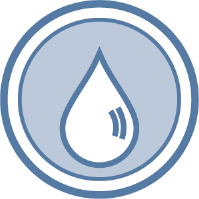
*Water System Design and Planning*

**Group A TNC Water System Design Workbook**

331-677 • Updated November 10, 2022



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# INTRODUCTION

We intend the Group A TNC Design Workbook and Guidelines to provide design engineers with an efficient way to meet the requirements in WAC 246-290; and the overall Group A design standards in DOH’s 2019 [*Group A Water System Design Manual* 331-123](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-123.pdf?ver=2019-10-03-153237-220). Completing this Group A-TNC Design Workbook (workbook) satisfies project report, design, and source approval requirements for a new or expanding Group A-TNC water system (WAC 246-290-110, -120, and -130, respectively).

Useful information for completing this workbook is found in the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf). Even if you are experienced at designing small systems, we recommend you read the guidelines before starting your design. We created them to support your goal of preparing a complete submittal that reflects sound water system design practices and established principles of public health protection.

We want all public water system owners to be aware of their responsibilities and legal obligations—see [*Owning and Managing a Group A Water System* 331-084](file:///\\doh\user\fr\jkj0303\Desktop\White%20Papers%20and%20such\Group%20A-TNC%20Workbook%20update\Owning%20and%20Managing%20a%20Group%20A%20Water%20https:\www.doh.wa.gov\portals\1\documents\pubs\331-084.pd%20System).

Professional engineers may submit a Group A-TNC water system design in an alternate format, but the submittal must include all the information referenced in this workbook and required by Chapter 246-290 WAC.

Make copies for yourself of all plans, design drawings, worksheets, equipment information, operations and maintenance manuals, legal documents, and the like before sending the completed workbook to us. These documents help owners and operators successfully manage and operate the new water system.

## Regulations

Before starting your design, become familiar with Washington’s Group A water system rule (chapter [246-290 WAC](https://apps.leg.wa.gov/wac/default.aspx?cite=246-290)). You should also review Section 2.0 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf) to be sure your project design requires our approval.

## Water Rights

The department’s review of your water system design will not confer or guarantee any right to a specific quantity of water. We base our review on your representation of available water quantity. If the Washington Department of Ecology (Ecology), a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

## Project Location Considerations

The location of your project may affect whether you can create a new public water system and the design standards that apply. We recommend that you determine whether your water system is located within any of the following areas, and refer to Chapter 2 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf) for further information:

* An area for which Ecology has closed or established water rights limits.
* A Critical Water Supply Service Area.
* An area served by a Satellite Management Agency (SMA) or an existing Group A water system.
* Tribal lands.

### Fees Charged for Workbook Design Reviews

A completed workbook addresses the project report, construction documents, and source approval required by WAC 246-290-110, -120 and -130.

We charge applicants each of the following fees for a new or existing Group A-TNC water system less than 100 connections.

**$491** Project Report Review for a complete new system [WAC 246-290-990(1)(d)]

**$633** for a Construction Document Review for a complete new water system [WAC 246-290-990(1)(f)]

**Total fee = $1,124**

In addition to the fees above, the water system needs to pay us or the local health department a fee to cover a well-site inspection. Note that the above fees may change if the WAC is updated.

#### Online Group A-TNC Resources

We developed many resources applicable to Group A-TNC water systems. These resources (such as fact sheets and guidance documents) help you from the pre-submittal stage of your water system design through operation and maintenance.

The online Group A resources most applicable to Group A-TNC water systems include:

* [*Project Approval Application form* 331-149](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-149-F.doc).
* Our [TNC Water System webpage](https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemAssistance/TNCWaterSystems) helps you understand the regulatory requirements for ongoing operations of Group A-TNC water systems.
* [*Preventive maintenance program: Guide for small public water systems using groundwater* 331-351](https://www.doh.wa.gov/portals/1/documents/pubs/331-351.pdf).
* [*Owning and Managing a Group A Water System* 331-084](https://www.doh.wa.gov/portals/1/documents/pubs/331-084.pdf).
* [*Small Water System Management Program Guide* 331-134](https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-134.pdf) and *Small Water System* [*Management Program Guide for Noncommunity Systems* 331-474](https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-474.pdf).

### Department of Health Contacts

Design engineers with questions or concerns should contact us. Table 1 presents our contact information.

If you have questions about this workbook, the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf), our online fact sheets and guidance, or the [State Board of Health Rules](http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/RegulationandCompliance/Rules) on Group A Public Water Systems, call our regional office that serves your area.

|  |  |
| --- | --- |
| Table 1 Office of Drinking Water Regional Offices | |
| [**Eastern Regional Office**](https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/OfficesandStaff/EasternRegionalOfficeStaff) | **Serving** |
| 16201 E. Indiana Ave. Suite 1500 Spokane Valley, WA 99216  **Phone:** 509-329-2100  **Fax:** 509-329-2104  **TDD Relay:** 1-800-833-6388 | Adams, Asotin, Benton, Chelan, Columbia, Douglas, Franklin, Ferry, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties. |
| [**Northwest Regional Office**](https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/OfficesandStaff/NorthwestRegionalOfficeStaff) | **Serving** |
| PO Box 47800 Olympia WA 98504  **Phone:** 253-395-6750  **Fax:** 253-395-6760  **TDD Relay:** 1-800-833-6388 | Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties. |
| [**Southwest Regional Office**](https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/OfficesandStaff/SouthwestRegionalOfficeStaff) | **Serving** |
| 111 Israel Road Tumwater, WA 98501  **Mail:** PO Box 47823  Olympia, WA 98504-7823  **Phone:** 360-236-3030  **Fax:** 360-664-8058  **TDD Relay:** 1-800-833-6388 | Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties. |

To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email [civil.rights@doh.wa.gov](mailto:civil.rights@doh.wa.gov).

# Group A-TNC Project Report and Design Submittal Checklist

**CHECKLIST FOR A NEW OR EXPANDING**

**GROUP A-TNC WATER SYSTEM**

**Check the appropriate box for each row and submit a completed checklist with workbook**

|  |  |  |  |
| --- | --- | --- | --- |
| **Planning and Design Submittal Element** | Group A-TNC Guidelines Section | **Yes,**  **Included** | **No, Not Applicable** |
| Completed submittal checklist for Group A-TNC system |  |  | **Always Applicable** |
| Completed project approval application form | Section 2.1 |  |
| Service area map | Section 2.2 |  |
| Demonstrate compliance with PWS Coordination Act **– Applies to new systems only.** | Section 2.3 |  |  |
| Demonstrate compliance with SMA requirement -  **Applies to new systems only.** | Section 2.4 |  |  |
| Water users’ agreement | Section 2.6 |  |  |
| Completed Water Facilities Inventory (WFI) | Section 2.7, Appendix D |  | **Always Applicable** |
| Water right permit or other needed Ecology approval (unless using permit exempt well) | Section 3.0 |  |  |
| Well log | Section 4.1.1 |  |  |
| Well pump test report | Section 4.1.2,  Appendix E |  |  |
| Well water quality sampling results (Coliform/IOC/VOC) | Section 4.2 |  |  |
| Documentation of well site approval | Section 4.3 |  |  |
| Well sanitary control area protective covenants | Sec. 2.5, 4.3, Appendix H |  |  |
| Well Susceptibility Assessment | Section 4.3 |  |  |
| Intertie agreement | Section 4.4.2 |  |  |
| Well and pump house detailed drawings and specifications | Section 5.2 and 5.3 |  |  |
| Distribution system detailed drawing and specifications | Section 6.10 |  | **Always Applicable** |
| Storage tank sizing, detailed drawings, and specifications | Section 7.6 |  |  |
| Booster pump sizing, detailed drawings, and specs | Section 8.0 |  |  |
| Treatment design, if needed | See WSDM |  |  |
| Completed Group A-TNC Design Report Workbook |  |  | **Always Applicable** |

## 1.0 GROUP A-TNC Design Report Workbook

### 1.1 Design Engineer and Owner

Failure to complete all applicable sections of this workbook may result in the return of your application or delay in its approval.

### 1.2 Water System Design Engineer:

Workbook prepared by:

Mailing Address:

Company Name:

Day Phone:

Email:

Apply professional engineer seal and signature here.

### 1.3 Water System Owner

Owner’s Name:

Owner’s Mailing Address:

Day Phone:

Email:

Owner’s Representative Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_

# 2.0 Basic Water System Information

### 2.1 Water system name and location.

System Name

Water System Location        
*(Town or City, County)*

Public Water System ID#        
*(Applies only to existing systems seeking approval to expand.)*

### 2.2 Connections and Population

By properly accounting for the connections and population the water system will serve (and documenting that on the Water Facilities Inventory form), this confirms that your public water system is properly classified, and it aids in the proper sizing of the water system facilities.

|  |  |  |  |
| --- | --- | --- | --- |
| Connections | | Service Population | |
| Dwelling units | Nonresidential | Residential | Nonresidential |
|  |  |  |  |

Use the space below to describe the basis for estimating your residential and nonresidential service population.

### 2.3 Small Water System Management Program

Every public water system must develop and implement a [*Small Water System Management Program Guide* 331-134](https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-134.pdf) (SWSMP) if the system isn’t required to complete a Water System Plan (WAC 246-290-105). The SWSMP is a powerful tool for documenting operations and management procedures; it provides information the system needs to remain in compliance and to protect public health when operations don’t go as expected. It should be available for review on request, for example, during a routine sanitary survey.

Our [*Noncommunity Small Water System Management Program Guide* 331-474](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-474.pdf) provides guidance and a template for non-community water systems preparing a SWSMP.

Please check with your DOH regional office to verify whether you will need to submit a SWSMP along with the Group A TNC approval workbook.

# 3.0 Estimating Water Demands

### 3.1 Complete Worksheet 3-1

|  |  |  |  |
| --- | --- | --- | --- |
| Summary of Peak Hourly Demand (PHD) and Maximum Daily Demand (MDD) Summary | | | |
| Worksheet 3-1 | | | |
| Line | Group A-TNC Design Guidelines Section | Description | Value |
| A | 3.1.1, and 3.3 | Total residential MDD, gallons per day |  |
| B | 3.1.2, and 3.3 | Total residential PHD, gallons per minute |  |
| C | 3.2.1, and 3.3 | Total non-residential MDD, gallons per day |  |
| D | 3.2.2, and 3.3 | Total non-residential PHD, gallons per minute |  |
| F-1 | 3.4 | Fire suppression flow required (if any), gpm |  |
| F-2 | 3.4 | Fire suppression flow duration, minutes |  |

Total area intended for irrigation:       square feet or acres

Total system MDD (Lines A+C):       gallons per day

Total system PHD (Lines B+D+F1):       gallons per minute

Is a **water right permit** or other written Ecology water resource approval required? See Section 3 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).

     Yes      No

If “Yes,” enclose a copy of the water right permit or other written approval from the Ecology. Note that in accordance with our joint review procedures with Ecology, we will send them a copy of this submittal to verify the water rights adequacy.

Use the space below to show your calculations of estimated MDD and PHD or attach a separate paper.

# 4.0 Source of Supply

### 4.1 Well information

If a well will supply water to your system, you must attach the following to your design submittal.

|  |
| --- |
| * Well log. |
| * Pump test report. (See Section 4.1 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).) * Unless the new well falls under the water rights exemption, discuss this with Ecology or [visit their website](https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Groundwater-permit-exemption). You must provide Ecology documentation that permits the planned withdrawal. This documentation must include a [*Water Rights Self-Assessment Form* 331-372](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-372-F.docx). |
| * Water quality sampling results. (See Section 4.2 of the *[Group A-TNC Water System Design Guidelines](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf)* [331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf). |
| * Well site inspection report prepared by DOH or the local health jurisdiction. Conduct the well site inspection prior to drilling the well, per WAC 173-160. |
| * Well sanitary control area protective covenants. (Attach a copy of the actual protective covenants filed with the County Auditor for each public drinking water well. See Sections 2.7 and 4.3 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf)*.*) * Completed [*Ground Water Contamination Susceptibility Assessment Form* 331-274](https://www.doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-274.docx), including a copy of the well log and the time-of-travel radii map. See Section 4.3 and Appendix H of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf). * See Section 9 of this Workbook if treatment will be proposed for the well. |

### 4.2 Intertie information

If an intertie will supply your system, you must attach a copy of your intertie agreement, and service capacity and hydraulic analyses of the wholesale system. Refer to Section 4.4.2 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf). For details about the minimum scope of an intertie agreement, see WAC 246-290-132.

# 5.0 Well Pump, Bladder Tanks, and Pump House

### 5.1 Piping Schematic

Draw a schematic of the piping system below. Begin with the well, continue to the pump house, and on to the distribution system. Include each branch line in the distribution system and label each branch line junction. These junction points will be referenced in Worksheet 5-1.

(See Example 5-1 in Section 5.0 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).)

### 5.2 Complete Worksheet 5-1 (See Example 5-1 in Section 5.0 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf)*.*)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total Dynamic Head Calculation | | | | | | | | | | | | |
| Friction Head Calculation | | | | | | | | Static Head Calculation,  Assume top of well casing elevation is 0 ft. | | | Min. Pressure Head, ft | Min. Total Dynamic Head, ft |
| Pipe Segment | From | To | Pump or Flow Rate, gpm | Pipe Size, inches | Friction Loss per 100 ft | Pipeline Length, ft | Pipe Segment Friction Loss, ft | Top of well casing to water while pumping, ft | Ground Elev. at “to” | Elevation difference, ft |
| **1** | Well pump | Top of well casing |  |  |  |  |  |  |  |  | 69 |  |
| **2** | Top of well casing |  |  |  |  |  |  |  |  |  | 69 |  |
| **3** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **4** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **5** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **6** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **7** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **8** |  |  |  |  |  |  |  |  |  |  | 69 |  |
| **9** |  |  |  |  |  |  |  |  |  |  | 69 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. With a simple system consisting of only a well pump and bladder tanks, the well pump is the only pump in the system. Without a storage tank, the well pump must generate enough flow and pressure to supply at least the PHD, and to provide at least 30 psi to each customer connected to the distribution system during PHD conditions.
2. For the segment that includes the well house, **add ten feet of friction loss** to account for losses related to fittings and valves. If you intend to use a cycle control valve, **add additional friction loss** per manufacturer’s data (See Section 5.0 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf)).
3. Total the “pipe segment friction loss” for each pipe segment + “elevation difference” + “minimum pressure head” values. The highest Total Dynamic Head (TDH) is the minimum pressure, expressed in feet of head that the well pump must generate while pumping the peak hourly demand. You may wish to select a pump with a TDH greater than the required minimum.

### 5.3 Summary of Well Pump Selection

Cycle Control Valve (CCV) incorporated in design:       Yes       No

Variable frequency drive well pump(s) incorporated in design:       Yes       No

|  |  |  |  |
| --- | --- | --- | --- |
| Pump Design Parameter | At well pump “on”: | At well pump “off”: | Comment |
| Pressure switch settings  or  Reservoir level control | psi        ft | psi        ft | If well pumps to bladder tanks  If well pumps to atmospheric reservoir |
| Discharge rate | gpm | gpm |  |
| Total Dynamic Head | feet | feet |  |

Well pump setting (depth) below top of well casing:       feet.

Attach well pump information with your design submittal:

* Pump curve (or table showing discharge head and corresponding discharge flow).
* Identify the pump “on” and pump “off” operating points on the pump curve.
* Pump manufacturer and pump model number.
* Pump horsepower.

### 5.4 Bladder Tank Selection (for well pump or booster pump)

Follow the design guidance in Section 5.1 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf) for bladder tank selection. If the design includes a cycle control valve, see the design guidelines Appendix F.

Summarize the bladder tank selection.

Size of bladder tanks       gallons

Number of tanks       tanks

Pre-charged pressure       psi

Use the space below to show your calculations (Equation 5-2) for selecting bladder tanks.

### 5.5 Well and pump house detailed drawings and specifications

Attach a copy of the well and pump house detailed drawings and specifications. The minimum scope of this information is in Sections 5.2 and 5.3 of the Group A-TNC Water System Design Guidelines.

# 6.0 Piping and Distribution System

### 6.1 Summary of pipe design

Distribution system pipe size and material specified.

(For example, 1½ to 3-inch ASTM D 1785 Schedule 40 PVC.)

Minimum pipeline depth of bury specified.

(For example, no less than 48 inches from finished grade.)

Pipeline hydrostatic pressure testing specification.

(For example, APWA/WSDOT [latest revision] Section 7-11 … minimum 200 psi.)

Pipeline disinfection specification.

(For example, APWA/WSDOT [latest revision] Section 7-11.)

Private property easements required?

      Required (design drawings must identify the location and dimension of these easements).

      Not required.

### 6.2 Service meters

Service meters:

      Provided at each connection.

      Not provided at each connection.

### 6.3 Cross connection control

Are there any existing or proposed customer connections that pose a high health risk if a cross connection occurred between the drinking water system and a contaminant source originating from the consumer’s property? (See Section 6.8 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).)

      Yes (if yes, attach a description of the cross connection and how the cross connection will be controlled or eliminated).

      No.

### 6.4 Distribution system detailed drawings and specifications

Attach a copy of the distribution system detail drawings and specifications (see Section 6.10 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf)).

# 7.0 Atmospheric Storage Tank

### 7.1 Determining need for an atmospheric storage tank

If any of the following conditions apply to the design of the new or expanding Group A-TNC water system, an atmospheric storage tank must be provided:

Yes       No \_\_\_\_\_ The peak hourly demand is greater than the selected well pump can deliver at the pump “on” setting.

Yes       No \_\_\_\_\_ The local fire authority requires the Group A-TNC water system to provide fire suppression capacity, and the source of supply cannot match the needed fire flow.

Yes       No \_\_\_\_\_ The designer wishes to provide standby storage or fire suppression capacity.

Use the space below (or a separate sheet of paper) to show your calculations for sizing the storage tank and establishing the elevation of the tank bottom and tank overflow. See Chapter 7 and Equation 7-4 in the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).

Operating storage.

Equalizing storage.

Standby storage.

Fire suppression storage.

Dead storage.

### 7.2 Storage tank detailed drawings and specifications

Attach a copy of the storage tank detail drawings and specifications. (See Section 7.6 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).)

# 8.0 Booster Pumps

### 8.1 Booster pump selection

Summarize the following booster pump design information.

Number of booster pumps:

Pump Cycle Control Valve (CCV) incorporated in design.

      Yes       No

Variable frequency booster pump drive pump(s) incorporated in design.

      Yes       No

#### Booster Pump 1

|  |  |  |
| --- | --- | --- |
| Pump Design Parameter | At booster pump “on:” | At booster pump “off:” |
| Pressure switch pressure setting | psi | psi |
| Discharge rate | gpm | gpm |
| Total Dynamic Head | feet | feet |

Attach booster pump catalog information with your design submittal.

* Pump curve (or table showing discharge head and corresponding discharge flow).
* Identify the pump “on” and pump “off” operating points on the pump curve.
* Pump manufacturer and pump model number.
* Pump horsepower.

#### Booster Pump 2 (if applicable)

|  |  |  |
| --- | --- | --- |
| Pump Design Parameter | At booster pump “on:” | At booster pump “off:” |
| Pressure switch pressure setting | psi | psi |
| Discharge rate | gpm | gpm |
| Total Dynamic Head | feet | feet |

Attach booster pump catalog information with your design submittal.

* Pump curve (or table showing discharge head and corresponding discharge flow).
* Identify the pump “on” and pump “off” operating points on the pump curve.
* Pump manufacturer and pump model number.
* Pump horsepower.

### 8.2 Booster pump station detailed drawings and specifications

Attach a copy of the booster pump station detailed drawings and specifications. (See Sections 5.2, 5.3, and 8.0 of the [*Group A-TNC Water System Design Guidelines* 331-676](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-676.pdf).)

# 9.0 Treatment Design

If treatment is needed, provide:

* A project report,
* Design/construction documents, and
* An operations and maintenance plan.

For design guidance and requirements, refer to Chapter 10 and Appendix F of our [*Group A Water System Design Manual* 331-123](https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-123.pdf?ver=2019-10-03-153237-220).

If disinfection treatment is not proposed for the water system described in this workbook, the design of the system should contain provisions for chlorination and/or other disinfection if required in the future. Such provisions include things like space in the pumphouse for a future disinfection system if it is ever needed.

We may require future disinfection of the water system at any time if water quality or site conditions warrant it. Please see [WAC 246-290-451(4)](https://apps.leg.wa.gov/wac/default.aspx?cite=246-290-451) for a description of the conditions that trigger a requirement for a public water system to install disinfection.