

## Checklist: Groundwater Exceedance (GWX)

# Manitoba



Sustainable Development

*The Drinking Water Safety Act*  
Self Assessment or Qualified Person  
Checklist

Revised: September 18, 2018

### **Section 1: Owner Information**

Owner Water System	<input type="text"/>		
Operator Water System	<input type="text"/>		
Owner Mailing Address	<input type="text"/>		
Town/ City	<input type="text"/>	Province	<input type="text"/>
		Postal Code	<input type="text"/>
Email	<input type="text"/>	Phone/ Cell	<input type="text"/>

### **Section 2: Water System Information**

Public Water System (PWS)	<input type="checkbox"/>	PWS Code # (i.e. 123.00)	<input type="text"/>
Semi-Public Water System (SPWS)	<input type="checkbox"/>	SPWS Code # (i.e. 1000.00)	<input type="text"/>
Operating License #	<input type="text"/>	Seasonal?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

### **Section 3: Assessor Information** *(please fill this out even if Self Assessment)*

Name	<input type="text"/>		
Company	<input type="text"/>		
Email	<input type="text"/>	Phone/ Cell	<input type="text"/>

### **Section 4: Certification**

The information contained in this report is complete and accurate to the best of my knowledge.

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Signature of Owner or Owner's Representative

Date

Personal information is collected under the authority of The Drinking Water Safety Act and its pursuant regulations, and is used to issue permits and licenses, and for enforcement purposes. Information collected is protected by the privacy provisions of The Freedom of Information and Protection of Privacy Act. If you have any questions, contact the Access & Privacy Coordinator, 200 Saulteaux Crescent, Box 85, Winnipeg MB, R3J 3W3.

**Checklist: Groundwater Exceedance (GWX)**

Attachments

**Section 5: Suggestions or Recommendations for Improvements** *(please don't leave blank)*

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**Checklist: Groundwater Exceedance (GWX)**

**Section 6: GWX System - Description**

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Type of Water System Connections:  Hospital/ Health Care Centre  Apartments/ Condos  
 Year-round Residential  Restaurant/ Food Establish.  Day Care Facility  
 Seasonal Cottages  School  Rec./ Community Centre  
 RV Hook-ups  Personal Care Home  Other:  
 Open Campsites/ Standpipes  Seniors Manor/ Apartments

Average # People Served per Day

Peak # People Served per Day

# Building or Service Connections (include standpipes)

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**WATER USE:** PROVIDE UNITS! (volume water/ time) i.e. Liters, cubic meters, US or Imperial gallons.

Average Day Demand  **Don't just write "gallons".**  
 Metered  Estimated  
1 US gallon = 3.785 L

Peak/ Max Day Demand   
 Metered  Estimated  
1 Imp gallon = 4.546 L

Peak Hourly Flow   
 Metered  Estimated

Note:  
This is not the same information sent to the Groundwater section for the Manitoba Government for annual water usage.

Additional comments:

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Schematic or Flow Diagram:  Attachment/s

Please attach a schematic or flow diagram of your water system, only for the water treatment plant or pumphouse.

Distribution system maps are not required.

If you are physically mailing a hand-drawn hardcopy to the Office of Drinking Water, please keep a copy for your own records.

## Checklist: Groundwater Exceedance (GWX)

### Section 7: GWX System - General Information

Is your system currently under a drinking water advisory?  Yes  No  N/A

If yes, what type of advisory? (i.e. Boil Water, Water Quality - Arsenic). Type:

If yes, when was it issued? Date:

If the system is under an advisory, are water users notified and public areas posted with the advisory notice?  Yes  No  N/A

Are all water system components (wells, water treatment plant, storage tanks, pumps, etc...) adequately protected from vandalism?  Yes  No  N/A

Is the water treatment plant locked?  Yes  No  N/A

Has the water treatment plant site ever been flooded?  Yes  No  N/A

Can water supply be maintained during power outages?  Yes  No  N/A

Yes, standby generator (genset)  Yes, fuel-driven pump  
How many electrical power outages per year or per season?

Standby generator (genset) or fuel-driven pump located above the reservoir?  Yes  No  N/A

If yes, is it in a metal or epoxy coated box to protect the reservoir from spills?  Yes  No  N/A

Does the system experience frequent water outages due to equipment failures or water supply capacity issues?  Yes  No  N/A

System experienced failures in the past of treatment/ disinfection equipment?  Yes  No  N/A

Is the water system equipped with flow meters to monitor water use?  Yes  No  N/A

Raw water  Treated water  Blended water  Backwash water  
 Rural distribution water  Town distribution water  Bulk/ truck/ pail fill water

Are water service connections metered?  Yes  No  N/A

System able to meet peak water demands with adequate at-tap pressures?  Yes  No  N/A

What is the rated treatment or design capacity of the water treatment system? Units.

What is the peak or maximum day demand on the water system? Units.

Is the water treatment plant or pumphouse equipped with an alarm system?

Yes, local alarm/ exterior light only  Yes, sent to operator  No  N/A

What alarm conditions are monitored?

Distribution pump failure  Low reservoir level  Power failure  UV failure

Chlorination pump failure  High reservoir level  Building flood

Low chlorine residual  Low incoming pressure  Intrusion

High turbidity  Low distribution pressure  Other:

## Checklist: Groundwater Exceedance (GWX)

### Section 7: GWX System - General Information

- 
- Is the water system equipped with a suitable raw water sampling tap?  Yes  No  N/A
- Is the water system equipped with a suitable treated water sampling tap?  Yes  No  N/A
- Is the water system equipped with other sampling taps between treatment units?  Yes  No  N/A
- 
- Are there any obvious cross-connections within the piping between raw, partially treated, treated, or distributed water?  Yes  No  N/A
- Are there any by-passes around critical treatment equipment or treatment processes such as a cartridge filter, or a UV unit?  Yes  No  N/A
- Are these by-passes tagged or labelled?  Yes  No  N/A
- Are there procedures for activating by-passes including DWO notification?  Yes  No  N/A
- 
- Does the system provide appropriate water treatment given the type of raw water source and the raw water quality?  Yes  No  N/A
- Does the system receive frequent or repeated complaints from water users about water quality?  Yes  No  N/A
- Describe redundancy level in the water supply, treatment, storage and pumping systems. (i.e. 2 wells)

- Was the system designed by a Professional Engineer?  Yes  No  N/A
- Was the system approved by the Office of Drinking Water?  Yes  No  N/A
- Owner/ operator aware of the need to obtain approval (i.e. permit) before starting treatment upgrades or significant alterations to the system?  Yes  No  N/A
- This includes watermain extensions.
- Is the installation of treatment equipment or disinfection equipment required by the Office of Drinking Water as noted in an advisory letter or inspection letter?  Yes  No  N/A
- Adequate space in the building to install additional treatment equipment?  Yes  No  N/A
- 
- Are key water pipes, valves, taps, and components labelled to assist with O&M?  Yes  No  N/A
- Is the equipment accessible for O&M and inspection?  Yes  No  N/A
- Is there adequate space around equipment to perform O&M?  Yes  No  N/A
-

**Checklist: Groundwater Exceedance (GWX)**

**Section 7: GWX System - General Information**

Any changes, upgrades, or expansions to the system since the last assessment?  Yes  No  N/A

If yes, explain:

What is the average age (years) of the following components of the system?

Supply (i.e. well)

Treatment

Storage

Distribution

At inspection time, were all water system components in good working order?  Yes  No  N/A

If no, explain:

What is the general condition of the buildings?

- Good
- Fair - nearing end of useful life
- Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 8: GWX System - Wells** *(complete one checklist for each well)*

Attachment: well driller's report (well log)     Not Available

Well Name: (if applicable)

Well Identification Tag Number:

Type of well:     Small diameter drilled well     Large diameter dug well  
                           Large diameter drilled well     Sand point (driven) well

How is the well being used?     Primary     Alternating     Back-up/ emergency

Does the well have a watertight casing to a depth of at least 15 m (50 feet)?     Yes     No     N/A

Is there at least 3 m (10 feet) of low permeability soil (i.e. clay or till) above the casing depth to protect the water bearing zone from contamination?     Yes     No     N/A

Is the annular space between the casing and the ground sealed with grout, clay, or bentonite?     Yes     No     N/A

Does the well casing extend at least 0.45 m (18 inches) above the ground or 0.30 m (12 inches) above the pumphouse floor?     Yes     No     N/A

Does well bacteria history suggest it is secure from contamination?     Yes     No     N/A

Are there periodic changes in water quality?     Yes     No     N/A

Is the wellhead accessible for inspection and maintenance?     Yes     No     N/A

Is the well constructed with a pitless adapter? (i.e. no well pit)     Yes     No     N/A

If the well is located in a pit, does it appear to provide a watertight boundary complete with a sanitary seal?     Yes     No     N/A

Is the wellhead fitted with a secure, watertight lid/cap with all openings sealed?     Yes     No     N/A

Is the wellhead protected from damage from vehicles, animal access, etc.?     Yes     No     N/A

Does the ground slope away from the well?     Yes     No     N/A

Are there any trees, bushes, or tall grass that may impact the wellhead?     Yes     No     N/A

What is the nature of surrounding land use within approximately 100 m (300 feet) of the well?

Urban/ Residential     Cottages/ Recreational     Agricultural/ Crop Production  
 Commercial     Natural/ Undeveloped     Agricultural/ Livestock

How close is the nearest natural water body or water course? (i.e. lake, river, stream, creek)

Within 30 m (100 feet)  
 30 m to 100 m (100 - 300 feet)  
 101 m to 200 m (300 - 600 feet)  
 over 200 m (600 feet)

**Checklist: Groundwater Exceedance (GWX)**

**Section 8: GWX - Wells** (complete one checklist for each well)

Any potential sources of contamination within 30 m (100 feet) of the wellhead?  Yes  No  N/A

- |                                                      |                                                           |                                                       |
|------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------|
| <input type="checkbox"/> Sewage/ septic holding tank | <input type="checkbox"/> Landfill site                    | <input type="checkbox"/> Abandoned/ unsealed wells    |
| <input type="checkbox"/> Septic field                | <input type="checkbox"/> Petroleum storage area           | <input type="checkbox"/> Local overland flooding area |
| <input type="checkbox"/> Sewer main/ pipe            | <input type="checkbox"/> Chemical storage area            | <input type="checkbox"/> Overtopped well in past      |
| <input type="checkbox"/> Greywater field or pit      | <input type="checkbox"/> Feed/ grain storage area         | <input type="checkbox"/> Other:                       |
| <input type="checkbox"/> Livestock area              | <input type="checkbox"/> Herbicide/ fertilizer apply area | <input type="checkbox"/> Other:                       |
| <input type="checkbox"/> Manure storage area         | <input type="checkbox"/> Excavations or gravel pits       | <input type="checkbox"/> Other:                       |
| <input type="checkbox"/> Manure application area     | <input type="checkbox"/> Dugouts                          |                                                       |
| <input type="checkbox"/> Composting site             | <input type="checkbox"/> Drainage ditches                 |                                                       |

Does the well have adequate capacity to meet demands?  Yes  No  N/A

What is the capacity of the well pumping system? Units.

What is the peak or maximum day demand on the water system? Units.

How is the well pump controlled?  
 Distribution pressure switch  Storage tank level  Other:

Is there ASME pressure tank/s to reduce pump cycling?  Yes  No  N/A

What is the average age (years) of the raw water supply?  
Supply (i.e. well)

What is the general condition of the raw water supply?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

Attachment/s:  
Please attach a sketch or map showing well(s) and approximate distances to any potential sources of contamination, and to the water treatment plant or pumphouse.



### Checklist: Groundwater Exceedance (GWX)

#### Section 9: GWX - Iron/ Manganese Filter

Section is Not Applicable to this System.

Is an aerator used to oxidize iron, manganese, or arsenic?  Yes  No  N/A

Is a chemical oxidant applied to assist with iron, manganese, or arsenic removal?  Yes  No  N/A

If yes, which chemical? (i.e. chlorine, potassium permanganate, ozone)

If yes, what is the target dosage? (mg/L)

Is the rated capacity of the filters able to meet peak or maximum day demands?  Yes  No  N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

What type(s) of media are in the filter? (layers)  Other:

Anthracite  Carbon  Sand  Greensand  Gravel

Can the filters be visually inspected for maintenance and repair?  Yes  No  N/A

Are the filters regularly inspected?  Yes  No  N/A

Inspection frequency for the filters?

Has the filter media ever been replaced or topped up?  Yes  No  N/A

If yes, how long ago?

Can head loss be determined for the filters?  Yes  No  N/A

Are the filters regularly backwashed?  Yes  No  N/A

Backwash frequency for the filters?

What is the trigger to initiate a backwash? (time, pressure loss, turbidity)

Is the backwash flow rate adequate?  Yes  No  N/A

What is the source of backwash water?  Filtered and chlorinated water  
 Filtered and unchlorinated water  Raw water

How is the backwash disposed of?  
 Municipal sewer system  Holding tank or septic system  Other:  
 Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap?  
(i.e. there is no direct connection to avoid backflow)  Yes  No  N/A

**Checklist: Groundwater Exceedance (GWX)**

**Section 9: GWX - Iron/ Manganese Filter**

Section is Not Applicable to this System.

Does the filter system have an air release valve, pressure relief valve, or both?  Yes  No  N/A

Is there a suitable sample tap for water leaving the filters?  Yes  No  N/A

Are iron and/or manganese levels regularly monitored?  Yes  No  N/A

If being used for arsenic removal, are arsenic levels regularly monitored?  Yes  No  N/A

What were the iron and manganese levels (mg/L) in the raw and filter water at time of the inspection?

Iron - raw  Manganese - raw

Iron - filtered  Manganese - filtered

What was the arsenic (mg/L) level in the raw and treated water in the most recent chemistry report?

Arsenic - raw  Arsenic - treated

What is the removal rate (%) for arsenic?

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 10: GWX System - Water Softener**

Section is Not Applicable to this System.

Is there a bypass to allow blending of softened and un-softened water?  Yes  No  N/A

SPWS: is there a separate un-softened water tap provided for drinking water?  Yes  No  N/A

How often (frequency) is the softener regenerated? Units.

How is the regeneration frequency set?  Based on volume of water treated  Timed

Other

What is used to regenerate the resin?  Sodium chloride  Other

Is the salt used for regeneration food grade and NSF 60 certified?  Yes  No  N/A

Has the resin ever undergone a chemical clean with an acid solution?  Yes  No  N/A

Where is the waste brine discharged after regeneration?

Municipal sewer  Holding tank or septic system  Discharged to environment

If the brine disposal is to sewer or drain, is there an air gap?  Yes  No  N/A  
(i.e. there is no direct connection to avoid backflow)

What is the average age (years) of the softening equipment?

Softener

What is the general condition of the softening equipment?  Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 11: GWX System - Cartridge Filters (single or bank of micron filters)**

Section is Not Applicable to this System.

How is the filtration equipment being used?  Turbidity control  Pre-treatment filter  
 UV Pre-treatment filter

Are the filter housings and cartridge filters NSF certified?  Yes  No  N/A

If yes, to which NSF standards? (i.e. 53, 60, 61)

Is the rated capacity of the filters able to meet peak or maximum day demands?  Yes  No  N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

Can pressure loss across individual filters be monitored?  Yes  No  N/A

Are spare cartridges kept on-hand?  Yes  No  N/A

Are cartridges changed as per manufacturer's requirements? (i.e. pressure loss)  Yes  No  N/A

LIST ALL CARTRIDGE FILTERS IN THEIR ORDER IN THE TREATMENT PROCESS.

	Size (microns)	Manufacturer's listed max. pressure loss (psi)	Trigger and trigger value to change filter (pressure loss, time, turbidity)	Change out frequency (days)
Cartridge #1	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #2	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #3	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #4	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>

Is there a suitable sampling tap for water leaving each filter?  Yes  No  N/A

Is there a suitable sampling tap for the final filter effluent?  Yes  No  N/A

Are the filters equipped with an air release valve, pressure relief valve, or vent?  Yes  No  N/A

What were the turbidity levels (NTU) in the raw and filtered water at time of the inspection?

Turbidity - raw  Turbidity - filtered

Does the system use pre-coagulation?  Yes  No  N/A

If yes, which chemical?

If yes, what is the target dosage? (mg/L)

**Checklist: Groundwater Exceedance (GWX)**

**Section 11: GWX System - Cartridge Filters (single or bank of micron filters)**

Section is Not Applicable to this System.

Are cartridge filters used as a primary barrier?  
i.e. turbidity standard applied  Yes  No  N/A

Is the final stage cartridge filter rated at 1 micron absolute?  Yes  No  N/A

Does the 1 micron absolute filter carry certification to NSF Standard 53 for  
removal of *Cryptosporidium* and *Giardia*?  Yes  No  N/A

Is the final stage cartridge filter flushed after changing out the filter and  
before returning the filter to service?  Yes  No  N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 12: GWX System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane**

Section is Not Applicable to this System.

What type(s) of membranes are used?  Nanofiltration (NF)  Reverse Osmosis (RO)  Both

Membrane model #

What is the recovery rate (%)?  What is the reject rate (%)?

How many sealed vessels/ modules?

How many membrane elements in each vessel/ module?

Is there an isolation valve for each vessel/ module?  Yes  No  N/A

Are there pressure gauges on influent & effluent piping for each vessel/ module?  Yes  No  N/A

Does the concentrate/ reject piping rise after the final stage to prevent air locking and draining after the shutdown flush?  Yes  No  N/A

Are there sampling taps for: permeate  Yes  No  N/A

Are there sampling taps for: concentrate/ reject  Yes  No  N/A

Are there sampling taps for: blended water  Yes  No  N/A

Are there sampling taps for: individual vessels  Yes  No  N/A

Are the permeate, concentrate/ reject, by-pass metered?  permeate  concentrate  by-pass

Is there online conductivity monitoring?  feed  permeate

Is there online turbidity monitoring?  feed  permeate

Is there online pH monitoring?  Yes  No  N/A

Is an antiscalant added to the influent water to reduce fouling?  Yes  No  N/A

If yes, list chemical and dosage.

Is an acid solution added to reduce pH prior to the membrane?  Yes  No  N/A

If yes, which type of acid solution is used?  hydrochloric  sulphuric  Other:

What method is used to stabilize the permeate water?

blending

pH adjustment using sodium hydroxide (caustic soda)

alkalinity & pH adjustment using sodium carbonate (soda ash)

limestone contactor

degasification or air stripping to remove carbon dioxide

**Checklist: Groundwater Exceedance (GWX)**

**Section 12: GWX System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane**

Section is Not Applicable to this System.

Are the alkalinity and pH levels of the finished water suitable for distribution to limit corrosion?  Yes  No  N/A

Is a permeate flush done after each shut-down?  Yes  No  N/A

Is there a Clean-In-Place (CIP) unit for cleaning the membrane to limit fouling and scaling?  Yes  No  N/A

If yes, list the cleaning chemicals.

Are all treatment and cleaning chemicals certified to NSF Standard 60?  Yes  No  N/A

Is the CIP unit equipped with a heater to heat the cleaning water?  Yes  No  N/A

Have rules been established for initiating a membrane cleaning?  Yes  No  N/A

What triggers a chemical CIP membrane cleaning?

Run Time  Transmembrane Pressure (TMP)  Flow reduction  Initiated manually Operator

Approximately how often is a CIP performed?

How is the concentrate/ reject or CIP waste disposed?  Municipal sewer system  Holding tank or septic system  N/A  Discharged to environment  Other:

If the concentrate or CIP waste disposal is to sewer or drain, is there an air gap? (i.e. there is no direct connection to avoid backflow)  Yes  No  N/A

Is there a pre-filter?  Yes  No  N/A

If yes, specify pore size in microns.

Are there pressure gauges on the inlet and outlet of the pre-filter?  Yes  No  N/A

Is there redundancy to ensure water demands can be met during shut-downs such as cleanings? (i.e. dual trains, extra modules, treated water storage)  Yes  No  N/A

What types of monitors or indicators are provided for the membrane unit?

Run Time  Transmembrane Pressure (TMP)  Pressure  Temperature

What alarms are provided for the membrane unit?

Low feed pressure  High feed pressure  Low feed flow rate

Other:   Other:

**Checklist: Groundwater Exceedance (GWX)**

**Section 12: GWX System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane**

Section is Not Applicable to this System.

Was the membrane system installed to achieve compliance with specific water quality standard(s) or guideline(s)?  Yes  No  N/A

What was the level (i.e. mg/L) in the raw and treated water in the most recent chemistry report for the parameter required to achieve compliance with a water quality standard(s)?

parameter:  raw:  treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved?  Yes  No  N/A

parameter:  raw:  treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved?  Yes  No  N/A

parameter:  raw:  treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved?  Yes  No  N/A

parameter:  raw:  treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved?  Yes  No  N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:



### Checklist: Groundwater Exceedance (GWX)

#### Section 13: GWX System - Slow Sand/ Biological Filtration

Section is Not Applicable to this System.

Is the rated capacity of the filters able to meet peak or maximum day demands?  Yes  No  N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

Are there two filter beds each with independent biological layers to allow for cleaning and repairing?  Yes  No  N/A

Is the biological layer scraped?  Yes  No  N/A

If yes, what is the frequency?

Can the filters be visually inspected for maintenance and repair?  Yes  No  N/A

Are the filters regularly inspected?  Yes  No  N/A

Inspection frequency for the filters?

Is there an ozone generator?  Yes  No  N/A

If yes, what is the source gas for the ozone generator?

Compressed air  Concentrated oxygen  Liquid oxygen (LOX)

What is the applied dosage range for the ozone (mg/L)?

Is the ozone feed rate or dosage adjusted seasonally?  Yes  No  N/A

If yes, what are the adjustments based on?  Turbidity changes  UVT changes  Other

Is the ozone injected in a sidestream using a venturi?  Yes  No  N/A

Is an ozone contactor tank provided immediately after ozone injection?  Yes  No  N/A

Is the ozone contactor equipped with an ozone destruction unit vented to the atmosphere?  Yes  No  N/A

Is an ambient ozone monitor/ sensor located near the ozone equipment?  Yes  No  N/A

Were all ozone systems functional at the time of the inspection?  Yes  No  N/A

Is there a gravel roughing filter provided ahead of the slow sand filter?  Yes  No  N/A

How often (frequency) is the roughing filter backwashed?

What is the trigger and trigger value to initiate a backwash?  
(time, head loss, turbidity)

Do the slow sand filters have at least 750 mm (30 inches) of sand?  Yes  No  N/A

Has the slow sand filter media ever been replaced or topped up?  Yes  No  N/A

Can head loss be determined for each slow sand filter/s?  Yes  No  N/A

**Checklist: Groundwater Exceedance (GWX)**

**Section 13: GWX System - Slow Sand/ Biological Filtration**

Section is Not Applicable to this System.

Are the slow sand filters backwashed?  Yes  No  N/A

If yes, what is the frequency?

What is the trigger and trigger value to initiate a backwash?  
(time, head loss, turbidity)

Is the backwash source treated & unchlorinated water?  Yes  No  N/A

Is the filter equipped with filter-to-waste following backwash?  Yes  No  N/A

Is the filter-to-waste period automatically controlled based on turbidity levels?  Yes  No  N/A

If manually controlled, explain the trigger and trigger value for stopping the filter-to-waste?  
i.e. turbidity levels, timed, etc...

Trigger to stop filter-to-waste:

Are there Biological Activated Carbon (BAC) filters after the slow sand filters?  Yes  No  N/A

Are the BAC filters backwashed?  Yes  No  N/A

If yes, what is the frequency?

Is the backwash source treated & unchlorinated water?  Yes  No  N/A

How is the backwash water from the biological filters disposed?  N/A

Municipal sewer system     Holding tank or septic system     Other:

Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap?  
(i.e. there is no direct connection to avoid backflow)  Yes  No  N/A

Is there a suitable sample tap for water leaving each of the filters?  Yes  No  N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

## Checklist: Groundwater Exceedance (GWX)

### Section 14: GWX System - Chlorination

Section is Not Applicable to this System.

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What type of chlorine solution is used?  Sodium hypochlorite fed directly from container  
 Diluted sodium hypochlorite  
 Solution from calcium hypochlorite powders or tablets  
 Unscented household bleach  
 On-site sodium hypochlorite generation ("analyte")

What is the make-model-brand name of the chlorine or generator used? (i.e. supplier label)

Does the chlorine solution, or powder/ tablets, or salt carry NSF 60 certification?  Yes  No  N/A

Does the on-site sodium hypochlorite generator carry NSF 60 certification?  Yes  No  N/A

Does the on-site sodium hypochlorite generator carry NSF 61 certification?  Yes  No  N/A

---

Is an adequate amount of chlorine chemical kept on-hand at all times? (i.e. 30 days minimum)  Yes  No  N/A

Is the chlorine solution stored away from sunlight?  Yes  No  N/A

Is the sodium hypochlorite solution used within 3 months of purchase?  Yes  No  N/A

---

Are chlorine tanks stored over a spill tray?  Yes  No  N/A

Is the chlorine stored in a separate chemical storage room?  Yes  No  N/A

---

Is the system equipped with duty-standby chlorine pumps with automatic switchover in the case of pump failure?  Yes  No  N/A

Is there only a single feed chlorine pump?  Yes  No  N/A

Is there a spare feed chlorine pump? (i.e. "shelf spare")  Yes  No  N/A

Are critical spare parts kept on-hand to maintain the feed pump?  Yes  No  N/A

---

What triggers operation of the chlorine feed? (i.e. raw water pump, reservoir level, etc...)

Is operation of the feed pump controlled by the raw water pump (fixed injection rate) or by a flow meter (flow-paced injection rate)?

N/A  Raw water pump  Flow meter  Other

Do feed pump settings suggest a properly sized feed pump?  Yes  No  N/A

---

**Checklist: Groundwater Exceedance (GWX)**

**Section 14: GWX System - Chlorination**

Section is Not Applicable to this System.

What type of chlorine residual test kit is used?

N/A    Digital DPD colorimeter    Colour wheel    Unapproved unit (i.e. pool kit)

When was the equipment last calibrated?

Is the system equipped with an online chlorine residual analyzer?

Yes    No    N/A

Explain where the analyzer sample draw water goes:

Normally, what is the free chlorine residual (mg/L) of the outgoing water?

Is chlorine gas (Cl<sub>2</sub>) used for chlorination?

Yes    No    N/A

If yes, what type of chlorine gas addition is used?

100# 150# cylinders    ton cylinders    N/A

Is there automatic changeover equipment to switch from one cylinder or bank of cylinders to another cylinder or bank of cylinders, to ensure that unchlorinated water is not allowed into the distribution system?

Yes    No    N/A

Does gas chlorinator provide discharge at a point of positive pressure?

Yes    No    N/A

Is the chemical feed equipment located in a separate room to reduce hazards and vapors?

Yes    No    N/A

What is the average age (years) of the chlorination equipment?

Chlorination

What is the general condition of the chlorination equipment?  Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

### Checklist: Groundwater Exceedance (GWX)

#### Section 15: GWX System - Chlorine Dioxide

Section is Not Applicable to this System.

---

What type of chlorine dioxide feed system is used?

Generator: sodium chlorite & hydrochloric acid     Powder/s     Tablets     Other

What is the make-model-brand name of the chlorine dioxide feed system?

---

Is an adequate amount of chlorine dioxide chemicals kept on-hand at all times? (i.e. 30 days minimum)     Yes     No     N/A

Are the chemicals stored in accordance with the supplier's instructions?     Yes     No     N/A

---

Are chemicals stored over a spill tray?     Yes     No     N/A

Is the chlorine dioxide stored in a separate chemical storage room?     Yes     No     N/A

---

Is the system equipped with duty-standby chlorine dioxide pumps with automatic switchover in the case of pump failure?     Yes     No     N/A

Is there only a single feed chlorine dioxide pump?     Yes     No     N/A

Is there a spare feed chlorine dioxide pump? (i.e. "shelf spare")     Yes     No     N/A

Are critical spare parts kept on-hand to maintain the feed pump?     Yes     No     N/A

---

What triggers operation of the chlorine dioxide feed? (i.e. raw water pump, reservoir level, etc...)

Is operation of the feed pump controlled by the raw water pump (fixed injection rate) or by a flow meter (flow-paced injection rate)?

N/A     Raw water pump     Flow meter     Other

Do feed pump settings suggest a properly sized feed pump?     Yes     No     N/A

---

What type of chlorine dioxide test kit is used?

chlorine dioxide probe     spectrophotometric: lissamine green B

How often are chlorine dioxide levels monitored in the treated water?

How often are chlorite levels monitored in the treated water?

How often are chlorate levels monitored in the treated water?

Are chlorite samples done on-site or at the laboratory?     on-site     laboratory

Are chlorate samples done on-site or at the laboratory?     on-site     laboratory

Are chlorite and chlorate levels below the health-based standards of 1 mg/L?     Yes     No     N/A

---

**Checklist: Groundwater Exceedance (GWX)**

**Section 15: GWX System - Chlorine Dioxide**

Section is Not Applicable to this System.

What is the average age (years) of the chlorine dioxide equipment?

Chlorine Dioxide

What is the general condition of the chlorine dio. equipment?  Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 16: GWX System - Other Treatment Chemicals (excluding chlorine/ dioxide)**

Section is Not Applicable to this System.

	Chemical Name/s	Dosage (mg/L)
Chemical #1	<input type="text"/>	<input type="text"/>
Chemical #2	<input type="text"/>	<input type="text"/>
Chemical #3	<input type="text"/>	<input type="text"/>
Chemical #4	<input type="text"/>	<input type="text"/>
Chemical #5	<input type="text"/>	<input type="text"/>

Are all chemicals that may come into contact with the potable water certified to NSF Standard 60?  Yes  No  N/A

Is an adequate amount of treatment chemicals kept on-hand at all times? (i.e. 30 days minimum)  Yes  No  N/A

Are the chemicals stored in accordance with the supplier's instructions?  Yes  No  N/A

Are chemical tanks stored over a spill tray?  Yes  No  N/A

Is the chemicals stored in a separate chemical storage room?  Yes  No  N/A

Is the system equipped with duty-standby chemical pumps with automatic switchover in the case of pump failure?  Yes  No  N/A

Is there only a single feed chemical pump?  Yes  No  N/A

Is there a spare feed chemical pump? (i.e. "shelf spare")  Yes  No  N/A

Are critical spare parts kept on-hand to maintain the feed pump?  Yes  No  N/A

What triggers operation of the chemical feeds? (i.e. raw water pump, reservoir level, etc...)

Is operation of the chemical pumps controlled by the raw water pump (fixed injection rate) or by a flow meter (flow-paced injection rate)?

N/A  Raw water pump  Flow meter  Other

Do feed pump settings suggest properly sized feed pumps?  Yes  No  N/A

**Checklist: Groundwater Exceedance (GWX)**

**Section 16: GWX System - Other Treatment Chemicals (excluding chlorine/ dioxide)**

Section is Not Applicable to this System.

---

What is the average age (years) of the chemical equipment?

Chemicals

What is the general condition of the chemical equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:



## Checklist: Groundwater Exceedance (GWX)

### Section 17: GWX System - UV Disinfection

Section is Not Applicable to this System.

Are the UV units certified to NSF Standard 55 Class A?  Yes  No  N/A

Does the unit provide a minimum dosage of 40 mJ/cm<sup>2</sup>?  Yes  No  N/A

What is the make-model-brand name of the UV units?

How many UV units are used?

Is the UV disinfection system equipped with Uninterruptible Power Supply (UPS) for low power events like brown-outs?  Yes  No  N/A

Is the system equipped with a minimum 5 micron cartridge pre-filter or another type of pre-filter, such as iron filter?  Yes  No  N/A

Have the units been installed in the right orientation (horizontal or vertical) based on the manufacturer's specifications?  Yes  No  N/A

Is there a by-pass around the UV disinfection system that could allow un-disinfected water to be sent to distribution or taps?  Yes  No  N/A

Are these by-passes tagged or labelled?  Yes  No  N/A

Are there procedures for activating by-passes including DWO notification?  Yes  No  N/A

Are there isolation valves before or after the UV units?  Yes  No  N/A

Are proper procedures being followed to clean the sleeve and sensor?  Yes  No  N/A

How often are the sleeves cleaned?

Are UV bulbs being changed at least annually?  Yes  No  N/A

Is there a spare UV bulb available? (i.e. "shelf spare")  Yes  No  N/A

Are the UV sensors being calibrated once per year, or as per manufacturer's requirements, or when an unresolved alarm occurs?  Yes  No  N/A

UV system or sensor checked by the equipment supplier in the last year?  Yes  No  N/A

Has Operator or supplier had to replace sensors?  Yes  No  N/A

What is the usual UVT level (%), or at the time of the inspection?

Have the UV units experienced ongoing or frequent alarms suggesting an issue with the water quality (UVT level) or the sensor?  Yes  No  N/A

Does the UV unit have an automatic shut-off (i.e. solenoid valve) that shuts off the water supply if there is a UV alarm?  Yes  No  N/A

How frequent are UV alarms?  no alarms (haven't had any)  infrequent (i.e. bulb change only)

frequently (i.e. weekly) - need to clean sleeve or sensor issues

constantly (i.e. daily or anytime UV runs) - cleaning only resolves issues for a short period of time

What kind of alarms?  N/A  visual  audible  sent to computer  sent to cellphone  
Check all that apply.  other

**Checklist: Groundwater Exceedance (GWX)**

**Section 17: GWX System - UV Disinfection**

Section is Not Applicable to this System.

---

What is the average age (years) of the UV equipment?

UV

What is the general condition of the UV equipment?

- Good
- Fair - nearing end of useful life
- Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 18: GWX System - Treated Water Storage in Aboveground Tank(s)**

Section is Not Applicable to this System.

What type of tank is used to store treated water before it is distributed?

*(Note: Pressure or hydropneumatic tanks with a single inlet/outlet pipe meant to reduce pump cycling are not considered storage tanks.)*

flow-through pressurized tank/s  atmospheric tank/s (poly)  other:

What is the total volume of the tank/s? Units.

How many tanks? List # and each volume.

For atmospheric tanks:

What is the total volume of the tank/s based on the lowest operating level? Units.

Are the tanks in series (flow through one to another) or parallel (separate flows)?

single (1) tank  multiple tanks  tanks in series  tanks in parallel  N/A

What is the tank material?

polyethylene (PE)  fibreglass (FRP)

epoxy-coated steel  other:

Is the tank material or interior tank coating certified or approved for use in a potable water system? (i.e. NSF 61 or FDA approved)

Yes  No  N/A

What is the purpose of the water storage?

to meet peak demands  chlorine contact time

Check all that apply.

fire protection  other

Storage tanks sized to meet peak demands?

Yes  No  N/A

Storage tanks sized for at least 20 minutes chlorine contact time?

Yes  No  N/A

don't know

Storage tanks sized for fire protection?

Yes  No  N/A

If no for fire protection, do the tanks provide at least 1 Average Day Demand (ADD) and less than 3 ADD of storage?

Yes  No  N/A

What is the peak hourly flow rate? Units.

What is the hydraulic retention time at the estimated peak hourly flow rate when the tanks are at their lowest operating level (atmospheric tanks) or at their normal full volume (pressurized tanks)?

(Divide the volume from above by the peak hourly flow rate from above. Convert to same units.)

Retention time: (i.e. 2.50 hours or 150 minutes)

**Checklist: Groundwater Exceedance (GWX)**

**Section 18: GWX System - Treated Water Storage in Aboveground Tank(s)**

Section is Not Applicable to this System.

The following table is taken from the "Filtration and Disinfection Log Reduction Credits" document from the Office of Drinking Water. This document is available online.

Table 1: Baffling Factors for Water Storage Systems.

<u>Storage System Configuration:</u>	<u>Baffling Factor:</u>	<u>(This System)</u>
Hydropneumatic tank with single inlet and outlet	no contact time	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled retention tank; or multiple tanks in parallel	0.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two storage tanks in series	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Three or more storage tanks in series	0.3 - 0.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
Baffled tank or baffled reservoir cell	0.3 - 0.6	<input type="checkbox"/> Yes <input type="checkbox"/> No

Based on the above table, what is the baffle factor for this system:

What is the effective chlorine contact time?  
(Multiply the retention time from previous page by the baffle factor from above.)

Effective chlorine contact time: (i.e. 25 minutes)

Storage tanks sized for at least 20 minutes effective chlorine contact time?  Yes  No  N/A  
 don't know

For atmospheric tanks, are the tanks equipped with level sensors for pump operation?  Yes  No  N/A  
 floats  pressure sensors  ultrasonic sensing system  other (contact probes)

Are the tanks accessible for visual inspection?  Yes  No  N/A  
Are the tanks equipped with access or inspection hatches?  Yes  No  N/A  
Are the tanks regularly inspected?  Yes  No  N/A

Last inspected or inspection frequency:

Are the tanks regularly cleaned and disinfected?  Yes  No  N/A

Last cleaned or cleaning frequency:

**Checklist: Groundwater Exceedance (GWX)**

**Section 18: GWX System - Treated Water Storage in Aboveground Tank(s)**

Section is Not Applicable to this System.

Are the inlet and outlet pipes located to minimize the chance of water short-circuiting through the tanks and leading to water stagnation?  Yes  No  N/A

Is the pump intake line properly sealed and located at least 150 mm (6 inches) above the bottom of the tank?  Yes  No  N/A

Can individual tanks be isolated for inspection or maintenance?; without interrupting water service or interrupting chlorine contact time.  Yes  No  N/A

Are pumps connected to multiple tanks to allow for isolation?  Yes  No  N/A

Are all openings sealed watertight?  Yes  No  N/A

Are all vents, overflows, and drain lines equipped with screens?  Yes  No  N/A

Are all vents, overflows, and drain lines located to avoid backflow or run-off?  Yes  No  N/A

If the tanks are located outside the building:

Are the tanks protected from vandalism (fenced area or locked hatches)?  Yes  No  N/A

Are the tanks protected from direct sunlight (opaque or covered?)  Yes  No  N/A

What is the average age (years) of the storage equipment?

Storage

What is the general condition of the storage equipment?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 19: GWX System - Treated Water Storage Inground Reservoir or Buried Tank(s)**

Section is Not Applicable to this System.

What type of storage system is used to store treated water before it is distributed?

inground concrete reservoir

buried tank/s

other:

What is the total volume of the reservoir/s or tank/s? Units.

How many reservoir cells or tanks? List # and each volume.

What is the total storage volume based on the lowest operating level? Units.

Are the cells or tanks in series (flow through one to another) or parallel (separate flows)?

single (1) cell

multiple cells

cells in series

cells in parallel

N/A

What is the reservoir or tank material?

concrete

fibreglass (FRP)

polyethylene (PE)

other:

Is the reservoir or interior tank coating certified or approved for use in a potable water system? (i.e. NSF 61 or FDA approved)

Yes

No

N/A

What is the purpose of the water storage? Check all that apply.

to meet peak demands

chlorine contact time

fire protection

other

Reservoir or tanks sized to meet peak demands?

Yes

No

N/A

Reservoir or tanks sized for at least 20 minutes chlorine contact time?

Yes

No

N/A

don't know

Reservoir or tanks sized for fire protection?

Yes

No

N/A

If no for fire protection, does it provide at least 1 Average Day Demand (ADD) and less than 3 ADD of storage?

Yes

No

N/A

What is the peak hourly flow rate? Units.

What is the hydraulic retention time at the estimated peak hourly flow rate when the cells/ tanks are at their lowest operating level?

(Divide the volume from above by the peak hourly flow rate from above. Convert to same units.)

Retention time: (i.e. 2.50 hours or 150 minutes)

**Checklist: Groundwater Exceedance (GWX)**

**Section 19: GWX System - Treated Water Storage Inground Reservoir or Buried Tank(s)**

Section is Not Applicable to this System.

The following table is taken from the "Filtration and Disinfection Log Reduction Credits" document from the Office of Drinking Water. This document is available online.

Table 1: Baffling Factors for Water Storage Systems.

<u>Storage System Configuration:</u>	<u>Baffling Factor:</u>	<u>(This System)</u>
Hydropneumatic tank with single inlet and outlet	no contact time	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled retention tank; or multiple tanks in parallel	0.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled cell reservoir, inlet and outlet at opposite ends	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two storage tanks in series	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two cell reservoir, inlet and outlet in same cell	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two cell reservoir, inlet and outlet at opposite ends of separate cells	0.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
Three or more storage tanks in series	0.3 - 0.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
Baffled tank or baffled reservoir cell	0.3 - 0.6	<input type="checkbox"/> Yes <input type="checkbox"/> No

Based on the above table, what is the baffle factor for this system:

What is the effective chlorine contact time?

(Multiply the retention time from previous page by the baffle factor from above.)

Effective chlorine contact time: (i.e. 25 minutes)

Reservoir or tanks sized for at least 20 minutes effective chlorine contact time?

Yes  No  N/A  
 don't know

Is the reservoir or tanks equipped with level sensors for pump operation?

Yes  No  N/A

floats  pressure sensors  ultrasonic sensing system  other (contact probes)

Are the cells or tanks accessible for visual inspection?

Yes  No  N/A

Are the cells or tanks equipped with access or inspection hatches?

Yes  No  N/A

Are the cells or tanks regularly inspected?

Yes  No  N/A

Last inspected or inspection frequency:

Are the cells or tanks regularly cleaned and disinfected?

Yes  No  N/A

Last cleaned or cleaning frequency:

### Checklist: Groundwater Exceedance (GWX)

#### **Section 19: GWX System - Treated Water Storage Inground Reservoir or Buried Tank(s)**

Section is Not Applicable to this System.

---

Are the inlet and outlet pipes located to minimize the chance of water short-circuiting through the cells or tanks and leading to water stagnation?  Yes  No  N/A

Are there at least two isolatable cells or tanks with a valved interconnection?  Yes  No  N/A

Can individual cells or tanks be isolated for inspection or maintenance?; without interrupting water service or interrupting chlorine contact time.  Yes  No  N/A

Is pumping capacity available in at least two cells or tanks to allow water supply to be maintained when cleaning the reservoir cells or tanks?  Yes  No  N/A

---

Are access hatches curbed and sealed watertight?  Yes  No  N/A

Are all openings sealed watertight?  Yes  No  N/A

Are pipe entries into the reservoir or tanks sealed watertight to prevent contamination? (i.e. LinkSeal or cast-in-place sleeve)  Yes  No  N/A

Do any floor drains or wastewater pipes pass over or through the reservoir?  Yes  No  N/A

Yes - floor drain  Yes - wastewater  Yes - other

If yes, are these pipes encased in concrete?  Yes  No  N/A

Are pipes through walls protected from differential settling? (i.e. flexible joints/ ball-and-socket joints)  Yes  No  N/A

---

Are all vents, overflows, and drain lines equipped with screens?  Yes  No  N/A

Is the reservoir or tank equipped with a screened air vent? (i.e. gooseneck or inverted J-pipe)  Yes  No  N/A

Is the reservoir or tank equipped with an adequately sized screened overflow that discharges to the ground?  Yes  No  N/A

---

Are all vents, overflows, and drain lines located to avoid backflow or run-off?  Yes  No  N/A

Is the reservoir or tank protected from contamination from run-off or spills into the water treatment plant?  Yes  No  N/A

Is the reservoir or tank located at least 15 m away from sewer system components such as sewer lines or holding tanks?  Yes  No  N/A

If the reservoir extends beyond the footprint of the water treatment plant building, is the reservoir roof adequately sloped and drained?  Yes  No  N/A

Is the reservoir or tank site graded to drain away?  Yes  No  N/A

---

If the cells or tanks are located outside the building:

Are the cells or tanks protected from vandalism (fenced area or locked hatches)?  Yes  No  N/A

---

Please attach a schematic of reservoir cells or tanks showing the inlet, outlet, pump locations, baffles.  Attachment/s

---



**Checklist: Groundwater Exceedance (GWX)**

**Section 19: GWX System - Treated Water Storage Inground Reservoir or Buried Tank(s)**

Section is Not Applicable to this System.

---

What is the average age (years) of the storage equipment?

Storage

What is the general condition of the storage equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 20: GWX System - Distribution Pumping (if not relying on well pump)**

Section is Not Applicable to this System.

**Pump sizes and flow rates (capacities) can be estimated; units can be given in HP.  
If unknown, fill out what information is available.**

LIST ALL PUMPS IN THE SYSTEM: (write Units)

	Pump Name or Description:	Size: (HP)	Output Pressure: (psi or kPa)	Size: Total Dynamic Head TDH (feet or meters)	Size: Flow Rate (L/s or USGPM)
Pump #1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Are the distribution pumps controlled by the distribution system pressure?  Yes  No  N/A

What is the pressure set-point (psi) for the distribution header?

System able to meet peak water demands with adequate at-tap pressures?  Yes  No  N/A

Does the pumping system have adequate capacity to meet demands?  Yes  No  N/A

What is the total capacity of the pumping system? Units.

What is the peak or maximum day demand on the water system? Units.

Are there any engine-driven pumps with fuel?  Yes  No  N/A

If yes, is there proper containment for the fuel to prevent contamination?  Yes  No  N/A

Is the distribution pumping system equipped with appropriate check valves, shut-off valves, pressure gauges, pressure relief or air/ vacuum relief valves?  Yes  No  N/A

Are taps or connections to mechanical equipment, where there is potential backflow of hazardous substances, protected with an air gap or appropriate backflow prevention device?  Yes  No  N/A  
(i.e. devices such as washdown sink, hose bib, boiler, heat exchanger, etc.)

**Checklist: Groundwater Exceedance (GWX)**

**Section 20: GWX System - Distribution Pumping (if not relying on well pump)**

Section is Not Applicable to this System.

---

What is the average age (years) of the pumping equipment?

Pumping

What is the general condition of the pumping equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

### Checklist: Groundwater Exceedance (GWX)

#### **Section 21: GWX System - Distribution System (not intended for a building plumbing system)**

Section is Not Applicable to this System.

---

Are there up-to-date maps of the distribution system indicating locations of:  
service connections, valves, flush-outs, hydrants, etc...  Yes  No  N/A

---

What types of watermain materials exist in the distribution system? Check all that apply.

- PVC (polyvinyl chloride)  AC (asbestos cement)  iron - cast  
 HDPE (high-density polyethylene)  other  iron - ductile

---

Are watermains adequately sized?  
(i.e. 50 mm (2 inch) if no fire protection, 150 mm (6 inch) if fire protection)  Yes  No  N/A

Are watermains adequate pressure rating?  
(i.e. minimum 100 psi or 690 kPa)  Yes  No  N/A

Is adequate at-tap pressure of 30-to-60 psi (200-to-400 kPa) maintained  
in the distribution system at all times?  Yes  No  N/A

---

Does the system have a watermain replacement or renewal strategy?  Yes  No  N/A

Are a set of standards available for new construction?;  
reference to Manitoba Water Services Board (MWSB) or  
City of Winnipeg standard construction specifications or similar,  
to ensure proper materials and construction procedures are followed?  Yes  No  N/A

Have minimum design and construction standards been established for  
new service connections?  Yes  No  N/A

Is all new construction inspected to meet these requirements?  Yes  No  N/A

Are all new watermains, service lines, and related equipment CSA or NSF  
certified for use in potable water systems?  Yes  No  N/A

Are all new watermains and water lines disinfected as per AWWA, MWSB,  
or City of Winnipeg disinfection standards including  
confirmatory bacterial testing before placed into service?  Yes  No  N/A

---

If piped sewer is present, is there at least 3 m (10 feet) horizontal distance  
separation between watermains and sewer mains, where they run parallel?  Yes  No  N/A

If watermains are closer than 3 m (10 feet) from sewer mains  
are the watermains vertically above the sewer mains?  Yes  No  N/A

If yes, do the watermains have a vertical distance separation at least  
0.45 m (18 inches)?  Yes  No  N/A

If watermains cross: sewer mains, raw or other non-potable water lines,  
oil or gas pipelines, etc... is the watermain above at least 0.45 m (18 inches)?  Yes  No  N/A

---

Are watermains protected from damage by being buried with at least  
2.4 m (8 feet) cover for year-round systems or 0.45 m (18 inches) for seasonal?  Yes  No  N/A

Has the distribution system had any issues with frozen service lines?  Yes  No  N/A

Are "bleeder" lines or valves used to prevent frozen service lines?  
(These are used in some northern communities.)  Yes  No  N/A

---

**Checklist: Groundwater Exceedance (GWX)**

**Section 21: GWX System - Distribution System (not intended for a building plumbing system)**

Section is Not Applicable to this System.

Are water service connections metered?  Yes  No  N/A

some connections

Are water losses kept under 15% to reduce water production requirements?  Yes  No  N/A

don't know

What is the estimated % of water loss for this water system? %   don't know

Are dead ends supplied with hydrants or flush-outs?  Yes  No  N/A

Are valves and hydrants regularly inspected and exercised?  Yes  No  N/A

Are there adequate number of valves, hydrants, and flush-outs to isolate and flush the system? Drain the system if seasonal.  Yes  No  N/A

Are watermains and distribution lines flushed at least annually?  Yes  No  N/A

Flushing frequency:

Are there any known lead service lines present in the system?  Yes  No  N/A

don't know

If found, has a strategy been developed to remove lead service lines?  Yes  No  N/A

Is there a cross connection and backflow prevention program?  Yes  No  N/A

Are connections where there is potential for backflow of hazardous materials protected by backflow prevention assembly or air gap? (i.e. potential locations include agricultural operations, wastewater treatment plants, etc.)  Yes  No  N/A

Are connections from heat exchangers prohibited from being connected to the water supply? (i.e. prohibited from returning water to the potable water line)  Yes  No  N/A

Is there equipment within the distribution system with a high water table or potential to be flooded?  Yes  No  N/A

Includes: manholes with potable water equipment, underground meter/ valve pits

Are all manholes with potable water equipment or underground meter/ valve pits or similar installations, watertight and free from non-potable water intrusion?  Yes  No  N/A

Are air relief valves within the distribution system located aboveground?  Yes  No  N/A

**Checklist: Groundwater Exceedance (GWX)**

**Section 21: GWX System - Distribution System (not intended for a building plumbing system)**

Section is Not Applicable to this System.

Are there periodic changes in treated water quality in the distribution system?  Yes  No  N/A

Do the distribution system bacterial records suggest it is well operated and well maintained?  Yes  No  N/A

Do the distribution system chlorine residual records suggest it is well operated and well maintained?  Yes  No  N/A

Do the records suggest any specific water quality issues?  Yes  No  N/A

If yes, please explain:

What is the average age (years) of the distribution system?

Distribution

What is the general condition of the distribution system?  Good  
 Fair - nearing end of useful life  
 Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 22: GWX System - Bulk Fill/ Truck Fill/ Pail Fill**

Section is Not Applicable to this System.

Does the bulk/ truck/ pail fill have appropriate backflow prevention?  Yes  No  N/A

If yes, what type of backflow prevention is used? Check all that apply.  other:

backflow prevention assembly: double check valve plus siphon break

backflow prevention assembly: reduced pressure principle

hose bib vacuum breaker (only allowed on pail fill)

air gap

Is the station equipped with appropriate signage indicating that only drinking water containers are allowed to be filled?  Yes  No  N/A

Is access to the fill station limited? (i.e. locked, FOB electronic key, card swipe)  Yes  No  N/A

Is there a flow meter that monitors water usage (volumes) at the fill station?  Yes  No  N/A

Is there a separate or dedicated pump for the fill station?  Yes  No  N/A

No - combo pump

Is the hose length such that it is off the ground at least 1 m (3 feet)?  Yes  No  N/A

What is the average age (years) of the fill station equipment?

Fill Station

What is the general condition of the fill station?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 23: GWX System - Operation and Maintenance (O&M)**

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Is the water system checked on a daily basis when it is operating?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
How many hours per day does the water treatment system run?	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>
How many hours per day does the pump/s run?	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>
How many hours per day does the operator spend on the water system?	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>

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Is there a back-up operator for the water system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Has the water treatment facility and/or water distribution system been classified under the operator certification program?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
water treatment facility:	<input type="checkbox"/> small system <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4
water distribution system:	<input type="checkbox"/> small system <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4
Have any operators been classified under the operator certification program?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

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Is there an up-to-date emergency contact list?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a list of critical water users (i.e. hospitals, personal care homes, schools) to be contacted during an emergency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a procedure for emergency notification of water users if a water quality issue occurs or there is an advisory?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a plan for obtaining water on an emergency basis?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

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If the system is operated on a seasonal basis, are Office of Drinking Water procedures followed for start-up and shut-down of the water system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Have written procedures been developed for key activities such as: backwashing filters, watermain repairs, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there an up-to-date process schematic or water system drawing available?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there an up-to-date O&M manual available with equipment specifications, product sheets, supplier information, O&M instructions, troubleshooting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Has the operator received training from the equipment supplier on O&M of critical water system components such as treatment equipment, controls, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a maintenance log for recording preventive maintenance, repairs, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are water system records kept for a minimum of 2 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

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Are instruments regularly calibrated, in particular, water testing equipment to ensure reliable test results?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are extra bacterial sample bottles kept on-hand for emergency purposes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is the system in compliance with the sampling parameters and frequency listed in the Operating Licence?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

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**Checklist: Groundwater Exceedance (GWX)**

**Section 23: GWX System - Operation and Maintenance (O&M)**

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Additional comments:

**Checklist: Groundwater Exceedance (GWX)**

**Section 24: GWX - Arsenic Removal by Filtration Using Disposable Media**

Section is Not Applicable to this System.

Is the rated capacity of the filters able to meet peak or maximum day demands?  Yes  No  N/A

What is the treatment capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

What type(s) of disposable media is used for arsenic removal?  Other:

Granular Ferric Hydroxide (i.e. Bayoxide, AdEdge)

Titanium Oxide (i.e. MetSorb)

Activated Alumina

Does the disposable media carry NSF certification?  Yes  No  N/A

Can the filters be visually inspected for maintenance and repair?  Yes  No  N/A

Are the filters regularly inspected?  Yes  No  N/A

Inspection frequency for the filters?

What is the trigger to replace the media? (time, pressure loss, turbidity)

What is the expected life of the media according to the supplier?

Has the filter media ever been replaced or topped up?  Yes  No  N/A

If yes, how long ago?

Are there pressure gauges on the inlet and outlet of the filter?  Yes  No  N/A

Are the filters regularly backwashed?  Yes  No  N/A

Backwash frequency for the filters?

What is the trigger to initiate a backwash? (time, pressure loss, turbidity)

What is the source of backwash water?  Filtered and chlorinated water  
 Filtered and unchlorinated water  Raw water

How is the backwash disposed of?  
 Municipal sewer system  Holding tank or septic system  Other:  
 Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap?  Yes  No  N/A  
(i.e. there is no direct connection to avoid backflow)

**Checklist: Groundwater Exceedance (GWX)**

**Section 24: GWX - Arsenic Removal by Filtration Using Disposable Media**

Section is Not Applicable to this System.

Is there a suitable sample tap for water leaving the filters?  Yes  No  N/A

Are arsenic levels regularly monitored?  Yes  No  N/A

What was the arsenic (mg/L) level in the raw and treated water in the most recent chemistry report?

Arsenic - raw

Arsenic - treated

What is the removal rate (%) for arsenic?

Is the filtration system achieving the expected removal of arsenic?  Yes  No  N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment?  Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments: