MVLWB

Operation and Maintenance Plan Templates for Municipal Water Licences: Water Treatment Plant

Plan prepared:

Mackenzie Valley Land and Water Board

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

1. Site Description

Date this plan was prepared:

Where is the Water Treatment Plant (WTP) 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 drawing scale, north arrow, and site access/roads.

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

2. WTP 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 facility controlled? (Check any that apply.)

- ☐ No control
- ☐ Chain-link fence around reservoir
- ☐ Locked man-door
- ☐ Other:

Is the following signage posted at the WTP? (Check any that apply.)

- ☐ Name of facility
- ☐ Notification of restriction of public access
- ☐ Warning signage regarding chemicals used in the treatment process

4. Facility Design

Facility design shall be provided in the form of a piping and instrumentation diagram (P&ID) and general arrangement views of the equipment and facility prepared by a Professional Engineer or Geoscientist registered with NAPEG, who has expertise in the subject area. Attach one of the following drawing options with the documents you are submitting. As-built drawings are preferred, if available. All drawings are required to have scales and north arrows (for plan views).

Indicate what type of drawings are attached:

○ As-built drawings ○ Design drawings ○ Other:

5. Raw Water Sources

Name of **primary** raw water source (if applicable). Note that if you have a second water source, there will be a place to add information for the secondary source later in this section. For now, enter the information for the source that is used most often.

Type of raw water source (check any that apply):

☐ Lake ☐ River ☐ Groundwater ☐ Other:

Average annual quantity of water drawn from the source:

m^3/year

For **river** sources, what is the flow rate of the river? m^3/d

For **lake** sources, what is the size (area) of the lake? m^2

When does the ice on the water source normally **freeze up**? January

When does the ice on the water source normally **break up**? January

What is the flow rate of raw water being withdrawn from the **primary** source? L/s

Does raw water from the **primary** source fill a reservoir (i.e. seasonal or annual fill), or does it go directly to the treatment system, tanks, or trucks?

◯ Reservoir fill ◯ Direct to treatment, tanks, or trucks

If the primary source is used to fill a reservoir, how many times per year is the reservoir filled?

fills/year

During which months is the reservoir filled? (Skip if not filling a reservoir.)

☐ All Months

☐ January ☐ February ☐ March ☐ April ☐ May ☐ June

☐ July ☐ August ☐ September ☐ October ☐ November ☐ December

How long does it take to fill the reservoir? (Skip if not filling a reservoir.) Days

If the primary source is used to supply the treatment system, tanks, or trucks directly, how many days per week is water drawn from the source? (Skip if a reservoir is used.)

days/week

How many times does the intake pump run on an average delivery day? (Skip if a reservoir is used.)

times/day

What type of intake is used for the **primary** water source?

- ☐ Inclined shaft (submersible pump and discharge pipe inside a larger casing pipe)
- ☐ Gravity-fed wetwell (gravity fed well from which raw water is drawn – NOT a storage well filled by a pump from the source)
- ☐ Groundwater well
- ☐ Infiltration gallery
- ☐ Temporary/seasonal surface intake (pump and piping are removed from the source after use or at the end of the season)
- ☐ Other (specify): _____

Provide the opening size for the mesh on the fish screen at the end of the intake in the water (the smallest dimension of the openings in the mesh): _____ mm

Is a Source Water Protection Plan (SWPP) in place for the **primary** raw water source?

○ Yes ○ No

If **yes**, provide the following information for the plan:

Prepared by (name of company or person that wrote the plan):

_____

Title of document:

_____

Completion date: _____ yyyy/mm/dd

Location of document (where is the plan kept, or where can a copy be obtained?):

_____

If **no**, what is being done to protect the **primary** raw water source?

_____

Identify the type of raw water storage (check any that apply):

☐ None ☐ Reservoir ☐ Storage Tank ☐ Other: _____

Raw water storage capacity: _____ m^3

Name of **secondary or alternate** raw water source (if applicable). This could include a source used seasonally, during maintenance, when there are problems with the primary source, or any other backup raw water source. If only one water source is used, skip to Section 6.

_____

Type of raw water source (check any that apply):

☐ Lake ☐ River ☐ Groundwater ☐ Other: _____

Average annual quantity of water drawn from the source:

_____ m^3/year

For **river** sources, what is the flow rate of the river? _____ m^3/d

For **lake** sources, what is the size (area) of the lake? _____ m^2

When does the ice on the water source normally **freeze up**? January

When does the ice on the water source normally **break up**? January

What is the flow rate of raw water being withdrawn from the **secondary** source? _____ L/s

Does raw water from the **primary** source fill a reservoir (i.e. seasonal or annual fill), or does it go directly to the treatment system, tanks, or trucks?

○ Reservoir fill ○ Direct to treatment, tanks, or trucks

If the secondary source is used to fill a reservoir, how many times per year is the reservoir

_____ fills/year

During which months is the reservoir filled? (Skip if not filling a reservoir.)

☐ All Months

☐ January ☐ February ☐ March ☐ April ☐ May ☐ June

☐ July ☐ August ☐ September ☐ October ☐ November ☐ December

How long does it take to fill the reservoir? (Skip if not filling a reservoir.) _____ Days

If the secondary source is used to supply the treatment system, tanks, or trucks directly, how many days per week is water drawn from the source? (Skip if a reservoir is used.)

_____ days/week

How many times does the intake pump run on an average delivery day? (Skip if a reservoir is used.)

_____ times/day

What type of intake is used for the **secondary** water source?

- ☐ Inclined shaft (submersible pump and discharge pipe inside a larger casing pipe)
- ☐ Gravity-fed wetwell (gravity fed well from which raw water is drawn – NOT a storage well filled by a pump from the source)
- ☐ Groundwater well
- ☐ Infiltration gallery
- ☐ Temporary/seasonal surface intake (pump and piping are removed from the source after use or at the end of the season)
- ☐ Other (specify): _____

Provide the opening size for the mesh on the fish screen at the end of the intake in the water (the smallest dimension of the openings in the mesh): _____ mm

Is a Source Water Protection Plan (SWPP) in place for the **secondary** raw water source? (Skip this question if no secondary source is used.)

○ Yes ○ No

If **yes**, provide the following information for the plan:

Prepared by (name of company or person that wrote the plan):

Title of document:

Completion date: _____ yyyy/mm/dd

Location of document (where is the plan kept, or where can a copy be obtained?):

If **no**, what is being done to protect the **secondary** raw water source?

Explain the reasons or situations where the secondary raw water source is used, including the time of year for seasonal sources (skip this question if no secondary source is used):

6. Water Treatment Process

Indicate any **pre-treatment** processes that are used at the WTP. (Check any that apply.)

☐ Screen ☐ pH adjustment ☐ Gravity settling ☐ Other:

Indicate any treatment technologies that are used at the WTP. (Check any that apply.)

☐ Coagulation and Flocculation

(A chemical is added to the water to make particles of dirt stick together and sink.)

List chemical(s) added:

Clarification (methods to help particles settle out after they are stuck together)

☐ Gravity ☐ Inclined plate ☐ Settling tubes ☐ Dissolved air floatation (DAF)

☐ Other:

Filtration (filters use various methods to trap particles and remove them from the water)

☐ Slow sand ☐ Rapid rate gravity ☐ Rapid rate pressure ☐ Bag/cartridge

☐ Other:

Membrane Filtration (a material with tiny holes is used to strain particles from the water)

☐ Microfiltration ☐ Ultrafiltration ☐ Nanofiltration ☐ Reverse osmosis

☐ Membrane of unknown type

☐ Other:

Additional Treatment Processes

☐ Activated carbon ☐ Ion exchange (softening or targeted removal)

☐ Other:

Iron and/or Manganese Removal

☐ Greensand ☐ Oxidation/filtration

☐ Other:

Indicate what types of disinfection are done at the facility. (Check any that apply.)

☐ Chlorination

○ Solid ○ Liquid ○ Gas

☐ Ozonation

☐ Ultraviolet Radiation (UV)

☐ Other:

Water Demand, Production and Distribution:

Total annual water usage:

m^3/year

Identify the water distribution methods used (check any that apply):

☐ Piped (underground or utilidor) ☐ Trucked ☐ Other:

Identify the type of treated water storage (check any that apply):

☐ None ☐ Reservoir ☐ Storage Tank ☐ Other:

Treated water storage capacity:

m^3

7. WTP Waste Production

Skip this section if the WTP does not produce sludge.

Is sludge composition data available? (Lab report, engineering study, etc. showing what substances are in the sludge.)

○ Yes ○ No

If yes, please attach the data to this document when submitting.

☐ Sludge composition data attached

Estimate monthly quantity of sludge disposal: m^3/month

How is the sludge disposed of?

- ○ Discharged to sewage system or lagoon
- ○ Direct discharge to waterbody (lake, river, etc)
- ○ Discharged onto land
- ○ Mechanical dewatering
- ○ Evaporative sludge drying (sludge is spread out to air dry before disposal)
- ○ Other: _____

Skip this section if the WTP does not produce wastewater from backwashing, regeneration (e.g. for softeners), or a reject water stream from membrane filtration.

Estimate monthly quantity of filter backwash, regeneration and/or membrane reject wastewater disposal:

_____ m^3/month

How is the backwash/regeneration/membrane reject water disposed of?

- ○ Discharged to sewage system or lagoon
- ○ Direct discharge to waterbody (lake, river, etc)
- ○ Exfiltration
- ○ Discharged onto land
- ○ Other: _____
- ○ Combination (describe):

_____

Indicate if any of the following waste streams are produced at the plant. Provide the annual quantity and the disposal method for each. (Check any that apply.) **Skip** this section if no waste is generated at the WTP.

Check the items that apply:	Method of Disposal	Quantity per year	Units
☐ Spent cartridges or other disposable filters	(choose or type)		(choose or type)
☐ Spent media and/or resin	(choose or type)		(choose or type)
☐ Expired reagents such as DPD	(choose or type)		(choose or type)
☐ Expired calibration standards	(choose or type)		(choose or type)
☐ Chemical waste (specify):			
	(choose or type)		(choose or type)
	(choose or type)		(choose or type)
	(choose or type)		(choose or type)
☐ Other*:			
	(choose or type)		(choose or type)

*Do not include regular municipal waste (garbage, such as paper towels and packaging) or wastewater from a sink or washroom that is discharged to the municipal system (trucked or piped).

8. WTP O&M and Record-Keeping

Does the WTP have an existing O&M Plan or Manual?

○ Yes ○ No

If yes, please provide the following information for the plan:

Prepared by (name of company or person that wrote the plan):

Title of document:

Completion date: yyyy/mm/dd

Location of document (where is the plan kept, or where can a copy be obtained?):

The following are record keeping requirements related to O&M of the WTP 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 items:

- Monthly and annual quantities of fresh water obtained from all sources, reported in cubic metres.

  How and where is this recorded?

  Where are these records kept?

- A summary of modifications and/or major maintenance work carried out on the WTP, 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 studies requested by the MVLWB that relate to water treatment waste disposal or water use and a brief description of any future studies planned.

  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

9. Surveillance Network Program

Annex A of the Community's water licence, "the Surveillance Network Program", outlines the requirements for water quality/quantity monitoring for the Water Treatment Plant.

10. Additional Comments or Notes

If there is any additional information that was not covered or didn't fit in the sections above, please include it here.

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