MVLWB

Operation and Maintenance Plan Templates for Municipal Water Licences: Wastewater (Sewage) Treatment System

June 2017

Mackenzie Valley Land and Water Board

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Government of Northwest Territories

Mackenzie Valley Land and Water Board

Operation & Maintenance Plan Template – Wastewater (Sewage) Treatment System (WWTS)
General Questions – All System Types

If you have any questions about this document, please contact your regional Manager of Community Infrastructure Planning.

1. Site Description

Definitions:

- **Mechanical Plant:** a constructed system with mechanical parts such as tanks, pumps, blowers, screens, and grinders.
- **Natural Lake Lagoon:** a natural lake being used as a lagoon, including lakes with minor modifications or added control structures.
- **Engineered Lagoon:** any type of constructed or artificial lagoon that is decanted at a specific point or flows continuously through a weir or other discharge structure, including all lined lagoons.
- **Exfiltration System:** a pit, trench, or lagoon that is designed to allow effluent to seep continuously through gravel, sand, or another material.

Identify the type of treatment system. Note that each type of system requires a separate additional document to be completed. Schedules A through D have questions specific to each system type.

- ○ Mechanical Plant - complete and attach Schedule A.
- ○ Natural Lake Lagoon - complete and attach Schedule B.
- ○ Engineered Lagoon - complete and attach Schedule C.
- ○ Exfiltration System - complete and attach Schedule D.

Where is the wastewater treatment system (WWTS) located?

Community:	
Latitude:	
Longitude:	

Which coordinate system was used for these coordinates?

- ○ Decimal Degrees
- ○ Degrees, Decimal Minutes
- ○ Universal Transverse Mercator (UTM)

☐ Location map attached.

Map to include scale, north arrow, roads/access, and location of groundwater monitoring wells.

Date of Commissioning of WWTS: _____ yyyy/mm/dd (if date is unknown, estimate year)

What are the ground conditions relating to permafrost in and around the community in which the WWTS is located?

Definitions:

- **Permafrost** – Ground that stays frozen through the summer. There is a surface layer that thaws, but underneath the ground stays frozen. (There are other definitions, but for the following question, use this one.)
- **Continuous permafrost** – There is permafrost everywhere in the area.
- **Discontinuous permafrost** – (a) There is permafrost but some areas thaw in the summer, or (b) there are some patches of permafrost, but most of the ground thaws in the summer.

○ Continuous permafrost

○ Discontinous permafrost

○ No permafrost in area.

2. WWTS Staff

Provide the name, contact information, and role for each staff member.

Name	Phone	Email

Role/Responsibilities

Name	Phone	Email

Role/Responsibilities

Name	Phone	Email

Role/Responsibilities

3. Security and Control

How is public access to the system controlled? (Check all that apply.)

☐ No control

☐ Front gate locked when facility is closed

☐ Perimeter chain-link fence around entire facility

☐ Locked man-door

☐ Other: _____

Is the following signage posted at the WWTS? (Check all that apply.)

☐ Name of facility

☐ Notification of restriction of public access

☐ Warning signage regarding chemicals used in the treatment process

☐ Sign at each Surveillance Network Program (SNP) monitoring site

4. Wastewater Generation and Conveyance

Is wastewater collection done with trucks, or a sanitary sewer system (either underground pipes or utilidor)?

○ Trucked ○ Sanitary Sewer ○ Combination of sanitary sewer and trucked

○ Other: _____

If both a sanitary sewer and trucks are used, please answer both sets of questions below.

For **sanitary sewer systems**, attach a map indicating locations of lift stations and force mains including design flow rates and control points (valves).

☐ Map attached

Annual volume of wastewater collected in piped system: _____ m^3/year

For **trucked systems**, provide the following information:

Describe the group responsible for the collection and transport of wastewater to the WWTS (e.g., community staff, private contractor) and scope of service (e.g., vehicles, equipment, fuel etc.):

How many days per week is wastewater collection done?	days per week
Number of wastewater trucks available:	Truck(s)
Wastewater truck volume:	Litres
Number of truckloads delivered to lagoon per week:	trips per week
Annual volume collected by all trucks (if known):	m^3/year

Are honeybags accepted at the WWTS?

○ Yes ○ No

If yes,

Estimated annual volume of honeybags: m^3/year

Where are honeybags stored/disposed of?

How are hazardous wastes and other unacceptable substances kept out of the WWTS?

5. Influent Wastewater Quality

Influent wastewater quality refers to the composition of the raw wastewater to be treated at the WWTS.

Are water quality results available for influent (raw) wastewater quality?

○ Yes ○ No

If **no**, skip this section.

If **yes**, attach the results of the sampling program.

☐ Results attached

6. System Capacity and Design Data

Indicate the **Design Flows** for which the system was designed. If this is an existing system and **design information** (such as an engineering report) is not available, skip this question.

Monthly **design** flow: _____ m^3

Annual (yearly) **design** flow: _____ m^3

Indicate the Effluent Quality Criteria for which the **system was designed**. Add any additional criteria listed in the water license for the system. Skip any that don't apply. If this is an existing system and **design information** (such as an engineering report) is not available, skip this question.

pH:		
Biochemical Oxygen Demand (BOD5):		mg/L
Carbonaceous Biochemical Oxygen Demand (CBOD):		mg/L
Total Suspended Solids (TSS):		mg/L
Oil and Grease:		mg/L
Fecal Coliforms:		CFU/100 ml
Ammonia-N (NH3-N):		mg/L
Phosphorus:		mg/L
Acute Toxicity - Rainbow Trout		% survival
Acute Toxicity - Daphnia magna		% survival

Additional criteria from water license:

7. Effluent Discharge

Is treated wastewater discharged/decanted at specific times (seasonal), or does it flow all the time except when frozen (continuous)?

○ Seasonal ○ Continuous

If Seasonal, indicate the duration of discharge (or decant):

_____ Days OR _____ Weeks

What time of year is seasonal discharge typically done?

Indicate the average discharge flow rate: _____ m^3/day

Indicate which of the following activities are done. Your water licence will specify which requirements apply to your system. Check all that apply.

☐ The Land and Water Board is advised at least ten days prior to discharge of treated sewage.

☐ The Water Resource Officer is advised at least ten days prior to discharge of treated sewage.

☐ Land and Water Board approval is obtained prior to discharge of treated sewage

☐ Water Resource Officer approval is obtained prior to discharge of treated sewage

☐ Discharged effluent is sampled at the SNP station prior to and/or during discharge.

Where is the treated wastewater discharged?

○ Surface Waterbody ○ Natural Wetland

If discharged to surface water, provide the following information:

Name of waterbody: _____

Average annual flow rate of waterbody (if known): _____ m^3/sec

Attach water quality data for the waterbody upstream of the discharge point, if available.

☐ Data attached

If discharged to a natural wetland, provide as much of the following information as possible. If this is an existing system and design information (such as an engineering report) is not available, skip any that are unknown.

Average annual discharge flow rate out of the wetland system: _____ m^3/sec

Wetland Area: _____ hectares

Wetland Length: _____ m

Wetland Operating Depth: _____ m

List the types of plants in the wetland:

Estimated Hydraulic Loading Rate: _____ cm/day

Estimated Hydraulic Retention Time: _____ days

8. Sludge Management

Has sludge from the treatment system ever been removed for disposal?

○ Yes ○ No

How frequently is the sludge level checked?

○ Annually ○ Other: _____

How often is sludge removal done?

Every _____ years.

Estimated annual sludge production: _____ m^3

Briefly explain how sludge removal is done.

How is the sludge disposed of?

○ On-site Land Application

○ Off-site Land Application

○ Landfill

○ Other: _____

Identify/name and describe the location or facility where the sludge is disposed of.

9. Surface Water Management

Are there perimeter ditches surrounding the site to manage run-on?

○ Yes ○ No

Is the site constructed with positive site drainage (minimum 1%) to minimize ponding?

○ Yes ○ No

What is the distance to the nearest fish-bearing water body (lake, river, etc.)? _____ m

Describe any other surface water mangement at the site:

10. Record-Keeping

The following are record keeping requirements related to O&M of the Wastewater Treatment System and should be filed as an annual report with the MVLWB no later than the date stipulated in the water license for the previous year. The annual report should include the following:

- Monthly and annual quantities of all wastewater discharged to wastewater treatment system, reported in cubic metres.

  How and where is this recorded? _____

  Where are these records kept? _____

- A summary of volumes of effluent discharge to the environment.

  How and where is this recorded? _____

  Where are these records kept? _____

- A summary of volume of sludge removed from the system.

  How and where is this recorded? _____

  Where are these records kept? _____

- A summary of modifications and/or major maintenance work carried out on the wastewater treatment system, including all associated structures. Check your water licence for specific requirements regarding modifications.

  How and where is this recorded? _____

  Where are these records kept? _____

- A list of spills and unauthorized discharges.

  How and where is this recorded?

  Where are these records kept?

- A summary of any closure and reclamation work completed during the year and outline of any work anticipated for the next year.

  How and where is this recorded?

  Where are these records kept?

- A summary of any studies requested by the MVLWB that relate to waste disposal or reclamation, and a brief description of any future studies planned.

  How and where is this recorded?

  Where are these records kept?

- An outline of any spill training and communication exercises carried out.

  How and where is this recorded?

  Where are these records kept?

Are records of repairs kept?

○ Yes ○ No

Are records of upgrades kept?

○ Yes ○ No

11. Water Quality Monitoring

The "**final discharge point**" is the point where the treated wastewater leaves the treatment system and enters the environment. What type of final discharge point does the WWTS have? (Choose one.) *Note this is at the end of the treatment system, which may be different from the lagoon decant point.*

○ Exfiltration through berm or substrate

○ Natural channel outflow (i.e. discrete stream from natural lake lagoon)

○ End of wetlands (natural or engineered)

○ Engineered berm - water pumped or siphoned over berm

○ Engineered berm - outfall structure built into berm (gate with stop logs/pipe/spillway/notch)

○ Pipe outflow

○ Other (specify):

What are the coordinates of the final discharge point?

Latitude:

Longitude:

Which coordinate system was used for these coordinates?

- Decimal Degrees
- Degrees, Decimal Minutes
- Universal Transverse Mercator (UTM)

The "**receiving environment**" is the environment or area where the treated wastewater ends up after passing through the entire treatment system. What is the receiving environment located after the final discharge point? (Choose one.)

- **River/stream**
- **Lake/pond**
- **Ocean** (i.e. water goes directly from the treatment system to the ocean, with nothing else in between)
- **Wetland** (that is not part of the treatment system)
- **Land - subsurface (exfiltration)**
- **Land - surface (overland)** (e.g. a field)
- **Other (specify):**

Name of waterbody or area, if applicable:

If the receiving environment is water (river/stream/lake/pond/ocean or similar), estimate the size of the waterbody:

What types of plants or trees are in the receiving environment? (Choose all that apply.)

☐ Wildflowers (e.g. Butterwort, Cloudberry, Common Plantain, Common Yarrow, Fireweed, Indian Paintbrush, Mountain Avens, Prickly Saxifrage, Red Baneberry, Silverweed, Twinflower, Wild Mint, Yellow Lady's Slipper)

☐ Aquatic plants (e.g. Cat-tail, Duckweed, Rat Root, Water-arum, Yellow Pond-lily)

☐ Horsetails (e.g. Common Horsetail)

☐ Sedges (e.g. Cotton-grass)

☐ Shrubs (e.g. Black Currant, Bog Rosemary, Crowberry, Ground Juniper, Labrador Tea, Mountain Cranberry and Kinnikinnick, Prickly Wild Rose, Silverberry, Soapberry, Willow)

☐ Trees (e.g. Black Spruce and White Spruce, Jack Pine, Paper Birch and Dwarf Birch, Tamarack, Trembling Aspen and Balsam Poplar)

☐ Other (specify):

Has a study or sampling program been done to determine **background water quality** at the final discharge point (i.e. a study of the water in the environment before the WWTS started discharging there, or at a distance from the discharge point)?

◯ Yes ◯ No

If **yes**, provide the following information on the study.

Title of document:

Name of company or person who did the study:

Date study was completed (yyyy/mm/dd):

Attach the results of the study if available.

☐ Background water quality results attached

Has a study or sampling program been done to assess **effluent quality** at the final discharge point (i.e. a study or sampling of the water coming out the end of the treatment system)?

◯ Yes ◯ No

If **yes**, provide the following information on the study.

Title of document:

Name of company or person who did the study:

Date study was completed (yyyy/mm/dd):

Attach the results of the study if available.

☐ Effluent quality results attached

12. Additional Information Required

For **Mechanical Plants**, complete and attach Schedule A.
For **Natural Lake Lagoons**, complete and attach Schedule B.
For **Engineered Lagoons**, complete and attach Schedule C.
For **Exfiltration Systems**, complete and attach Schedule D.

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