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Application for Waterworks Construction Permit

A. Owners information

Type of ownership (select one)	☐ Sole proprietorship ☐ Partnership ☐ Corporation ☐ Society ☐ Other:
Legal owner (ex: Jane Doe or 123456 Ltd.):	Common Name of Water System (ex: City of Fort Frank Water System):
Owner contact name:	Owner contact number:

B. Contact information

Site information:		
Person in charge (operator):	Position: ☐ Owner ☐ Manager ☐ Other	
Street address:		
City / municipality:	Postal code:	Phone / Fax:
Cell:	Email:	
Mailing / Billing information: ☐ Same as site information		
Mailing address:		
City / municipality:	Postal code:	Phone:
Cell:	Owner Email:	

Reason for applying

☐ New system ☐ Existing system needing approval (not previously approved) ☐ System upgrade / alteration / extension

Components being modified: (Check all that apply) ☐ New system ☐ Source* ☐ Treatment ☐ Storage ☐ Distribution

Section to be completed: ☐ All parts ☐ Part A ☐ Part A and B ☐ Part C ☐ Part D

Describe Proposed Works **

* New OR not previously approved water source

** For watermains, list length of each size, class, type – eg, 85m of 150mm C900 DR18 PVC – include # hydrants, # valves

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Submission Package Checklist – to be completed for all applications in addition to "Parts" selected above.	**Enclosed**	**Previously Submitted**	**Not Applicable**
Cover Letter (explain the context of application)	☐	☐	
Manufacturer's Technical Specifications (for new or altered equipment, specify model, settings, NSF validation, test protocols)	☐	☐	
Design Brief (eg, assumptions and design parameters)	☐	☐	☐
Plans and Drawings (11x17 or 8.5x 11 preferred in pdf electronic format)			
Either: A) Three Basic Plans (i, ii, iii)			
i. Location Map (regional setting, how to get there from the nearest town)	☐	☐	☐
ii. Site Plan (intake, treatment, storage, watermains, valves, hydrants, clean-outs, sampling locations - include contaminant sources like sewers, lagoons, etc.)	☐	☐	☐
iii. Schematic Diagram(s) – water flow sequence. See Appendix B for examples	☐	☐	☐
Or B) Engineered Plans (plan and profile, piping and instrumentation, etc.)	☐	☐	☐
Source Approval			
Completed by EHO if a new source or a source that has not previously been approved is proposed	☐	☐	☐

Reference any additional plans, drawings, reports, etc. that will be submitted with your application below:

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Does the water system have an existing ***Operating Permit*** under the *Drinking Water Protection Act*?	☐ Yes	☐ No
Is the water system currently on a *Boil Water Notice or Water Quality Advisory*?	☐ Yes	☐ No
Is the water system operated only part of the year (seasonal operations e.g., camps, resorts)?	☐ Yes	☐ No
Is the system classified as a small water system (max. 500 users within any 24 h period)?	☐ Yes	☐ No
Is this application for the purposes of a subdivision under the *Local Services Act*?	☐ Yes	☐ No
Will the Water System operate as a *Water Utility*?	☐ Yes	☐ No
Are all proposed works located on public right-of-ways or registered easements?	☐ Yes	☐ No
Does the proposal involve any strata lots or buildings?	☐ Yes	☐ No
Are plans and drawings signed, sealed, and dated by a Professional Engineer?	☐ Yes	☐ No

Incomplete applications will not be processed and will be returned to the applicant.

Please mail or email the submission package (or any questions) to:

Att: Regional Public Health Engineer
Northern Health Authority, Public Health Protection
4th Floor – 1600 3rd Avenue, Prince George, BC V2L 3G6

Phone: 250-565-7322

Email: PHE@northernhealth.ca

Please allow 30 to 60 days for normal processing of Waterworks Construction Permit Applications. The works may be inspected by Northern Health during or following construction. You also require a valid Water System ***Operating Permit*** before supplying water to users. Operational details should be discussed with your local Drinking Water Officer / Environmental Health Officer.

Submitted by:			Signature:	
Representing:	☐ Owner	☐ Operator	☐ Designer	☐ Legal Agent for Owner
Address: ☐ as above				
Telephone(s):			Email:	

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Part A New or Modified Raw Water **Source**

Source

☐ ***Groundwater Source***
☐ Well construction:
☐ drilled ☐ dug ☐ driven
☐ other ☐ not sure
☐ Well pit:
☐ drained ☐ sump pump
☐ Flowing (artesian) well
☐ Well pump:
☐ submersible ☐ hand
☐ turbine ☐ other ☐ none

☐ Aquifer type:
☐ sand/gravel ☐ bedrock ☐ not sure
☐ Aquifer protection:
☐ confined ☐ unconfined ☐ not sure

Attached documents:
☐ driller's well log
☐ hydrogeologist's report
☐ GUDI / GARP screening

☐ ***Surface Water Source***
☐ MoE Water Licence
☐ Lake
☐ Stream
☐ Spring
☐ DFO approved intake
☐ Low-lift pump

☐ ***Hauled Water Source***

☐ Attach lab report on chemical, physical, and bacteriological raw untreated, source water quality
☐ Water quality concerns
☐ iron ☐ manganese ☐ arsenic ☐ uranium ☐ sulphur ☐ hardness ☐ turbidity ☐ colour ☐ UVT ☐ coliforms
☐ cysts ☐ viruses ☐ DBPs ☐ Other (specify:_____)
☐ Odour: ☐ none ☐ slight ☐ strong (describe:_____)
☐ Taste: ☐ none ☐ sweet ☐ salty ☐ bitter ☐ metallic ☐ other (Describe:_____)
☐ Sampling tap for raw water quality

Does raw, untreated, unfiltered source water quality meet current *Canadian Drinking Water Guidelines*:
- for all ***health-based*** parameters? ☐ Yes ☐ No List any exceedances:_____
- for other ***aesthetic*** parameters? ☐ Yes ☐ No List any exceedances:_____

Part B New or Modified **Treatment** Works

Treatment

What is the design flow for the treatment works? _____ ☐ *gpm*, ☐ *m³/d, specify*:_____

☐ Attach supporting calculations for design flow, if available, based on population served, fixture counts, etc.
☐ Discharge backwash/reject water to: ☐ sanitary sewer ☐ storm sewer ☐ ground ☐ subsurface pit ☐ surface water

☐ Source water protection plan
☐ Bank (subsurface) filtration
☐ Coarse pre-filter (µm)
☐ Oxidation:
☐ aeration ☐ Cl_2 ☐ $KMnO_4$
☐ Coagulant: ☐ PACl ☐ Alum
☐ other:_____
☐ flocculation / sedimentation
☐ Rapid sand filter (backwashable)
☐ Multi-media filter: ☐ gravel
☐ sand ☐ anthracite ☐ GAC
☐ garnet ☐ other ☐ greensand
☐ pyrolusite ☐ BIRM
☐ Water softener (☐ Na ☐ K)
☐ Anion exchange (target:_____)

☐ Activated carbon: ☐ granular,
☐ block, ☐ powdered, ☐ other:_____
☐ Membrane cartridge filter(s)
_____ µm → _____ µm → _____µm ☐ (abs)
☐ Pressure drop measured

Chlorination:
☐ feed pump ☐ batch ☐ Ozone disinfection
☐ Contact tank volume?
☐ *gal* ☐ *L* ☐ CT? _____ mg·min/L
☐ Membrane filtration:
☐ micro ☐ ultra ☐ nano ☐ RO
☐ Validation: ☐ NSF ☐ EPA ☐ none
☐ Integrity testing: ☐ direct ☐ indirect

☐ Slow sand filtration
☐ UV disinfection
☐ NSF 55 ☐ Class A
☐ Class B
☐ UVT value?_____ %
☐ UV dose?_____ mJ/cm²
☐ Point-of- ☐ Entry
☐ Use #:_____
☐ Chlorine monitor/log
☐ Turbidity monitor/log
☐ Sampling taps #:_____
☐ Qualified operator
☐ Other:_____

Does the treatment comply with **4-3-2-1-0** treatment objectives? ☐ Yes ☐ No ☐ Not required

Required for surface water and groundwater at risk of containing pathogens as per the BC Drinking Water Treatment Objectives (Microbiological)

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Part C New or Modified **Storage** (Raw or Treated Water)

Storage

☐ **Raw Water Storage**	☐ **Treated Water Storage**	☐ **Distribution Storage**
☐ Volume? _____ ☐ *gal* ☐ *L* ☐ *m³*	☐ Volume? _____ ☐ *gal* ☐ *L* ☐ *m³*	☐ Volume? _____ ☐ *gal* ☐ *L* ☐ *m³*
☐ Covered ☐ Uncovered	☐ Pressure tank(s)	☐ Rechlorination stations
☐ Above ground ☐ Below ground	☐ Clear well ☐ Cistern(s)	☐ Distance to first user?
☐ Pressurized ☐ Vented	☐ High lift pump _____ ☐ kW ☐ hp	_____ ☐ metres ☐ feet

Has provision been made for backflow prevention and a sampling tap at all storage sites? ☐ Yes ☐ No

At average flow conditions, how long will water be stored in the tank or reservoir last? _____ ☐ *hours* ☐ *days*

Part D New or Modified **Distribution** System

Distribution

☐ Watermain replacement ☐ Watermain extension ☐ Pumping station ☐ Other (specify) _____

How many new lots/units will be serviced?	# fee simple units:	# fee simple units:

Does the waterworks produce enough water (quantity) to service existing and future lots? ☐ Yes ☐ No

Will all watermains have 3 metres clear ***horizontal separation*** from sewers and drains? ☐ Yes ☐ No
If NO, propose protection measures on plans and submit **Schedule A** below.

At all sewer/drain crossings, and wherever the normal 3 m ***horizontal separation*** is not possible, are the watermains at least 450 mm (18 inches) above the sanitary or storm sewer? ☐ Yes ☐ No
If NO, propose protection measures on plans and submit **Schedule A** below.

Do all service connections meet the above separation guidelines? ☐ Yes ☐ No

Have blow-offs or hydrants been provided for flushing purposes on all dead-ends and low points? ☐ Yes ☐ No

Does the location of valves permit flushing to be carried out effectively? ☐ Yes ☐ No

Have valves, hydrants, or services designed to provide air relief been provided at all high points? ☐ Yes ☐ No

Will water for flushing, testing, and disinfection come from a hydrant (testable BFP) or water hauler? ☐ Yes ☐ No

Do you have enough water pressure to achieve a flushing velocity of at least 0.8 m/s (2.5 ft/s)? ☐ Yes ☐ No

Schedule A: (Attach a separate page if necessary, and refer to the ***Guideline: Sewer – Watermain Conflicts*** for more details.)

#	Street Name	Station (0+000)	Horizontal Separation (m)	Vertical Separation[a] (mm)	Proposed Protective Measures
1					
2					
3					

[a] Vertical Separation = elevation of bottom sewer - elevation of top of watermain (can be negative)

How will you disinfect the new pipes and equipment before putting them in service following construction activities?

☐ AWWA C651-C654	
☐ MMCD Section 02666	
☐ No disinfection planned	
☐ Other (describe)	

Appendix A: Required Water Quality Parameters

Core Parameters	*Guideline*
☐ **E. Coli**	***[none detected]***
☐ **Total Coliforms**	***[none detected]***
☐ HPC[1]	[~ 100-500 CFU/mL]
☐ Alkalinity	[~ 30-500 mg/L]
☐ Chloride	[250 mg/L]
☐ Colour	[15 TCU]
☐ Electrical Conductivity	[~ 800 µS/cm]
☐ **Fluoride**	**[1.5 mg/L]**
☐ Hardness	[~ 250 mg/L]
☐ Langelier Saturation Index	[~ -2 to + 2]
☐ **Metals Scan**	**[varies[2]]**
☐ Nitrogen species[3] :	
☐ Ammonia – N	[~ 1.5 mg/L]
☐ Organic N	[~ 0.15 mg/L]
☐ **Nitrate – N**	**[10 mg/L]**
☐ **Nitrite – N**	**[1 mg/L]**
☐ pH	[6.5 – 8.5]
☐ Sulphate	[500 mg/L]
☐ Total Dissolved Solids (TDS)	[~ 500 mg/L]
☐ Total Organic Carbon (TOC)	[2.5 mg/L]
☐ **Turbidity**	**[~ 1 NTU]**
☐ Odour	[describe]

May require …	*Guideline*
☐ UV Transmittance (UVT)[4]	[80%]
☐ **Disinfection By-Products (DBPs)[5]**	
☐ **Trihalomethanes (THMs)**	**[0.100 mg/L]**
☐ **Haloacetic Acids (HAAs)**	**[0.080 mg/L]**
☐ Bromide	[0.050 mg/L]
☐ Tannins and Lignin[6]	[~ 0.400 mg/L]
☐ Iron and Sulphate Bacteria[7]	[presence]
☐ Sulphide[8]	[0.050 mg/L]
☐ **Hydrocarbons[9]**	
☐ **Benzene**	**[0.005 mg/L]**
☐ Toluene	[0.024 mg/L]
☐ Ethylbenzene	[0.002 mg/L]
☐ Xylenes	[0.300 mg/L]

Appendix A: **Required Water Quality Parameters (cont.)**

General Comments

- The sampler must make arrangements for receiving and shipping of chemical / physical sample bottles and coolers with an accredited private lab. Northern Health may accept bacteriological samples only.
- Analysis of additional parameters may be required based on the results of the initial analysis and on potential impact by nearby sources of contamination. The required parameters should be confirmed with Northern Health before sampling.
- The analytical detection limit must be less *than 10% of the Guideline for Canadian Drinking Water Quality* where applicable. Other analyses must provide sufficient information to reasonably assess the water suitability for domestic use and to determine what, if any, treatment might be needed. Analyses must be conducted in accordance with the methods prescribed in Standard Methods (latest edition).
- Analyses should be for total or closely equivalent concentrations, to represent potential quality problems.
- A copy of all analytical results must be sent to the *Northern Health* Officer responsible for the water system.

Notes

1. May be omitted if bacterial growth is not found during Total Coliform test – lab to note *"Other bacterial growth not present"*.
2. *Total metals* required*. Dissolved metals* optional, but recommended if turbidity is elevated. Scan to include both highand low level metals: Aluminum (if coagulant used), **Antimony(0.006), Arsenic (0.010), Barium (1), Boron (5), Cadmium(0.005),** Calcium (~ 100), **Chromium (0.050),** Copper **(2,** 1), Iron(0.300), **Lead (0.005),** Magnesium (~ 30), **Manganese (0.12;**0.02), Phosphorus (~ 0.100), Potassium (~ 400), **Selenium(0.010),** Sodium (20-200; **1000**), Zinc (5), **Uranium (0.020)** [expand scan if zone is mineralised to include **Mercury (0.001)**].

   * For the most up-to-date limits, refer to the **Guidelines for Canadian Drinking Water Quality**
3. Required for source water characterisation. If all are less than 1 mg/L as N, later samples may be analyzed for **Total N** only.
4. Required if UV disinfection is being considered as part of the water treatment process. The test must be conducted on a RAW, UNFILTERED water sample. [Modified version of Standard Method 5910B where the sample is not filtered or pH adjusted.]
5. Required if chlorination is used or proposed and TOC greater than 2.5 mg/L. For new sources, specify *"DBP **formation potential**"*. Different DBPs are required for **chlorine dioxide** or ozone disinfection.
6. Required for TOC greater than 2.5 mg/L and/or color greater than 15 TCU.
7. Required if bacterial regrowth is suspected in well or distribution piping. Contact laboratory for sampling procedure.
8. Required if unsatisfactory odor is suspected. Analyse on site or preserve sample. Contact laboratory for sampling procedure.
9. Required if hydrocarbon / gasoline type contamination is suspected. Contact laboratory for sampling procedure.

Appendix B: **Example Schematic Diagram for Typical Water Systems**

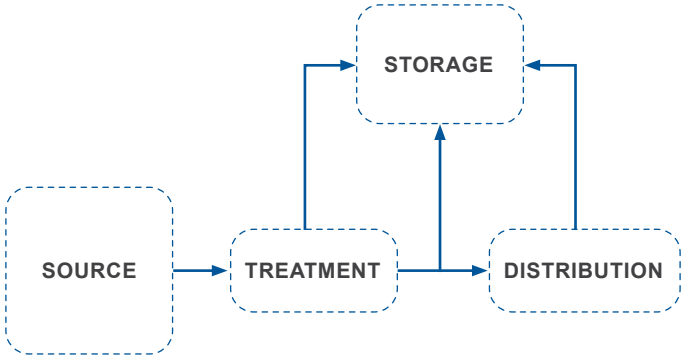


Figure 1. Generic Water System Schematic

Simple boxes are fine, as long as they are in the right order, and neatly labelled.

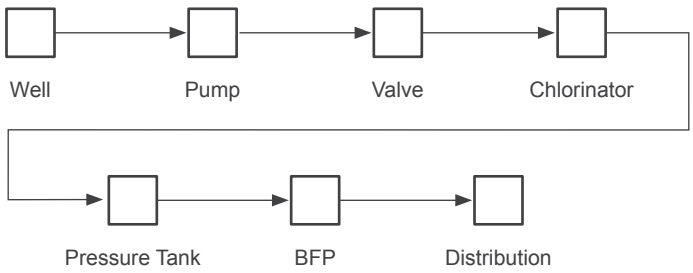


Figure 2. Box Schematic Diagram

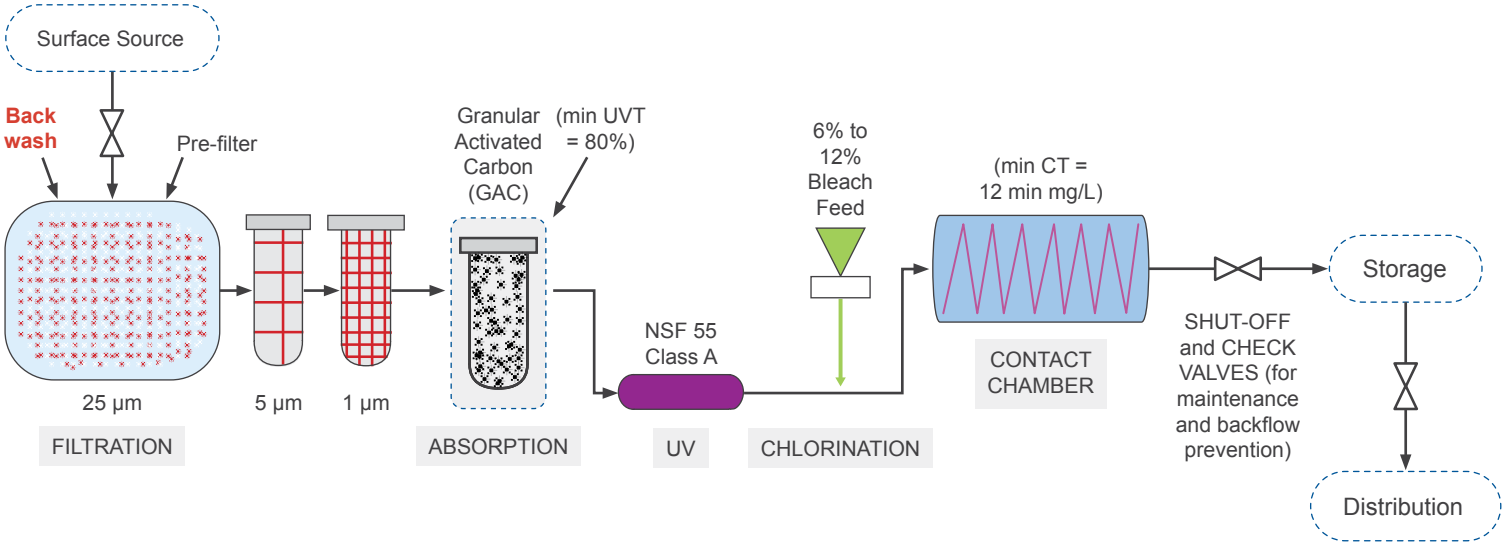
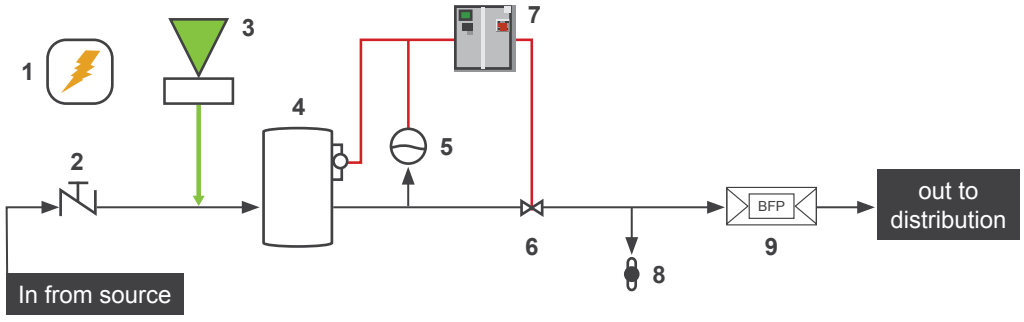


Figure 3. **(EXAMPLE ONLY)** Typical Small Water System Surface Water Treatment Train



Water Treatment Equipment List

1. Backup Power
2. Shut-off and Check Value
3. Disinfectant Feed Pump
4. Baffled Pressure Tank with Pressure Sensor
5. Disinfectant Meter
6. Flow Meter
7. Control Panel and Data Logger
8. Sampling
9. Backflow Prevention Device

Figure 4. **(EXAMPLE ONLY)** Typical Secure Groundwater Treatment Train with Monitoring and Control

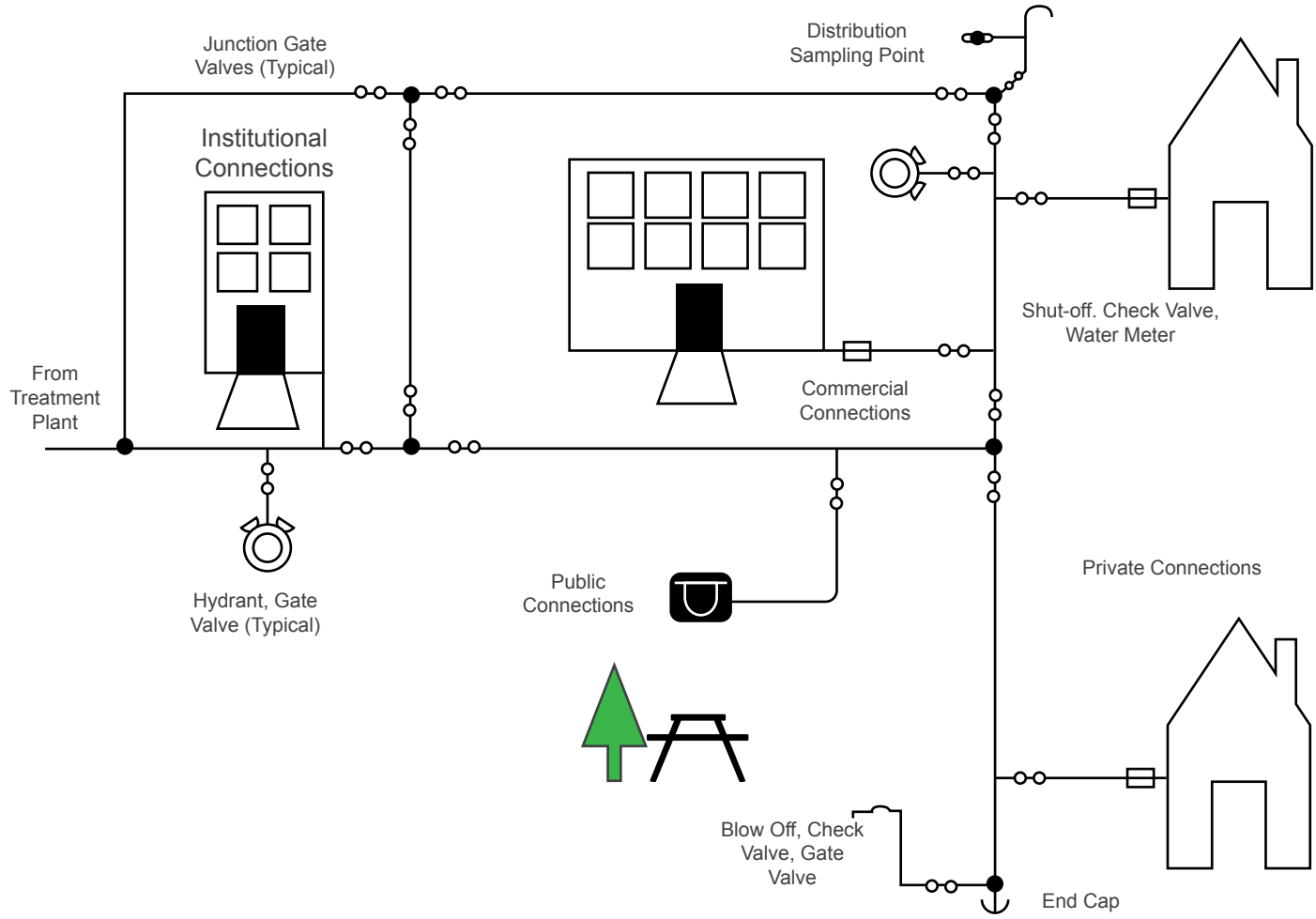


Figure 5. **(EXAMPLE ONLY)** Typical Distribution System Appurtenances