



**Mackenzie Valley Land and Water Board**  
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**Staff Report**

<b>Applicant:</b> City of Yellowknife	
<b>Location:</b> Yellowknife, NT	<b>Application:</b> MV2009L3-0007
<b>Date Prepared:</b> May 28, 2018	<b>Meeting Date:</b> June 7, 2018
<b>Subject:</b> 2017 Annual Water Licence Report	

**1. Purpose/Report Summary**

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the 2017 Annual Water Licence Report (Annual Report) submitted by the City of Yellowknife (City), to satisfy Part B, condition 3 and Schedule 1, condition 1 of their municipal Water Licence MV2009L3-0007.

**2. Background**

- May 31, 2010 – Issuance of Licence MV2009L3-0007;
- March 29, 2018 – 2017 Annual Report received;
- April 6, 2018 – Review commenced;
- April 26, 2018 – Reviewer comments and recommendations due and received;
- May 7, 2018 – Responses received;
- May 10, 2018 – Responses due;
- **June 7, 2018 – 2017 Annual Report presented to the Board for information;** and
- May 30, 2022 – Expiration of Licence MV2009L3-0007.

**3. Discussion**

On March 29, 2018, the City submitted their 2017 Annual Report (attached) to fulfill Part B, condition 3 and Schedule 1, condition 1 of Licence MV2009L3-0007. This submission is not for Board approval; however, it is being presented as an update to the Board.

**4. Comments**

The City does not use an annual reporting template created by Board staff.

## 5. Reviewer Comments

By April 26, 2018, comments and recommendations on the 2017 Annual Report were received from Environment and Climate Change Canada (ECCC), the Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR), and Board staff.

The City responded on May 7, 2018, ahead of the May 10, 2018 comment response deadline. The Review Summary and Attachments (attached) presents the concerns identified through this review.

### Non-sewage wastes discharged to Sewage Disposal Facilities

In response to reviewer recommendations (ECCC Comment ID 1, GNWT-ENR Comment ID 8) that the City provide monitoring and characterization results for all non-sewage wastes that are discharged to the sewage lagoon, the City stated that these results will be available in the 2018 Annual Report. Board staff are of the opinion that the City could be reminded to conduct sampling as per SNP revisions made in August 2017 and to include these results in the 2018 Annual Report. Sampling for specific parameters at the sources of non-sewage wastes may be considered during the renewal of the City's Licence, which expires May 30, 2022.

In addition, GNWT-ENR recommended that monitoring results for the landfill Cell A leachate and landfill Baling Facility be included/attached to the 2017 Annual Report (Comment ID 7), which the City agreed to do. In Board staff's opinion, the City should attach laboratory reports and tabular summaries for sampling done on the landfill Cell A leachate and the Baling Facility leachate in 2017, to the Annual Report, for resubmission by August 7, 2018.

In response to Comment ID MVLWB 1, the City stated that catch basins are cleaned out in spring, with contents deposited along the edge of the lagoon allowing the water to drain into the lake. Although the City's response stated that the contents of the catch basin is gravel, Board staff observed that the catch basins also contained garbage during a tour of storm sewer outfalls on May 8, 2018. As a result, Board staff note Part D, condition 4 of the Licence, which states that 'The Licensee shall maintain the Sewage Disposal Facilities to the satisfaction of an Inspector.' Waste are to be directed to the Solid Waste Disposal Facility, as per Part D, condition 7.

### Water Consumption

GNWT-ENR (Comment ID 1) recommended that the City review historical water consumption trends and anticipate water use in the near future to determine if a Water Licence amendment is required to increase the annual water usage volumes. This topic has been raised in previous annual report reviews, and the City maintains that they expect water usage to return to quantities similar to the 2011-2013 period.

### SNP point of compliance

GNWT-ENR tallied and pointed out several SNP exceedances at station 0032-F3, the point of compliance, over the past 10 years (Comment ID 4) and recommended that the revised Fiddlers Lake Treatment System Plan include options for improving water quality at the F3 compliance point. Board staff note that the Board has given the City direction based on the requirements of the Licence (Fiddlers Lake Treatment System Plan, Schedule 2, condition 3, a revised version of which is expected to be submitted by the City in the near future).

Board staff note the exceedances at 0032-F3, as documented by GNWT-ENR, and the City's response and plans for relocating the sampling location. Board staff suggest the City could be encouraged to continue working with the GNWT-ENR Inspector regarding these and any future exceedances. The requirements for the point of compliance of the Sewage Disposal Facilities may be discussed at the renewal of the City's Licence (which expires May 30, 2022).

#### Inclusion of laboratory reports

GNWT-ENR recommended that the City append laboratory reports to their annual reporting (Comment ID GNWT-ENR 11) and that future data compilations prepared by the City clearly identify SNP exceedances. The City declined to provide laboratory reports, as the additional 800-1000 pages of documentation would not be practical but agreed to highlight exceedances in future data compilations; Board staff considered these to be acceptable responses.

#### Water quality data

GNWT-ENR recommended that the City provide all of its sampling results to the public registry in an accessible file type (Comment ID 13), and that the City complete the metadata template they provided during the review and provide it with the associated water quality data to the public registry in an accessible file type (Comment ID 14). The City responded that it will continue to submit data as it has been and is willing to forward GNWT-ENR laboratory results if requested. Board staff note that the public registry only supports pdf file types, and the Licence does not require the City to use the standard metadata template. However, in Board staff's opinion, the Board could encourage the City to discuss submission of the standard metadata template with GNWT-ENR.

### **6. Security**

Not applicable.

### **7. Conclusion**

Board staff conclude that further information was provided by the City in their responses to reviewer comments; however, some reviewers requested additional information be provided. As such, Board staff are of the opinion that the 2017 Annual Report should be revised and resubmitted to include information requested during the review, and to reflect the full requirements of Licence MV2009L3-0007 and Board direction provided in letters; specifically, laboratory reports and tabular summaries of non-sewage wastes deposited in the Sewage Disposal Facilities in 2017, including the highlighting of any exceedances.

Board staff conclude that the City could be reminded to include laboratory reports and tabular summaries of all non-sewage wastes deposited in the Sewage Disposal Facilities, as well as a discussion of work done with the GNWT-ENR Inspector regarding SNP exceedances in future annual reports. Board staff also conclude that the Board could encourage the City to discuss submission of the standard metadata template with GNWT-ENR.

### **8. Recommendation**

Board staff recommend the Board **direct the City to revise the 2017 Annual Report, in accordance with reviewer comments and recommendations, for resubmission by August 7, 2018, for confirmation of conformity by Board staff.**

Board staff have prepared a draft response letter (attached), which includes the revisions detailed above.

Board staff recommend the Board remind the City to include laboratory reports and tabular summaries of all non-sewage wastes deposited in the Sewage Disposal Facilities, as well as a discussion of work done with the GNWT-ENR Inspector regarding SNP exceedances, in future annual reports. Board staff recommend the Board could encourage the City to discuss submission of the standard metadata template with GNWT-ENR.

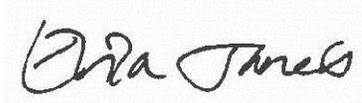
Board staff recommend including the following text in the decision letter:

- The City shall adhere to the commitments made in their responses to reviewer comments dated May 7, 2018.

## 9. Attachments

- [2017 Annual Water Licence Report](#)
- Review Summary and Attachments
- Draft Letter from the Board

Respectfully submitted,



Name  
Regulatory Specialist



Heather Scott  
Technical Advisor

**Review Comment Table**

<b>Board:</b>	MVLWB
<b>Review Item:</b>	City of Yellowknife - 2017 Annual Water Licence Report (MV2009L3-0007)
<b>File(s):</b>	<a href="#">MV2009L3-0007</a>
<b>Proponent:</b>	City of Yellowknife
<b>Document(s):</b>	<a href="#">MV2009L3-0007 - City of YK - 2018 Annual Water Licence Report - Mar29-18.pdf</a> (2.4 MB)
<b>Item For Review Distributed On:</b>	Apr 6 at 11:43 <a href="#">Distribution List</a>
<b>Reviewer Comments Due By:</b>	Apr 26, 2018
<b>Proponent Responses Due By:</b>	May 10, 2018
<b>Item Description:</b>	<p>The City of Yellowknife has submitted their 2017 Annual Water Licence Report, in accordance with Part B, condition 3 and Schedule 1, condition 1 of their municipal Water Licence MV2009L3-0007. Although formal approval of Annual Reports is not required under the Licence, the Board must be satisfied that the City has reported in accordance with the requirements of their Licence.</p> <p>Reviewers are invited to submit questions, comments and recommendations on the 2017 Annual Water Licence Report by <b>April 26, 2018</b>.</p> <p>If you have questions or comments regarding this review or the Online Review System, please contact Erica Janes at (867)766-7466 or <a href="mailto:ejanes@mvlwb.com">ejanes@mvlwb.com</a>.</p>
<b>General Reviewer Information:</b>	<p>â€œIn addition to the email distribution list, the following organizations received review materials by fax:</p> <p>Hay River Metis Council - Trevor Beck, President (867)874-4472; and Northwest Territory Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586.</p>
<b>Contact Information:</b>	<p>Erica Janes 867-766-7466 Heather Scott 867-766-7463 Jen Potten 867-766-7468</p>

### Comment Summary

Environment and Climate Change Canada: Petrel Liu				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
4	General File	<b>Comment</b> <a href="#">(doc)</a> ECCC Cover Letter <b>Recommendation</b>	--	Noted.
1	Non-Sewage Waste Discharged to Lagoon Reference: Table 3, Non-Sewage Waste Discharged to Lagoon, pg 2	<b>Comment</b> Table 3 indicates the quantities of various non-sewage waste sources that are discharged to the sewage lagoon. For 2017 this included baling facility sludge, cell A leachate, and WTP backwash. However, while the volumes of these wastes have been provided, no monitoring or characterization results have been provided, which is required under the license as per the Board's August 17, 2017 letter regarding the Sewage Disposal Facilities <b>Recommendation</b> ECCC recommends that the proponent provide monitoring and characterization results for all non-sewage wastes that are discharged to the sewage lagoon.	<b>May 7:</b> The requirement to monitor and characterize non-sewage waste sources arrived too late in the year to account for all the sources. Characterizing and monitoring of all the non-sewage waste sources is planned for 2018, and the results will be available in the 2018 Annual Report	Acceptable response.
2	Errata Reference: Table 4, WTP Backwash Discharged to Sewer- December 20, 2017, pg 3	<b>Comment</b> The report indicates that, "the city took one sample in December to characterize the WTP sludge, the results of which are found in the table below." However, the reference table (Table 4) is titled "WTP Backwash discharged to sewer." <b>Recommendation</b> ECCC recommends that the proponent clarify the source of the data presented in Table 4.	<b>May 7:</b> The WTP backwash is incorrectly referred to as 'WTP sludge', this will be corrected in future versions of the Annual Report.	Noted.

3	Phosphorus Exceedance Study Summary Reference: Study Summaries, Completed Studies, pg 7	<p><b>Comment</b> ECCC has previously identified concern with the phosphorus exceedances within the swage lagoon and had recommended adaptive management to be implemented to address monitoring results. A phosphorus risk assessment was completed in 2017 to investigate the potential impacts of phosphorus being discharged through the lagoon system. However, while total phosphorus concentrations consistently exceeded water license criteria again in 2017 (up to a maximum of 5.9 mg/L), the results of this study are not discussed in the annual report.</p> <p><b>Recommendation</b> ECCC recommends that the proponent provide the results and discussion of the phosphorus risk assesment, including management options for the sewage lagoon.</p>	<p><b>May 7:</b> The Great Slave Lake Nutrient Risk Assessment study will be part of the Revised Fiddlers Lake Treatment System Plan that will be sent to the MVLWB before the end of May 2018.</p>	Noted.
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**GNWT - ENR: Central Email GNWT**

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
16	General File	<p><b>Comment</b> (<a href="#">doc</a>) ENR Letter with Comments, Recommendations and Attachment</p> <p><b>Recommendation</b></p>	--	Noted.
17	General File	<p><b>Comment</b> (<a href="#">doc</a>) Attachement: 2018 Appendix A Example of Water Quality Sample Metadata Template (2)</p> <p><b>Recommendation</b></p>	--	Noted.
1	Topic 1: Water Consumption -	<p><b>Comment</b> Comment(s): Yr Water Consumption (in m3)</p>	<p><b>May 7:</b> Increased levels of construction activities and</p>	Noted.

	<p>10 Years Trend</p>	<p>2008 .... 2,792,467 2009 .... 2,931,434 2010 .... 2,684,612 2011 .... 3,111,917 2012 .... 2,972,640 2013 .... 3,090,278 2014 .... 3,491,910 2015 .... 7,000 (Loss/no data provided for 8 months, from May to Dec) 2016 .... 3,578,117 (No data provided for Jan-Feb. Volumes estimated) 2017 .... 3,577,379 The above numbers are showing steadily increasing water consumptions between 2008 and 2014. Although no amounts were provided for ~ 10 months in 2015 &amp; 2016 (loss of data), annual water consumption has been nearing the maximum allowable limit of 3,600,000 m3 for several years. The maximum reported in 2017 was no exception, with a 3,577,379 m3 total. Appropriate steps should be taken to ensure that the quantity of water not to be exceeded is adhered to. Proactive planning by means of a Water Licence amendment, would ensure the City of YK (the City) remains compliant with their Water Licence water usage limits in the future.</p> <p><b>Recommendation 1)</b> ENR recommends the City review historical water consumption trends and anticipate water use in the near future to determine if a Water Licence amendment is required to increase the annual water usage volumes/limits in order to prevent future non-compliance issues.</p>	<p>their associated water usage, i.e. flushing temporary water lines and new water mains, resulted in increased water usage in the 2014 to 2017 period. It is expected that water usage will return to the quantities similar to those in the 2011 to 2013 period.</p>	
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2	<p>Topic 2: Sewage Production 10 Years Trend</p>	<p><b>Comment</b> Comment(s): Yr Water Consumption Yr Wastewater Production (in m3) (in m3) 2008 2,792,467 ..... 2,656,377 2009 2,931,434 ..... 2,919,731 2010 2,684,612 ..... 2,782,095 2011 3,111,917 ..... 4,305,107 2012 2,972,640 ..... 4,399,221 2013 3,090,278 ..... 4,362,510 2014 3,491,910 ..... 4,868,775 2015 7,000 ..... 3,615,123 2016 3,578,117 ..... 2,897,807 2017 3,577,379 ..... 3,026,144 A sharp wastewater/sewage production increase from 2,782,095 m3 to 4,305,107 m3 was observed between 2010 and 2011 (as illustrated here above) - and remained roughly at that level for 3 years afterwards. A maximum of 4,868,775 m3 was then reached in 2014, representing a nearly 40% increase from 2010. These annual volumes are well above the 2009 Fiddler's Lagoon Treatment System Plan projected estimates for 2021 (3,322,347 m3) and 2031 (3,743,261 m3), provided in Table 2 (p. 14) of the FLTSP. Reported sewage volumes were also above estimated sewage production volumes of 3,942,254 m3 for 2030, calculated with MACA's model (p. 25 &amp; 26 of FLTSP). ENR also notes that the sewage volumes have decreased since 2014 while water consumption has increased over this period. Sewage volumes generally</p>	<p><b>May 7:</b> It was identified during the work Dillon Consulting did for the Fiddlers Lake Treatment System Plan that there were issues with the flow meters at Lift Station #5 that caused high flow readings. The City has been working since 2012 to identify the issue and resolve the programming problems in the SCADA system. These were resolved in 2015 which is why there has been a decrease in sewage quantity since 2015 when compared to the 2012 to 2015 values.</p>	<p>Acceptable response.</p>
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		<p>relate to water use volumes, so the reason for the decrease in sewage volumes is not clear. A Revised Fiddlers Lake Treatment System Plan (FLTSP), due in May 2018, is to include components identified in Schedule 2 Item 3 of the Water Licence. The updated FLTSP annual volumes should consider the sewage/wastewater production volume trends, measured since 2010 and evaluate whether the increased volumes have impacted overall treatment system efficiency.</p> <p><b>Recommendation 1)</b> ENR recommends the City clarify what factors/events resulted in the sewage production volume to nearly double from 2010 to 2014, and then to decrease from 2015 to 2017.</p>		
3	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends the FLTSP include an evaluation of whether the increased sewage treatment volumes have impacted the treatment efficiency of the system.</p>	<b>May 7:</b> See previous response	Noted.
4	Topic 3: Compliance at F3 - 10 Year Trend	<p><b>Comment</b> Monitoring results at the F3 Compliance Point (as submitted in Annual Reports, along the Fiddler's Lake Drainage Treatment System) were compiled for the last 10 years for all EQCs enumerated in Part D.2 of the Water Licence. No exceedances were noted for BOD, when using the discrete "Average Concentration" calculation of 4 consecutive results, as specified in the "Definition"</p>	<p><b>May 7:</b> With respect to TSS and FC, the sampling location, from the shoreline, is a potential explanation for these exceedances. The City is looking into having a dock installed allowing sampling to take place away from the shoreline. Regarding pH, the City has already completed a pH Compliance Point Assessment and it was concluded that "These seasonally high pH levels may</p>	<p>Board staff note that the Board has given the City direction based on the requirements of the Licence (Fiddlers Lake Treatment System Plan, Schedule 2, condition 3, a revised version of which is expected to be submitted by the City in the near</p>

		<p>section of the Water Licence. The total number of exceedances events for other parameters (and associated year of occurrence), are as follows: . TSS: 13, in 2017 (4), 2015 (1), 2014 (1), 2012 (1), 2011 (2), 2010 (1) &amp; 2008 (3) . FC: 16, in 2017 (3), 2016 (2), 2015 (2), 2013 (3), 2012 (2), 2010 (2), 2009 (2) . pH: 32, in 2017 (4), 2016 (3), 2015 (4), 2013 (4), 2012 (1), 2011 (4), 2010 (8) &amp; 2009 (4) Water Licence EQCs are in place to foster environmental protection, and each single exceedance represents individual Water Licence non-compliance events regarding water quality. As specified previously, the Compliance Point formerly located at the end of the lagoon (F6) was moved further downstream in the past (about half way along this 13 km long system), to re-establish compliance again. Components of a revised FLTSP should focus on measures to maintain/enhance compliance at F3, rather than suggesting that the Compliance Point be moved once again further downstream - at the F1 location. ENR notes that a total of 10 TSS exceedances were also compiled at F1 via the 10 years trend. Sludge removal from the primary lagoon cell could help improve the quality of treated wastewater entering the wastewater treatment system, and de-sludging procedures should be</p>	<p>likely be attributed to high levels of photosynthetic activity (from observed algal cover in the wetlands during summer, but not directly correlated with chlorophyll-a concentrations), which is a normal process during summer months in wetland wastewater treatment facilities.” Therefore the elevated pH levels are not a concern.</p>	<p>future). Board staff note the exceedances at 0032-F3, as documented by ENR, and the City’s response and plans for relocating the sampling location. Board staff encourage the City to continue working with the Inspector regarding these and any future exceedances. The requirements for the point of compliance of the Sewage Disposal Facilities may be discussed at the renewal of the City’s Licence.</p>
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		<p>included in the Sludge Management Plan (to be submitted in August 2018). The MVLWB O&amp;M templates should be referred to as minimum information components to be included in a Sludge Management Plan and a Wastewater/Sewage Treatment O&amp;M Plan. The GNWT Guideline for Industrial Waste Discharges in the NWT and the Yellowknife City By-Law 4663 provide limits on the types of waste that can be discharged to sewage treatment facilities. Recent analyses of discharges from City operations (e.g. Landfill Cell A, Bailing Facility, Water Treatment Plant) exceeded these limits, would not be considered appropriate for disposal in the Yellowknife sewage treatment system, and should be managed using alternative treatment/disposal methods - as specified in the Sewage Disposal Facilities O&amp;M Plan Staff Report (August 2017). As noted previously, there have been a number of exceedances measured at compliance point F3 over the last 10 years, and ENR does not support the City's intention to adapt parameters limits of their By-law 4663 "in order to address wastes coming from City facilities" (Sewage Disposal Facilities O&amp;M Plan Staff Report, August 2017). Allowing higher concentrations of non-sewage parameters to enter the sewage treatment system</p>		
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		could cause further issues with compliance at location F3. National guidance is available regarding levels of non-sewage parameters that can be discharged into municipal sewage treatment systems, e.g. CCME Model Sewer Use Bylaw Development Report, CCME Model Sewer Use Bylaw Guidance Document, etc. <b>Recommendation 1)</b> ENR recommends the revised FLTSP include options for improving water quality at the F3 compliance point.		
5	None	<b>Comment</b> None <b>Recommendation 2)</b> ENR recommends that the City's intentions regarding non-sewage discharges to Yellowknife Sewage Disposal Facilities be clarified along other revisions recommended by the MVLWB - either in the revised FLTSP (due in May 2018), or the revised SWF O&M Plan (due in August 2018).	<b>May 7:</b> The sampling parameters at F1 and F3 were expanded in 2018 to determine if these discharges were having a negative effect on the treatment process. Until more data is received, there will be no changes in the non-sewage discharges.	Acceptable response.
6	None	<b>Comment</b> None <b>Recommendation 3)</b> ENR recommends the City refer to MVLWB templates for guidance on the minimum information to be provided in various Waste Management Plans.	<b>May 7:</b> Noted.	Noted.
7	Topic 4: Monitoring Results for Cell A and Baling Facility Effluents - Not Submitted	<b>Comment</b> Results for Yellowknife landfill Cell A effluent (2014 & 2015 ARs) presented elevated levels for BOD, pH, fluoride, iron, zinc and ammonia, as per Guideline for Industrial Waste Discharges in the NWT (2004).	<b>May 7:</b> These results will be submitted.	The City should attach laboratory reports and tabular summaries for sampling done on the landfill Cell A leachate and the Baling Facility

		<p>Elevated levels of ammonia were also reported in 2014 for the landfill Bailing Facility effluent. It was noted that no results were reported at the time for Total Phosphorus, TSS, Sulphides (as H<sub>2</sub>S), Sulphate (as SO<sub>4</sub>) and Total Cyanide - as currently reported in the Water Treatment Plant backwash discharge to the sewer system (2017 AR - Table 4). It was also noted that no values were provided for some of the main organic parameters, such as BTEX (Benzene, Toluene, Ethylbenzene and Xylenes), Oil &amp; Grease, Total phenols and TPH. Table 3 (p. 6 of 62) specifies the various types of Non-Sewage Effluents/wastes discharged to the lagoon in 2017, as being Bailing Facility sludge (18,000 L), Cell A leachate (50,000 L) and Water Treatment Plant backwash (644,000 L). In the August 2017 Staff Report on Solid Waste Disposal Facilities (Landfill) O&amp;M Plan v5, the City was reminded that "All monitoring and characterization results from non-sewage wastes destined for disposal in the Sewage Disposal Facilities [Fiddler's Lake Drainage System], should be submitted each year with the City's Annual Water Licence Reports."</p> <p><b>Recommendation 1)</b> ENR recommends that monitoring results (Laboratory reports at minimum) for the landfill Cell A leachate and landfill Bailing</p>		<p>leachate in 2017, to the Annual Report, for resubmission by August 7, 2018.</p>
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		Facility be included/attached to the City of Yellowknife 2017 Annual Report.		
8	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends that important organic parameters such as BTEX, Oil &amp; Grease, Total phenols and Total Petroleum Hydrocarbons (TPH) also be included in the list of parameters to be monitored at each of these 3 facilities.</p>	<p><b>May 7:</b> Some of these parameters are already monitored at each of these 3 facilities. In 2017, the City didn't receive the request to expand the sampling parameters at F1 and F3 until after the sampling was completed at the Solid Waste Facility. These parameters will be included in the 2018 sampling program.</p>	<p>Board staff note that the expanded list of parameters applied to SNP stations 0032-F1 and 0032-F3 in August 2017, in addition to the requirement for developing a sludge management plan, were intended to help provide insight on the inputs of non-sewage waste into the lagoon system, and to aid in the development of the City's plan to outline how the City will work to meet the criteria set out in the <i>Guideline for Industrial Waste Discharges in the NWT</i> and/or the City's By-Law 4663 (see Board's Aug17-17 denial letter of SDF O&amp;M Plan). Sampling for specific parameters at the sources of non-sewage wastes may be considered during the renewal of the City's Licence.</p>
9	Topic 5: Cell A and Cell B - Effluent Collection and	<p><b>Comment</b> Although specified in the 2016 Annual Report that closure of Cell A was anticipated for 2017, Section i) of the 2017 Annual Report</p>	<p><b>May 7:</b> A consistent nomenclature for the Cells will be established and the SWF O&amp;M Plan will be updated accordingly.</p>	<p>Acceptable response.</p>

	<p>Discharge Clarification</p>	<p>stated that Cell A's capacity was to increase, as its final elevation will be higher due to the larger footprint of the combined cells. The summer 2016 construction of Cell B was also specified in the 2016 AR. It is noted that the SWF O&amp;M Plan (March 2017) does not differentiate the various landfill cells throughout the plan (eg. Cell A, Cell B), other than on the Figure 1.2.1 map. As well, section 5.3 of the City SWF O&amp;M Plan specifies that new landfill cells are equipped with leachate collection systems consisting of a series of pipes for collection and transport of cell-generated effluents to leachate collection sumps, located at the lower point of the cells. ENR is unclear if a separate collection system and sump is used for each separate new landfill cell, which would be potentially producing a separate source of wastes effluents (from Cell B). ENR notes that updates to the SWF O&amp;M Plan are due to be submitted to the Board in August 2018. Addition of the above details would be appreciated to best understand landfill Cell A and Cell B effluent waste production and management practices.</p> <p><b>Recommendation 1)</b> ENR recommends that future SWF O&amp;M Plan versions (as the one due in August 2018) - identify each separate existing landfill Cells at the Solid Waste Facility (Cell A, Cell B,</p>		
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		etc), rather than referring solely to “new landfill cells” all throughout the document.		
10	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends that clarification surrounding waste effluent management details for each separate cell be made. If each different cells’ effluent is collected together via the same collection system and/or sump, such details should be specified in upcoming SWF O&amp;M Plan versions.</p>	<p><b>May 7:</b> Clarification will be provided in upcoming SWF O&amp;M Plan versions.</p>	Acceptable response.
11	Topic 6: Raw Data - Taiga Lab Reports	<p><b>Comment</b> Original laboratory reports for the bioassay test results were attached to the 2017 Annual Report in Appendix F, but no laboratory reports (such as from the Taiga Lab) were attached for other monitoring events. ENR notes that such lab reports were submitted in the past (eg. see Appendix C - 2015 Annual Report), but none were submitted in most recent years. In addition, the City has been compiling SNP monitoring data into tabular summaries, as requested in Schedule 1 Item 1 e) of MV2009L3-0007. Exceedances of applicable standards within these tabular summaries should be highlighted to facilitate evaluation of system compliance.</p> <p><b>Recommendation 1)</b> ENR recommends laboratory reports, from which tabular summaries are being compiled, to be attached as Appendice(s) to Annual Reports. This is typical</p>	<p><b>May 7:</b> Due to the significant amount of testing, the City estimates that compiling the lab reports into the appendix will results in an extra 800-1000 pages of documentation. The City feels that is not practical, and will continue to provide the data in a tabular format.</p>	Acceptable response.

		practice in other Water Licence Reports from other NWT communities.		
12	None	<b>Comment</b> None <b>Recommendation 2)</b> ENR recommends future data compilations prepared by the City clearly identify exceedances, via highlighted or bolded characters.	<b>May 7:</b> Exceedances will be highlighted in future data compilations prepared by the City.	Acceptable response.
13	Topic 7: Water Quality Data	<b>Comment</b> The City of Yellowknife provided its 2017 water quality sampling results in Appendices B, C, D and E in a PDF format. However, the utility of this data is limited by third parties in its current format (i.e. pdf). <b>Recommendation 1)</b> ENR recommends that the City submit all water quality data associated with the sewage lagoon stations, surface water sampling stations, landfill ground water stations and storm water effluent stations to the public registry in an accessible file type (e.g., csv or xls).	<b>May 7:</b> The City will continue submitting its data as it has been. ENR can be CC'd the City's testing results by the lab if requested.	Board staff note that formats other than pdf cannot be posted to the public registry. The City and ENR can discuss sharing of laboratory reports.
14	Topic 8: Metadata Template	<b>Comment</b> ENR appreciates that the City provided all monitoring sampling results in Appendices D, C, D and E of the 2017 Annual Report. However, to ensure consistency among reporting by proponents, ENR encourages the use of a standard metadata template. Metadata sets the context for the water quality data, providing a description of data that was collected as part of a water quality sampling program and includes field conditions and a	<b>May 7:</b> The City will continue submitting its data as it has been. ENR can be CC'd the City's testing results by the lab if requested.	Board staff note that the Licence SNP does not require the City to use ENR's standard metadata template. However, the Board could encourage the City to discuss submission of the standard metadata template with GNWT-ENR.

		<p>description of laboratory analyses conducted.</p> <p>Metadata standards are required to ensure the proper use and interpretation of the data by the users. Also, as with the water quality data itself, ENR encourages that the metadata be available in an accessible file type.</p> <p><b>Recommendation 1)</b> ENR recommends that the City of Yellowknife complete the attached metadata template and provide it with the associated water quality data to the Board’s public registry in an accessible file type (e.g., csv or xls).</p>		
15	Topic 9: Formatting in Excel ORS Spreadsheet	<p><b>Comment</b> Formatting is not always accepted by the ORS spreadsheet, sometimes rendering the data or tables unusable.</p> <p><b>Recommendation 1)</b> It is recommended that the Board and the City view numerical and/or table data in ENR’s submitted letter if unreadable in the ORS spreadsheet.</p>	May 7: Noted.	Noted.
<b>MVLWB: Erica Janes</b>				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Page 3, non-sewage wastes discharged to the sewage lagoon	<p><b>Comment</b> This section indicates that other non-sewage wastes discharged to the lagoon include the 'spring catch basin cleanout, which the City will characterize and measure the volume of discharge in 2018'. Board staff appreciate the City's commitment to characterizing this waste.</p> <p><b>Recommendation</b> Please</p>	<p><b>May 7:</b> Catch basins in the City require cleaning in the spring. This entails sucking out the built up gravel that accumulates in the bottom of the basin. The gravel is deposited along the edge of the lagoon allowing the water to drain into the lake.</p>	<p>Board staff note Part D, condition 4 of the Licence, which states that ‘The Licensee shall maintain the Sewage Disposal Facilities to the satisfaction of an Inspector.’</p>

		clarify what is meant by 'spring catch basin cleanout'.		
2	Appendix B, Sewage lagoon sampling results	<b>Comment</b> Board staff note that, as has been previously noted, total phosphorus levels at F1 and F3 consistently exceed Licence objectives. <b>Recommendation</b> None	<b>May 7:</b> Noted.	Noted.
3	Appendix E, Stormwater sampling results	<b>Comment</b> Board staff note the exceedances for phosphorus and various metals in stormwater effluent results, listed in Appendix E. <b>Recommendation</b> None	<b>May 7:</b> Noted.	Noted.

## **APPENDIX A: Water Quality Sample Metadata Template - Field Data**

### **Proponent Identification**

Proponent Name:

Contact Name:

Contact Number and Email:

Program/Project Title:

Unique Identifier for Sample:

### **Sample Identification**

Sampled By:

Date Sample was Collected (DD-MM-YYYY):

Time of Sample Collection (24 hr clock hh:mm):

Sampling Frequency (e.g. 3x/yr, monthly):

Program/Project Title:

Program Initiation (MM-YYYY):

Purpose of Data Collection:

Legal Sample:

### **Sampling Equipment**

Instrumentation Type with Model Number:

Sensors Used, Including Model Numbers:

Date of Last Calibration:

### **Field Data**

Waterbody Type:

Sample Matrix:

Sample Type:

Sample Form:

Sampling Equipment:

Sample Location:

Depth of Sample (m):

Wind Speed/Direction:

Air Temperature (0C):

Precipitation in the Previous 24 Hours (Y/N):

Water Depth (m):

Ice Thickness (m):

Snow Thickness (m):

Cloud Cover (%):

Field Observations & Comments. Note anything unusual about the location or sampling procedure

--

**Sample 1**

**Sample 2**

**Sample 3**

**Etc.**

**APPENDIX B: Water Quality Sample Metadata  
Template - Lab Data**

**Proponent Identification**

Proponent Name:

Contact Name:

Contact Number and Email:

Program/Project Title:

Unique Identifier for Sample:

**Lab Data**

Parameter

Sample Date (DD-MM-YYYY)

Laboratory Used

Lab Analysis Date (DD-MM-YYYY)

Sample Preservation Method

Sample Preparation Method

Laboratory Analytical Method Used

Method Detection Limit

**Sample 1**

**Sample 2**

**Sample 3**

**Etc.**



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

Environmental Protection Operations Directorate  
Prairie & Northern Region  
9250 – 49<sup>th</sup> 1<sup>st</sup> Street NW  
Edmonton, AB  
T6B 1K5

April 26, 2018

ECCC File: 5200 000 001/004  
MVLWB File: 2009L3-0007

Erica Janes  
Regulatory Specialist  
Mackenzie Valley Land and Water Board  
4922 – 48<sup>th</sup> Street  
7<sup>th</sup> Floor YK Centre Mall  
P.O Box 2130, Yellowknife, NT, X1A 2P6

Via online submission

**RE: MV2009L3-0007 – City of Yellowknife – 2017 Annual Water Licence Report**

Attention: Erica Janes

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board regarding the above mentioned annual water licence report. ECCC's specialist advice is provided based on our mandate, in the context of the *Canadian Environmental Protection Act*, and the pollution prevention provisions of the *Fisheries Act*.

Should you require further information, please do not hesitate to contact Petrel Liu at (780)951-8851 or [petrel.liu@canada.ca](mailto:petrel.liu@canada.ca)

Sincerely,

Petrel Liu  
Environmental Assessment Intern

Attachment(s): ECCC Comments Excel Sheet

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU)  
ECCC Review Team



April 26, 2018

Erica Janes  
Regulatory Officer  
Mackenzie Valley Land and Water Board  
7<sup>th</sup> Floor – 4910 50<sup>th</sup> Avenue  
P.O. Box 2130  
Yellowknife, NT  
X1A 2P6

Dear Ms. Janes,

**Re: City of Yellowknife  
Water Licence – MV2009L3-0007  
2017 Annual Water Licence Report  
Request for Comment**

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the report at reference based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Forest Protection Act*, the *Species at Risk (NWT) Act*, the *Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

**Topic 1: Water Consumption - 10 Years Trend**

**Comment(s):**

**Yr Water Consumption (in m3)**

2008	2,792,467
2009	2,931,434
2010	2,684,612
2011	3,111,917
2012	2,972,640
2013	3,090,278
2014	3,491,910
2015	7,000 (Loss/no data provided for 8 months, from May to Dec)

2016 ..... 3,578,117 (No data provided for Jan-Feb. Volumes estimated)  
 2017 ..... 3,577,379

The above numbers are showing steadily increasing water consumptions between 2008 and 2014. Although no amounts were provided for ~ 10 months in 2015 & 2016 (loss of data), annual water consumption has been nearing the maximum allowable limit of 3,600,000 m3 for several years. The maximum reported in 2017 was no exception, with a 3,577,379 m3 total.

Appropriate steps should be taken to ensure that the quantity of water not to be exceeded is adhered to. Proactive planning by means of a Water Licence amendment, would ensure the City of YK (the City) remains compliant with their Water Licence water usage limits in the future.

**Recommendation(s):**

- 1) ENR recommends the City review historical water consumption trends and anticipate water use in the near future to determine if a Water Licence amendment is required to increase the annual water usage volumes/limits in order to prevent future non-compliance issues.

**Topic 2: Sewage Production - 10 Years Trend**

**Comment(s):**

	<b>Yr Water Consumption</b> (in m3)	<b>Yr Wastewater Production</b> (in m3)
2008	2,792,467 .....	2,656,377
2009	2,931,434 .....	2,919,731
2010	2,684,612 .....	2,782,095
2011	3,111,917 .....	<b>4,305,107</b>
2012	2,972,640 .....	<b>4,399,221</b>
2013	3,090,278 .....	<b>4,362,510</b>
2014	3,491,910 .....	<b>4,868,775</b>
2015	7,000 .....	<b>3,615,123</b>
2016	3,578,117 .....	2,897,807
2017	3,577,379 .....	3,026,144

A sharp wastewater/sewage production increase from 2,782,095 m3 to 4,305,107 m3 was observed between 2010 and 2011 (as illustrated here above) – and remained roughly at that level for 3 years afterwards. A maximum of 4,868,775 m3 was then reached in 2014, representing a nearly 40% increase from 2010. These annual volumes are well above the 2009 Fiddler’s Lagoon Treatment System Plan

projected estimates for 2021 (3,322,347 m3) and 2031 (3,743,261 m3), provided in Table 2 (p. 14) of the FLTSP. Reported sewage volumes were also above estimated sewage production volumes of 3,942,254 m3 for 2030, calculated with MACA's model (p. 25 & 26 of FLTSP).

ENR also notes that the sewage volumes have decreased since 2014 while water consumption has increased over this period. Sewage volumes generally relate to water use volumes, so the reason for the decrease in sewage volumes is not clear.

A Revised Fiddlers Lake Treatment System Plan (FLTSP), due in May 2018, is to include components identified in Schedule 2 Item 3 of the Water Licence. The updated FLTSP annual volumes should consider the sewage/wastewater production volume trends, measured since 2010 and evaluate whether the increased volumes have impacted overall treatment system efficiency.

### **Recommendations:**

- 1) ENR recommends the City clarify what factors/events resulted in the sewage production volume to nearly double from 2010 to 2014, and then to decrease from 2015 to 2017.
- 2) ENR recommends the FLTSP include an evaluation of whether the increased sewage treatment volumes have impacted the treatment efficiency of the system.

### **Topic 3: Compliance at F3 – 10 Year Trend**

#### **Comment(s):**

Monitoring results at the F3 Compliance Point (as submitted in Annual Reports, along the Fiddler's Lake Drainage Treatment System) were compiled for the last 10 years for all EQCs enumerated in Part D.2 of the Water Licence. No exceedances were noted for BOD, when using the discrete "Average Concentration" calculation of 4 consecutive results, as specified in the "Definition" section of the Water Licence. The total number of exceedances events for other parameters (and associated year of occurrence), are as follows:

- **TSS:** 13, in 2017 (4), 2015 (1), 2014 (1), 2012 (1), 2011 (2), 2010 (1) & 2008 (3)
- **FC:** 16, in 2017 (3), 2016 (2), 2015 (2), 2013 (3), 2012 (2), 2010 (2), 2009 (2)
- **pH:** 32, in 2017 (4), 2016 (3), 2015 (4), 2013 (4), 2012 (1), 2011 (4), 2010 (8) & 2009 (4)

Water Licence EQCs are in place to foster environmental protection, and each single exceedance represents individual Water Licence non-compliance events regarding

water quality. As specified previously, the Compliance Point formerly located at the end of the lagoon (F6) was moved further downstream in the past (about half way along this 13 km long system), to re-establish compliance again. Components of a revised FLTSP should focus on measures to maintain/enhance compliance at F3, rather than suggesting that the Compliance Point be moved once again further downstream - at the F1 location.

ENR notes that a total of 10 TSS exceedances were also compiled at F1 via the 10 years trend. Sludge removal from the primary lagoon cell could help improve the quality of treated wastewater entering the wastewater treatment system, and de-sludging procedures should be included in the Sludge Management Plan (to be submitted in August 2018). The MVLWB O&M templates should be referred to as minimum information components to be included in a Sludge Management Plan and a Wastewater/Sewage Treatment O&M Plan.

The GNWT Guideline for Industrial Waste Discharges in the NWT and the Yellowknife City By-Law 4663 provide limits on the types of waste that can be discharged to sewage treatment facilities. Recent analyses of discharges from City operations (e.g. Landfill Cell A, Bailing Facility, Water Treatment Plant) exceeded these limits, would not be considered appropriate for disposal in the Yellowknife sewage treatment system, and should be managed using alternative treatment/disposal methods – as specified in the Sewage Disposal Facilities O&M Plan Staff Report (August 2017). As noted previously, there have been a number of exceedances measured at compliance point F3 over the last 10 years, and ENR does not support the City’s intention to adapt parameters limits of their By-law 4663 “*in order to address wastes coming from City facilities*” (Sewage Disposal Facilities O&M Plan Staff Report, August 2017). Allowing higher concentrations of non-sewage parameters to enter the sewage treatment system could cause further issues with compliance at location F3. National guidance is available regarding levels of non-sewage parameters that can be discharged into municipal sewage treatment systems, e.g. CCME Model Sewer Use Bylaw Development Report, CCME Model Sewer Use Bylaw Guidance Document, etc.

### **Recommendations:**

- 1) ENR recommends the revised FLTSP include options for improving water quality at the F3 compliance point.
- 2) ENR recommends that the City’s intentions regarding non-sewage discharges to Yellowknife Sewage Disposal Facilities be clarified along other revisions recommended by the MVLWB – either in the revised FLTSP (due in May 2018), or the revised SWF O&M Plan (due in August 2018).

- 3) ENR recommends the City refer to MVLWB templates for guidance on the minimum information to be provided in various Waste Management Plans.

#### **Topic 4: Monitoring Results for Cell A and Bailing Facility Effluents - Not Submitted**

##### **Comment(s):**

Results for Yellowknife landfill Cell A effluent (2014 & 2015 ARs) presented elevated levels for BOD, pH, fluoride, iron, zinc and ammonia, as per Guideline for Industrial Waste Discharges in the NWT (2004). Elevated levels of ammonia were also reported in 2014 for the landfill Bailing Facility effluent. It was noted that no results were reported at the time for Total Phosphorus, TSS, Sulphides (as H<sub>2</sub>S), Sulphate (as SO<sub>4</sub>) and Total Cyanide - as currently reported in the Water Treatment Plant backwash discharge to the sewer system (2017 AR - Table 4). It was also noted that no values were provided for some of the main organic parameters, such as BTEX (Benzene, Toluene, Ethylbenzene and Xylenes), Oil & Grease, Total phenols and TPH.

Table 3 (p. 6 of 62) specifies the various types of Non-Sewage Effluents/wastes discharged to the lagoon in 2017, as being Bailing Facility sludge (18,000 L), Cell A leachate (50,000 L) and Water Treatment Plant backwash (644,000 L).

In the August 2017 Staff Report on *Solid Waste Disposal Facilities (Landfill) O&M Plan v5*, the City was reminded that "All monitoring and characterization results from non-sewage wastes destined for disposal in the Sewage Disposal Facilities [Fiddler's Lake Drainage System], should be submitted each year with the City's Annual Water Licence Reports."

##### **Recommendations:**

- 1) ENR recommends that monitoring results (Laboratory reports at minimum) for the landfill Cell A leachate and landfill Bailing Facility – be included/attached to the City of Yellowknife 2017 Annual Report.
- 2) ENR recommends that important organic parameters such as BTEX, Oil & Grease, Total phenols and Total Petroleum Hydrocarbons (TPH) also be included in the list of parameters to be monitored at each of these 3 facilities.

#### **Topic 5: Cell A and Cell B - Effluent Collection and Discharge Clarification**

Although specified in the 2016 Annual Report that closure of Cell A was anticipated for 2017, Section i) of the 2017 Annual Report stated that Cell A's capacity was to increase, as its final elevation will be higher due to the larger footprint of the

combined cells. The summer 2016 construction of Cell B was also specified in the 2016 AR.

It is noted that the SWF O&M Plan (March 2017) does not differentiate the various landfill cells throughout the plan (eg. Cell A, Cell B), other than on the Figure 1.2.1 map. As well, section 5.3 of the City SWF O&M Plan specifies that new landfill cells are equipped with leachate collection systems consisting of a series of pipes for collection and transport of cell-generated effluents to leachate collection sumps, located at the lower point of the cells. ENR is unclear if a separate collection system and sump is used for each separate new landfill cell, which would be potentially producing a separate source of wastes effluents (from Cell B).

ENR notes that updates to the SWF O&M Plan are due to be submitted to the Board in August 2018. Addition of the above details would be appreciated to best understand landfill Cell A and Cell B effluent waste production and management practices.

### **Recommendations:**

- 1) ENR recommends that future SWF O&M Plan versions (as the one due in August 2018) – identify each separate existing landfill Cells at the Solid Waste Facility (Cell A, Cell B, etc), rather than referring solely to “new landfill cells” all throughout the document.
- 2) ENR recommends that clarification surrounding waste effluent management details for each separate cell be made. If each different cells’ effluent is collected together via the same collection system and/or sump, such details should be specified in upcoming SWF O&M Plan versions.

### **Topic 6: Raw Data - Taiga Lab Reports**

#### **Comment(s):**

Original laboratory reports for the bioassay test results were attached to the 2017 Annual Report in Appendix F, but no laboratory reports (such as from the Taiga Lab) were attached for other monitoring events. ENR notes that such lab reports were submitted in the past (eg. see Appendix C - 2015 Annual Report), but none were submitted in most recent years.

In addition, the City has been compiling SNP monitoring data into tabular summaries, as requested in Schedule 1 Item 1 e) of MV2009L3-0007. Exceedances of applicable standards within these tabular summaries should be highlighted to facilitate evaluation of system compliance.

## **Recommendations:**

- 1) ENR recommends laboratory reports, from which tabular summaries are being compiled, to be attached as Appendice(s) to Annual Reports. This is typical practice in other Water Licence Reports from other NWT communities.
- 2) ENR recommends future data compilations prepared by the City clearly identify exceedances, via highlighted or bolded characters.

## **Topic 7: Water Quality Data**

### **Comment(s):**

The City of Yellowknife provided its 2017 water quality sampling results in Appendices B, C, D and E in a PDF format. However, the utility of this data is limited by third parties in its current format (i.e. pdf).

### **Recommendation(s):**

- 1) ENR recommends that the City submit all water quality data associated with the sewage lagoon stations, surface water sampling stations, landfill ground water stations and storm water effluent stations to the public registry in an accessible file type (e.g., csv or xls).

## **Topic 8: Metadata Template**

### **Comment(s):**

ENR appreciates that the City provided all monitoring sampling results in Appendices D, C, D and E of the 2017 Annual Report. However, to ensure consistency among reporting by proponents, ENR encourages the use of a standard metadata template. Metadata sets the context for the water quality data, providing a description of data that was collected as part of a water quality sampling program and includes field conditions and a description of laboratory analyses conducted. Metadata standards are required to ensure the proper use and interpretation of the data by the users. Also, as with the water quality data itself, ENR encourages that the metadata be available in an accessible file type.

**Recommendation(s):**

- 1) ENR recommends that the City of Yellowknife complete the attached metadata template and provide it with the associated water quality data to the Board's public registry in an accessible file type (e.g., csv or xls).

**Topic 9: Formatting in Excel ORS Spreadsheet**

**Comment(s):**

Formatting is not always accepted by the ORS spreadsheet, sometimes rendering the data or tables unusable.

**Recommendation(s):**

- 1) It is recommended that the Board and the City view numerical and/or table data in ENR's submitted letter if unreadable in the ORS spreadsheet.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division, NWT CIMP and the North Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email [patrick.clancy@gov.nt.ca](mailto:patrick.clancy@gov.nt.ca).

Sincerely,



Patrick Clancy  
Environmental Regulatory Analyst  
Environmental Assessment and Monitoring Section  
Conservation, Assessment and Monitoring Division  
Department of Environment and Natural Resources  
Government of the Northwest Territories

Att: 2018 Appendix A Example of Water Quality Sample Metadata Template (2)