage Disposal Facilities and is identified within the drawings submission dated October 3, 2008, "Cambridge Bay Sewage and Solid Waste Facilities", specifically on Drawing No. C-01, Process Summary and drawing C-04, Sewage Lagoon Improvement Plan;

"Sewage" means all toilet wastes and greywater;

"Sewage Wetland" compromises the 'Sewage Wetland Area' Drawing No. C-O1, 'Wetland' Drawing No. C-02 and 'Proposed Wetland' Drawing No.C-04, Government of Nunavut Cambridge Bay Waste Facilities, October 3, 2008;

"Toilet Wastes" means all human excreta and associated products, but does not include greywater;

"Waste" means, as defined in S.4 of the Act, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"Water Supply Facilities" comprises the area and associated intake infrastructure at Water Lake, the Intake Pump House and back-up truck fill station, the Water Treatment Plant, the Storage Tanks adjacent to the Water Treatment Plant and the Water Supply

Pipe as described in the Application for a renewal of Water Licence dated August 3, 2007;

3. Enforcement

a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the Act;

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the Act; and

c. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the Act, hold all powers, privileges and protections that are conferred upon them by the Act or by other applicable law.

PART B: GENERAL CONDITIONS

1. 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:

a. tabular summaries of all data generated under the "Monitoring Program";

b. the monthly and annual quantities in cubic metres of fresh water obtained at the Water Supply Facilities;

c. the monthly and annual quantities in cubic metres of all waste discharged;

d. 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;

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

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

g. Any addendum with updates or revisions for manuals and plans (i.e., *Operations and Maintenance Manual*) as required by changes in operation and/or technology;

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

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

2. 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.

3. The "Monitoring Program" and compliance dates specified in the Licence may be modified at the discretion of the Board in writing.

4. Meters, devices or other such methods as approved by the Board in writing, used for measuring the volumes of water used and waste discharged shall be installed, operated and maintained by the Licensee.

5. The Licensee shall, within ninety (90) days following the first visit by the Inspector following issuance of this Licence, post the necessary signs to identify the stations of the "Monitoring Program," in the Official Languages of Nunavut.

6. The Licensee shall immediately report to the 24-Hour Spill Report Line (867-920-8130), any spills of Waste which are reported to or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities.

7. The Licensee shall ensure a copy of this Licence is maintained at the Municipal Office at all times. Any communication with respect to this Licence and any notice provided to an Inspector, shall be made in writing to the attention of:

Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nunavutwaterboard.org

Inspector Contact:
Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

8. 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.

9. The Licensee shall ensure that all document(s) and correspondence submitted by the Licensee to the Board are received and acknowledged by the Manager of Licensing.

10. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

11. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

12. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and condition imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

13. This Licence is not assignable except as provided in Section 44 of the Act.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all fresh water from Water Lake using the Water Supply Facilities or as otherwise approved by the Board in writing.

2. The annual quantity of water used for all purposes shall not exceed eighty-eight thousand (88,000) cubic metres.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

4. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless otherwise approved by the Board in writing.

5. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

6. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall direct all Sewage to the Existing Sewage Disposal Facilities or until such time as the Modified Sewage Disposal Facilities are operational.

2. The Licensee shall notify the Inspector sixty (60) days prior to the commissioning each of the Modified Sewage Disposal Facilities and the Modified Solid Waste Disposal Facilities.

3. The Licensee shall direct all Sewage to the Modified Sewage Disposal Facilities upon commissioning.

4. The Licensee shall direct all effluent from the Modified Solid Waste Disposal Facilities to the Retention Sewage Lagoon once the Modified Solid Waste Disposal Facilities and Modified Sewage Disposal Facilities are operational.

5. The Licensee shall provide a minimum of ten (10) days notice annually to an Inspector of the intent to discharge effluent from either the Existing Sewage Disposal Facilities or the Modified Sewage Disposal Facilities.

6. All Effluent discharged from the Modified Solid Waste Disposal Facilities to the Retention Sewage Lagoon, at Monitoring Program Station CAM-4, shall not exceed the effluent objectives as set in Schedule I of the *Environmental Guideline for Industrial Waste Discharges, Government of Nunavut, Environmental Protection Service, January 2002*. Effluent that does not meet these objectives shall be considered hazardous waste and either treated to the specified limits or disposed of at an approved facility.

7. All Effluent discharged from the Existing Sewage Disposal Facilities at Monitoring Program Station CAM-3 and the Retention Sewage Lagoon to the Sewage Wetland at Monitoring Program Station CAM-5, shall not exceed the following effluent quality limits:

Parameter	**Maximum Concentration of Any Grab Sample**
BOD_5	100 mg/L
Total Suspended Solids	120 mg/L
Fecal Coliforms	1×10^6 CFU/100mL
Oil and grease	No visible sheen
pH	between 6 and 9

8. The Licensee shall maintain at all times, a freeboard of at least 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board in writing, for all dams, dykes or other structures intended to contain, withhold, divert or retain water or wastes.

9. The Existing Sewage Disposal Facilities and Modified Sewage Disposal Facilities shall be maintained and operated in such a manner as to prevent structural failure.

10. The Licensee shall dispose of and permanently contain all solid wastes at the Existing Solid Waste Disposal Facilities or Modified Solid Waste Disposal Facilities, or as otherwise approved by the Board in writing.

11. The Licensee shall segregate and store all hazardous materials and/or hazardous waste within the Existing Solid Waste Disposal Facilities or Modified Solid Waste Disposal Facilities in a manner to prevent the deposit of deleterious substances into any water, until such a time that the materials have been removed for proper disposal at an approved facility.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Board for approval in writing, for construction design drawings stamped by a qualified Engineer, sixty (60) days prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.

2. The Licensee may, without written approval from the Board, carry out modifications to the Water Supply and Waste Disposal Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:

    a. the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;

    b. these modifications do not place the Licensee in contravention of the Licence or the Act;

    c. the Board has not, during the sixty (60) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and

    d. the Board has not rejected the proposed modifications.

3. Modifications for which all of the conditions referred to in Part E, Item 2, have not been met may be carried out only with written approval from the Board. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

4. The Licensee shall provide to the NWB for review, as-built plans and drawings, stamped and signed by an Engineer, within ninety (90) days of completion of construction or, if already constructed, within ninety (90) days of issuance of this Licence, including the following:

    a. Sewage Treatment Facilities upgrade, as detailed in the application dated August 3, 2007 for renewal of Licence and the additional submitted documents with the application;

    b. Solid Waste Disposal Facilities upgrade, as detailed in the application dated August 3, 2007 for renewal of Licence and the additional submitted documents with the application;

5. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

6. The Licensee shall implement and maintain sediment and erosion control measures prior to and during activities carried out under this Part, to prevent the release of sediment and minimize erosion.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board for approval in writing, within ninety (90) days of issuance of the Licence, an updated Operations and Maintenance Manual prepared where appropriate, in accordance with the *"Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996"*. The updated Manual shall take into consideration the comments received during the application review process and include the following information:

    a. A schedule for recording daily water use volumes as part of the *Water Distribution Facility Operation and Maintenance (O&M) Plan*;
    b. The updated sampling locations, parameters and timing required under the Licence;
    c. A *Sewage Sludge Management Plan*;

d. A detailed description on when and where waste incineration is to take place as part of the *Solid Waste Disposal Facility Operation and Maintenance (O&M) Plan*;
e. An expanded *Spill Contingency Plan* that thoroughly discusses spill training, identifies locations of all spill kits and their contents, has the correct emergency contact information for the INAC inspector, EC, GN-DoE and KIA, has a step-by-step plan for spill containment for different types of spills and spill locations, includes a map, MSDS sheets and a copy of the Nunavut Spill Report Form, emergency (24hr) contact information for a representative of the Hamlet and the Plan shall describe all chemicals and fuels (inventory) stored by the Hamlet, their locations and quantities; and
f. A QA/QC Plan that has been submitted to an analyst for review under Part H, Item 11, including a letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under this Licence, and proof of CAEAL accreditation for all laboratories doing testing as required under this Licence.

2. The Licensee shall review the O&M Manual referred to in Part F, Item 1 as required by changes in operation and/or technology and modify accordingly. Revisions are to be submitted in the form of an Addendum to be included with the Annual Report.

3. An inspection of all engineered facilities related to the management of water and waste shall be carried out annually in July or August by a Geotechnical Engineer. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing each of the Engineer's recommendations.

4. The Licensee shall perform more frequent inspections of the engineered facilities at the request of an Inspector.

5. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

a. employ the appropriate contingency measures as approved under the Operation and Maintenance Manual for the Hamlet of Cambridge Bay;
b. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
c. submit to the Inspector, a detailed report on each occurrence, not later than thirty (30) days after initially reporting the event, that provides the necessary information on the location (including the GPS coordinates), initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and preventative measures to be implemented.

PART G: CONDITIONS APPLYING TO ABANDONMENT, RESTORATION AND CLOSURE

1. The Licensee shall submit to the Board for approval an *Abandonment, Restoration and Closure Plan* at least six (6) months prior to abandoning any facilities or upon submission of the final design drawings for the construction of new facilities to replace existing ones. Where applicable, the Plan shall include information on the following:

    a. water intake facilities;
    b. the water treatment and waste disposal sites and facilities;
    c. petroleum and chemical storage areas;
    d. any site affected by waste spills;
    e. leachate prevention;
    f. an implementation schedule;
    g. maps delineating all disturbed areas, and site facilities;
    h. consideration of altered drainage patterns;
    i. type and source of cover materials;
    j. future area use;
    k. hazardous wastes; and
    l. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Number	Description	Status
CAM-1	Raw water supply intake at Water Lake	Active (Volume)
CAM-2	Runoff from the Existing Solid Waste Disposal Facilities	Active until modifications are complete
CAM-3	Effluent discharge from the Existing Sewage Disposal Facilities	Active until modifications are complete
CAM-4	Effluent from the sump in the Modified Solid Waste Disposal Facilities being discharged to the Retention Sewage Lagoon	Inactive until modifications are complete then active
CAM-5	Final Discharge Point for effluent from the Retention Sewage Lagoon to the	Inactive until modifications

Monitoring Program Station Number	Description	Status
	Sewage Wetland	are complete then active
CAM-6	Outfall area for the Sewage Wetland	Inactive until modifications are complete then active

2. The Licensee shall measure and record, in cubic metres, the monthly and annual quantities of water pumped at Monitoring Program Station CAM-1, for all purposes.

3. The Licensee shall sample at Monitoring Program Station CAM-2, Existing Solid Waste Disposal Facilities, monthly during periods of observed flow, until such time as the Modified Solid Waste Disposal Facilities are operational. Samples shall be analyzed for the following parameters:

Biochemical Oxygen Demand (BOD_5)	Fecal Coliforms
Total Suspended Solids	pH
Conductivity	Nitrate-Nitrite
Oil and Grease	
Magnesium	Calcium
Sodium	Potassium
Chloride	Sulphate
Total Hardness	Total Alkalinity
Ammonia Nitrogen	Total Zinc
Total Cadmium	Total Iron
Total Cobalt	Total Manganese
Total Chromium	Total Nickel
Total Copper	Total Lead
Total Aluminum	Total Arsenic
Total Mercury	Total Organic Carbon (TOC)

4. The Licensee shall sample monthly during periods of observed flow at Monitoring Program Station CAM-3, until such time as the Modified Sewage Disposal Facility is operational. Samples shall be analyzed for the parameters listed under Part H, Item 3.

5. The Licensee shall sample at Monitoring Program Station CAM-4 prior to discharge, in order to verify compliance with Part D, Item 6. Samples shall be analyzed for parameters set out in Schedule I of the *Environmental Guideline for Industrial Waste Discharges, Government of Nunavut, Environmental Protection Service, January 2002*.

6. The Licensee shall sample at the Retention Sewage Lagoon, Monitoring Program Station

CAM-5, once at the beginning, middle and near the end of discharge. Samples shall be analyzed for all the parameters listed under Part H, Item 3.

7. The Licensee shall sample monthly, during periods of observed flow, at Monitoring Program Station CAM-6. Samples shall be analyzed for the parameters listed under Part H, Item 3.

8. The Licensee shall inspect weekly from May to October, at Monitoring Program Station CAM-2, CAM-3 and CAM-6, for effluent or water flow in order to fulfill the monitoring requirements of Part H, Item 3, 4, and 7. A record of inspections shall be made available to an Inspector upon request.

9. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board.

10. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

11. The Licensee shall submit to the Board, a Quality Assurance/Quality Control (QA/QC) Plan, within the Operations and Maintenance Manual as required under Part F Item 1(f). The Plan shall include up to date sampling methods to all applicable standards, acceptable to an accredited laboratory as required by Part H, Item 9 and Part H, Item 10. The Plan shall include a letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under this Licence.

12. The Licensee shall annually review the Quality Assurance/Quality Control Plan and modify as necessary with accompanying letter from the accredited laboratory as in Part H, Item 11.

13. The Licensee shall measure and record the annual quantities of sewage solids removed from the Existing Sewage Disposal Facilities and Modified Sewage Disposal Facilities.

14. Additional monitoring stations, sampling and analyses may be requested by an Inspector.

15. The Licensee shall include all of the data and information required by the “Monitoring Program” complete with an interpretation and discussion of the results, in the Licensee's Annual Report, as required *per* Part B, Item 1, or as requested by an Inspector.

16. Modifications to the Monitoring Program may be made only upon written approval from the NWB. Requests for changes to the Monitoring Program should be forwarded to the NWB in writing, and should include the justification and appropriate evidence to support the change.

Appendix- B

Sewage and Waste Sample Results: Details

Cambridge Bay Water Licence 3BM-CAM0914

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

Taiga Batch No.:
140567

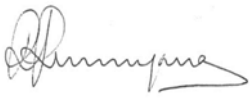
- FINAL REPORT -

Prepared For: Hamlet of Cambridge Bay

Address: P.O. Box 16
Cambridge Bay,NU
X0B 0C0

Attn: **Wayne Weese** **Facsimile: (867) 983-2186**

Final report has been reviewed and approved by:



Angelique Ruzindana
Quality Assurance Officer

NOTES:

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

ReportDate: Wednesday, August 20, 2014
Print Date: ***Wednesday, August 20, 2014***

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

Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Client Project: CB2014-07
Sample Type: Wastewater
Received Date: 24-Jul-14
Sampling Date: 24-Jul-14
Sampling Time: 9:30
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	14.5	0.005	mg/L	30-Jul-14	SM4500-NH3:	
Biochemical Oxygen Demand	64	2	mg/L	25-Jul-14	SM5210:B	
Organic Carbon, Total	45.3	0.5	mg/L	28-Jul-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	258	0.4	mg/L	25-Jul-14	SM2320:B	
Conductivity, Specific (@25C)	869	0.4	µS/cm	25-Jul-14	SM2510:B	
pH	7.95		pH units	25-Jul-14	SM4500-H:B	
Solids, Total Suspended	40	3	mg/L	30-Jul-14	SM2540:D	
Major Ions						
Calcium	40.0	0.1	mg/L	25-Jul-14	SM4110:B	
Chloride	106	0.7	mg/L	25-Jul-14	SM4110:B	
Hardness	222	0.7	mg/L	25-Jul-14	SM4110:B	
Magnesium	29.5	0.1	mg/L	25-Jul-14	SM4110:B	
Nitrate as Nitrogen	0.57	0.01	mg/L	25-Jul-14	SM4110:B	

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Taiga Batch No.: 140567

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Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Nitrate+Nitrite as Nitrogen	0.79	0.01	mg/L	25-Jul-14	SM4110:B
Nitrite as Nitrogen	0.22	0.01	mg/L	25-Jul-14	SM4110:B
Potassium	17.4	0.1	mg/L	25-Jul-14	SM4110:B
Sodium	72.6	0.1	mg/L	25-Jul-14	SM4110:B
Sulphate	22	1	mg/L	25-Jul-14	SM4110:B
Microbiology					
Coliforms, Fecal	5100	100	CFU/100mL	25-Jul-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			30-Jul-14	Visual Exam
Trace Metals					
Aluminum	42.5	5	µg/L	06-Aug-14	EPA200.8
Antimony	0.9	0.1	µg/L	06-Aug-14	EPA200.8
Arsenic	1.7	0.2	µg/L	06-Aug-14	EPA200.8
Barium	15.9	0.1	µg/L	06-Aug-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	06-Aug-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Chromium	0.5	0.1	µg/L	06-Aug-14	EPA200.8
Cobalt	0.3	0.1	µg/L	06-Aug-14	EPA200.8
Copper	14.8	0.2	µg/L	06-Aug-14	EPA200.8
Iron	460	5	µg/L	06-Aug-14	EPA200.8
Lead	0.5	0.1	µg/L	06-Aug-14	EPA200.8
Lithium	6.1	0.2	µg/L	06-Aug-14	EPA200.8
Manganese	63.6	0.1	µg/L	06-Aug-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	06-Aug-14	EPA200.8

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Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Molybdenum	1.2	0.1	µg/L	06-Aug-14	EPA200.8
Nickel	2.4	0.1	µg/L	06-Aug-14	EPA200.8
Rubidium	13.0	0.1	µg/L	06-Aug-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	06-Aug-14	EPA200.8
Silver	0.2	0.1	µg/L	06-Aug-14	EPA200.8
Strontium	67.0	0.1	µg/L	06-Aug-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Titanium	0.8	0.1	µg/L	06-Aug-14	EPA200.8
Uranium	0.6	0.1	µg/L	06-Aug-14	EPA200.8
Vanadium	0.5	0.1	µg/L	06-Aug-14	EPA200.8
Zinc	12.4	5	µg/L	06-Aug-14	EPA200.8

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Client Project: CB2014-07
Sample Type: Wastewater
Received Date: 24-Jul-14
Sampling Date: 24-Jul-14
Sampling Time: 9:30
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	>99.48	2	mg/L	25-Jul-14	SM5210:B	55
Phosphorous, Total	0.696	0.002	mg/L	30-Jul-14	SM4500-P:D	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	425	0.4	mg/L	25-Jul-14	SM2320:B	
Conductivity, Specific (@25C)	3290	0.4	µS/cm	25-Jul-14	SM2510:B	
pH	7.57		pH units	25-Jul-14	SM4500-H:B	
Solids, Total Suspended	107	3	mg/L	30-Jul-14	SM2540:D	
Major Ions						
Calcium	446	0.1	mg/L	25-Jul-14	SM4110:B	
Chloride	349	0.7	mg/L	28-Jul-14	SM4110:B	
Hardness	1520	0.7	mg/L	25-Jul-14	SM4110:B	
Magnesium	98.0	0.1	mg/L	25-Jul-14	SM4110:B	
Nitrate as Nitrogen	0.12	0.01	mg/L	28-Jul-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.12	0.01	mg/L	28-Jul-14	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	28-Jul-14	SM4110:B	
Potassium	70.3	0.1	mg/L	25-Jul-14	SM4110:B	

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Sodium	172	0.1	mg/L	25-Jul-14	SM4110:B
Sulphate	1070	1	mg/L	28-Jul-14	SM4110:B
Organics					
Hexane Extractable Material	< 2.0	2.0	mg/L	31-Jul-14	EPA1664A
Subcontracted Inorganics					
Sulphide	0.21	0.1	mg/L	06-Aug-14	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	0.0284	0.005	mg/L	01-Aug-14	APHA4500-CN
Phenols, Total	0.0667	0.001	mg/L	06-Aug-14	AB ENV.06537
Trace Metals					
Aluminum	132	5	µg/L	06-Aug-14	EPA200.8
Antimony	31.7	0.1	µg/L	06-Aug-14	EPA200.8
Arsenic	5.6	0.2	µg/L	06-Aug-14	EPA200.8
Barium	56.5	0.1	µg/L	06-Aug-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Cadmium	0.35	0.1	µg/L	06-Aug-14	EPA200.8
Cesium	2.3	0.1	µg/L	06-Aug-14	EPA200.8
Chromium	5.8	0.1	µg/L	06-Aug-14	EPA200.8
Cobalt	7.9	0.1	µg/L	06-Aug-14	EPA200.8
Copper	64.6	0.2	µg/L	06-Aug-14	EPA200.8
Iron	23000	5	µg/L	06-Aug-14	EPA200.8
Lead	13.8	0.1	µg/L	06-Aug-14	EPA200.8
Lithium	54.1	0.2	µg/L	06-Aug-14	EPA200.8
Manganese	1100	0.1	µg/L	06-Aug-14	EPA200.8
Mercury	0.08	0.01	µg/L	06-Aug-14	EPA200.8

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Molybdenum	11.9	0.1	µg/L	06-Aug-14	EPA200.8
Nickel	37.5	0.1	µg/L	06-Aug-14	EPA200.8
Rubidium	54.0	0.1	µg/L	06-Aug-14	EPA200.8
Selenium	1.0	0.5	µg/L	06-Aug-14	EPA200.8
Silver	0.6	0.1	µg/L	06-Aug-14	EPA200.8
Strontium	1730	0.1	µg/L	06-Aug-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Titanium	3.3	0.1	µg/L	06-Aug-14	EPA200.8
Uranium	2.2	0.1	µg/L	06-Aug-14	EPA200.8
Vanadium	1.5	0.1	µg/L	06-Aug-14	EPA200.8
Zinc	304	5	µg/L	06-Aug-14	EPA200.8

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Client Project: CB2014-07
Sample Type: Wastewater
Received Date: 24-Jul-14
Sampling Date: 24-Jul-14
Sampling Time: 9:40
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.893	0.005	mg/L	30-Jul-14	SM4500-NH3:	
Biochemical Oxygen Demand	32	2	mg/L	25-Jul-14	SM5210:B	
Organic Carbon, Total	47.2	0.5	mg/L	28-Jul-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	216	0.4	mg/L	25-Jul-14	SM2320:B	
Conductivity, Specific (@25C)	1100	0.4	µS/cm	25-Jul-14	SM2510:B	
pH	9.08		pH units	25-Jul-14	SM4500-H:B	
Solids, Total Suspended	28	3	mg/L	30-Jul-14	SM2540:D	
Major Ions						
Calcium	52.5	0.1	mg/L	25-Jul-14	SM4110:B	
Chloride	182	0.7	mg/L	25-Jul-14	SM4110:B	
Hardness	308	0.7	mg/L	25-Jul-14	SM4110:B	
Magnesium	43.0	0.1	mg/L	25-Jul-14	SM4110:B	
Nitrate as Nitrogen	0.19	0.01	mg/L	25-Jul-14	SM4110:B	
Nitrite as Nitrogen	0.06	0.01	mg/L	25-Jul-14	SM4110:B	
Potassium	17.2	0.1	mg/L	25-Jul-14	SM4110:B	

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Sodium	111	0.1	mg/L	25-Jul-14	SM4110:B	
Sulphate	93	1	mg/L	25-Jul-14	SM4110:B	
Microbiology						
Coliforms, Fecal	< 10	10	CFU/100mL	25-Jul-14	SM9222:D	68
Organics						
Oil and Grease, visible	Non-visible			30-Jul-14	Visual Exam	
Trace Metals						
Aluminum	50.2	5	µg/L	06-Aug-14	EPA200.8	
Antimony	2.2	0.1	µg/L	06-Aug-14	EPA200.8	
Arsenic	4.4	0.2	µg/L	06-Aug-14	EPA200.8	
Barium	52.1	0.1	µg/L	06-Aug-14	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8	
Cadmium	< 0.10	0.1	µg/L	06-Aug-14	EPA200.8	
Cesium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8	
Chromium	0.4	0.1	µg/L	06-Aug-14	EPA200.8	
Cobalt	0.6	0.1	µg/L	06-Aug-14	EPA200.8	
Copper	4.7	0.2	µg/L	06-Aug-14	EPA200.8	
Iron	598	5	µg/L	06-Aug-14	EPA200.8	
Lead	1.7	0.1	µg/L	06-Aug-14	EPA200.8	
Lithium	9.7	0.2	µg/L	06-Aug-14	EPA200.8	
Manganese	48.6	0.1	µg/L	06-Aug-14	EPA200.8	
Mercury	< 0.01	0.01	µg/L	06-Aug-14	EPA200.8	
Molybdenum	7.6	0.1	µg/L	06-Aug-14	EPA200.8	
Nickel	5.2	0.1	µg/L	06-Aug-14	EPA200.8	
Rubidium	8.3	0.1	µg/L	06-Aug-14	EPA200.8	

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- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Selenium	< 0.5	0.5	µg/L	06-Aug-14	EPA200.8
Silver	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Strontium	167	0.1	µg/L	06-Aug-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Titanium	1.9	0.1	µg/L	06-Aug-14	EPA200.8
Uranium	2.5	0.1	µg/L	06-Aug-14	EPA200.8
Vanadium	1.9	0.1	µg/L	06-Aug-14	EPA200.8
Zinc	22.7	5	µg/L	06-Aug-14	EPA200.8

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Client Project: CB2014-07
Sample Type: Wastewater
Received Date: 24-Jul-14
Sampling Date: 24-Jul-14
Sampling Time: 9:45
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.023	0.005	mg/L	30-Jul-14	SM4500-NH3:	
Biochemical Oxygen Demand	26	2	mg/L	25-Jul-14	SM5210:B	
Organic Carbon, Total	38.3	0.5	mg/L	28-Jul-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	222	0.4	mg/L	25-Jul-14	SM2320:B	
Conductivity, Specific (@25C)	1040	0.4	µS/cm	25-Jul-14	SM2510:B	
pH	7.87		pH units	25-Jul-14	SM4500-H:B	
Solids, Total Suspended	8	3	mg/L	30-Jul-14	SM2540:D	
Major Ions						
Calcium	52.9	0.1	mg/L	25-Jul-14	SM4110:B	
Chloride	157	0.7	mg/L	25-Jul-14	SM4110:B	
Hardness	310	0.7	mg/L	25-Jul-14	SM4110:B	
Magnesium	43.1	0.1	mg/L	25-Jul-14	SM4110:B	
Nitrate as Nitrogen	0.09	0.01	mg/L	25-Jul-14	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	25-Jul-14	SM4110:B	
Potassium	13.7	0.1	mg/L	25-Jul-14	SM4110:B	

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Sodium	97.4	0.1	mg/L	25-Jul-14	SM4110:B	
Sulphate	80	1	mg/L	25-Jul-14	SM4110:B	
Microbiology						
Coliforms, Fecal	< 10	10	CFU/100mL	25-Jul-14	SM9222:D	68
Organics						
Oil and Grease, visible	Non-visble			30-Jul-14	Visual Exam	
Trace Metals						
Aluminum	12.8	5	µg/L	06-Aug-14	EPA200.8	
Antimony	1.2	0.1	µg/L	06-Aug-14	EPA200.8	
Arsenic	3.4	0.2	µg/L	06-Aug-14	EPA200.8	
Barium	79.4	0.1	µg/L	06-Aug-14	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8	
Cadmium	< 0.10	0.1	µg/L	06-Aug-14	EPA200.8	
Cesium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8	
Chromium	0.6	0.1	µg/L	06-Aug-14	EPA200.8	
Cobalt	0.4	0.1	µg/L	06-Aug-14	EPA200.8	
Copper	1.8	0.2	µg/L	06-Aug-14	EPA200.8	
Iron	819	5	µg/L	06-Aug-14	EPA200.8	
Lead	0.6	0.1	µg/L	06-Aug-14	EPA200.8	
Lithium	8.8	0.2	µg/L	06-Aug-14	EPA200.8	
Manganese	103	0.1	µg/L	06-Aug-14	EPA200.8	
Mercury	< 0.01	0.01	µg/L	06-Aug-14	EPA200.8	
Molybdenum	3.5	0.1	µg/L	06-Aug-14	EPA200.8	
Nickel	3.5	0.1	µg/L	06-Aug-14	EPA200.8	
Rubidium	5.3	0.1	µg/L	06-Aug-14	EPA200.8	

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

Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Selenium	< 0.5	0.5	µg/L	06-Aug-14	EPA200.8
Silver	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Strontium	134	0.1	µg/L	06-Aug-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	06-Aug-14	EPA200.8
Titanium	0.6	0.1	µg/L	06-Aug-14	EPA200.8
Uranium	1.6	0.1	µg/L	06-Aug-14	EPA200.8
Vanadium	0.9	0.1	µg/L	06-Aug-14	EPA200.8
Zinc	5.5	5	µg/L	06-Aug-14	EPA200.8

ReportDate: Wednesday, August 20, 2014
Print Date: *Wednesday, August 20, 2014*

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Taiga Batch No.: 140567

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

55 *BOD result is inconclusive; residual DO was less than 1 mg/L. For evaluation purposes only.*

68 *Unable to repeat analysis at lower dilution. Holding time exceeded.*

*** 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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Taiga Batch No.: 140697

- FINAL REPORT -

Prepared For: Hamlet of Cambridge Bay

Address: P.O. Box 16
Cambridge Bay,NU
X0B 0C0

Attn: **Wayne Weese** **Facsimile: (867) 983-2186**

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: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Client Project: CAM2014-08
Sample Type: Sewage
Received Date: 20-Aug-14
Sampling Date: 19-Aug-14
Sampling Time: 9:30
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	12.2	0.005	mg/L	22-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	<18.00	2	mg/L	20-Aug-14	SM5210:B	68
Organic Carbon, Total	43.7	0.5	mg/L	22-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	269	0.4	mg/L	20-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	921	0.4	µS/cm	20-Aug-14	SM2510:B	
pH	7.98		pH units	20-Aug-14	SM4500-H:B	
Solids, Total Suspended	26	3	mg/L	25-Aug-14	SM2540:D	
Major Ions						
Calcium	44.8	0.1	mg/L	20-Aug-14	SM4110:B	
Chloride	114	0.7	mg/L	20-Aug-14	SM4110:B	
Hardness	242	0.7	mg/L	20-Aug-14	SM4110:B	
Magnesium	31.7	0.1	mg/L	20-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.93	0.01	mg/L	20-Aug-14	SM4110:B	

ReportDate: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-3 **Taiga Sample ID:** 001

Nitrite as Nitrogen	0.14	0.01	mg/L	20-Aug-14	SM4110:B
Potassium	18.6	0.1	mg/L	20-Aug-14	SM4110:B
Sodium	76.4	0.1	mg/L	20-Aug-14	SM4110:B
Sulphate	25	1	mg/L	20-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	7400	100	CFU/100mL	20-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam
Trace Metals					
Aluminum	19.9	5	µg/L	02-Sep-14	EPA200.8
Arsenic	1.7	0.2	µg/L	02-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	02-Sep-14	EPA200.8
Chromium	0.5	0.1	µg/L	02-Sep-14	EPA200.8
Cobalt	0.3	0.1	µg/L	02-Sep-14	EPA200.8
Copper	9.1	0.2	µg/L	02-Sep-14	EPA200.8
Iron	520	5	µg/L	02-Sep-14	EPA200.8
Lead	0.1	0.1	µg/L	02-Sep-14	EPA200.8
Manganese	68.8	0.1	µg/L	02-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	02-Sep-14	EPA200.8
Nickel	2.3	0.1	µg/L	02-Sep-14	EPA200.8
Zinc	9.3	5	µg/L	02-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Client Project: CAM2014-08
Sample Type: Wastewater
Received Date: 20-Aug-14
Sampling Date: 19-Aug-14
Sampling Time: 9:45
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Biochemical Oxygen Demand	42	2	mg/L	20-Aug-14	SM5210:B	74
Phosphorous, Total	0.691	0.002	mg/L	22-Aug-14	SM4500-P:D	
Inorganics - Physicals						
pH	7.61		pH units	20-Aug-14	SM4500-H:B	
Solids, Total Suspended	96	3	mg/L	25-Aug-14	SM2540:D	
Major Ions						
Chloride	730	0.7	mg/L	23-Aug-14	SM4110:B	
Fluoride	0.7	0.1	mg/L	23-Aug-14	SM4110:B	
Sulphate	1160	1	mg/L	23-Aug-14	SM4110:B	
Organics						
Hexane Extractable Material	2.4	2.0	mg/L	28-Aug-14	EPA1664A	
Subcontracted Inorganics						
Sulphide	2.22	0.1	mg/L	02-Sep-14	APHA4500-S2	
Subcontracted Organics						
Cyanide, Total	< 0.0500	0.050	mg/L	02-Sep-14	APHA4500-CN	
Phenols, Total	0.0751	0.001	mg/L	04-Sep-14	AB ENV.06537	

ReportDate: Friday, September 05, 2014
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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-4 **Taiga Sample ID:** 002

Trace Metals

Aluminum	136	5	µg/L	02-Sep-14	EPA200.8
Arsenic	7.3	0.2	µg/L	02-Sep-14	EPA200.8
Barium	36.0	0.1	µg/L	02-Sep-14	EPA200.8
Cadmium	0.40	0.1	µg/L	02-Sep-14	EPA200.8
Chromium	6.1	0.1	µg/L	02-Sep-14	EPA200.8
Iron	11600	5	µg/L	02-Sep-14	EPA200.8
Lead	17.6	0.1	µg/L	02-Sep-14	EPA200.8
Mercury	0.07	0.01	µg/L	02-Sep-14	EPA200.8
Nickel	26.7	0.1	µg/L	02-Sep-14	EPA200.8
Silver	0.1	0.1	µg/L	02-Sep-14	EPA200.8
Tin	2.1	0.1	µg/L	02-Sep-14	EPA200.8
Zinc	475	5	µg/L	02-Sep-14	EPA200.8

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Client Project: CAM2014-08
Sample Type: Wastewater
Received Date: 20-Aug-14
Sampling Date: 19-Aug-14
Sampling Time: 10:00
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.066	0.005	mg/L	22-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	30	2	mg/L	20-Aug-14	SM5210:B	
Organic Carbon, Total	46.0	0.5	mg/L	22-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	211	0.4	mg/L	20-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	1310	0.4	µS/cm	20-Aug-14	SM2510:B	
pH	9.87		pH units	20-Aug-14	SM4500-H:B	
Solids, Total Suspended	66	3	mg/L	25-Aug-14	SM2540:D	
Major Ions						
Calcium	46.1	0.1	mg/L	20-Aug-14	SM4110:B	
Chloride	240	0.7	mg/L	20-Aug-14	SM4110:B	
Hardness	327	0.7	mg/L	20-Aug-14	SM4110:B	
Magnesium	51.4	0.1	mg/L	20-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.19	0.01	mg/L	20-Aug-14	SM4110:B	
Nitrite as Nitrogen	0.07	0.01	mg/L	20-Aug-14	SM4110:B	
Potassium	20.3	0.1	mg/L	20-Aug-14	SM4110:B	

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-5 **Taiga Sample ID:** 003

Sodium	149	0.1	mg/L	20-Aug-14	SM4110:B
Sulphate	135	1	mg/L	20-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	< 10	10	CFU/100mL	20-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam
Trace Metals					
Aluminum	62.7	5	µg/L	02-Sep-14	EPA200.8
Arsenic	5.4	0.2	µg/L	02-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	02-Sep-14	EPA200.8
Chromium	0.5	0.1	µg/L	02-Sep-14	EPA200.8
Cobalt	0.8	0.1	µg/L	02-Sep-14	EPA200.8
Copper	3.2	0.2	µg/L	02-Sep-14	EPA200.8
Iron	835	5	µg/L	02-Sep-14	EPA200.8
Lead	1.3	0.1	µg/L	02-Sep-14	EPA200.8
Manganese	49.5	0.1	µg/L	02-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	02-Sep-14	EPA200.8
Nickel	5.9	0.1	µg/L	02-Sep-14	EPA200.8
Zinc	11.0	5	µg/L	02-Sep-14	EPA200.8

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Client Project: CAM2014-08
Sample Type: Wetland
Received Date: 20-Aug-14
Sampling Date: 19-Aug-14
Sampling Time: 10:15
Location: Cambridge Bay
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.022	0.005	mg/L	22-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	<13.32	2	mg/L	20-Aug-14	SM5210:B	68
Organic Carbon, Total	41.7	0.5	mg/L	22-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	230	0.4	mg/L	20-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	1290	0.4	µS/cm	20-Aug-14	SM2510:B	
pH	7.93		pH units	20-Aug-14	SM4500-H:B	
Solids, Total Suspended	18	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	55.2	0.1	mg/L	20-Aug-14	SM4110:B	
Chloride	217	0.7	mg/L	20-Aug-14	SM4110:B	
Hardness	346	0.7	mg/L	20-Aug-14	SM4110:B	
Magnesium	50.7	0.1	mg/L	20-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.09	0.01	mg/L	20-Aug-14	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	20-Aug-14	SM4110:B	
Potassium	17.0	0.1	mg/L	20-Aug-14	SM4110:B	

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

Sodium	130	0.1	mg/L	20-Aug-14	SM4110:B
Sulphate	114	1	mg/L	20-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	< 10	10	CFU/100mL	20-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam
Trace Metals					
Aluminum	17.7	5	µg/L	02-Sep-14	EPA200.8
Arsenic	3.7	0.2	µg/L	02-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	02-Sep-14	EPA200.8
Chromium	0.5	0.1	µg/L	02-Sep-14	EPA200.8
Cobalt	0.5	0.1	µg/L	02-Sep-14	EPA200.8
Copper	0.9	0.2	µg/L	02-Sep-14	EPA200.8
Iron	753	5	µg/L	02-Sep-14	EPA200.8
Lead	0.8	0.1	µg/L	02-Sep-14	EPA200.8
Manganese	124	0.1	µg/L	02-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	02-Sep-14	EPA200.8
Nickel	4.0	0.1	µg/L	02-Sep-14	EPA200.8
Zinc	5.1	5	µg/L	02-Sep-14	EPA200.8

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Taiga Batch No.: 140697

- CERTIFICATE OF ANALYSIS -

Client Sample ID: CAM-6 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

68 *Unable to repeat analysis at lower dilution. Holding time exceeded.*

74 *Unable to repeat analysis at higher dilution. Holding time exceeded.*

*** 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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