

2011 Annual Water License Report - Executive Summary

Under Water License 3AM-IQA0611 (License), which was issued by the Nunavut Water Board in 2006, the City of Iqaluit (City):

- Extracts water from Lake Geraldine for municipal use,
- Manages its solid waste at the West 40 Landfill, and
- Manages its wastewater at the West 40 Wastewater Treatment Plant and backup Sewage Lagoon.

In 2011, the expiry date of the License was extended from May 15, 2011 to July 15, 2012. In accordance with Schedule B of the License, this Annual Water License Report summarizes the activities conducted by the City in 2011.

The Water Treatment Plant (WTP) receives raw water from Lake Geraldine and provides the residents of Iqaluit with potable water. In 2011, the City used 839,610 m³ of water from the Lake Geraldine, which is below the quantity of water not to be exceeded under the License (1,100,000 m³). In September 2011, a grouting program on Lake Geraldine Dam and the Water Treatment Plant was completed in response to the 2010 Dam Safety Inspection recommendations. Also, in September 2011, a Dam Safety Inspection (DSI) was completed on the Lake Geraldine Dam, which recommended that the City: 1) repair the north berm to provide long-term stability, 2) continue to monitor the leaks around the north berm and 3) integrate the Emergency Preparedness Plan with the Permanent Record File once it is complete. The City plans to complete the Emergency Preparedness Plan and recommended north berm repairs in 2012. Furthermore, the City continues to monitor the leaks around the north berm.

The Wastewater Treatment Plant (WWTP) provides the City with primary sewage treatment. In 2011, maintenance work was completed at the WWTP, including cleaning of the screen tanks, replacement of the filter in the Salsnes Filter, and replacement of the screw screen and auger brushes. In addition, the City of Iqaluit undertook a technical review of the 2005 secondary sewage treatment design to investigate whether or not the proposed design remains valid both from a regulatory and design perspective. This work revealed that the design is still valid; however, given the fact that the documentation has been put aside for 6 years, the 2005 design requires a significant amount of review and revision to validate the design and tender documentation prior to tendering. In 2011, the Sewage Lift Station #2 upgrades were substantially completed.

The City manages its solid waste at the West 40 Landfill. In the fall of 2011, an upgrade to a 200 meter section of the perimeter berm was complete as per the recommendation in the 2009 Iqaluit Landfill Water Management Improvements Report. In 2011, the City also began The Iqaluit Waste Management Project, which includes:

- the development of a new Solid Waste Management Plan,
- the identification of a new solid waste management site, and
- the development of a Decommissioning Plan for the West 40 Landfill.

The City continues to work on completing its application for renewal and expects to submit the application in 2012.

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Water License No. 3AM-IQA0611
2011 Annual Report
City of Iqaluit

In July of 2006, the City of Iqaluit was issued Water License number 3AM-IQA0611 by the Nunavut Water Board. This license was issued for a five year period commencing on May 15, 2006. On June 17, 2011, the Nunavut Water Board amended the water license expiry date to July 15, 2012. A requirement of the license is an annual report due March 31 of each year summarizing activities governed by the license for the previous calendar year. In accordance with Schedule B of the Water License, this Annual Water License Report summarizes the activities conducted by the City of Iqaluit in 2011.

A. The monthly and annual quantities in cubic meters of water obtained from Lake Geraldine

Table 1 summarizes the monthly and annual quantities of water drawn from Lake Geraldine, the City of Iqaluit's raw water source. The total water usage for 2011 was 839,610 m³, which is well within the maximum allowed usage of 1,100,000 m³.

**Table 1. Raw Water Drawn
from Lake Geraldine Reservoir (2011)**

Month	Volume (m ³)
January	63,890
February	62,830
March	75,440
April	68,560
May	68,880
June	68,570
July	67,060
August	70,580
September	73,870
October	80,000
November	72,420
December	67,510
Total	839,610

B. The monthly and annual quantities in cubic meters of discharge from the Wastewater Treatment Facility

Table 2 summarizes the monthly and annual quantities of discharge from the City of Iqaluit's Wastewater Treatment Plant (WWTP) during 2011.

Table 2. Discharge from the Wastewater Treatment Plant (2011)

Month	Volume (m³)
January	58,548
February	55,657
March	70,120
April	69,160
May	66,039
June	69,975
July	74,425
August	70,622
September	72,536
October	73,240
November	67,967
December	65,797
Total	814,085

During shutdowns of the WWTP, raw sewage was diverted to the backup sewage lagoon. The knife gate valve that diverts the sewage to the sewage lagoon is not equipped with a monitoring device; therefore, there was no measurements taken to determine the amount of discharge for the days that the WWTP is not operational. As a result, the amount of discharge for the duration of each shutdown was calculated using average daily discharge rates. The average daily total was determined by dividing the total volume of discharge from the WWTP recorded for the month that the shutdown occurred by the number of days the WWTP was operational that month. The dates of each shutdown can be found in Section F.

C. The monthly and annual quantities in cubic meters of sludge removed from the Wastewater Treatment Facility

Table 3 summarizes an estimate of the monthly and annual quantities of sewage sludge removed from the City of Iqaluit's WWTP and deposited at a designated area in the West 40 Landfill.

Table 3. Sewage Sludge Removed from the Wastewater Treatment Facility and Deposited at the West 40 Landfill (2011)

Month	Volume (m³)
January	54.4
February	47.6
March	51
April	51
May	51
June	51
July	51
August	51
September	51
October	40.8
November	51
December	51
Total	601.8

The sludge that is removed by the Salsnes Filter in the WWTP falls into a trailer in a room below the primary treatment room. The trailer that is used to catch the sludge from the Salsnes Filter has 3.4 cubic meters of storage and is approximately 100% full each time it is unloaded. The trailer is unloaded at the West 40 Landfill every second day including weekends and holidays. The difference in volume from month to month is due to two different factors: 1) every month doesn't have the same number of days, and 2) during the shutdowns there is no sludge produced because the raw sewage was diverted to the lagoon.

D. A summary report which includes all data and information generated under the Monitoring Program, including the QA/QC program, in an electronic and printed format acceptable to the Board

The Monitoring Program was not applied in 2011. The Department of Public Works is working to implement the Monitoring Program in 2012.

E. A summary of construction activities conducted

Lift Station #2

Lift Station was substantially completed on February 26, 2011. Please see Appendix A for a copy of the as-built drawings.

Apex Bridge

The repairs to Apex Bridge were substantially completed on August 15, 2011. The repairs included:

- Localized repairs to existing components of the steel bailey trusses of the bridge;
- Existing three course wood deck was removed and replaced with a new two course wood deck; and,
- Installed a gabion basket directly beside the existing gabion basket on the north-west approach of the bridge.

Please see Appendix B for a copy of the as-built drawings.

Lake Geraldine Dam and Water Treatment Plant Grouting Program

The grouting program that was undertaken to seal active leaks in the Lake Geraldine Dam and Water Treatment Plant were substantially completed on September 1, 2011. The grouting program consisted of:

- Sealing approximately ten actively leaking cracks on the downstream face of Lake Geraldine Dam; and,
- Seal an actively leaking crack that was associated with one of the holding tanks in the Water Treatment Plant.

Please see Appendix C for a copy of the as-built drawings.

Landfill Water Management Upgrades

In November of 2011, construction was completed on the south-east berm of the West 40 Landfill. Upgrades the Landfill Water Management system included:

- Removing the existing landfill perimeter fence in the berm construction area;
- Removing the existing metal waste from berm construction area;
- Increasing the height and width of the berm;
- Replacing the perimeter fence that was removed; and,

- Installing and anchoring the geomembrane against reconstructed berm.

Due to the time of the year that construction finished, final inspection wasn't possible. Once final inspection and as-builts are completed, they will be submitted to the Nunavut Water Board. Please see Appendix D for a copy of the tender drawings.

F. A summary of any modification and/or major maintenance work and/or demolition work carried out and any associated structures

Wastewater Treatment Plant

The following maintenance work was carried out at the WWTP in 2011:

May 4 - 6, 2011:	The bearings in the Salsnes Filter were replaced.
October 18 - 25, 2011:	The influent chambers had to be cleaned in order to install a new screw screen at the bottom of the chamber. Brushes were also installed on the trash auger that removes larger solids from the influent.

During the above listed maintenance work, the WWTP was shut down and the sewage was diverted to the sewage lagoon

West 40 Landfill

In 2011, the Public Works Department started two new processes to dispose of hazardous waste in the Landfill. A Bulb Eater was purchased that crushes bulbs and extracts the mercury from the air in a sealed drum. The crushed bulbs can then be disposed of as normal waste. A Freon Remover was purchased to remove Freon from white goods (ex. refrigerators). The hazardous materials are being stored on site in sealed containers until they can be shipped south to a hazardous waste facility.

In 2011, the Public Works Department shipped 80, 45 gallon barrels of Caustic Soda from the landfill to Clean Alliance in Bolton, Ontario, to be disposed of properly. The Caustic Soda was packed in sea containers and shipped as per Transport Canada's, Transportation of Dangerous Goods Regulations.

G. A summary of all work carried out under the Managements Plans in accordance with this License

Lake Geraldine Dam Safety Inspections

In September 2011, a Dam Safety Inspection (DSI) was performed on Lake Geraldine Dam by Concentric Associates International Inc. A report was prepared for the DSI and can be found in Appendix E.

Sewage Lagoon Dam Safety Inspection

In September 2011, a DSI was performed on the Sewage Lagoon by Concentric Associates International Inc. A report was prepared for the DSI and can be found in Appendix F.

Preliminary Design of New Solid Waste Management Facilities

The City has undertaken the Solid Waste Management Project, which involves extensive public consultation and technical analysis to develop a new solid waste management plan and identify a new solid waste management site. The Project also involves the development of a decommissioning plan for the West 40 Landfill and update its operation and maintenance manual. The Terms of Reference for the project were submitted with the 2010 Annual Water License Report. This Solid Waste Management Project involves ongoing stakeholder and community consultation and communication throughout all four phases of the project:

1. Understand the problem;
2. Identify potential waste management options;
3. Evaluate alternative Solid Waste Management Program options;
and,
4. Recommend preferred Solid Waste Management Programs.

In 2011, two project newsletters were distributed and two public meetings were held to engage the public and key stakeholders in the first two phases of the project. Another newsletter and public meeting are planned for 2012, to give the public an opportunity to provide feedback on the evaluation of the options and recommended program. Please See Appendix G for copies of the two project newsletters.

Lake Geraldine Dam Emergency Preparedness Plan

In 2011, the City of Iqaluit hired AMEC Environment and Infrastructure to complete and Emergency Preparedness Plan (EPP) for the Lake Geraldine Dam. The EPP will,

- Define hazards posed by the dam;
- Identify roles and responsibilities of all parties; and,
- Include inundation mapping.

The EPP is a requirement from the 2011 Dam Safety Inspection and is scheduled to be completed in 2012.

Lake Geraldine Dam Permanent Record File

The City of Iqaluit contracted Concentric Associates to complete the Lake Geraldine Dam Permanent Record File (PRF) in 2011. The PRF is a document to keep a record of important files and events associated with Lake Geraldine Dam. A copy of the updated PRF is available at the Water Treatment Plant and the Department of Engineering. Please see Appendix H for the PRF.

- H. A progress report and revisions to any studies requested by the Board that relate to waste management, water use or reclamation and a brief description of any future studies planned by the Licensee including, an executive summary in terms understandable to the general public, translated into Inuktitut**

See information provided in Section G.

- I. Any addendums to the approved Contingency Plans and the approved Operation and Maintenance Manuals**

In 2011, no addendums were made to the approved Contingency Plans and Operation and Maintenance Manuals.

- J. A list and description of all spills and un-authorized discharges, including volumes, Spill Report Line Identification Number and summaries of follow-up action taken**

Table 4 provides a summary of all spills and un-authorized discharges that occurred in 2011, including volumes, Spill Report Line Identification Number and summaries of the follow-up actions taken. Copies of the spill reports and a map showing all spill locations can be found in Appendix I.

Table 4. Summary of all spills and un-authorized discharges that occurred in 2011

Spill Report ID No.	Date	Location	Description	Volume (m ³)	Cause	Follow up Actions
2011024	02/02/2011	Lift Station #2 near Manhole #30	Sewage	0.2	Pumps at Lift Station #2 were not working properly due to an electrical malfunction	An electrical company was brought in and fixed the high level alarming system. The lift station has been monitored and seems to be working properly
2011056	3/13/2011	Sewage Truck Dumping Station	Sewage	5.0	Pumps at the Wastewater Treatment Plant were not working properly	Pumps were reset and an electrical company was brought in to determine why the high level alarms didn't go off. The system was reset and the pumps have been checked regularly and are working properly
2011100	04/08/2011	Between AV224 and AV225	Sewage	0.5	Blockage in the sewer main between AV224 and AV225 which caused an over flow in AV225	The sewer main was blasted until the blockage was removed and this area has been added to the daily check list to make sure the sewer main stays clear
2011165	5/18/2011	Apex Garage	Diesel Fuel	1.5	Cap at the bottom of the tank was intentionally removed. (Possible Vandalism)	The City moved the fuel tank inside the Apex Garage to ensure the security of the fuel tank
2011177	5/24/2011	Elders Center	Fuel	0.9	Flex hose attached to the tank had been removed (Possible Vandalism)	The flex hose was replaced
2011211	06/05/2011	Manhole #86	Sewage	0.1	Blockage in the sewer main which caused an over flow in Manhole 86	The sewer main was blasted until the blockage was removed
2011390	10/03/2011	Manhole #9	Sewage	8.0	Blockage in the sewer main which caused an over flow in Manhole 9	The sewer main was blasted until the blockage was removed
2011427	11/02/2011	AV 400	Sewage	5.0	Partially blocked sewage main	Sewage trucks vacuumed up the sewage contained to the ditch, the affected snow and ice was removed and disposed of in the lagoon, the affected sand was removed and sent to Nunatta Environmental's Land Farm. The line was blasted until the blockage was removed
2011437	11/11/2011	City Hall	Heating Oil	0.5	Supply valve was removed by vandals	The contaminated snow and ice was removed and disposed of at Nunatta Environmental's Land Farm

K. Any revisions to approved Closure and Reclamation Plans

In 2011, no revisions were made to approved Closure and Reclamation Plans.

L. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including and changes to implementation and scheduling.

In 2011, no closure and reclamation work was undertaken. No closure or reclamation work is anticipated for 2012.

M. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector**Required Safety Training for Water Treatment Facility**

The City of Iqaluit has provided the employees who work at the Water Treatment Plant with the required safety training. The safety training for the Water Treatment Facility includes WHMIS, Gas Monitoring, Respirators, SCBA's and Confined Space. Please see Appendix J for the list of employees who received training on the items listed above.

Required Safety Equipment, Spill Containment and Clean-up Materials for the Water Treatment Facility

The City of Iqaluit has provided the Water Treatment Plant with SCBA's and Respirators which are the required safety equipment. Also the chlorine gas room is equipped with a chlorine gas detector and the Water Treatment Plant has a chlorine gas clean-up and containment kit on site.

Safety and Compliance Program for the Water Treatment Facility

The City has developed Safe Work Procedures and Instructions for hazards within the Water Treatment Facility. Please see Appendix K for a copy of all safe work procedures prepared for the Water Treatment Plant.

Surveillance Monitoring Program

The City of Iqaluit is working towards implementing the Monitoring Program in 2012. It is expected by the summer of 2012 that the Monitoring Program will be fully operational.

Submit Operation and Maintenance Manuals for Review

The Nunavut Water Board acknowledged receipt of the Operation and Maintenance Manuals for the Water Treatment Plant, Wastewater Treatment Plant, Landfill and Sewage Sludge Pilot Program on November 1, 2011.

Submit a Report on Collection, Treatment and Release of Landfill run-off

The City of Iqaluit sent the West 40 Landfill Drainage Management Review to the Nunavut Water Board on September 30, 2011.

Final Assessment of Sewage Sludge Pilot Project

The Nunavut Water Board acknowledged receipt of the Sewage Sludge Pilot Project final report on November 1, 2011.

N. Update on implementation of recommendations from any Dam Safety Inspection and/or Review

See Section G.

O. A brief update on the implementation plan of all facilities within the scope of this License including projected implementation and status of Phase II of the Wastewater Treatment Plant

Solid Waste Management Facilities

See Sections E and G.

Wastewater Treatment Facility

The City is currently working to secure the funding necessary to proceed with Phase II of the Wastewater Treatment Plant, which is currently estimated to cost approximately \$15 million. In 2011, the City of Iqaluit completed a Capital Infrastructure Needs Assessment with a 20 year planning horizon. This assessment was used to identify the City's Capital funding requirements and shortfalls over the next five years. Based on this work, the City of Iqaluit has submitted a block-funding request to the Government of Nunavut to address the significant capital funding shortfall for priority core infrastructure projects, such as these Wastewater Treatment Plant upgrades.

In addition, the City of Iqaluit retained AECOM to complete a technical review of the 2005 secondary sewage treatment design (see report in Appendix L) to investigate whether or not the proposed design remains valid both from a regulatory and design perspective. This work revealed that the design is still valid; however, given the fact that the documentation has been put aside for 6 years, the 2005 design requires a significant amount of review and revision to validate the design and tender documentation prior to tendering.

- P. Any details on water use or waste disposal requested by the Board by November 1st of the year being reported**

Water License Renewal Application and Amendments

The City is planning to combine its past amendment application with its upcoming renewal application. City staff have been working hard on completing the detailed renewal application and expect to submit the application in 2012.

Appendices

Appendix A - Lift Station No. 2 As-built Drawings

Appendix B - Apex Bridge As-built Drawings

Appendix C - Lake Geraldine Dam & Water Treatment Plant As-built Drawings

Appendix D - Landfill Water Management Upgrades As-built Drawings

Appendix E - Lake Geraldine Dam Safety Inspection

Appendix F - Sewage Lagoon Dam Safety Inspection

Appendix G - Solid Waste Management Facilities Project Newsletters 1 & 2

Appendix H - Lake Geraldine Dam Permanent Record File

Appendix I - 2011 Spill Reports

Appendix J - Required Safety Training

Appendix K - Water Treatment Plant Safe Work Procedures

Appendix L - Technical Review of the 2005 Secondary Sewage Treatment Design