

Managing Small Public Water Systems



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Managing Small Public Water Systems: Introduction

Introduction

This publication is the overview of a five-part series *Managing Small Public Water Systems* (TCEQ publication series RG-501).

An electronic version of the complete series is available at the TCEQ Small Business and Local Government Assistance Section's Public Water Supply Compliance Tools web page at <www.tceq.texas.gov/goto/help4pws>.

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-463-5561. The rules are also available online at <www.tceq.texas.gov/goto/TAC30>.

Who should use this guide?

This guide is for any person involved in the management or operation of a small public water system including:

- board members
- owners
- council members
- system managers
- system operators

How will this guide help?

This management guide will help you:

- understand the rules,

- comply with the rules, and
- develop tools to plan for, manage, and operate public water systems.

This guide also contains worksheets and tables that you can keep in a file or binder and add to, as things change at your public water system.

How is this guide organized?

This guide is organized into five parts. Each part is available as a separate document at <www.tceq.texas.gov/goto/help4pws>.

Introduction (RG-501)

Introduction to the five-part series to help owners, managers, or operators of small water utilities understand and comply with rules and develop tools for planning and operation. This introduction discusses the other modules and provides contact information for how to request assistance from the TCEQ.

Part A. Asset Management (RG-501a)

Part A includes worksheets and instructions to help you conduct an inventory of the water system's resources; prioritize repairs and replacements; plan for future needs; and develop a budget.

Part B. Source Assessment and Planning (RG-501b)

Part B explains how to identify your public water system's source; develop best-management practices for sustaining your source; identify options for alternative sources; and plan for the future.

Part C. Operation and Maintenance (RG-501c)

Part C provides worksheets that help you create your own operation and maintenance manual for your public water system and outlines a program for scheduling and performing preventive and general maintenance.

Part D. Compliance (RG-501d)

Part D describes how to prepare for an investigation; the investigation and enforcement process; violations that can lead to enforcement and fines; enforcement scenarios; and provides tables that summarize the requirements for sampling, monitoring, record keeping, and reporting.

Part E. Resources (RG-501e)

Part E includes a listing of resources that may help you as you create and carry out your asset management plan and conduct everyday operations at your facility.

Where can I go for more help?

For one-on-one compliance assistance, contact the Small Business and Local Government Assistance (SBLGA) specialist in the TCEQ office for the region where you are located, or call the SBLGA hotline, 800-447-2827.

For free on-site financial, managerial, and technical assistance, contact the TCEQ's Water Supply Division at 512-239-4691.

How can I obtain TCEQ publications?

Publications produced by the TCEQ are available to order or download on the webpage at <www.tceq.texas.gov/publications>. Click on the first link, Catalog of Current Publications, and conduct a search.

To order copies of a publication, please contact the Publications Section at 512-239-0028, or by mail:

TCEQ Publications, MC 118
PO Box 13087
Austin, TX 78711-3087

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.



Managing Small Public Water Systems: Part A, Asset Management

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Introduction

This publication is Part A of a five-part series *Managing Small Public Water Systems* (TCEQ publication series RG-501) and includes worksheets and instructions to:

- help you conduct an inventory of your public water system's resources,
- prioritize repairs and replacements of assets,
- plan for future needs, and
- develop a budget.

An electronic version of Part A is available at the TCEQ Small Business and Local Government Assistance Section's Public Water Supply Compliance Tools web page at <www.tceq.texas.gov/goto/help4pws>. A downloadable Microsoft Excel version of the worksheets is also available.

As you work through Part A, you may find it beneficial to review other parts of the series to help you prepare a comprehensive asset management plan. To view or download the complete series go to the web page at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 for a paper copy of the complete series *Managing Small Public Water Systems* (RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-463-5561. The rules are also available online at <www.tceq.texas.gov/goto/TAC30>.

Asset Management: The Basics

What is asset management?

Asset management can be defined as “a planning process that ensures that you get the most value from each of your assets and have the financial resources to rehabilitate and replace them when necessary.” This includes “developing a plan to reduce costs while increasing the efficiency

and the reliability of your assets.”* For a water system, an “asset” includes the source of water (aquifer or surface water), along with any building, tool, piece of equipment or machinery, and pipes, used in the operation of the system.

Asset management can help you—the manager or operator—get the most value out of the assets that make up your water system by prioritizing repairs and budgeting for equipment replacement. It can also help you maintain the financial capacity to make scheduled repairs and planned replacement of assets *before* there is a crisis.

When planning to replace assets, you should consider upgrading to energy-efficient and water-saving equipment and processes. Including these upgrades in your proposed plans may assist you in finding funding for your project. Part B of this series, *Sustainability and Water Source Planning* (RG-501b), further discusses making energy assessments and choosing more efficient equipment.

This guide includes instructions and worksheets to help you complete each of the four steps of asset management. You should adjust your plan based on your own experience and the particular characteristics of your system. You should also reevaluate your plan every year, updating each of the worksheets provided in this booklet. Your plan is useful only as long as it reflects the current conditions of your water system.

To ensure your system is sustainable for the next five to 30 years, it is important to evaluate immediate needs along with future needs. For successful asset management planning to occur, you must consider:

- potential growth or decline in population served
- equipment and installation costs
- inflation
- overall age and life span of the infrastructure within your system
- engineering costs

* *Asset Management: A Handbook for Small Water Systems*. U.S. Environmental Protection Agency, 2003, page 5.

How do I practice proper asset management?

Step 1. Take an inventory of your system and prioritize your assets.

List all of your assets and prioritize each asset based on how critical it is to the operation of your public water system. This will help you make informed decisions to ensure that you have funds available for the maintenance, repair or replacement of the vital parts of the system.

Step 2. Develop a comprehensive plan for managing your assets.

Based on your prioritization in Step 1, identify the repairs and replacements you expect to make in the next five years. Estimate how much money your system needs to set aside or reserve for these expenses.

Step 3. Develop a budget for managing your assets.

Based on your comprehensive plan from Step 2, identify your expected revenues for the next five years—and compare them to your expected expenses. This may involve a rate study.

Step 4. Implement your asset-management plan.

Once you complete the initial three steps of your asset-management plan, you need to implement it. Work with your management team—including council or board members, if appropriate—to complete your identified repairs and maintenance, and to make sure that you have the technical and financial means necessary to provide reliable service.

1. Inventory Your System and Prioritize Your Assets

Use Worksheet 1–System Inventory and Prioritization, at the end of this section to create a comprehensive inventory of your system and to prioritize your assets. Developing an accurate inventory of your system’s assets is important to overall asset management, as all other steps will

refer back to the data gathered during this step. It will also help you to establish the relative importance of the equipment and components of your system, and especially to identify the assets that are most critical to operations. A drinking-water system's assets include the facilities that make up the water system as well as all the equipment and supplies that are used to operate the plant.

The most significant asset of a water system is the water source.

A well-run system is worthless without a reliable water source and delivery system. If you have not assessed the health and sustainability of your water source and you are not maintaining water-availability data, you should complete Part B of this series: *Sustainability and Water Source Planning* (publication 501b). You may find it necessary to make adjustments to your budget if you need to drill a new well or make an interconnection with another system.

You will need to assess your source to ensure that it is reliable for the long term and that your well field or surface water intake is adequate to provide water to your system. If you have assessed your source and you know your source is reliable for the long term, you may not need to include expenditures for well drilling or rehabilitation in this year's budget. However, it is a good idea to assess your source annually to ensure that your system maintains an adequate water supply.

Fill Out Worksheet 1—System Inventory and Prioritization

Before you begin to fill in the columns on the worksheet, fill in the date and check the appropriate box to indicate whether you are making the first inventory of your system or updating an existing inventory. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

Step 1. Identify your assets.

List each of your public water system's assets, including pumps, chlorinators, wells, tanks, buildings, vehicles, intake structures, booster or pump stations, water mains, and all other physical assets and the year of

installation. Be as specific as possible by providing the location, manufacturer, material composition, horsepower (hp), gallon-per-minute (gpm) capacity, or other identifying characteristics for each asset; or refer to this information if it is included in your operations and maintenance manual. This information will be useful when calculating replacement costs in step 7. For example, you might list a piece of equipment as “Well 1 pump (25 hp, 200 gpm), 2003” or a section of your distribution system as “10-inch PVC on Main St.”

Step 2. Describe the redundancy.

Briefly describe the redundancy of each of the system’s assets. Are there backups? Are there different assets that can do the same job? (Certain equipment redundancy is required by rule for drinking water systems in Title 30, Texas Administrative Code, Chapter 290 [30 TAC 290], Subchapter D.)

Step 3. Fill in the expected useful life.

Use the manufacturer’s recommendations, if available, or the information in Table 1, Estimated Useful Life Span for Standard Equipment, to enter the expected useful life for each asset. Table 1 provides the estimated useful life span for many standard pieces of equipment, assuming proper maintenance has been conducted. For new equipment, use the higher end of the expected useful life.

Keep in mind the current condition of each asset as well as routine maintenance activities, repairs and rehabilitation. Work orders can help you track your maintenance and repairs. A sample Repair Work Order is located in Part C of this series: *Operations and Maintenance* (RG-501c).

Focus on conditions that may affect its useful life (for example, rust or broken parts).

- If your asset is in poor condition, has not been maintained according to the manufacturer’s recommendations, or operates under challenging circumstances (such as poor water quality or excessive use), then the expected useful life is likely to be on the lower end of the range.

- If the asset is in good condition and has been properly maintained according to the manufacturer's recommendations, use the higher end of the expected useful life.

Choosing the lower end of the useful-life range will produce a more conservative estimate, which may help to ensure that you are prepared to replace the asset in a worst-case scenario.

Step 4. Record the age.

For each asset, fill in how long it has been in use. If an asset has been previously used by another system, you should list the total age, not just the length of time your system has used it.

Table 1. Estimated Useful Life Span for Standard Equipment

Asset	Expected Useful Life (years)
Backflow prevention	8-15
Blow-off valves	35-40
Buildings	around 30
Chlorination or disinfection equipment	10-15
Computers	around 5
Distribution pipes	35-40
Electrical systems	7-10
Fencing	10-20
Galleries and tunnels	30-40
Generators	10-20
Hydrants	around 40
Intake structures	35-45
Lab and monitoring equipment	5-7
Landscaping and grading equipment	around 40
Meters	10-15
Office furniture and supplies	around 10
Other treatment equipment	10-15
Pumps	10-15
Service lines	around 30
Storage tanks	around 30
Tools and shop equipment	10-15
Transmission mains	35-40
Transportation equipment	around 10
Valves	35-40

Step 5. Calculate the remaining useful life.

For each asset, calculate the remaining useful life by subtracting its age (column 4) from its adjusted useful life (column 3).

Step 6. Calculate the expected replacement year.

For each asset, calculate the expected replacement year by adding the remaining useful life (column 5) to the current year.

Step 7. Calculate the cost to replace.

You can calculate your estimate on the cost of buying and installing a new piece of equipment based on:

- your knowledge from completing similar projects,
- information from a neighboring system that has done similar work, or
- bids from vendors.

When estimating the cost of replacing each asset, bear in mind the expected replacement year, because inflation can affect replacement costs. It is a challenge to place a specific value on future costs, because we cannot predict changes in the economy. For assets that have a remaining useful life of more than 10 years, the system should consider the average inflation rate over a 10-year period, or set aside some reserve funding to account for inflation.

Generally the best way to obtain an estimate of the inflation cost per year is to use a federal, state or locally established inflation rate, if available. Local economic-development corporations, along with local universities, are a good source for local inflation rates. The Texas comptroller's website, at <comptroller.texas.gov>, has information on inflation rates, as does the U.S. Bureau of Labor Statistics, on its Consumer Price Index web page at <www.bls.gov> and select "Subjects."

If you are unable to obtain this information from your local economic-development corporation or those government sources, we suggest you use an average inflation rate of 5 percent per year.

Step 8. Set the priority level.

For each asset, consider:

- how critical it is to the operation of your system,
- its remaining useful life,
- the availability of other assets to replace it or be used as a backup for it,
- its maintenance history, and
- any other factors important in evaluating its priority for receiving funding.

Rank each asset from “1” to “5,” where “1” is the highest priority and “5” is the lowest. Use the information provided in Table 2, Prioritization Rating, to determine how each asset should be rated. Because there are only five priority levels, some assets will have the same priority level.

When ranking assets, keep in mind that assets in the following three categories should be assigned a higher priority:

- Assets with a shorter remaining useful life, because you will need to rehabilitate or replace them relatively soon. How likely is it that the asset will fail? Base this evaluation on the asset’s age, condition, and failure history.
- Assets that are *critical* to your operation, because of the system’s responsibility for protecting public health.
- Assets for which your system has less redundancy, because the system would have trouble operating without them.

Table 2. Prioritization Rating

Description	Prioritization Rating
Effective life exceeded and/or excessive maintenance cost incurred. A high risk of breakdown or imminent failure with serious impact on performance. No additional life expectancy; immediate replacement or rehabilitation needed. Asset is highly critical to infrastructure of system and in providing safe drinking water and maintaining compliance.	1
Very near end of physical life. Substantial ongoing maintenance with short, recurrent maintenance levels required to keep the asset operational. Unplanned corrective maintenance is common. Renewal (refurbishment or replacement) is expected within the next year or two.	2
Asset functions but requires a sustained high level of maintenance to remain operational. Shows substantial wear and is likely to cause significant performance deterioration. Renewal (refurbishment or replacement) is expected within the next two to three years.	3
Asset is sound and well-maintained but may be showing some signs of wear. Delivers full efficiency with little or no performance deterioration. Virtually all maintenance is planned and preventive. At worst, only minor repair might be needed at this time.	4
Asset is like new, fully operable, and well-maintained, and performs consistently at or above current standards. Little wear shown and no further action required.	5

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT
Worksheet 1—System Inventory and Prioritization

[This worksheet is designed to help you inventory and prioritize your water system's assets.
 Make copies if additional pages are needed.]

Date _____

☐ Initial Inventory☐ Update

1. Asset and Year Installed	2. Redundancy	3. Expected Useful Life (years)	4. Age (years)	5. Remaining Useful Life (years)	6. Expected Replacement Year	7. Cost to Replace (\$)	8. Priority (1 to 5, high-low)
<i>Example: Well 1 pump (25 hp, 200 gpm), 2003</i>	<i>Backup pump (25 hp, 200 gpm)</i>	<i>15</i>	<i>9</i>	<i>6</i>	<i>2019</i>	<i>\$35,000</i>	<i>4</i>

1. Asset and Year Installed	2. Redundancy	3. Expected Useful Life (years)	4. Age (years)	5. Remaining Useful Life (years)	6. Expected Replacement Year	7. Cost to Replace (\$)	8. Priority (1 to 5, high-low)

2. Develop a Comprehensive Plan

Use Worksheet 2–Comprehensive Planning, at the end of this section to generate a cost-management plan for your system’s assets.

Adapted from an EPA worksheet, our worksheet is a tool to assist in identifying the funding and other resources required for long-term, continued operation.

Fill Out Worksheet 2–Comprehensive Planning

Before you begin to fill in the columns on the worksheet, fill in the date, and check the appropriate box to indicate whether you are generating the first comprehensive plan for your water system’s assets or updating an earlier plan.

You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets change, or start a new worksheet each year.

Step 1. List your prioritized assets.

List the assets from Worksheet 1, with the highest-priority (lowest numbered) assets first. If you plan to drill a new well, include it as an asset (for example, New Well #5).

Step 2. List repair and replacement activities.

For each asset, list the rehabilitation, repair, and replacement activities that you expect to perform over the next five years. If you plan to drill a new well, state “drill a new well.” Include enough detail for each activity so that you can determine its cost. Be sure to include anticipated employee costs.

Step 3. Estimate years until action is needed.

For each activity, fill in the number of years before you will need to perform that task. For annual activities, enter “1.” For replacement activities, enter the remaining useful life you estimated in column 5 of Worksheet 1.

Step 4. Estimate cost.

Fill in the expected cost for each activity. Make sure it's the complete cost, including preparation, cleanup, removal, and disposal of any waste.

If you expect to sell an asset at the end of its useful life, subtract the estimated sale price from the cost of a new item, and enter the difference.

Step 5. Calculate the financial reserve required per year.

For each asset, calculate the reserve required by dividing the cost by the years until the action will be needed. This is the estimated amount of money that your public water system needs to set aside per year ("Reserve Required per Year" on the worksheet) for that asset.

Step 6. Calculate the total financial reserve required in the current year.

Add the reserves required per year for each item to calculate the total reserve required in the current year. This is the estimated amount of money that your system needs to set aside, starting this current year, in order to pay for all of the rehabilitation and replacement.

Step 7. Repeat the process for the next four years.

To create a five-year plan, you should complete a separate comprehensive planning worksheet for each of the next four years. This will allow you to compare how much reserve money will be required if the cost is spread out over a longer period of time.

You can then use this information to determine whether a potential rate increase, customer surcharge, state or federal grant or loan, or other source of funding will be required.

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

Worksheet 2—Comprehensive Planning

[This worksheet is designed to help you generate a comprehensive plan for maintaining your water system's assets. Make copies if additional pages are needed.]

Date _____

☐ Initial Plan☐ Update

1. Asset (list from highest to lowest priority)	2. Activity	3. Years until Action Is Needed	4. Cost (\$)	5. Reserve Required per Year (\$) (No. 4 ÷ No. 3)
Example: 1. Chlorinator	Replace	2	\$6,000	\$3,000
	Purchase redundant unit	3	\$6,000	\$2,000

1. Asset (list from highest to lowest priority)	2. Activity	3. Years until Action Is Needed	4. Cost (\$)	5. Reserve Required per Year (\$) (No. 4 ÷ No. 3)
6. Total Reserve Required in the ____ * Year: *Fill in the blank as to whether this is the reserve required for the 1st, 2nd, 3rd, 4th, or 5th year of your comprehensive plan				

3. Calculate Your Budget

Use Worksheet 3–Annual Budget worksheet at the end of this section to calculate an annual budget for your water system.

Fill Out Worksheet 3–Annual Budget

Before you begin to fill in the columns on the worksheet, fill in the date, indicate the fiscal year that the budget covers, and check the appropriate box to indicate whether you are generating the first budget for your water system or updating an earlier budget.

You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

Step 1. List your revenues.

- In the “Revenues” column, list all your water system’s revenue sources and the dollar amount each source is expected to provide in the coming fiscal year.
- In the space labeled “Water Charges,” enter the revenue you expect to generate from the sale of water.
- For “Fees and Service Charges,” list all late fees, fees for establishing and transferring service, impact fees, and other fees.
- In the “Interest” space, enter any interest you expect to accrue on the water system’s investments.
- If your water system has other sources of income not listed on the worksheet, enter them in the blank lines below “Other”.
- Calculate your total annual revenue by adding all the revenues you listed. Enter this number in the box labeled “1. Total Annual Revenue.”

Step 2. List your expenses.

- In the “Expenses” column, list the sources of your water system’s expenses and the dollar amount each source is expected to draw in the coming fiscal year.
- If your water system has other general expenses not listed on the worksheet, enter them in the blank lines below “Other”.

- Calculate your total annual expenses by adding all the expenses you listed. Enter this number in the box labeled “2. Total Expenses.”

Step 3. Calculate your net income.

Calculate your net income by subtracting your expenses from your revenue. Enter this number in the boxes labeled “3. Net Income.”

Step 4. Enter your net income.

Transfer the result of box 3 to the box labeled “4. Net Income.”

Step 5. Enter your total required reserves.

In the “Total Required Reserves” (box 5), insert the amount of total reserves in the current year from Worksheet 2–Comprehensive Planning (line 6).

Step 6. Calculate additional reserves needed now and into the future.

Subtract your total required reserves (box 5) from your net income (box 4). Enter this number in the box labeled “6. Additional Reserves Needed.”

If the result is a positive number, you have no shortfall to make up for and can set aside the required funds in a reserve account. If the result is a negative number, you should start planning ways to make up for the shortfall.

To make up for the needed resources, you might increase rates with the approval of the Public Utility Commission, charge customers a surcharge, or seek state or federal funding through grants or loans. The Texas Water Infrastructure Coordination Committee, described in Part E of this series, *Resources* (RG-501e), can help your system identify appropriate funding options.

Step 7. Plan for the future.

To get a picture of future financial needs, complete the budget worksheet for the next four years—or longer, depending on the system’s needs. This will allow you to forecast expenditures for expensive repairs or replacement items, such as storage tanks, work trucks, or electronics.

By doing this, you can avoid drastic increases in rates, surcharges, or loans that the system may have to pay back for many years to come.

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

Worksheet 3—Annual Budget

[This worksheet is designed to help you identify your water system's revenues and expenses and calculate your budget. Make copies if additional pages are needed.]

Date _____ Fiscal Year of Budget _____

☐ Initial Budget

☐ Update

Revenues (Operating Income)		Description
Water Charges		Revenue from the sale of water—include all customers (actual or projected receipts)
Usage Fees and Service Charges		Include late payments, forfeited deposits, surcharges, impact fees, tap fees, etc.
Reserve Interest Earned		Interest accrued from reserve accounts or other investments
Other Income:		Itemize other income not classified elsewhere
1. Total Annual Revenue	\$	
Expenses (Operating Costs)		Description
Regular Maintenance and Repair		Cost of performing regular or routine maintenance and repair on equipment
Utilities, Rent, and Other Overhead		Other overhead may include billing, building maintenance, cleaning, etc.
Salaries and Benefits		Include administrative and operations staff
Operating Supplies		Operating supplies not classified elsewhere
Equipment Leases		Include all equipment leases
Chemicals		Chemicals expensed in prior years, but not used, should be included for initial budgets

Revenues (Operating Income)		Description
Monitoring and Testing		Include laboratory fees for projected monthly and annual sampling requirements
Insurance and Bonds		Costs of insuring buildings, equipment, etc.
Professional Services		Accounting, legal, engineering & other professional (not related to capital projects)
Training and Licenses		Cost of operator training courses and license renewal fee
Security		Cost of maintaining security related items (i.e., fencing, alarms, etc.)
Debt Repayment		Include interest paid on debt
Transfer to Reserved Funds		For Capital Expenditures
Other:		Itemize other expenses not classified elsewhere
2. Total Expenses	\$	
3. Net Income (Revenue – Expenses)	\$	
Additional Reserves Needed		
4. Net Income (from 3. Net Income)		\$
5. Total Required Reserves (from Worksheet 2– Comprehensive Planning)		\$
6. Additional Reserves Needed (Net Income – Total Required Reserves) (-/+)		\$

4. Implement Your Asset-Management Plan

Congratulations! You have completed the initial three steps of your asset-management plan: inventory development and asset prioritization, comprehensive planning, and budget building.

Now you must work with your management team, including council and board members, if appropriate, to implement the plan. This process should help ensure you have the technical and financial means necessary to offer reliable service. Ideally, you should create a plan for at least the next five years.

Hold a Meeting

Arrange a meeting with your management team. Give the following items to each member.

- a map of the system
- a list of current assets, identifying for each the value, or cost to replace, and the remaining useful life (from Worksheet 1)
- a list of priority asset repairs and replacements (from Worksheet 1)
- a list of costs associated with the expected repairs or replacements (from Worksheet 2)
- the current budget allotment as well as the projected budgetary requirements (from Worksheet 3)

Prioritize

Discuss each of the items on the priority list and how you plan to address them, creating an action timeline with a projected budget.

You may find that your current budget will cover only one or two of your priority needs. Explain why these items are priorities and the manner in which you plan to take care of them.

If the current budget is lower than what you need to take care of priority items, discuss potential funding options for management input and approval, and develop a plan to obtain needed funding.

Communicate Regularly

Keep your management team updated with quarterly progress reports. This will reinforce your dedication to the plan, and help make certain that your system is functioning optimally. It will also ensure that you maintain management support throughout the implementation process.

Update Changes

Keep up with the changes that occur as your plan is implemented, including changes in the system's equipment, finances, and personnel. This will help ensure that you successfully manage your water system's assets.

Conduct a Rate Study

If you determine that your water system is not bringing in enough money to be sustainable or to complete necessary improvements, you may need to raise your rates.

You will need to contact the Public Utilities Commission (PUC) of Texas for information and assistance with rate increase applications. You can contact the PUC at 888-782-8477 or 512-936-7120 or by e-mail at <customer@puc.texas.gov>. You can also visit the PUC website at <www.puc.texas.gov>.

Need more help?

The TCEQ's Financial, Managerial, and Technical Assistance Program offers free contractor on-site assistance to help you analyze planning options, and help you with all aspects of running and funding your public water system. For more information about the program, visit the web page <www.tceq.texas.gov/utilities/fmt>, call the Water Supply Division at 512-239-4691, or contact the TCEQ small business and local government assistance representative in your region. To find a representative, visit <www.tceq.texas.gov/goto/regions>. You can also call the toll-free, confidential compliance hotline, 800-447-2827.

Many state and federal funding agencies have grants and loans available for planning and development of new water treatment plants and infrastructure improvements. The Texas Water Infrastructure Coordination Committee (TWICC) is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas. You can contact TWICC by phone at 512-463-7870, by e-mail at <TWICC@twdb.state.tx.us>, or by fax at 512-475-2086 or visit the website at < www.twicc.org > to learn more information about the program.

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.



Managing Small Public Water Systems: Part B, Source Assessment and Planning

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Introduction

This publication is Part B of a five-part series Managing Small Public Water Systems (RG-501). Part B will help you:

- identify your water source,
- measure your water level,
- develop best management practices to manage your source,
- identify options for alternative sources, and
- plan for the future.

This guide includes a list of helpful contacts and worksheets to help you determine how reliable your source and distribution systems are.

An electronic version of the series is available at the TCEQ Small Business and Local Government Assistance Section's (SBLGA) Public Water Supply Compliance Tools webpage at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 to request a paper copy of the complete series Managing Small Public Water Systems (RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-463-5561. The rules are also available online at <www.tceq.texas.gov/goto/TAC30>.

Health and Sustainability: What you must know

To avoid water shortages or outages, it is critical to evaluate your sources and plan for the future. A good start is to develop, implement, and revise your asset-management, water-conservation, and drought contingency plans (DCPs) as necessary. If you determine your water source is not adequate under current conditions or that it will not be in the next five years, you should consider budgeting for a new (alternate) source of drinking water. Part A of this series, *Asset Management* (RG-501a), will help you prepare a comprehensive budget.

Keep the following questions in mind as you work through Part B. They will help you focus on assessing the health and sustainability of your water source.

1. What sources of water are currently used for our public water system (PWS)?
2. Considering current demands, how long will each of these sources last?
3. What is the minimum water level elevation or flow rate of my water source needed to maintain an adequate water supply?
4. What are the appropriate water levels to be used as triggers in our drought contingency plan (DCP)?
5. In the event of a water outage, how will we get water to the system?
6. At what point (trigger level) do we need to seek an alternate source of water?
7. What alternate sources are available?
8. How much would each alternate source cost to develop?
9. How long would it take to bring an alternate source into production?
10. Does our PWS need to increase rates to fund an alternate source or infrastructure improvements?
11. What funding is available?

Where does my water come from?

Raw water that is treated and used for drinking water usually comes from groundwater, surface water sources, or a combination of both. For surface water, it is easy to see the water body that the intake pulls from. The health and long-term viability of surface water sources can be identified by streamflow or the measurement of lake and reservoir levels.

For groundwater systems, it is more complicated because the source is an underground aquifer. Specialized tools and techniques are used to measure the water available from the groundwater wells.

A PWS can obtain information about its system, including the water source, from the TCEQ Water Supply Division by calling 512-239-4691.

Groundwater: Basics of a groundwater well

When your groundwater well was initially drilled, the licensed driller developed a well (or boring) log report as required by Texas statute. The driller is required to submit the log to the Texas Department of Licensing and Regulation (TDLR) and a copy is included with the plans and specifications submitted to TCEQ during the initial approval of the well.

The Texas Water Development Board (TWDB) hosts an online application for the submission of required well log reports. TWDB also maintains two online resources that provides access to all well log reports:

- Submitted Drillers Report Database online at <www.twdb.texas.gov/groundwater/data/drillersdb.asp>.
- Groundwater Database Reports at <www.twdb.texas.gov/groundwater/data/gwdbbrpt.asp>.

The well log contains information about the aquifer, the depth and diameter of the well, the depth to the top of the groundwater (before pumping began), and production levels measured after construction.

You can review current aquifer information on the TWDB's website at: <www.twdb.texas.gov/groundwater/aquifer/index.asp> or, if you do not have Internet access, contact the TWDB at 512-463-7847.

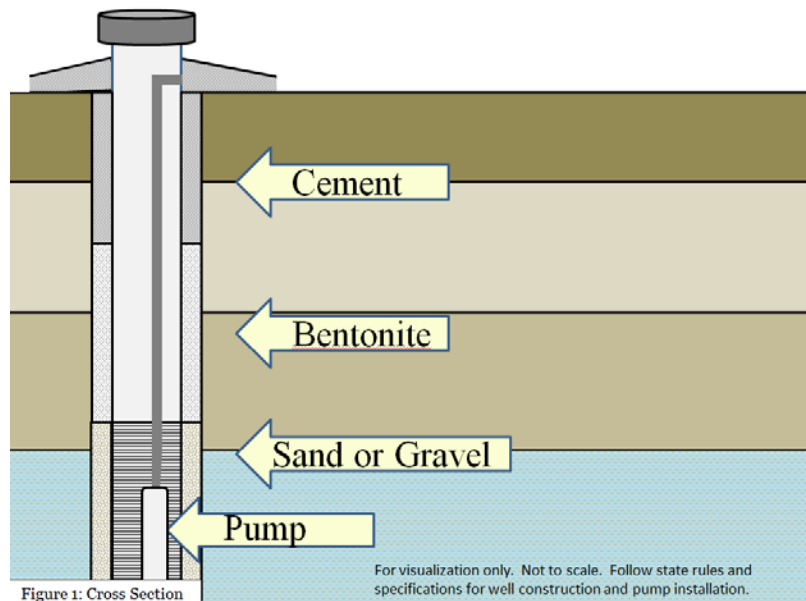
Figure 1: Cross-Section of a Groundwater Well

Figure 1 shows a cross-section of a typical well. The construction of the well is regulated, but there may be differences in its completion. Information on well completion is included in the well log and may show amounts of bentonite and cement used during construction. Most wells will have a well screen in the aquifer, which is also known as the saturated zone. The casing of most wells will stick up above the ground, and that distance is important when you are measuring water levels.

If you do not have your well log information, you can visit the TWDB's Drillers Report database referenced above or the TCEQ's Drinking Water Standards Section webpage at www.tceq.texas.gov/drinkingwater/SWAP/wells.html to obtain the well log. You can also contact the Water Supply Division at 512-239-4691 to request a well log if you do not have Internet access.

How do I measure my groundwater level?

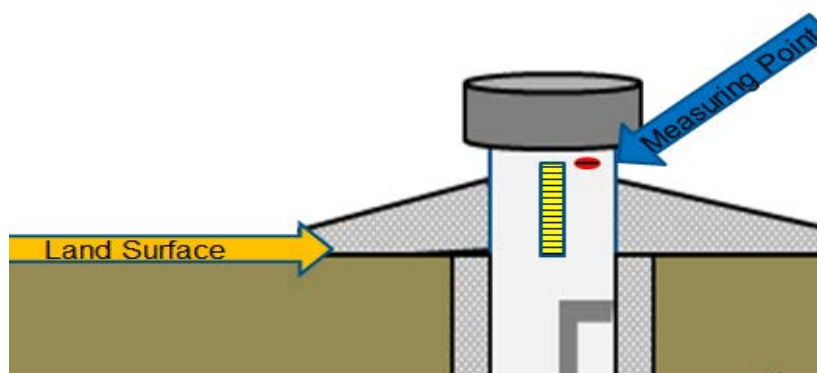
Groundwater level is a direct indicator of the groundwater supply. Follow Step 1 through Step 3 in this section to help determine annual and long-term changes of groundwater storage and estimate recharge rates of the groundwater supply so that you can plan for future needs.

Step 1. Establish a permanent measuring point

It is important to take well measurements from the same point in your well casing or sample port each time.

To ensure you are measuring from the same point, you should establish a permanent measuring point (also referred to as “measuring point” in this document) and mark that point inside of the casing with a waterproof marker.

Figure 2: Measuring Point



The measuring point (see Figure 2) can be surveyed and designated as elevation above mean sea level (msl). If your measuring point is surveyed, and you know the elevation at the wellhead, then your water level measurements will be in elevation (feet) above msl by subtracting the depth-to-water from the elevation of the measuring point.

If you do not have an elevation of the measuring point or of the land at the well head, you can subtract the distance from the ground to your measuring point from your total depth-to-water to determine your depth below land surface.

Example:

If the distance from the ground to your measuring point is 3 ft and your depth-to-water is 100 ft then your depth below land surface is 97 ft.

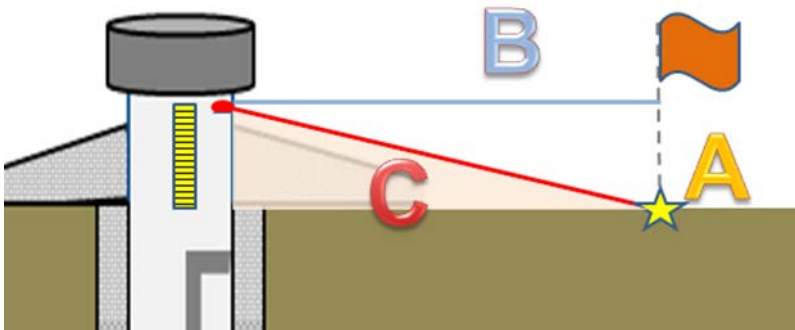
$$100 \text{ ft} - 3 \text{ ft} = 97 \text{ ft}$$

If you have not had the well elevation surveyed, use this equation “ $A^2 + B^2 = C^2$ ” to create a “virtual” triangle and calculate your measuring point. To use the equation:

1. Mark a spot on the ground with spray paint or a flag, shown as a star in Figure 3.
2. Measure the distance from the measuring point in the well to the marker (this distance is C).
3. Take a measurement from the mark inside the well until it is parallel with the marker or flag on the ground (this distance is B).
4. Calculate A.
5. Subtract your calculated distance to the land surface from your water level measurement taken from your measuring point to get your depth to water below the land surface.

Figure 3 (below) shows a diagram of the equation applied to calculating the distance to the land surface if you do not know the thickness of the well pad.

Figure 3: Land Surface to Measuring Point



Example Calculation for Land Surface to Measuring Point

If C is 3.16 ft, B is 3 ft, and $A^2 + B^2 = C^2$ then:

$$A^2 + 3^2 = 3.16^2$$

$$A^2 + 9 = 10 =$$

$$A = \sqrt{(10-9)} = 1 \text{ ft}$$

The distance from the measuring point to the land surface is 1 ft (the square root of 1).

Step 2. Sanitize equipment, select a method, and measure the water level

There are several methods for measuring the depth to water level, including wetted steel tape, an electric water-level indicator, an acoustic well sounder, and the air-line method. Using a steel tape and chalk is the least expensive method and offers a reliable reading, although it may not work for your situation.

This guide discusses the most accessible methods for small systems. Regardless of the method you choose, if you measure consistently with the same method and technique each time, your data will show water -level trends.

Sanitize equipment

It is important that the tape (or line) that you send down your well is clean. To sanitize your equipment, wipe it down with a rag and household (unscented) bleach solution. Allow it to air dry, and avoid contact with soil or unclean surfaces.

The wetted-tape method

This method is typically used for depths up to 300 ft. To use this method, you must already have a good idea of the depth to water in your well (within approximately ten feet).

Materials you will need

- A steel measuring tape long enough to reach the water (ideally, the tape will show tenths of inches)
- A weight (a few ounces is usually sufficient)
- Carpenter's chalk

Steps to take

1. Coat the lower 3 to 4 ft of the tape with carpenter's chalk.
2. Note the previous depth to water (if this information is available) or consider what you suspect is the depth to water to determine the number of feet you intend to spool off the reel and into the well bore.
3. Securely attach the weight to the end of the measuring tape.

4. Lower the tape into the well until the weighted part of the tape is under water, and then lower the tape a little more until the next foot marker sits at your established measuring point.
5. Record the number of feet indicated at the measuring point.
6. Remove the tape from the well and record the length of tape that was under water. (The chalk that was under water will be wet or washed away.) The difference between these two measurements is the depth to water from the measuring point.

Example

Feet recorded at measuring point = 130 ft

Amount of tape under water (wet or missing chalk) = 2 ft 6 in

Depth to water from the measuring point = 130 ft - 2 ft 6 in = 127 ft 6 in below the measuring point

First, subtract the distance from the measuring point to ground level to get the depth to water from land surface.

Then convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.

For example, 3 ft 6 in becomes $3 + (6/12) = 3 + (0.50) = 3.50$ ft = 127.5 ft - 3.5 ft = 124 ft depth to water below the land surface.

The air-line method

The air-line method is useful in areas where wells may be turbulent; once installed, the air-line can remain in the well. Piping is placed down the well to a depth of approximately 20 ft below the water level. As air is pumped into the piping, bubbles are forced out by the water pressure, until it comes to equilibrium. From the air pressure gauge reading, you can calculate the depth to water. The instructions provided in this guidance are general; more information about this method is available online through the USGS at www.pubs.usgs.gov/tm/1a1/pdf/GWPD13.pdf. Additionally, your local groundwater conservation district (GCD) or a well driller may be able assist with the initial installation of the air-line.

Materials you will need

- 1/8- to 1/4-inch diameter tubing, preferably seamless copper, brass or galvanized pipe, and tee fitting

- Calibrated pressure gauge, preferably filled with oil or silicone
- Compressed air source with Schrader valve. You can use a bicycle pump for shallow wells or an air compressor where the depth to water is hundreds of feet.
- Small open-end wrench
- Steel tape with measurements in hundredths of feet

Steps to take

1. Attach the air-line to the pump column, making sure it is at least 5 ft above the suction intake of the pump. Make note of the length of pipe required.
2. Use the wrench to fit the upper end of the pipe with a tee fitting, pressure gauge, and valve to attach air supply.
3. Pump air into the pipe until the pressure levels off, indicating that all of the water has been pumped from the line. This will be the pressure-gauge reading used in your calculations. Take water-level measurements with the steel tape at the same time to verify the pressure-gauge reading. If the two readings are not equal, use a correction factor when you take measurements.
4. Deduct the pressure in feet from the known length of air-line.

Example

Length of air-line = 150 ft

Air pressure = 26 psi

Convert air pressure to feet by multiplying psi by 2.31. In this case, $26 \text{ psi} \times 2.31 = 60 \text{ ft}$.

Subtract the air pressure in feet from the length of air-line. $150 \text{ ft} - 60 \text{ ft} = 90 \text{ ft}$. The distance to the water is 90 ft. As with other methods, you also need to subtract the distance from the measuring point to the land surface.

Water-Level-Indicator Measuring Tape

A WLI is a battery-powered electric measuring tape (“e-line”) or cable that is double wired, has an electrode probe on the tip, and is marked with feet, tenths, and hundredths. Most water-level indicators can be considered accurate to 0.01 foot (0.12 inch) at depths of less than 200 feet.

Materials you will need

- Water-level-indicator tape (can be rented from an equipment-supply company and require calibration)

Steps to take

1. Check the circuitry of the water-level indicator before lowering the probe into the well by dipping the probe into clean tap water and observing whether the indicator needle, light, and buzzer are functioning properly. If the tape has multiple indicators (some have sound and light), confirm that they are operating simultaneously. If not, determine the most accurate indicator. The strength of the buzzer and light intensity used should be the same on all measurements (be consistent—for example, if you record the measurement as soon as you hear the sound or see the indicator light, continue to do so throughout measuring).
2. Establish a measuring point as discussed in Step 1 and shown in Figure 2.
3. Lower the electrode probe slowly into the well (use the well port, or take the well cover off) until the indicator shows contact with the water surface. Place the tip of your index finger on the tape at the measuring point, and read the depth to water.
4. Repeat the measurement until you get consistent results (within 0.02 foot [0.24 inch]).
5. Record the date and time of the measurement.
6. Once you record the water level from your measuring point, subtract the distance to the land surface, so you have the depth to water from the land surface.

Example

Depth to water reading = 150 ft

Distance to land surface = 90 ft

$150 \text{ ft} - 90 \text{ ft} = 60 \text{ ft}$

As with other methods, you also need to subtract the distance from the measuring point to the land surface. Repeat the measurement until you get consistent results (within 0.02 foot [0.24 inch]).

Step 3. Record your water levels

Record well data to track the health of your well, identify and predict trends, and to assist with planning activities. The examples discussed in this section represent some of the key well data that you should record.

Water level measurements should be recorded in feet, with reference to land surface. The elevation of the land surface above sea level should be documented in the well description, along with the height of the measuring point above or below land surface.

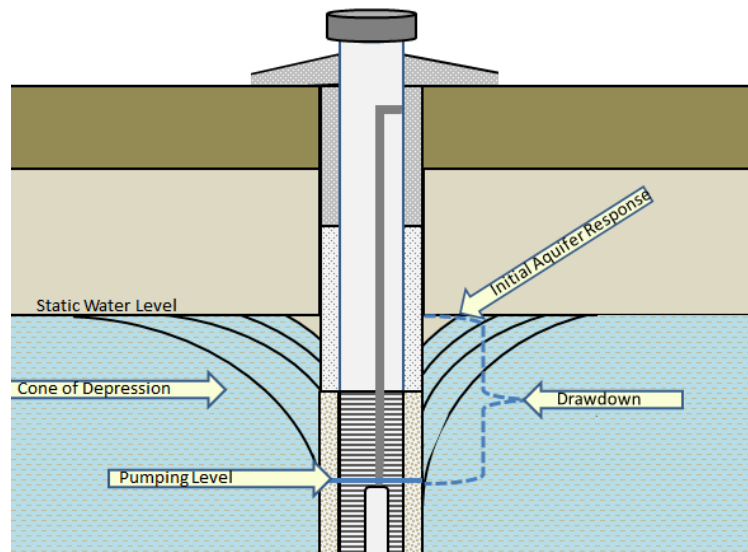
The measuring point should be described physically (such as top of casing, top of instrument shelf, and so forth), and in relation to the land surface (such as 1.3 ft or 1 ft 4 in above land surface). The description will help demonstrate that the same measuring point was used each time.

The **static water level** of the well is the level of water when the pumps are not operating. This level should have been measured and recorded in the well log when the well was drilled and before the initial 36-hour pump test. However, if that record cannot be located, you can take the well offline and record the static level once the pump has been off for 24 hours.

The **dynamic water level**, also known as the pumping level, of the well is the level of water when the pumps are operating. By tracking the dynamic water levels in the well, you can identify any mechanical issues as well as severe drawdown.

Drawdown (see **Figure 4**) is the drop in the water level when the water is pumped at a **constant yield** (sustained rate of water flow) for 24 hours. The pumping level minus the static level equals drawdown. Reasons to track drawdown include:

- detecting a slow decline in the water source;
- detecting pump or well screen issues before they become major problems; and
- evaluating efficiency and performance of the well.

Figure 4: Cross-Section Pumping Well

Drawdown may also be influenced by external factors. For instance, if the wells are in an agricultural area, you may find that drawdown is faster during periods of crop irrigation. It is also beneficial to track the **well recovery rate**. This is the time (measured in minutes) that it takes for the well to recover after being lowered to pumping level. A long recovery time coupled with a larger drawdown and greater cone of depression may indicate that the well is located in an area influenced by over-pumping, or that the aquifer is not being recharged.

A **cone of depression** occurs in an aquifer when groundwater is pumped from a well. In an unconfined aquifer (water table), this is an actual depression of the water levels. In confined aquifers, the cone of depression is a reduction in the pressure head surrounding the pumped well.

Another useful way to track the health of your well is by calculating specific capacity. The **specific capacity** is calculated by dividing the yield in gallons per minute by the drawdown in feet. For example, the specific capacity for a well with a yield of 3,000 gpm and 30 ft of drawdown would be 3,000 gpm/30 ft or 100 gpm/ft. The specific capacity can be calculated from the well driller's log and compared to the current data from your pump test. If there is more than a 25 percent decrease in specific capacity, you should consider rehabilitating the well.

Record water levels and identify trends

Maintaining records of your data will allow you to determine trends, and to identify potential problems or emergencies, such as extreme drought. A good practice is to measure and record the information once a week for a month, and then review the data to identify trends in the water level.

To record and track the water levels in your well use:

- Worksheet 1A if the groundwater *elevation* is known.
- Worksheet 1B if the groundwater *level below land surface* is known.

If problems are discovered, use Worksheet 2 to help determine solutions to the problem.

How do I calculate how much surface water is available?

It is important to track the level of your surface water source over time in order to stay informed about water availability. This section will help you determine whether you need to secure other sources to meet the needs of your system *before* you can no longer access the water from your intake location.

Tracking available water allows you to notice trends and fluctuations over time. Your source may lose a foot or more of water per week due to pumping and evaporation, or levels could drop rapidly as water is released to downstream water right holders. During a drought, tracking the amount of water available will help predict how long your supply will last to help you plan for securing alternative water sources.

How much water is available in my surface water source?

Various state and federal agencies track surface water levels in Texas. These agencies, the data they track, and how to access the water data is listed in Table 1.

Table 1: Surface Water Tracking Agencies

Agency (Phone)	Data Tracked	Webpage(s)
Texas Water Development Board (512-463-7847)	Level of most reservoirs in Texas	www.waterdatafortexas.org/reservoirs/statewide
United States Geological Survey (888-275-8747)	Daily surface water level Streamflow data	<ul style="list-style-type: none"> • www.waterdata.usgs.gov/tx/nwis/current?type=lake • www.waterdata.usgs.gov/tx/nwis/current/?type=flow
United States Department of the Interior (512-899-4150)	Water level data for four minor Texas reservoirs.	www.usbr.gov/gp-bin/arcweb_sanford.pl

Determine how much water is available to your PWS from a reservoir

Reservoirs are a specific type of surface water source used to store water. PWS's pulling water from a reservoir, can calculate how much water is in the reservoir. Follow the steps below to learn how to do this simple calculation.

Step 1. Look up amount of water in the reservoir

Look up the amount of water in the reservoir or the source's elevation (msl) for the day of measurement. Obtain this information from resources listed in Table 1.

Step 2. Measure the amount of water over the top of your raw water intake

Measure how much water is over the top of your raw water intake to calculate how much water is available. This will establish a reference point for tracking water availability.

Remember that the water available to your system may be limited by your water right or water rights of others who use the same reservoir. Mere availability of water does not guarantee that it is yours to use; however, tracking available water can be useful in assessing the need for an alternative supply.

Step 3. Complete your calculations

Calculate the elevation of your intake by subtracting the measurement of the amount of water over the top of your raw water intake from the source's elevation. This is your "critical pumping level," below which you will not be able to pump water.

Example

On September 27, 2012, you measure 10 ft of water over your intake. The source elevation listed on the TWDB's website for the same day is 200 ft above sea level. You can then find out the intake's elevation as follows:

Lake level 200 ft above msl – 10 foot of water over intake = 190 ft msl. This is the intake location above sea level (the critical pumping level).

Periodically (at least weekly during drought conditions, or more frequently if needed) check how much water is over the top of the raw water intake by checking the source elevation online, and then subtracting the intake elevation level from the source elevation. Use Worksheet 3 at the end of this document to track the amount of water available.

Determining how much water is available to your PWS from a river or stream

If your water system is diverting from a river or stream, you should be particularly aware of your source, your water right, and other water users upstream and downstream of your intake. You can check for streamflow gauges nearby to assess the available water. You may want to maintain records of the flow to see how it is changing over time. If you have questions about your source or if you need to amend your water right, contact the TCEQ's Water Availability Division at 512-239-4691.

Water-Shortage Reporting

TCEQ rules in 30 Texas Administrative Code (TAC) 290.41(b) require that you report to the agency when you have less than a 180-day supply of water. If you are experiencing water outages or having issues due to drought, contact the TCEQ's Water Supply Division's drought team at 512-239-4691.

Identify Alternative Sources

Following water conservation measures will help prolong your water supply. However, you need to monitor your source-water levels to determine how reliable your supply is and whether an alternate source is needed. The reliability of your water source is important for long-term planning and when dealing with drought conditions. The TWDB provides assistance for long-term planning and financial assistance for developing new or alternate water sources.

As a part of your drought contingency plan, you should assess the need for additional water *before* the primary water source is showing signs of stress (reduced flow, decreased well recovery, etc.).

You can buy and haul water, obtain additional water rights, drill a new well, construct an emergency interconnection, or convert a non-drinking water well for temporary emergency use as a drinking-water source.

How do I haul potable water?

In case of extreme emergencies, hauling potable water to your PWS may be necessary. Water haulers that carry potable water are required to get the water from an approved source and carry the water using equipment approved by the TCEQ.

If you are considering hauling your own potable water, there are specific requirements for the water truck or trailer, including proper labeling, materials, and construction. The rules for hauling potable water are located in 30 TAC 290.44(i).

To become an approved potable water hauler, you must send the TCEQ:

- a cover letter describing the purpose of your submission,
- an engineering report,
- plans and specification, signed and sealed by a professional engineer licensed in Texas, and
- a TCEQ Core Data Form (TCEQ—10400) available at www.tceq.texas.gov/goto/coredata.

To find out more about becoming an approved water hauler, contact the TCEQ's Plan Review Team in the Water Supply Division at 512-239-4691.

To hire an approved water hauler, review the list of approved haulers online at <www.tceq.texas.gov/assets/public/agency/water_haulers.pdf>.

How do I get additional surface water rights?

In Texas, surface water is owned and managed by the state. The TCEQ grants the right to use this water for municipal (for example, drinking water, domestic, and household use), industrial use, farming, ranching, and other activities.

The rights to surface water are issued on a first-come, first-served basis. That means that if your water right is older (senior), your rights to use the water come before the rights of someone who received a water right after you (junior).

In non-watermaster areas, the TCEQ will limit the water that junior water right holders can divert by either suspending or adjusting their water right if restrictions are warranted. This will ensure that senior water right holders — those first in line — will receive water in the river before junior right holders.

If you want to get additional surface water, you will need to submit a water right application. You can visit the TCEQ's water rights webpage <www.tceq.texas.gov/permitting/water_rights> or call a member of the Water Rights Permitting Team at 512-239-4691 for more information about submitting an application.

Note: Applying for a water right does not ensure that the water will be available.

How do I drill a new well?

After exploring your alternative water source options, you may choose to drill a new well. Any new PWS well must be drilled to meet all of the TCEQ standards.

Before you drill, check with the GCD in your area, if one exists, to determine the amount of water that can be withdrawn from the district's groundwater sources. To view a map of the GCDs and to determine what the requirements are for new water wells drilled in their jurisdictional area, visit the TCEQ's GCD webpage at www.tceq.texas.gov/groundwater/districts.html.

The first step to drilling a new well is hiring an engineer to submit plans and specifications to the TCEQ. To assist engineers with completing and submitting the appropriate plans and specifications use the TCEQ checklists provided online at www.tceq.texas.gov/drinkingwater/udpubs.html. Specifically, the Checklist for a Proposed Public Water Supply Well/Spring (TCEQ form 10205) lists components of the plan to be submitted.

A licensed water-well driller must drill PWS wells. Information about licensed drillers is available on the TDLR's License Search webpage at www.license.state.tx.us/licensesearch/.

After the well has been drilled, the engineer must submit well-completion data to the TCEQ. The required data on well completion are listed on the TCEQ's Public Well Completion Data Checklist for Interim Approval (TCEQ form 10234) at www.tceq.texas.gov/drinkingwater/udpubs.html. Based on these data, the TCEQ will evaluate whether to approve use of the well.

What is the process for drilling an emergency well?

If your PWS needs to drill an emergency well, the owner, contractor, or engineer must contact the appropriate regional TCEQ office, which will verify the emergency while working with the TCEQ's Plan Review Team in the Water Supply Division.

The TCEQ will respond with a letter stating if construction of the emergency well is approved or disapproved. The letter will also include the checklists discussed under the "How do I drill a new well?" heading of this guidance.

After drilling the emergency well, you are required to submit plans and specifications, according to the TCEQ's Public Well Completion Checklist for Interim Approval (TCEQ form 10234) in order to get approval for use as a PWS well.

For detailed information about the approval process, contact the Plan Review Team at 512-239-4691 and ask to speak with someone about emergency well approvals.

Can I use an irrigation or domestic supply well as a drinking water source?

If you want to use an irrigation or domestic supply well as a PWS source, you first need to send the TCEQ Plan Review Team information regarding the well's construction, including the well log (if available), as-built plans and specifications, and bacteriological and chemical analyses. Also, include a survey of potential sources of pollution within one-fourth mile of the well.

If you want to convert an existing well in an unconfined aquifer to a PWS well, an engineer will need to perform a well assessment and submit engineering plans.

For more information, refer to the TCEQ's Emergency Use of Wells for Public Water Supplies (TCEQ publication RG-485) online at www.tceq.texas.gov/goto/rg-485.

How do I establish an emergency interconnection?

You should consider securing an interconnection with a nearby water system *before* their source water is depleted. Once a neighboring water system has agreed to provide an emergency interconnection, the receiving system should contact the regional TCEQ office for verification of the emergency. If the interconnection is approved by the TCEQ, the applicant will receive a letter authorizing construction.

Plans and specifications must be submitted to the TCEQ within 30 days of the date of the acceptance letter.

For more information, refer to the TCEQ fact sheet *Emergency Interconnection Procedure for Public Water Systems* online at www.tceq.texas.gov/assets/public/agency/emergency_interconnection.pdf or you may contact the Water Supply Division at 512-239-4691.

We don't have an alternative source—what should we do?

Planning for emergencies, including taking steps as described in the next section on best management practices (BMPs), will help ensure that the system can afford to take the required steps toward seeking alternative water sources.

If you are at risk of running out of water and have no alternatives, call your local or county emergency-management office while there is still time to plan for your community. Review the Texas Department of Public Safety's *Drought Assistance Directory for Public Officials and Drinking Water Utilities*, which includes a flowchart on the process for responding to PWS problems at www.dps.texas.gov/dem/CouncilsCommittees/droughtCouncil/droughtAssistDir.pdf.

Develop Best Management Practices (BMPs) For Protecting Your Source

BMP 1: Develop an Asset Management Plan

Without developing an asset management plan, your system may not be prepared for emergency conditions, such as extreme drought. As described in Part A of this series, along with Attachment 501A, Expense and Revenue

Projections, you can determine your budgetary needs by comparing your annual revenues to your expenditures. If there is a shortfall within your budget, you may need to consider raising rates or seek outside funding.

Keep in mind, rate studies are often required before outside funding can be obtained. For help with rate studies and rate setting, the Public Utility Commission of Texas (PUC) offers free one-on-one assistance.

The PUC's publication *Utili-Facts* explains types of assistance available and how to get assistance. For more information about this program go to www.puc.texas.gov/consumer/facts/factsheets/waterfacts/UtilityOnsiteAssistance.pdf or call the PUC's Water Utility Division at 512-936-7405.

BMP 2: Create a Drought Contingency Plan

Most DCPs define three to five drought response stages and include “triggering criteria” for both initiating and terminating each stage. Triggering criteria should be designed to ensure timely action in response to a developing drought and that the response is appropriate to the level of severity. Make sure your DCP is tailored to your system and updated at least annually.

The following suggestions will assist you with developing and implementing your DCP.

Customer Involvement

- Help the public understand the need for the DCP. Often, successful implementation of a DCP depends upon how well the public understands the need for the plan.
- Get input from customers and city council members.
- Give the public an opportunity to participate directly in the planning.
- Schedule field trips to the well or intake structure to show customers and board members where their water comes from and why it is critical to conserve and protect their water source.
- Remember that sometimes change is easiest to accept in several small steps, instead of one big step.

Triggering Criteria

- Ensure that your plan's water-use-reduction stages have triggering criteria that correspond to your water source's critical pumping level.
- Create triggering criteria that will give you enough time to respond to the corresponding water shortage. Allow time to notify customers and see a decrease in water usage *before* the source reaches critical pumping levels.

Keep Records

- Keep a log of what works with your plan and what needs improvement, and update your plan accordingly; it is a living document.

Coordinate with Other PWS

- Coordinate your DCP stages with your neighboring water systems. If you and your neighbor are both pulling from the same source, it is likely that you will both be in trouble when the water levels start dropping. This coordination will also reduce customer complaints due to comparisons in water restrictions.

Review the TCEQ Handbooks and Resources

- Use the TCEQ's DCP handbooks for different types of water systems. Contact our Water Availability Section at 512-239-4691, or email the team at <WRAP@tceq.texas.gov> to request copies of the handbooks.
- You can also go to the TCEQ's DCP webpage at <www.tceq.texas.gov/goto/drought_plan> to find model DCP forms, requirements, and information on submissions.

BMP 3: Launch a leak detection program

On average, 14 percent of the water treated by water systems is lost to leaks; therefore, it is important to conduct a leak detection survey of all the equipment in the distribution system. The results of a leak detection survey show where and how your PWS loses water and how much this loss is costing your system.

Reducing water loss will extend the PWS and decrease operating costs. Additionally, state and federal funding agencies may also award funds

preferentially to water systems that have conducted a leak detection survey, also known as a water loss audit.

Conducting a leak detection survey demonstrates that you are:

- making the best use of the DWS's resources
- taking care of the DWS's assets
- concerned about saving money

Leak detection programs should include both public and internal campaigns.

Public Leak detection

Educate the public about leak detection. Encourage residents to check for and fix leaks in toilets, sinks, irrigation systems, and other water-using equipment to prevent waste.

Internal Leak detection

To assist utilities with identifying leaks and determining flow rates, the TWDB loans leak detection equipment free of charge. Visit their website at www.twdb.texas.gov/conservation/municipal/waterloss/leakdetection.asp for more information about borrowing this equipment.

TWDB's water-loss audit webpage at www.twdb.texas.gov/conservation/municipal/waterloss/index.asp is a resource available to provide water-loss audit assistance.

By using leak detection and water-loss audit results, you can decide where infrastructure improvements should be made.

BMP 4: Review pump conditions and maintenance

You should assess the condition of your well pump or water-intake pump annually. Often, an aging or poorly maintained pump, rather than a drop in the water table, is the cause of lost pumping capacity.

Regular assessments of the well pump will help you determine if the pump's capacity has diminished. Knowing this information will help you

create a timeline for future repairs and replacements. This information will also help you establish a budget for pump maintenance and for the eventual cost of pump replacement.

Use Part C of this series to help you develop an operation and maintenance program.

BMP 5: Flush water mains wisely

The TCEQ requires PWSs to flush all dead-end mains monthly, and as needed to address water quality complaints and inadequate disinfection residual.

It is necessary to balance the need to conserve water with these flush requirements. You can accomplish this balance by following these BMPs while flushing:

- Minimize water used for flushing activities. Monitor the water quality during flushing, and only flush as much water as necessary to meet requirements.
- Reuse flush water. Capture the flushed water for use in lawn watering or dust suppression.
- Use unidirectional flushing to respond most efficiently to water quality concerns. This involves closing adjacent valves and using a single hydrant per flush to isolate individual sections of the main, and intensely scouring the line to flush the water quickly while minimizing water waste.

Note: the TCEQ may grant an alternative dead-end main flushing routine on a case-by-case basis, if drought has reduced the water supply to critical levels. Contact the TCEQ's Water Supply Division at 512-239-4691, and ask to speak to someone on the Technical Review and Oversight Team for more information about alternative dead-end main flushing.

BMP 6: Communicate with your water supplier

If you purchase water from another PWS, you should contact your water supplier for frequent updates about the status of its source. This information will help you determine which drought stage has been triggered.

You may have to contact several PWSs to determine which system actually pulls the water from the lake, reservoir, river, stream, or aquifer. For example, if you buy water from system C, which buys from system B, which buys from system A, which actually pulls water from the source, only system A will be able to tell you how stable the water source is. Another consideration is that the purchasing systems (B and C) may be limited by how much water they can supply based on their contracts with system A.

Communicating with the other systems that pull from the same source will help you coordinate your drought response in order to reduce water use more effectively.

BMP 7: Evaluate energy consumption

Conduct an evaluation to determine how much energy it takes to run your PWS. You may find that energy is a large portion of your budget.

After conducting an evaluation, you may discover opportunities to incorporate energy efficiencies into day-to-day operations and long-term planning for the PWS. These energy efficiencies can promote sustainability of your water system by saving money, while also reducing operating and maintenance costs.

For more information and resources to help you begin an energy assessment, read the Environmental Protection Agency's guidance *Strategies for Saving Energy at Public Water Systems* at www.epa.gov/sites/production/files/2015-04/documents/epa816f13004.pdf.

Need more help?

The TCEQ's Financial, Managerial, and Technical (FMT) Assistance Program offers free on-site assistance to help public water and wastewater systems. The FMT Program can help you with planning, funding, reporting, and many other aspects of running your water system.

For more information about the program:

- Visit the TCEQ's Assistance for Public Water and Wastewater Systems webpage at <www.tceq.texas.gov/drinkingwater/fmt>.
- Call the Water Supply Division at 512-239-4691.
- Email FMT@tceq.texas.gov.

Many state and federal funding agencies have grants and loans available for planning and development of new water sources and infrastructure improvements. The Texas Water Infrastructure Coordination Committee (TWICC) is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas. Visit the TWICC Web site <www.twicc.org> for more information or to fill out a Funding Inquiry Form.

Helpful Contacts

TCEQ Office of Water

The TCEQ's Office of Water oversees the design and operational requirements of all public water and wastewater systems.

<www.tceq.texas.gov/goto/water_main>

Water Supply Division..... 512-239-4691

TCEQ Watermaster Program

The Watermaster Program ensures compliance with water rights by monitoring stream flows, reservoir levels, and water use. It also coordinates diversions and regulates reservoirs as needed to prevent the wasting of water or its use in quantities beyond a user's right.

<www.tceq.texas.gov/permitting/water_rights>

Concho Watermaster..... 325-655-9479 or 866-314-4894

Rio Grande Watermaster 956-430-6046 or 800-609-1219

South Texas Watermaster 210-490-3096 or 800-733-2733

Brazos Watermaster.....254-761-3027 or 254-761-3006

Small Business and Local Government Assistance

800-447-2827

The Small Business and Local Government Assistance program provides confidential technical assistance without the threat of enforcement.

<www.TexasEnviroHelp.org>

Other Resources

River Authorities

Develop and manage the waters of designated geographic regions of the state through conservation, storage, control, preservation, use, and distribution for the benefit of the public.

<www.tceq.texas.gov/waterquality/clean-rivers>

Angelina-Neches River Authority	936-632-7795
Bandera County River Authority	830- 796-7260
Brazos River Authority	254-761-3100 or 888-922-6272
Guadalupe-Blanco River Authority	830-379-5822
Lavaca-Navidad River Authority	361-782-5229
Lower Colorado River Authority	512-473-3200 or 800-776-5272
Lower Neches Valley Authority	409-892-4011
Nueces River Authority	830-278-6810
Red River Authority	940-723-2236
Sabine River Authority	409-746-2192
San Antonio River Authority	210-227-1373 or 866-345-7272
San Jacinto River Authority	936-588-3111
Trinity River Authority	817-467-4343 or 877-872-4343
Upper Colorado River Authority	325-655-0565
Upper Guadalupe River Authority	830-896-5445

Texas Alliance of Groundwater Districts

512-596-3101

Membership of underground water conservation districts of Texas with powers and duties to manage groundwater as defined in Chapter 36 of the Texas Water Code (voting members) and other organizations that work in the groundwater arena (associate members).

< www.texasgroundwater.org/>

Texas Groundwater Protection Committee

512-239-4691

Identifies areas where new or existing groundwater programs could be enhanced, and improves coordination among agencies involved in groundwater activities.

<www.tgpc.state.tx.us>

Texas Water Conservation Association

512-472-7216

Serves as an advocate for water users and includes interests in groundwater users, irrigators, municipalities, river authorities, navigation and flood control districts, industrial users, drainage districts, utility districts, and general environmental interests.

Texas Water Development Board

State agency charged with statewide water planning and administration of low-cost financial programs, data collection and dissemination, and technical assistance.

TWDB Financial Assistance Programs	512-463-0991
TWDB Groundwater Resources Division	512-463-7847
TWDB Surface Water Data	512-463-7847
TWDB Water Uses and Projections	512-936-0829

Groundwater-Conservation Districts

512-936-0817

Local units of government that develop and implement plans for the effective management of groundwater.

[<www.tceq.texas.gov/groundwater/districts.html>](http://www.tceq.texas.gov/groundwater/districts.html)

Regional Water Planners

512-463-6277

Guide and support planning of the state's water resources by administering and assisting in the development of the regional and state water plans.

www.twdb.texas.gov/waterplanning/staff.asp

Team 1: Regions A, O, E, F 512-463-6021

Team 2: Regions G, B 512-475-1128

Team 3: Regions C, D..... 512-475-4816

Team 4: Regions H, I 512-463-0250

Team 5: Regions J, K, L, P 512-463-7959

Team 6: Regions M,N 512-475-0590

Find your region by county at

[<www.twdb.texas.gov/waterplanning/rwp/>.](http://www.twdb.texas.gov/waterplanning/rwp/)

United States Geological Survey—Texas Water Science Center

512-927-3500

This agency works in cooperation with municipalities, river authorities, groundwater districts, and state and federal agencies in Texas to provide reliable, impartial scientific information to resource managers, planners, and other customers by monitoring water, biological, energy, and mineral resources.

[<tx.usgs.gov>](http://tx.usgs.gov)

Glossary

C

- *Cone of depression*: The depression, tapering in shape, produced in the water table by the pumping of water from a well.
- *Constant yield* (also see yield): A continuous flow of water for a specific period of time.
- *Critical pumping level*: The minimum level of water at the intake at which water can be pumped.

D

- *Drawdown*: the drop in the water table or level of water in the ground when water is being pumped from a well.
- *Dynamic water level*: (also known as the pumping level) level of water in the well when the pumps are operating.

F

- *Flow rate*: Measurement in gallons per minute of water coming out of a well.

L

- *Leak detection survey* (also see *water loss audit*): A physical evaluation of a water system to identify specific leaks. It involves using a listening device to find leaks in pipes or fittings within the distribution system.

P

- *Permanent measuring point* (*measuring point*): Water levels in wells are usually reported as depths below land surface, although the measuring point can be any suitable fixed place near the top of the well.
- *Potable water*: Water that has been treated and is safe to drink or to use for food preparation without the risk of health problems.

- *Public water system (PWS):* A water system that provides water to the public with at least 15 service connections or serve at least 25 individuals for at least 60 days out of the year.
- *Pump cavitation:* Significant damage to the impeller and/or the pump housing typically caused by insufficient flow of water through the pump.
- *Pump run time:* The length of time the pump is running.
- *Pumping capacity:* The amount of water the pump will move – normally measured in gallons per minute.
- *Pumping water level (also see dynamic water level):* The pumping water level is the distance from the land surface (or measuring point) to the water in the well while it is pumping.

R

- *Raw water intake (also see intake):* A mechanical device used to pull in untreated water from a water body – usually a river, lake or reservoir.
- *Recharge rate:* The length of time it takes for the well or aquifer to recover after water is pumped out.
- *Recovery:* The difference in feet between the post-test static water level and the pumping level (dynamic water level).

S

- *Saturated zone (also see water table):* The area in a well which all the pores and rock fractures are filled with water. The top of the saturated zone is called the water table.
- *Specific capacity:* The discharge rate divided by the drawdown (usually expressed as gallons per minute per foot of drawdown).
- *Static water level:* The static water level is the distance from the land surface (or the measuring point) to the water in the well under non-pumping (static) conditions.
- *Surface water:* Water in a reservoir or river basin.
- *Sustained rate of water flow (also see constant yield):* A continuous flow rate of water for a specific period of time.
- *Triggering criteria:* Statistical analysis of the vulnerability of the water source; rationale used to define different stages in a Drought Contingency Plan.

W

- *Water-intake pump (also see well pump)*: A mechanical device used to withdraw water from a water body (reservoir, lake or river).
- *Water loss audit (also see leak detection program)*: Represents the efforts of water utilities to provide accountability in their operation by consistently assessing their water supplies and implementing controls to minimize system losses.
- *Water table*: The upper surface of the zone of saturation.
- *Watermaster*: Divides the water in their areas based on the adjudicated water rights, regulate as necessary the controlling works of reservoirs and diversion works, and monitor stream flows, reservoir levels, and water use.
- *Watermaster Program*: Ensures compliance with water rights by monitoring stream flows, reservoir levels, and water use.
- *Well depth*: Total depth of the well is the distance from land surface to the bottom of the bore.
- *Well pump (also see water-intake pump)*: A mechanical device using suction or pressure to withdraw water from a well.
- *Well recovery rate*: The rate, in gallons per minute, at which water in the well returns to its static water level after the pump is turned off.

Y

- *Yield*: The amount of water measured in gallons per minute a well produces when pumped.

WORKSHEET 1A. GROUNDWATER LEVEL MEASUREMENTS: USING GROUNDWATER ELEVATION

This worksheet will help you maintain records of the water levels in your well. Use one worksheet for each well. Make copies if you need additional pages.

Instructions

1. Enter the date the measurements are taken in the Date column.
2. Record the depth to water in feet in Column A.
 - a. Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.
 - b. For example, 3 ft 6 in becomes $3 + (6/12) = 3 + (0.5) = 3.5$ ft
3. Calculate the groundwater elevation by subtracting the depth to water from your measuring point elevation and enter in Column B.

Example (week 1)

Depth to water = 200 ft

Measuring-point elevation = 600 ft

Groundwater elevation = measuring point elevation - depth to water

Groundwater elevation = 600 ft - 200 ft = 400 ft

Example (week 2)

Depth to water = 202 ft (measuring point is still 600 ft)

Groundwater elevation = 600 ft - 202 ft = 398 ft

4. Subtract the current week's groundwater elevation from the previous week's groundwater elevation and enter the difference in Column C.
 - a. For example, B (week 2) - B (week 1) = C (week 2)
 - b. $398 \text{ ft} - 400 \text{ ft} = -2 \text{ ft}$ (this means a 2 ft loss in water depth)
5. Enter the number of days since the last measurement in Column D.
6. Divide Column C by Column D and enter the result into Column E.
 - a. This result is the change in feet per day.
 - b. For example, $C (-2 \text{ ft}) \div D (7 \text{ days}) = -0.29 \text{ ft/day}$ loss of water
7. Continue to measure and record data for subsequent weeks to identify trends.

Note: If the groundwater elevation shows a continuous trend downward, complete Worksheet 2 to help determine what problems may exist with the well. It could be related to large drawdown, or drought conditions,

but other factors can also diminish groundwater levels. Reviewing the trends will help determine the next steps to take when evaluating your water source.

WORKSHEET 1A. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER ELEVATION

The elevation of your measuring point will not change unless you physically move the measuring point. If the measuring point changes, you will need to consider this change in your calculation.

Measuring-Point Elevation: _____

Well ID: _____

WORKSHEET 1A

Date	(A) Depth to Water (ft)	(B) Groundwater Elevation (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)
<i>Example (week 1): 10/11/12</i>	200	400	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>
<i>Example (week 2): 10/18/12</i>	202	398	-2	7	-0.29

Date	(A) Depth to Water (ft)	(B) Groundwater Elevation (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)

WORKSHEET 1B. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER LEVEL BELOW LAND SURFACE

This worksheet will help you maintain records of the water levels in your well.

Use one worksheet for each well. Make copies if you need additional pages.

Instructions

1. Enter the date the measurements are taken in the Date column.
2. Record the depth from the measuring point to the water in feet in Column A.
 - a. Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.
 - b. For example, 3 ft 6 in becomes $3 + (6/12) = 3 + (0.5) = 3.5$ ft
3. Calculate the depth to water from the land surface by subtracting the distance from your measuring point to the land surface (which does not change, as it is based on your specific measuring point in your well), from the depth to water from the measuring point and enter the result in Column B.

Example (week 1)

Depth to water from measuring point = 200 ft

Distance from the measuring point to land surface = 3 ft

Depth to water from land surface = $200 \text{ ft} - 3 \text{ ft} = 197 \text{ ft}$

Example (week 2)

Depth to water from measuring point = 198 ft

Depth to water from land surface = $198 \text{ ft} - 3 \text{ ft} = 195 \text{ ft}$

4. Subtract the current week's depth to water from the land surface from the previous week's depth to water from the land surface and enter the difference in Column C.
 - a. $B(\text{week } 2) - B(\text{week } 1) = C(\text{week } 2)$
 - b. For example, $195 \text{ ft} - 197 \text{ ft} = -2 \text{ ft}$ (This means a 2 ft loss in water depth)
5. Enter the number of days since the last measurement in Column D.
6. Divide Column C by Column D and enter in Column E. This is the change in feet per day.
 - a. For example, $C(-2 \text{ ft}) \div D(7 \text{ days}) = -0.29 \text{ ft/day}$ loss of water

Note: If the groundwater elevation shows a continuous trend downward, complete Worksheet 2 to help determine what problems may exist with the well. It could be related to large drawdown, or drought conditions, but other factors can also

diminish groundwater levels. Reviewing the trends will help determine the next steps to take when evaluating your water source.

WORKSHEET 1B. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER LEVEL BELOW LAND SURFACE

The elevation of your measuring point will not change unless you physically move the measuring point. If the measuring point changes, you will need to consider this change in your calculation.

Distance to the land surface from the measuring point: _____

Well ID: _____

Worksheet 1B

Date	(A) Depth to Water from Measuring Point (ft)	(B) Depth to Water from Land Surface (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)
<i>Example (week 1): 10/11/12</i>	200	197	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>
<i>Example (week 2): 10/18/12</i>	198	195	-2	7	-0.29

Date	(A) Depth to Water from Measuring Point (ft)	(B) Depth to Water from Land Surface (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)

WORKSHEET 2. TROUBLESHOOTING A GROUNDWATER WELL

It is critical that you determine the effect of drought on your PWS. This worksheet will help you determine if your source water is being affected by drought.

Has your system experienced any of the following conditions?

Worksheet 2: Conditions

Condition	Is the condition present?	Notes: <i>When did you notice the problem?</i> <i>What did you notice?</i>
Pump cavitations	Yes No	
Pumping sand	Yes No	
Pump lowered to bottom of well	Yes No	
Pump lowered within the last year	Yes No	
Reduced daily well production	Yes No	
Increased pump run times or pump hours	Yes No	
Increased electricity usage	Yes No	

Note: If you answered “Yes” to any of the above questions, you should consider taking one or more of the actions on the following page — Troubleshooting a Groundwater Well.

WORKSHEET 2. TROUBLESHOOTING A GROUNDWATER WELL

Worksheet 2: Action

Action	Date	Results
Conduct a well test (measure the time it takes for the well to recover after being pumped)		
Determine current static water level of well and compare to previous levels		
Contact the groundwater conservation district* for assistance		
Contact a well driller for assistance		

*Information on GCDs can be found in the “Helpful Contacts” section of this document, or on their website at www.twdb.texas.gov/groundwater/conservation_districts/.

Fill in the blanks next to the items listed below to help determine whether your groundwater supply may be affected by drought conditions:

_____ ft well depth
 _____ ft pump depth when constructed
 _____ ft current pump depth (if moved since construction)
 _____ ft static water level

If you have lowered the pump, or water levels have fluctuated, options to explore include:

- Review and implement your DCP.
- Consider an interconnection with another public water supply.
- Consider drilling another well.
- Consider video logging the well to identify physical problems. This may lead to a decision to conduct well rehabilitation.
- Find an alternative source.
- Contact the TCEQ for assistance at 800-447-2827, or visit the drought webpage at www.tceq.texas.gov/response/drought for more information.

WORKSHEET 3. MEASURING THE SURFACE WATER LEVEL

This worksheet will help you maintain records of the water levels in your reservoir. Make copies if you need additional pages.

Instructions

1. Enter the date in the Date column.
2. Record the elevation of your water source in Column A in feet (ft) above mean sea level (msl) (published on the TWDB, USGS, or USGI website or by physically measuring the depth).
3. Enter the depth to the intake, in feet, in Column B.
 - a. Determine the depth to the intake by subtracting the elevation of your intake from the water elevation published online (A), or by physically measuring the depth to your intake (recommend weekly measurements).
 - b. Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.
 - c. For example, 6 ft 3 in becomes $6 + (3/12) = 6 + (0.25) = 6.25$ ft

Example (week 1)

Source water elevation = 200 ft

Depth to intake = 20 ft

4. Subtract the current week's depth to the intake from the previous week's depth to intake and enter the difference in Column C.

Example (week 2)

$B(\text{week } 2) - B(\text{week } 1) = C(\text{week } 2)$

$19 \text{ ft} - 20 \text{ ft} = -1 \text{ ft}$ (This means a loss of 1 ft water depth)

5. Enter the number of days since the last measurement in Column D.
6. Divide Column C by Column D and enter into Column E. This is the change in feet per day. For example, $C(-1 \text{ ft}) \div D(7 \text{ days}) = -0.14 \text{ ft/day}$ loss of water
7. Estimate the number of days remaining by dividing Column B by Column E and enter the result in Column F.
 - a. For example, $B(19 \text{ ft}) \div E(0.14 \text{ ft}) = \sim 136$ days remaining (if no additional water is added via rain or inflows; based on current 7-day calculated water-loss rate)

Note: If the surface water levels show a continuous trend downward, it could be related to drought conditions or other factors that can affect reservoir or lake levels. Reviewing the trends will help determine the next steps to take when evaluating the water source, and whether alternative sources are needed.

WORKSHEET 3. MEASURING THE SURFACE WATER LEVEL

The elevation of your intake will not change unless you physically move the intake. If the intake has been moved, you will need to consider this change in your calculation.

Calculate: Elevation (feet above mean sea level) of raw water intake

= reservoir elevation - depth (in feet) to the intake on the same day

= _____ Elevation of raw water intake

Worksheet 3

Date	(A) Source water elevation (ft msl)	(B) Depth to the intake (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)	(F) Estimated Days Remaining = (B/E)
<i>Example (week 1): 10/11/12</i>	200	20	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>	<i>Gather 1 week's data to compare to depth next week</i>
<i>Example (week 2): 10/18/12</i>	199	19	-1	7	-0.14	136

Date	(A) Source water elevation (ft msl)	(B) Depth to the intake (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)	(F) Estimated Days Remaining = (B/E)



Managing Small Public Water Systems: Part C, Operation and Maintenance

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Introduction

This publication is Part C of a five-part series, *Managing Small Public Water Systems* (TCEQ publication series RG-501). Part C will help you:

- Create an operation and maintenance (O&M) manual for your public water system (PWS).
- Prepare a schedule to perform preventive and general maintenance.
- Maintain records to demonstrate compliance with all requirements.
- Address specific PWS requirements.

Part C also contains worksheets and tracking charts to help you develop your O&M manual and maintenance schedule.

As you work through Part C, you may find it beneficial to review other parts of the series to help you prepare a comprehensive O&M program. An electronic version of the series is available at the TCEQ Small Business and Local Government Assistance Section's Public Water Supply Compliance Resources webpage at www.tceq.texas.gov/goto/help4pws. If you do not have Internet access, call the SBLGA's hotline at 800-447-2827 to request a paper copy of the complete series *Managing Small Public Water Systems* (TCEQ publication RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at www.tceq.texas.gov/goto/TAC30.

Implementing an Operation and Maintenance Program

This document (Part C) is designed to help you—the manager or operator of a small public water system (PWS)—put together an operation and maintenance (O&M) manual to keep the system's infrastructure and equipment (assets) in good working condition, extend their useful life, and avoid some of the common O&M violations. Included are many of the forms required by the TCEQ to maintain compliance.

In RG-501a, *Asset Management* (Part A), you developed an asset management plan for your PWS. You will find Part A very useful when developing your Operation and

Maintenance Program as it contains important information about your assets (equipment) including its age and condition.

Benefits of an O&M Program

The safety of your PWS may be threatened without an effective O&M manual and maintenance schedule (collectively known as an O&M program).

A comprehensive O&M program can help you:

- Save you money by reducing the frequency that expensive assets need to be replaced.
- Estimate expenses for future repairs and replacement of PWS assets.
- Maintain compliance with state and federal environmental rules.

Common O&M Violations

Frequent O&M violations of the TCEQ's rules for PWSs include failure to:

- Inspect the system's pressure tanks, ground storage tanks, and elevated storage tanks annually [30 TAC 290.46(m)(1)].
- Maintain an accurate and up-to-date map of the distribution system, including valves, hydrants, and mains [30 TAC 290.46(n)(2)].
- Inspect pressure tanks to ensure that they are watertight, that pressure-release valves and pressure gauges are working properly, and that the air-to-water ratio is maintained at the proper level [30 TAC 290.46(m)(1)(B)].
- Inspect the interior of all pressure tanks with inspection ports at least every five years [30 TAC 290.46(m)(1)(B)].
- Flush all dead-end mains each month. Dead-end lines and other mains need to be flushed if there are water-quality complaints or if the disinfectant residuals fall below acceptable levels [30 TAC 290.46(l)].
- Post a sign with the name of the water supply and an emergency telephone number of a responsible system official at each of the production, treatment, and storage facilities. The sign must be legible and in plain sight of the public [30 TAC 290.46(t)].

Your O&M Manual

A comprehensive O&M manual will help you keep track of your inspections, equipment, operations, staff, and the maintenance you've done—or need to do—on your system. The following pages form a basic template for an O&M manual. Please remember to update and revise your manual when changes are made at your PWS.

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Public Water Supply Operation and Maintenance Manual

Record your PWS customer information in the table on this page, which will be the title page of your O&M manual.

Table 1

PWS Data	Your PWS Information
PWS Name	
PWS ID Number	
TCEQ Regulated Entity No. (RN)	
TCEQ Customer Reference No. (CN)	
Date	

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1. Facility Description

Describe your PWS. Include the following information in your description (attached additional pages as needed):

- Water source (aquifer, surface water body, or source of purchased water).
- Emergency interconnections or backup water sources.
- Number of connections (or population).
- Capacity and locations of all pressure tanks, ground storage tanks, and elevated storage tanks.
- Well information, identify each well with the:
 - PWS well name.
 - TCEQ well identification number (PWS ID number followed by a letter).
 - Well depths.
 - A copy of each well driller's log.
 - Location of each well.
 - Date well was drilled.
 - Well pump capacity.
- Distribution map: size of mains, type of pipe (if known), valves, hydrants, location of sampling sites, etc.

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Maps and Supporting Documents

Insert the distribution map, driller's logs, and other supporting documents here.

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2. Start-up and Operating Procedures

Describe your daily, weekly, and monthly operating procedures such as testing water, checking chemical feeds, and washing filters. Describe start-up activities such as the sequence of turning on pumps and equipment. Include a diagram or map of the plant showing details for each piece of equipment.

Daily Procedures

Weekly Procedures

Monthly Procedures

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Plant Map

Insert a map of the plant with all equipment identified here. Include equipment manufacturers, suppliers, and any warranty information.

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3. Routine Maintenance

Describe the routine maintenance performed on all equipment, such as wells, flow meters, pumps, pressure tanks, vehicles, and storage tanks. Indicate when the maintenance takes place, i.e. daily, weekly, monthly, quarterly, etc.

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Housekeeping Schedules

Insert your housekeeping schedules here.

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4. Records and Reporting

Describe daily, weekly, monthly, and annual recordkeeping and reporting requirements. These requirements should include keeping records of:

- Construction and repairs of the water system facilities (including distribution lines).
- Responses to emergencies (such as water outages, major leaks, natural disasters, etc.).
- Certifications and permits, if any, associated with the water plant (such as operator licenses, maps, utility easements, etc.).

Note: A complete table for monitoring, reporting, and record keeping is available in the Compliance module of this series (RG-501d).

Track the disinfectant residual, disinfectant usage, and water production using the charts at the end of this module.

Daily Records or Reports

Weekly Records or Reports

Monthly Records or Reports

Annual Records or Reports

5. Tracking Charts

Tracking Chart 1. Disinfectant Residual

Instructions

Use this chart to document the disinfectant residual at representative locations in the distribution system weekly. Make copies if additional pages are needed. If you have several locations to sample each week, use a separate table for each location, and identify the specific location on each tracking chart used. Transfer your readings to a Disinfectant Level Quarterly Operating Report (DLQOR) form every quarter.

Table 2

Data	Your Information
PWS No.:	
Year:	
Sample Location:	
Reagent Name (for example, DPD colorimetric reagent):	
Date Sampling Kit Purchased:	

Table 3

Week of Month	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1												
2												
3												
4												
5												

Notes

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Tracking Chart 2. Disinfectant Usage

Instructions

Use this chart to record the amount of chemical disinfectant added to the water each week. Make copies if additional pages are needed.

Table 4 - Quantity of disinfectant added (gallons, cups, or ounces) per week

Week of Month	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1												
2												
3												
4												
5												

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Tracking Chart 3. Water Production

Instructions

Use this chart to record the number of gallons of water treated each week. Make copies if additional pages are needed.

Table 5 - Quantity of water treated (gallons) per week

Week of Month	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1												
2												
3												
4												
5												

Notes

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6. Monitoring Plan (Sampling and Analysis)

Insert your monitoring plan here.

Note: All public water systems are required to maintain an up-to-date chemical and microbiological monitoring plan [30 TAC 290.121].

Make sure that your PWS monitoring plan identifies all the sampling locations, describes the sampling frequency, and specifies the analytical procedures and laboratories that the PWS will use [30 TAC 290.121(b)].

For guidance on developing your monitoring plan, (1) refer to “Sampling Requirements” in Part D of this series, Compliance (RG-501d) (2) go to our Public Water System Monitoring Plans webpage at www.tceq.texas.gov/drinkingwater/monitoring_plans/monitoring_plans.html.

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7. Staffing and Training

List the members of your staff (both full and part-time personnel), with their job titles, duties, licenses and certifications and training requirements. *Note:* Information on operator licensing is available in the Resources portion of this series (RG-501e).

Table 6: Staff and Training

Staff	Status (full-or part-time)	Job title	Job Duties	Licenses & Certifications	Training Requirements

Staff	Status (full-or part-time)	Job title	Job Duties	Licenses & Certifications	Training Requirements

8. Licensed Operators List

Your O&M manual should include a list of all operators and operating companies that your PWS uses. You may use Table 6 to record this information.

Note: Every year you must submit a list of all operators and operating companies that your PWS uses to the TCEQ [30 TAC Section 290.46(p)(2)]. The TCEQ's Public Drinking Water Section has developed an online Operator Notice Form that you can use to submit your annual list; the form is available at www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/tcr/Operator%20Notice%20Form.pdf. You can also print this form, complete it by hand, and submit it as indicated on the form by mail, e-mail or facsimile.

Table 6

Name of Operator or Operating Company (or both if appropriate)	Operator Contact Information	Operator Work Status (full, part-time or volunteer)	Operator License Number	Operator License Class	Operator License Expiration	Operating Company Registration Number (if applicable)

Name of Operator or Operating Company (or both if appropriate)	Operator Contact Information	Operator Work Status (full, part- time or volunteer)	Operator License Number	Operator License Class	Operator License Expiration	Operating Company Registration Number (if applicable)

Guidance on Specific PWS Requirements

Additional requirements that you may need to address at your PWS are discussed in this section. You must determine the applicability of each of these requirements for your PWS.

Revised Total Coliform Rule (RTCR)

The federal RTCR protects public health by reducing potential pathways for fecal contamination into public drinking water distribution systems. All PWSs must comply with the RTCR requirements that became effective on April 1, 2016.

The RTCR establishes a maximum contaminant level for *Escherichia coli* (*E.coli*) and uses *E.coli* and total coliforms to initiate a "find and fix" approach to prevent fecal contamination from entering the distribution system. This rule also requires PWSs to identify sanitary defects and correct them.

The TCEQ's Federal Revised Total Coliform Rule webpage at www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule provides resources and information about how to comply with the RTCR requirements, including:

- Forms and instructions.
- Sample siting plan template.
- Sample siting plan map example.
- Start-up procedures for seasonal PWSs.
- Getting help through our Financial, Managerial, and Technical (FMT) Assistance Program.

Lead and Copper Rule (LCR)

The federal LCR protects public health by minimizing lead and copper levels in drinking water, primarily by reducing corrosivity. **All community water systems and non-transient non-community water systems are subject to the LCR requirements.**

The TCEQ's Drinking Water Lead and Copper Program webpage at www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html provides resources and information about how to comply with the LCR, including:

- Guidance on rules.
- Forms and instructions.

- Laboratory information.
- Sampling instructions and guidance.

Disinfectant Level Quarterly Operating Report (DLQOR)

All community and nontransient, noncommunity PWSs that **use only purchased water or groundwater** must monitor the level of disinfectant in the distribution system and use the DLQOR form to report this information to the TCEQ quarterly.

DLQORs may only be submitted by mail or electronically using the TCEQ's Electronic Environmental Reporting System (E2).

The TCEQ's Residual Disinfectant Reporting for Public Water Systems webpage at <www.tceq.texas.gov/drinkingwater/disinfection/dl_qor/index.html> provides resources and information how to comply with DLQOR, including:

- Forms and worksheets.
- Guidance documents.
- Instructions on how to use E2.

Surface Water Monthly Operating Report (SWMOR)

If your PWS treats **surface water or groundwater under the direct influence of surface water**, you must submit SWMORs.

The TCEQ's SWMORs webpage at <www.tceq.texas.gov/drinkingwater/swmor/swmor/swmor-forms-and-instructions> provides forms, instructions, and guidance for SWMORs.

Blending Chloraminated and Chlorinated Waters

If you plan to blend chloraminated and chlorinated water or use both free chlorine and chloramines as disinfectants in the distribution system, you are required to request an exception. ***Your exception request must be granted before you begin blending.***

The PWS's owner, representative, or professional engineer must submit the exception request to the TCEQ in writing. Your request must provide the applicable information described under the Treatment Options heading of this guidance for the specific treatment option (Option 1 or 2) that your PWS uses.

The TCEQ's Requesting an Exception to Rules and Regulations for Public Water Systems webpage at <www.tceq.texas.gov/drinkingwater/trot/exception> provides

additional guidance on the exception request process. Submit your exception request to:

Technical Review and Oversight Team (MC 159)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711- 3087

For more information about preparing an exception request for blending chloraminated and chlorinated waters, see the TCEQ's:

- Requesting an Exception for Blending Chloraminated and Chlorinated Waters checklist at www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Blending_Chloramines_Checklist.pdf.
- Staff guidance on Blending Chlorine and Chloramines at www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Blending_Chlorine_and_Chloramines_SG.pdf.

Blending Treatment Options

Option 1: Chloraminated and Chlorinated Water in the Distribution System

For managed controlled blending: A PWS must develop a method that will ensure chlorine residuals will remain acceptable in a blended distribution system by injecting the appropriate amount of chlorine in one set of water sources to combine with free ammonia present in the chloraminated water.

For this option, your exception request should document:

- How the areas of blending were determined.
- How the areas of blending will be determined during actual operations.
- Sampling type and frequency that the PWS will perform to ensure adequate chlorine/chloramine residuals.
- Sampling type and frequency that the PWS will perform to ensure monochloramine, not di- nor tri-chloramine is being formed.
- Sampling type and frequency that the PWS will perform to ensure nitrification is not present in the blending area.

- Corrective actions to be taken if the sampling shows inadequate disinfectant residuals, taste and odor issues, bacteriological sample issues, or potential nitrification.

For physically isolated areas of the distribution with free chlorine from areas with chloramines: A PWS can eliminate blending in the distribution system by physically isolating the chlorinated and chloraminated water.

For this option, your exception request should include a drawing:

- Of the water treatment systems showing how the treatment systems will be divided.
- Identifying which area(s) will be disinfected by free chlorine and which area(s) will be disinfected by chloramines.

Option 2: Blending Chloraminated and Chlorinated Water in a Tank

Ensure chloramine formation after mixing the sources in the tank: A PWS must develop a method that will ensure that chlorine residuals will remain acceptable in treated water leaving the tank by injecting the appropriate amount of chlorine and ammonia at all times.

For this option, your exception request should document:

- That the tank is completely mixed.
- Free chlorine, total chlorine, free ammonia, and monochloramine sampling locations and frequency that the PWS will perform to know the appropriate amount of chlorine and ammonia dose.
- Calculations used to determine the dose of chlorine and ammonia to apply.
- Sample type and frequency that the PWS will perform to ensure monochloramine—not di- nor tri-chloramine—is being formed.
- Corrective actions to be taken if the sampling shows inadequate disinfectant residuals, taste and odor issues, bacteriological sample issues, or potential nitrification.

Nitrification Action Plan (NAP)

The purpose of a NAP is to ensure that chloramine disinfection is successful by preventing nitrification, responding to nitrification or both. Any water system distributing chloraminated water must maintain a written NAP as part of the system's

O&M manual. The NAP must be maintained as part of the PWS's monitoring plan (30 TAC Chapter 290.121) and it must contain:

- System-specific plan for monitoring free ammonia, monochloramine, total chlorine, nitrite, and nitrate levels.
- System-specific action levels of the above monitored chemicals where action must be taken.
- Specific corrective actions to be taken if the action levels are exceeded.

Go to the TCEQ's webpage, Controlling Nitrification in Public Water Systems with Chloramines at <www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html>, for additional guidance on the rules or for resources to help you develop your NAP.

The webpage includes links to:

- **NAP guidance** – one-page sheet that provides basic information about developing your NAP.
- **NAP summary** – more in-depth discussion about NAPs.
- **NAP template** – provides explanation, examples, and a template to help you develop your NAP.

Free, on-site training is available through the TCEQ's FMT program. Call the Water Supply Division at (512) 239-4691 and request the Chloramination and/or Nitrification Action Plan Directed Assistance Modules, or go to the TCEQ's Assistance for Public Drinking Water and Wastewater Systems webpage at <www.tceq.texas.gov/drinkingwater/fmt> to learn more about the FMT Assistance Program.

Water Storage Tank Inspections

TCEQ requires documentation of **annual** ground, elevated, and pressure storage tank maintenance inspections [30 TAC 290.46(f)(3)(D)(ii), 290.46(m)(1), and 290.46(m)(2)]. Water system personnel or a contracted inspection service provider can complete inspections.

To meet this requirement use the Potable Water Storage Tank Inspection Form in the next section of this document. A downloadable version of the form is available on the TCEQ's Public Water Supply: Compliance Resources webpage at <www.tceq.texas.gov/assistance/water/pdws>. Click the Water Tank Inspection Form link located under the "Tools" heading to access the form from our webpage.

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POTABLE WATER STORAGE TANK

Inspection Form

Section 290.46(f)(3)(D)(ii) of the Texas Commission on Environmental Quality's *Rules and Regulations for Public Water Systems* requires documentation of annual ground, elevated, and pressure storage tank maintenance inspections. [See also 290.46(m)(1) and 290.46(m)(2)]

Location:
Description:
Date & Material of Exterior Coating System:
Date & Material of Interior Coating System:

Exterior of Tank

O.K.	Problem	NA	Description
			<i>Foundation:</i> settling, cracks, deterioration
			<i>Protective Coating:</i> rust, pitting, corrosion, leaks
			<i>Water Level Indicator:</i> operable, cable access opening protected
			<i>Overflow Pipe:</i> flap valve cover accessible, operable, sealed
			<i>Access Ladder:</i> loose bolts or rungs
			<i>Roof:</i> low spots for ponding water, holes along seams, rust
			<i>Air Vents:</i> proper design, screened, sealed edges and seams
			<i>Cathodic Protection Anode Plates:</i> secured and sealed
			<i>Roof Hatch:</i> proper design, locked, hinge bolts secured, gasket
			<i>Pressure Tank Operational Status:</i> pressure release device, pressure gauge, air-water volume device

Interior of Tank

O.K.	Problem	NA	Description
			<i>Water Quality:</i> insects, floating debris, sediment on the bottom
			<i>Protective Coating:</i> rust, corrosion, scaling
Date:			Last Inspection of Pressure Tank Interior

Comments

Name of Inspector:
Date of Inspection:



Managing Small Public Water Systems: Part D, Compliance

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Introduction

The State of Texas has numerous regulations regarding the operation of public water systems. These regulations focus primarily on protecting the health and welfare of people. To help ensure compliance with these regulations, the TCEQ conducts investigations, provides assistance, and—when necessary, may pursue enforcement actions to ensure safe drinking water.

Part D of *Managing Small Public Water Systems* is designed to help you—the manager or operator of a small public water system (PWS)—become familiar with the rules for operating small public water systems, and understand the investigation and enforcement process.

This document covers:

- how to get organized to demonstrate compliance with the rules
- requirements for monitoring, reporting, and record keeping
- common violations related to drinking water
- an enforcement scenario for a water system

To view or download the complete series of this guide, go to the TCEQ Web page Water Compliance Resources <www.tceq.texas.gov/assistance/water>.

If you do not have Internet access, call SBLGA's hotline number, 800-447-2827, for a paper copy of the complete series.

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <[texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=290](http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=290)>.

Compliance

All owners of drinking-water systems are required to report the status of their compliance with the rules. All records required by the rules must be retained at the plant site or be easily available for review by a TCEQ representative. This is one way an investigator evaluates compliance.

General Compliance: Questions and Answers

There's so much to do. Where do I start?

1. **Obtain a copy of the rules.** Keep a copy of the rules in your official records **and** a working copy readily available. Make notes on them, highlight important information, and use them to help you achieve and maintain compliance.
2. **Become the expert.** Know the requirements for your system and keep track of those requirements using charts, logs, or other methods. The tables at the end of this module and the Operations and Maintenance Manual in Part C will help you get started, or you can develop your own system for tracking your requirements.
3. **Develop and maintain a filing system.** Keep all records of monitoring and reporting activities—including supporting documents, such as your sampling and monitoring plans—in a file by month and year. Be diligent in maintaining your filing system. Include copies of correspondence with the TCEQ, engineers, and personnel.
4. **Train your staff.** Once you have your filing system in place, train other personnel on how it is organized. Periodic refresher training is advisable—especially when new employees are hired.
5. **Seek help.** If you need help getting organized or help with compliance, read the section “I Need More Help with Compliance” later in this module.

What are some of the records I need to keep?

Operation and maintenance records

- routine maintenance records for equipment
- records of construction and repairs to the water system and distribution lines
- staffing and training records
- documentation of start-up and operating procedures

Part C of this series, *Operations and Maintenance*, contains useful tools and tables to assist with some requirements related to keeping these records.

Laboratory and sampling records

- sampling records noting the date, time, and location of sampling; the name of the individual who took the sample or measurement; the sample type; and any preservation information
- laboratory reports, noting the analyst's name, the date and time of analysis, the method of analysis or measurement, quality-assurance data for each sample set, and a copy of the completed chain-of-custody form
- calibration records for lab instruments, such as readings of pH meters, chlorine analyzers, and turbidimeters
- records of in-house lab analyses, if applicable

Self-monitoring records

Records of:

- disinfectant residual monitoring
- water production
- amounts of chemicals used

How long must records be retained?

Your system is required to maintain records of all operation and maintenance activities. It is important to keep these records organized, either in a paper file or stored electronically, so they can be accessed for review during inspections. For a detailed list of required records and retention time of these records, read 30 TAC 290.46(f).^{*} Use the Record-Retention Guide at the end of this module as a quick reference.

What are some of the reports I may need to submit?

The chart Monitoring, Reporting, and Record-Keeping Requirements at the end of this module lists some of the reports you may need to submit. This chart is a good tool to help you keep track of your specific monitoring and reporting frequencies and which documents need to be submitted to the TCEQ or kept on-site.

^{*} Short for 'Title 30, Texas Administrative Code, Subsection 290.46(f).'

Where can I find help with submitting reports?

The same chart also lists resources where you can find assistance with each requirement such as completing Monthly Operating Reports, Consumer Confidence Reports, and Public Notices.

I am scheduled for an investigation by our regional investigator. What should I do?

Investigations can be stressful, but there are steps you can take to reduce the stress:

- **Allocate time.** Schedule the investigation when you can devote uninterrupted time with your investigator. It isn't always possible to attend meetings without outside distractions, but it is always best to avoid unnecessary interruptions if possible.
- **Ask questions.** If you have questions or concerns about the investigation, ask the investigator before the meeting. The investigator will answer your questions, allowing you to better prepare. Ask about the extent of the investigation. Some investigations are focused on specific processes or areas. During the exit interview, ask about potential violations, if any, and try to correct them as soon as possible.
- **Be prepared.** Record keeping is one of the most important elements of maintaining and demonstrating compliance with regulatory requirements. Make sure your records are readily available and in good order prior to the investigator's arrival.
- **Be helpful.** Answer all of the investigator's questions honestly and thoroughly. If any information you supply is proprietary or if any areas of your facility contain proprietary information, let the investigator know. Otherwise, the information becomes part of the agency's public record. The same applies to photographs of your facility or operations.

The investigator plans to sample. What are my options?

Sampling may be required during routine investigations. When the investigator calls to schedule an investigation, ask if sampling will be conducted. You may have the option to split samples with the investigator. If you plan to conduct sample splits, make sure you have the necessary equipment and tools available for sampling the specified medium.

What records do I need to have available for an investigation?

Records required to be available to the TCEQ investigator will depend on the size and type of system you operate. For general guidance to help prepare for an investigation go to <www.tceq.texas.gov/assets/public/assistance/sblga/pws_records_required.pdf>. Some records listed may not be applicable for your specific system.

I Need More Help with Compliance

You can find more help at our Public Water Supply: Compliance Resources Web page at <www.tceq.texas.gov/goto/help4pws> for small-business owners and local governments that operate public water systems in Texas. Some of the resources include:

- compliance checklists
- rules and guidance documents for public water systems
- a discussion of operator licensing and requirements
- operations and management resources

Another resource offered by the SBLGA section is the EnviroMentor Program. This assistance is free and confidential and does not lead to inspections, citations, or fines.

EnviroMentors are qualified professionals with technical or legal expertise on environmental issues. They volunteer to help small businesses, local governments, and independent school districts with state environmental rules. Many EnviroMentors are private-sector consultants—some are engineers; others are successful professionals (for example, a water-system operator) who give peer-to-peer advice.

To receive free, confidential help from an EnviroMentor, you must:

- be a small business with 100 or fewer employees, or a local government (a city with population of 50,000 or less, or a county with 100,000 or less) or an independent school district with 100,000 students or less
- be unable to afford to hire a consultant
- be committed to complying with state rules to protect the environment, and to correcting violations as soon as possible

The TCEQ also has a program called Financial, Managerial and Technical Assistance. It pays contractors to help public water systems and wastewater systems comply with the regulations.

For more information about either program, please call the SBLGA Hotline at 800-447-2827.

Drinking-Water Violations: Questions and Answers

I received a Notice of Violation for my public water system. Is it serious?

It depends on the type of violation. An NOV means your facility is out of compliance with one or more rules. Violations are categorized based on the severity of their threat to human health or the environment.

Category A violations are the most serious, while Category B and C violations pose a less severe threat.

I received a Notice of Enforcement instead of an NOV; what does that mean?

When a violation is discovered either during an inspection at the regulated entity's location or through a records review, the investigator will determine the category of the violation as listed in the enforcement initiation criteria. Most violations are quickly corrected in response to Notices of Violation. An NOV documents the violations discovered during the inspection, specifies a time frame to respond, and requires documentation of compliance. When the regulated entity provides the required documentation, the violation is resolved.

If a Category A or consecutive repeat B violation is identified, you will be sent an NOE instead of an NOV. The NOE documents the violations and explains that the case has been referred to enforcement.

The notice also lets respondents know that they can appeal the NOE if they believe the violations were cited in error and there is new information that was not previously evaluated by the investigator.

The TCEQ is authorized to enforce correction of the violations which may include penalties to deter future noncompliance—typically through administrative orders that are issued by the TCEQ commissioners.

How do I respond to an NOV or an NOE?

The regulated entity or “respondent” must respond to the NOV or NOE, preferably in writing, within a set compliance period. The NOV or NOE will

let you know that you may request a meeting to discuss your case if you believe the violations were cited in error or new information is available that was not previously evaluated. If violations issued under an NOV are not resolved within the requested time frame, you may be issued an NOE and assessed a financial penalty.

What does “enforcement” mean?

“Enforcement” is the process used to respond to serious or continuing environmental violations by requiring corrective actions and by assessing monetary penalties against businesses or individuals for those violations.

What is an “enforcement action”?

An “enforcement action” is an action taken to obtain a legally binding obligation from a person or organization to achieve and maintain compliance.

How does the TCEQ determine whether an enforcement action is warranted?

The TCEQ conducts different types of investigations. When a violation is noted during any of these investigations, depending on the severity, it is categorized as a Category A, B, or C violation. Whether it is an on-site field investigation, a complaint investigation or a record review, any of these may prompt the agency to initiate enforcement action if the violation is a Category A violation or a repeat Category B violation.

I haven’t had an investigation, but I got an NOV. How did that happen?

Records-review investigations are often used to evaluate compliance. These investigations do not include an on-site visit. If the records review determines that reports sent to the TCEQ are missing information or have not been submitted at all, you may receive a Notice of Violation.

Where can I find examples of the different types of violations for drinking water—A, B, and C?

The Enforcement Initiation Criteria comprise a system for classifying violations by severity (A, B, or C), so we can determine the appropriate

level of enforcement for each violation. You may review the entire EIC online at <www.tceq.texas.gov/goto/eic>.

I have a fine. What are my options?

Pay the fine. Sometimes the TCEQ will defer part of the fine for prompt response. If you can't pay all or part of the proposed fine, you may speak with your enforcement coordinator about claiming financial inability to pay and what documents are needed for evaluating your claim.

A payment plan may be another option. Payment plans are frequently worked out between respondents and their enforcement coordinator if they indicate that they cannot pay the entire penalty in one payment. You can also participate in a Supplemental Environmental Project.

What is a Supplemental Environmental Project?

A SEP is a project that prevents pollution, reduces the amount of pollution reaching the environment or enhances its quality, or contributes to public awareness of environmental matters. You may negotiate an agreement to perform a SEP in return for an offset of the administrative penalty; local governments may be able to offset 100 percent. It is extremely important to contact your enforcement coordinator early in the enforcement process to see if you are eligible for a SEP project. Visit the SEP Web page for more information at <www.tceq.texas.gov/legal/sep>.

When is an agreement made?

An agreed order is used when you agree to the terms and conditions of the administrative order, which may include technical requirements and a penalty. Once you agree with the terms and conditions set forth in the proposed agreed order and the penalty amount, the case is set for approval at either the TCEQ commissioners' or the executive director's agenda meeting, held monthly in our central office. The commissioners or the executive director makes a final decision about the penalty the respondent must pay. After the agenda meeting, you can settle the case by paying the penalty and signing the order within 60 days of receiving it.

Can I contest the enforcement action?

Yes, if you contest the enforcement action or do not settle the case within 60 days of the date on the letter, the case is referred to our Litigation Division. You may request an administrative hearing, which is held in

front of an administrative law judge with the State Office of Administrative Hearings. However, a settlement could still occur at any time before a final decision on the enforcement order. You will receive an Executive Director's Preliminary Report and Petition (EDPRP), notifying you of the violations, the penalty assessed and of any corrective actions needed to come into compliance with the regulations. This document is not an order, but a petition filed with our Chief Clerk's Office to start the administrative-hearing process. After the hearing, the judge makes a recommendation to the TCEQ commissioners about an enforcement order. At an agenda meeting, the commissioners consider this recommendation and then make the final decision whether to issue, deny, or modify the judge's decision.

What is a default order?

If a respondent does not file a timely answer to the EDPRP, the commissioners may issue a default order. If the respondent fails to comply with the default order, then the executive director may refer the case to the Office of the Attorney General for civil enforcement in a court of law.

When does the process end for an enforcement case with an agreed order?

Once the respondent complies with the enforcement order, including payment of any penalty and compliance with all technical requirements of the order, the TCEQ will send a letter to the respondent indicating that the requirements of the order have been fulfilled. The respondent is responsible for meeting the terms of the agreed order for five years after its effective date.

Where can I get more information about investigations, violations, and enforcement?

The publications *The TCEQ Has Inspected Your Business. What Does This Mean to You?* (RG-344) and *Penalty Policy* (RG-253) discuss investigations and enforcement. These publications can be viewed or downloaded at <www.tceq.texas.gov/publications/search-pubs> by entering the publication number in the search box. You may also call 512-239-0028 to get a copy.

Common Drinking-Water Violations

Which violations can result in automatic enforcement for a water system?

The following Category A violations are examples of what may be discovered during an on-site investigation or during a records review by regional or central-office personnel.

- Failure to:
 - obtain approval for plans and specifications
 - provide treatment facilities necessary to meet the minimum surface water-treatment requirements of 30 TAC 290.42 and 290.111
 - provide disinfection equipment to maintain the required minimum disinfection residual
 - issue a Boil Water notice within 24 hours
- If the TCEQ determines that the system's water source is considered groundwater under the influence of surface water, or GUI, then the system must begin proper treatment of the water within 18 months of that determination
- Second occurrence of an investigator-documented low pressure (< 20 psi) within a period of 12 months when the cause was preventable by proper operation and maintenance
- Second occurrence of an outage for the same cause when the cause was preventable by proper operation and maintenance
- Greater than 50 percent deficiency of capacity requirements
- Failure to notify the commission of system reactivation in writing

Monitoring and reporting violations

Water systems are required to monitor the water quality to make sure it is safe for public consumption. Since some contaminants have a greater potential to make people sick, there are stricter consequences for failing to monitor and report these water quality parameters. A point-based system is used for ranking the severity and frequency of violations, giving more points for more severe violations.

Water systems that exceed the point threshold will escalate to formal enforcement action. The point system weighs the following violations more heavily, making it easier for a water system to reach the point threshold if they experience these violations:

- repeat monitoring violations of the Revised Total Coliform Rule
- monitoring and reporting violations related to nitrates
- other health-based violations

You can learn more about the point system on the TCEQ's Web page: www.tceq.texas.gov/goto/dwer. At the end of this document, you can find tables outlining the requirements for sampling, reporting, record keeping, and monitoring that a water system must follow. Use these tables to help stay in compliance with the TCEQ's requirements and avoid violations.

Example Drinking-Water Enforcement Scenario

Purpose

The purpose of this scenario is to show how a small water system can go to enforcement for reporting violations found during a TCEQ records review, even when no major violations are discovered during an investigation.

Background on the drinking-water system

Coldwater Creek Water Supply Corporation is a fictitious groundwater system which serves 200 customers on the outskirts of Medium City.

Violations found during a comprehensive compliance investigation

The water system received a routine compliance investigation by regional TCEQ personnel, which resulted in the following violations:

- The intruder-resistant fence was not high enough.
- The well house had a small hole near the foundation that showed evidence of rodent activity.

Actions taken to resolve the violations

Within a week of the investigation, the water system corrected the violations and documented its compliance **in writing** by submitting receipts for fencing supplies and labor, as well as photographs of the fencing and the repair to the well house.

Did the water system receive formal notice of these violations?

No. An NOV was not issued to the system since it quickly resolved the violations noted during the investigation.

Was an enforcement action initiated due to the investigation findings?

No. The regional investigation didn't result in an NOE. However, the water system received an NOE from the TCEQ's Enforcement Division for violating the agency's monitoring requirements, along with not preparing and submitting the certificate of delivery for its Consumer Confidence Report (CCR), which are Category A violations. The NOE resulted in an agreed order.

Why did the water system end up in enforcement even though it resolved the violations noted during the investigation?

Enforcement actions can be initiated either as a result of an on-site investigation **or** from a records review by the TCEQ's regional or central office.

During a routine records review, TCEQ discovered that some Disinfectant Level Quarterly Operating Reports (DLQORs) and the CCR certificate were missing.

How were the violations resolved?

The system was issued an agreed order requiring it to submit the CCR certificate of delivery and to begin submitting DLQORs to the TCEQ on time. This requirement will be satisfied upon two consecutive quarters of compliant reporting.

Conclusion

A records review conducted by the regional or central office in Austin can generate its own set of enforcement actions.

Table: Groundwater-System Sampling

How will this table assist with the required sampling at my water system?

All public water systems are required to sample for chemical and microbiological contaminants. The types of contaminants and monitoring frequency are dependent upon the type of PWS and sample results history.

You can go to the Drinking Water Watch Web page <www.tceq.texas.gov/goto/dww> to verify information about your water system, including sample results and sampling schedules for your facility. This table provides you with the water quality sampling schedule for both community and non-transient non-community water systems that use groundwater as their only source of drinking water. Use this chart to check whether you are complying with the sampling requirements. Please note that sampling requirements can become complex for a water system when sample results indicate contaminant exceedances. For additional assistance please contact the Water Supply Division at 512-239-4691.

How do we determine the cost for required sampling at my water system?

Use the online tool <www.tceq.texas.gov/goto/costestimate> to calculate the expected sampling costs for your water system. The tool takes you through a step-by-step process to first determine which specific samples a water system must collect and analyze, then you can enter this information into the cost-estimate tool to determine total expected cost.

Definitions and Abbreviations

Entry point—Where the finished (treated) water enters the distribution system

HAA5—the five most common haloacetic acids

MCL—maximum contaminant level

NELAP—National Environmental Laboratory Accreditation Program

Raw water—water before treatment

SOCs—synthetic organic compounds

30 TAC—Title 30, Texas Administrative Code

TTHM—total trihalomethanes

VOCs—volatile organic compounds

PWS Routine Sampling Requirements

Community and Non-Transient Non-Community Groundwater Systems

Sample Type	Number of Samples, Frequency	NELAP LAB Required?	Who Collects?
<i>Raw-Water Sampling</i>			
Coliform bacteria ^a	Monthly ^b	Yes	Operator
<i>Entry-Point Sampling</i>			
Bromate (if using ozone)	Monthly	Yes	Operator
Chlorine dioxide (if using)	1 sample daily for each entry point using chlorine dioxide	No	Operator
Chlorite (if using chlorine dioxide)	1 sample daily for each entry point using chlorine dioxide	No	Operator
Disinfectant level	≤ 500 people = 1 sample daily 501–1,000 = 2 samples daily 1,001–2,500 = 3 samples daily 2,501–3,300 = 4 samples daily	Yes	Operator
Inorganic chemicals as listed in 30 TAC 290.106(b) except for nitrate and nitrite (see below)	Once every 3 years	Yes	TCEQ contractor
Inorganic chemicals, nitrate, 30 TAC 290.106(c)(6)	Annually	Yes	TCEQ contractor
Nitrite, 30 TAC 290.106(c)(7)	Once every 9 years		
Secondary constituents as listed in 30 TAC 290.105(b) and 290.118(b)	Once every 3 years	Yes	TCEQ contractor

Sample Type	Number of Samples, Frequency	NELAP LAB Required?	Who Collects?
Entry-Point Sampling <i>(continued)</i>			
Radionuclides (gross alpha, radium, uranium): each contaminant has a different MCL (community systems only)	Once within 90 days of initiating use of a new water source; if results are below detection limits for all contaminants, then once every 9 years If results are above half the MCL but not exceeding the MCL then contaminant is sampled once every 3 years If results are above the detection limit and below half of the MCL then contaminant is sampled once every 6 years If contaminant is detected above MCL, then contaminant must be sampled quarterly	Yes	TCEQ contractor
SOCs (includes pesticides, herbicides)	Initially, quarterly for 4 quarters, then once every 3 years if there are no exceedances or detections	Yes	TCEQ contractor
VOCs (gas, oil)	Initially, quarterly for 4 quarters, then once every 3 years if no exceedances or detections	Yes	TCEQ contractor
Lead and copper in response to a corrosion-control study under the Lead and Copper Rule in 40 CFR 141.80–141.91	Once at each entry point within 180 days from the end of the monitoring period in which the PWS exceeded lead or copper	Yes	Operator or homeowner
Water quality parameters in response to a corrosion-control study under the Lead and Copper Rule	< 500 people = 1 sample at each entry point per quarter (4 consecutive quarters total) after a PWS exceeds either lead or copper 101 to 500 people = 2 samples at each entry point per quarter (4 consecutive quarters) after a PWS exceeds either lead or copper	No	Operator

Sample Type	Number of Samples, Frequency	NELAP LAB Required?	Who Collects?
<i>Distribution-System Sampling</i>			
Asbestos (if there is asbestos cement pipe)	Once during first 3 years of each 9-year cycle	Yes	TCEQ contractor
Coliform	1 to 1,000 people = 1 sample monthly 1,001 to 2,500 people = 2 samples monthly	Yes	Operator
Disinfectant residual at representative locations, free or total chlorine	< 250 connections or < 750 people = 1 sample every 7 days ≥ 250 connections or ≥ 750 people = 1 sample daily	No	Operator
Chlorite	1 set monthly for each entry point that uses chlorine dioxide (3 samples in a set, collected on the same day)	Yes	Operator
Disinfection by-products (TTHM, HAA5)	< 500 people = 1 or 2 sample sites annually 500 to 9999 people = 1 or 2 sample sites annually	Yes	TCEQ contractor
Lead and copper—tap sampling	< 101 people = 5 samples per 6-month period (for 2 periods) 101 to 500 people = 10 samples per 6-month period (for 2 periods) 501 to 3000 people = 20 samples per 6-month period (for 2 periods)	Yes	Operator or homeowner
Water quality parameters as part of a corrosion-control study under the Lead and Copper Rule or new public water system	< 500 people = 1 sample at each entry point and at one distribution-system site per quarter (4 consecutive quarters total) 101 to 500 people = 2 samples at each entry point and at two distribution-system sites per quarter (4 consecutive quarters total)	No	Operator

^a See 30 TAC 290.109(c)(4) for rules on monitoring raw-groundwater sources.

^b Groundwater systems may be required to collect monthly raw samples if granted a rule exception by the Technical Review and Oversight Team or as a corrective action under the Ground Water Rule (40 CFR Parts 9, 141, and 142).

Table: Monitoring and Reporting

How will this chart help me monitor and keep records?

You can use the table to check the required monitoring, reporting, and record keeping that applies to your PWS. This table can also help you schedule the monitoring and reporting requirements each year. Use the resources in the column “Guidance” to learn more about each type of record. Copies of records that are sent to the TCEQ should also be kept on-site for investigations.

Monitoring and reporting requirements can become complex for a water system when sample results indicate contaminant exceedances. For additional assistance please contact the Water Supply Division at 512-239-4961.

What abbreviations are used in the table?

ANSI/NSF Standard 60—American National Standards Institute and National Sanitation Foundation

BPA—backflow-prevention assembly

BT—bladder tank(s)

C—Community public water system

DLQOR—Disinfection Level Quarterly Operating Report

ET—elevated tank(s)

GUI—source of water is groundwater under the direct influence of surface water

GST—ground storage tank(s)

GW—source of water is groundwater

MCL—maximum contaminant level

MRDL—maximum residual disinfectant level

N/A—not applicable

NTNC—non-transient non-community public water system

PE—professional engineer (licensed in Texas)

PT—pressure tank(s)

PWS—public water system

SP—standpipe(s)

SW—source of water is surface water

TNC—transient non-community public water system

Monitoring, Reporting, and Record-Keeping Requirements

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW, GUI or SW	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?	Guidance
Chlorine residual monitoring or DLQORs	Any of these	GW, GUI	< 250 connections or < 750 people	Weekly	Quarterly	C, NTNC: send to TCEQ TNC: keep on-site	RG-407— <i>Disinfectant Residual Reporting for Public Water Systems</i> : <www.tceq.texas.gov/goto/rg-407>
			≥ 250 connections or ≥ 750 people	Daily	Quarterly		
Monthly operating reports (water production, disinfectant residual, pH, temperature)	Any of these	SW (GW if providing 4-log disinfection per GW rule)	N/A	Daily	Monthly	Send to TCEQ	Fill out the report here: <www.tceq.texas.gov/goto/swmor-forms> Guidance also available: <www.tceq.texas.gov/goto/rg-211>
Accuracy testing of electronic equipment for monitoring disinfectant residual	Any of these	GW, GUI, SW	N/A	Manual analyzers: every 90 days Continuous analyzers: calibrated every 7 days, checked weekly	N/A	Keep on-site	N/A
Flushing of dead-end mains	Any of these	GW, GUI, SW	N/A	Monthly	N/A	Keep on-site	N/A

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW, GUI or SW	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?	Guidance
Bacteriological monitoring (population dependent) 30 TAC 290.107(c)(2)(A)(iii)	Any of these	GW, GUI, SW	Up to 1,000 people	1 sample monthly	Monthly	Lab will send results to TCEQ	< www.tceq.texas.gov/goto/rg-421 > TCEQ's Revised Total Coliform Rule sample siting-plan template included in Part C: <i>Operations and Maintenance</i>
			1,001–2,500 people	2 samples monthly			
Tank inspections including BT, GST, ET, SP, and PT	Any of these	GW, GUI, SW	N/A	Annually for exterior and interior of GST, ET, and SP	N/A	Keep on-site	Storage Tank Inspection Form: < www.tceq.texas.gov/assets/public/assistance/sblga/tankinspectform.pdf >
				Annually for exterior of PT and BT Once every 5 years for interior of pressure tank with an inspection port			
Well-meter calibration ^a	Any of these	GW, GUI	N/A	Every 3 years	N/A	Keep on-site	N/A
Approval of chemicals under ANSI/NSF 60	Any of these	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	ANSI/NSF website: < www.nsf.org/ >
BPA tests	Any of these	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	Official BPA Test and Maintenance Form: < www.tceq.texas.gov/assets/public/permitting/watersupply/groups/ccs/Form_TCEQ-20700.docx >

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW, GUI or SW	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?	Guidance
Consumer-confidence report	C	GW, GUI, SW	N/A	N/A	Due July 1 annually	Send to TCEQ and customers	General information: <www.tceq.texas.gov/drinkingwater/ccr>
Copies of all exceptions	Any of these	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	<www.tceq.texas.gov/goto/pws-exception>
Corrosion-control study	Any of these (if lead or copper action-level exceedance)	GW, GUI, SW	N/A	N/A	Within 12 months of ALE violation	Send to TCEQ	Fill out Form TCEQ-20495: <www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/chemicals/lead_copper/TCEQ%20Form%2020495%20CCST.docx>
Customer-service inspection	Any of these	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	Official customer-service-inspection form: <www.tceq.texas.gov/assets/public/permitting/watersupply/groups/ccs/Form_TCEQ-20699.docx>
Distribution map	Any of these	GW, GUI, SW	N/A	N/A	Update as necessary	Keep on-site	N/A
Drought contingency plan (retail suppliers and utilities) ^a	C	GW, GUI, SW	< 3,300 connections	N/A	N/A	Keep on-site	Follow the appropriate model plan for your system: <www.tceq.texas.gov/assets/public/permitting/watersupply/drought/20191.pdf>
			≥ 3,300 connections	N/A	Submit within 90 days of adoption and revise every 5 years		

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW, GUI or SW	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?	Guidance
Emergency-preparedness plan	Any of these if providing overnight accommodations and located in an affected county ^b	GW, GUI, SW	N/A	N/A	Once	Send to TCEQ	Fill out this form to create your plan: < www.tceq.texas.gov/goto/epp-harrisfb >
Monitoring plan ^b	Any of these	GW, GUI, SW	N/A	N/A	N/A	GW: Keep on-site SW/GUI: Send to TCEQ	See model plan: < www.tceq.texas.gov/goto/rg-384 >
Operations and maintenance manual	Any of these	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	See the manual in Part C: <i>Operations and Maintenance</i>
Plans and specifications (submitted by PE)	Any of these	GW, GUI, SW	N/A	N/A	Once for TCEQ approval	Send to TCEQ	< www.tceq.texas.gov/goto/pws-planreview >
Public notices	Any of these	GW, GUI, SW	N/A	N/A	Post if exceed MCL, or MRDL, or have acute treatment-technique violation, or if received an NOV for monitoring and reporting violation	Send to TCEQ	Fill out the appropriate public notice template for the specific type of violation: < www.tceq.texas.gov/goto/swmor-pn >

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW, GUI or SW	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?	Guidance
Sanitary control easements for well(s) (needed for PWS plan approval) or the required exceptions	Any of these	GW, GUI	N/A	N/A	N/A	Send to TCEQ with plans	Sample Sanitary Control Easements or Exception to the Easements: Form (TCEQ-20698 < www.tceq.texas.gov/assets/public/permitting/watersupply/ud/Sanitary%20Control%20Easement%20(3).docx > or < www.tceq.texas.gov/assets/public/permitting/watersupply/pdw/Sanitary_Control_Easement_Exception_Checklist.pdf >
Service agreements and plumbing ordinance	C, NTNC	GW, GUI, SW	N/A	N/A	N/A	Keep on-site	<i>Establishing and Managing an Effective Cross-Connection Control Program (RG-478):</i> < www.tceq.texas.gov/goto/rg-478 >
Well-completion data	Any of these	GW, GUI	N/A	N/A	N/A	Keep on-site	View your well report: < www.tceq.texas.gov/goto/waterwellview >

^a Please note that well-meter calibrations, drought contingency plans and monitoring plans may be required by your local groundwater-conservation district.

^b "Affected utility" means a retail public utility, exempt utility, or provider or conveyor of potable- or raw-water service to more than one customer in a county with a population of 3.3 million or more or in a county with a population of 550,000 or more adjacent to a county with a population of 3.3 million or more. [Texas Water Code Section 13.1395(a)(1)(A–B).]

Table: Operational Record Retention

How will this table assist with the record-retention requirements?

All public water systems are required to maintain a record of water-works operation and maintenance activities and submit operating reports. These records must be organized and copies kept on file or stored electronically, and must be accessible for review during inspections. This chart lists records and the length of time they must be kept. For your reference, the applicable rule citation is listed for each record. If you need more information or clarification, 30 TAC 290.46(f) contains the complete rule wording. Use this table as a quick reference guide.

Record-Retention Guide

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities) ^a
Amount of chemicals used each day 290.46(f)(3)(A)(i)	X					
Volume of water treated each day 290.46(f)(3)(A)(ii)	X					
Complaints and results of investigations (water quality, pressure, or outages) 290.46(f)(3)(A)(iii)	X					
Dates that dead-end mains were flushed 290.46(f)(3)(A)(iv)	X					
Dates that storage tanks and other facilities were cleaned 290.46(f)(3)(A)(v)	X					
Maintenance records for water system equipment and facilities 290.46(f)(3)(A)(vi)	X					
Daily or monthly records of part-time operators (for systems that do not hire full-time operators) 290.46(f)(3)(A)(vii)	X					

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Copies of notices of violation and resulting corrective actions 290.46(f)(3)(B)(i)		X				
Copies of public notices issued by the water system 290.46(f)(3)(B)(ii)		X				
Results of disinfectant-residual monitoring from the distribution system 290.46(f)(3)(B)(iii)		X				
Calibration records for laboratory equipment, flow meters, rate-of-flow controllers, on-line turbidimeters, and on-line disinfectant residual analyzers 290.46(f)(3)(B)(iv)		X				
Records of backflow prevention device programs 290.46(f)(3)(B)(v)		X				
Raw surface water monitoring results and source-water monitoring plans 290.46(f)(3)(B)(vi)		X				

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Notifications to the executive director of 5.5-log <i>Cryptosporidium</i> treatment in lieu of raw surface water monitoring 290.46(f)(3)(B)(vii)		X				
Results of surface water–treatment monitoring used to demonstrate log inactivation or removal 290.46(f)(3)(B)(viii)		X				
Variances or exceptions granted to the system (for 5 years after they are no longer in effect) 290.46(f)(3)(C)(i)			X			
Concentration-time (CT) studies (for 5 years after they are no longer in effect) 290.46(f)(3)(C)(ii)			X			
Recycling Practices Report form and other records pertaining to site-specific recycle practices for treatment plants that recycle (for 5 years after they are no longer in effect) 290.46(f)(3)(C)(iii)			X			

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Turbidity monitoring results and exception reports for individual filters (for 5 years after they are no longer in effect) 290.46(f)(3)(C)(iv)			X			
Results of microbiological analyses 290.46(f)(3)(D)(i)			X			
Inspection records for all water-storage and pressure-maintenance facilities 290.46(f)(3)(D)(ii)			X			
Results of inspection for all pressure filters 290.46(f)(3)(D)(iii)			X			
Documentation of compliance with state-approved corrective-action plan and schedules (groundwater systems that must take corrective actions) 290.46(f)(3)(D)(iv)			X			
Documentation of the reason for invalidated fecal-indicator source sample 290.46(f)(3)(D)(v)			X			

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Notifications to wholesale systems of a distribution coliform positive sample 290.46(f)(3)(D)(vi)			X			
Documentation of compliance with consumer-confidence report 290.46(f)(3)(D)(vii)			X			
Monthly operating reports and supporting documentation 290.46(f)(3)(E)(i)				X		
Results of chemical analyses 290.46(f)(3)(E)(ii)				X		
Sanitary surveys of the system 290.46(f)(3)(E)(iii)				X		
Customer-service-inspection reports 290.46(f)(3)(E)(iv)				X		
Initial distribution-system-evaluation (IDSE) plan and supporting documents 290.46(f)(3)(E)(v)				X		
State notification of any modifications to an IDSE report 290.46(f)(3)(E)(vi)				X		

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Copy of any 40/30 IDSE waiver certification ^b 290.46(f)(3)(E)(vii)				X		
Documentation of corrective actions taken by groundwater systems 290.46(f)(3)(E)(viii)				X		
Monitoring plans 290.46(f)(3)(E)(ix)				X		
Records relating to lead and copper requirements 290.46(f)(3)(F)					X	
Records relating to special studies and pilot projects, special monitoring, and other system-specific matters 290.46(f)(3)(G)					X	
Approved emergency-preparedness plan and a copy of the approval letter 290.46(f)(5)(A)						X
All required operating and maintenance records for auxiliary power equipment 290.46(f)(5)(B)						X

Operational Record	No less than 2 years	No less than 3 years	No less than 5 years	No less than 10 years	No less than 12 years	For as long as they are applicable to the system (for affected utilities)^a
Manufacturer's specifications for all generators that are a part of the emergency-preparedness plan 290.46(f)(5)(C)						X

^a "Affected utility" means a retail public utility, exempt utility, or provider or conveyor of potable- or raw-water service to more than one customer in a county with a population of 3.3 million or more or in a county with a population of 550,000 or more adjacent to a county with a population of 3.3 million or more. [Texas Water Code Section 13.1395(a)(1)(A–B).]

^b 40/30 IDSE waiver systems must certify that every individual sample taken under 30 TAC 290.113 was less than 0.040 mg/L for TTHM and less than 0.030 mg/L for HAA5.



Managing Small Public Water Systems: Part E, Resources

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Introduction

This publication is Part E of a five-part series *Managing Small Public Water Systems* (TCEQ publication RG-501). Part E lists resources to help you develop and use your asset-management plan, conduct everyday operations at your public water system (PWS), and identify PWS training classes and programs.

An electronic version of the series is available at the TCEQ Small Business and Local Government Assistance Section's (SBLGA) Public Water Supply Compliance Tools webpage at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 to request a paper copy of the complete series.

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-463-5561. The rules are also available online at <www.tceq.texas.gov/goto/TAC30>.

Assistance with Common PWS Issues

Texas Water Infrastructure Coordination Committee (TWICC) is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas.

Visit the TWICC website at <www.twicc.org> for more information about assistance that they provide.

Conducting Board and Council Meetings

Board and council member training is available through the TCEQ's Financial, Managerial, and Technical (FMT) program:

- FMT Webpage: <www.tceq.texas.gov/drinkingwater/fmt>.
- FMT Phone: 512-239-4691.
- FMT E-mail: FMT@tceq.texas.gov

The Attorney General's Open Government webpage at <texasattorneygeneral.gov/og/open-government> provides links to information and guidance about the Public Information Act and Open Meetings Act. The Attorney General's Open Government group also has:

- Open Government Hotline at 1-877-673-6839

- Hotline staff can answer questions about the Public Information Act and Open Meetings Act.
- Open Government Publications, including:
 - *Open Meetings Handbook* that provides an in-depth review of the Open Meetings Act and its interpretation. Access the most recent version of the handbook on the Attorney General's website at <texasattorneygeneral.gov/og/open-government-related-publications>.
- Open Government Training
 - Open Meetings Act Training available at <texasattorneygeneral.gov/og/oma-training>.
 - Public Information Act Training at <texasattorneygeneral.gov/og/pia-training>.

Drought Contingency Planning

The TCEQ provides model drought contingency plan (DCP) forms, requirements, and information on DCP submissions.

- Go to the Model Drought Contingency Plan Forms heading on our webpage at <www.tceq.texas.gov/goto/drought_plan> to view example models.
 - Use the appropriate model plan as a template to help you prepare your PWS's DCP.
- Request a copy of the *Handbook for Drought Contingency Planning for Retail Public Water Suppliers* (RG-424) by calling the TCEQ Water Supply Division at 512-239-4691, or by sending an e-mail to the division at <WRAP@tceq.texas.gov>.

Reporting and Record Keeping

Refer to the table Monitoring, Reporting, and Record-Keeping Requirements, in Part D of this series (*Managing Small Public Water Systems*), for a detailed outline of the records and reports you must prepare for your PWS. Access Part D online at <www.tceq.texas.gov/publications/rg/rg-501d.html>.

Finding an Engineer

- If you receive funding from a state or federal agency, contact that agency to find out what their requirements are before hiring an engineer.
- Contact other PWSs in your area and ask them what engineer they use and if they are satisfied with their work.

- Look in the phone book for civil engineers. Call and ask them about their experience with PWSs.
- Contact a registered professional engineer listed on the State Board of Registration for Professional Engineers' website at <www.tbpe.state.tx.us/>.
- Look for a firm experienced with the TCEQ's design rules for water systems in 30 TAC 290, Subchapter D.
- Call the TCEQ's Plan and Technical Review Section at 512-239-4691 with engineering questions.

Operator Licensing

- Find out how to become a licensed PWS operator on the TCEQ's Water Systems Operators webpage at <www.tceq.texas.gov/licensing/licenses/waterlic>.
- Review our webpage Public Water System Operators: What Applicants for Licensing Need to Know webpage at <www.tceq.texas.gov/licensing/licenses/waterworksntk>.
- Check your credit hours on our TCEQ Search Licensing or Registration Information webpage at <www2.tceq.texas.gov/lic_dpa/>.
- Renew your license using the TCEQ's TCEQ Occupational License and Registration Online Renewal webpage at <www.tceq.texas.gov/goto/renew>.
- Renew your license on paper by contacting the TCEQ Licensing Section at <LICENSES@tceq.texas.gov> or phone 512-239-6133 to request a hard copy of the renewal application.
- Find TCEQ approved water operator courses and training providers on our Training Providers for Occupational Licensing webpage at <www.tceq.texas.gov/goto/training>. Under the heading "Search by License Category" on this webpage, select "Water Operators" to view PWSs training.

Rate Studies, Rate Setting, CCNs, and Applications for Sales, Transfers, and Mergers

For help with conducting rate studies, rate setting, certificates of convenience and necessity (CCNs), and applications for sales, transfers, or mergers, contact the Public Utility Commission of Texas' Water Utilities Division at 512-936-7405.

The PUC's publication *Utili-Facts* explains types of assistance available and how to get assistance. For more information about this program go to

<www.puc.texas.gov/consumer/facts/factsheets/waterfacts/UtilityOnsiteAssistance.pdf> or call the PUC's Water Utility Division at 512-936-7405.

Management Training

Running a PWS requires a variety of financial, managerial, and technical skills. Water system managers, including council members, mayors, public works directors, and board members can benefit from training to learn about the importance of their jobs overseeing and managing a public water system and the basics on how their public water system gets, treats, and distributes water.

Use Table 1 to find training specific to PWS operations, finances, and management.

Managing Small Public Water Systems: Resources

Table 1. PWS Operations, Finances, and Management Training

This table is intended to help managers of water systems, including city council members, mayors, public works directors, and board members find training specific to running a PWS.

Table 1. PWS Operations, Finances, and Management Training

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
American Management Association	General Management Courses	www.amanet.org/training/live-online-seminars.aspx	877-566-9441	Online communication, management, business, and financial-planning courses.
American Water Works Association (AWWA) and Water Environment Federation (WEF)	Utility Management Conference	<ul style="list-style-type: none"> www.awwa.org/conferences-education/conferences/utility-management.aspx www.wef.org/events/conferences/upcoming-conferences/utility-management/ 	AWWA Conferences and Events Group at www.awwa.org/about-us/contact-us.aspx?Regarding=Conferences&SubConf=General	<ul style="list-style-type: none"> Business-practice optimization Utility benchmarking Customer and stakeholder service, analytics, and engagement Employee development and succession planning Leadership and management development Budget, finance, accounting, rates Legal, regulatory, political issues

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
AWWA	AWWA Annual Conference & Exposition	www.awwa.org/conferences-education/conferences/annual-conference.aspx	AWWA Conferences and Events Group at kbbutt@awwa.org or 303.347.6234.	<ul style="list-style-type: none"> Public Officials Program –specialized courses covering the basics of water treatment and distribution, governance, and finance/asset management: <ol style="list-style-type: none"> 1. Introduction to Water and Sewer Operating Environments 2. Water and Sewer Infrastructure, Operations, and Maintenance 3. Financing Your Water and Sewer Utility for the Future Field Operators' Day – sessions with a focus on operator interest. Professional Program – including: <ol style="list-style-type: none"> 1. Transformational Water Utility Leadership 2. Stakeholder Engagement & Communication 3. Project, Infrastructure & Asset Management
AWWA	Conferences and Education	www.awwa.org/conferences-education.aspx	Registration through program webpage.	Conferences, seminars, distance learning – including online courses and webinars on: <ul style="list-style-type: none"> • Environmental issues • Infrastructure • Operations and management • Utility sustainability • Public involvement and affairs • Security and emergency preparedness • Stakeholder communication • Succession planning
AWWA	Small Systems Training	www.awwa.org/resources-tools/water-knowledge/small-systems/small-systems-training.aspx	Kami Johle Butt at kbbutt@awwa.org or 303.347.6234.	Free technical, financial, and managerial training available to help small PWSs. Program includes an annual Texas workshop, webinars, and self-paced online eLearning courses.

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
CU RCAP	Communities Unlimited - RCAP	www.communitiesu.org/	Harold Hunter 903-261-9161 Mark Pearson 512-284-3000	Utilities training for managers, board members, decision makers, and staff members.
Environmental Protection Agency (EPA)	Drinking Water Training	www.epa.gov/dwreginfo/drinking-water-training	N/A – see EPA’s Drinking Water Training webpage.	Training opportunities for water professionals. <ul style="list-style-type: none"> • Small Systems Webinar Series: a monthly webinar series to communicate EPA's current small systems research as well as implementation information and resources. • Resilience Training and Exercises for Drinking Water and Wastewater Utilities.
EPA	Asset Management 101 – Basics for Small Water and Wastewater Systems	www.epa.gov/sites/product/files/2015-10/documents/assetmgt101.pdf	N/A – see EPA’s Drinking Water Training webpage.	This online presentation covers the basics of asset management for small water and wastewater systems.
Texas Commission on Environmental Quality (TCEQ) and Texas Rural Water Association (TRWA)	Financial, Managerial, and Technical (FMT) program	www.tceq.texas.gov/drinkingwater/fmt	Phone: 512-239-4691 E-mail: FMT@tceq.texas.gov	Funded by the TCEQ through a contract with TRWA, the program offers free financial, managerial, and technical assistance to help PWSs comply with regulations, including: <ul style="list-style-type: none"> • Consolidation • Rate studies and rate change applications • Funding sources • Completing TCEQ reports • Disinfection requirements • Monitoring plan • Operation and maintenance manual • Tariff amendment • Board member training

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
TCEQ	Public Drinking Water Conference	www.tceq.texas.gov/drinkingwater/pdwevents	512-239-4691	This free two-day conference provides information and tools for PWSs operators, including exhibits and presentations on funding and other management issues.
TCEQ	Environmental Trade Fair	www.tceq.texas.gov/p2/events	Registration through program webpage.	Texas' premier environmental education forum featuring exhibits and presentations on various topics of interest to regulated entities, including small PWSs.
Texas Engineering Extension Service (TEEX)	Certificate Programs	teex.org/Pages/Course-Catalog.aspx?catID=601&level=1&catName=Certificate%20Programs	800-723-3811	<ul style="list-style-type: none"> • Certified Water Professional • Water Utility Certificate - Water Maintenance Tech • Water Utility Certificate - Water Operator
TEEX	On Site Training	teex.org/Pages/class-calendar.aspx	800-723-3811	<p>Offers training events throughout Texas. From the webpage at <teex.org/Pages/class-calendar.aspx>, filter by program to “water/wastewater” and by state to Texas to view PWS topics, which have included:</p> <ul style="list-style-type: none"> • Basic Water Works Operations • Chlorinator Maintenance • Disaster Management for Water and Wastewater Utilities • Groundwater and Surface Water Production • Instructional Design and Evaluation • Pump and Motor Maintenance • Water Distribution • Water Laboratory • Water Utilities Calculations • Water Utilities Management • Water Utilities Safety
TEEX	Online Training	teex.org/Pages/Program.aspx?catID=199&courseTitle=Online Courses	800-723-3811	<p>Online offerings for PWSs include:</p> <ul style="list-style-type: none"> • Applied Math – Hydraulics • PWS Security • Water Operator Test Preparation

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
TEEX	Water Technology	teex.org/Pages/Class.aspx?course=WWW007&courseTitle=Water%20Technology	OSHA Training Institute Education Center 800-723-3811 Email: itsi@teex.tamu.edu	40-hour course helps participants prepare for the Class A water exam and provides operational guidance associated with construction and maintenance of water systems, including: <ul style="list-style-type: none"> • Basic water • Water distribution • Customer service inspection • Groundwater production • Surface water production I • Surface water production II • Water lab • Safety • Confined space entry • Pump and motor maintenance • Chlorinator maintenance • Valve and hydrant maintenance • Management
TEEX	Water Utilities Management	teex.org/Pages/Class.aspx?course=WWW280&courseTitle=Water+Utilities+Management	OSHA Training Institute Education Center 800-723-3811 Email: itsi@teex.tamu.edu	20-hours course provides information about proper management of water utility management, including: <ul style="list-style-type: none"> • Budget and finance • Functions of management • Interacting with governing bodies • Planning for growth • Reporting • Security • Emergency response plans • Using engineers

Provider	Program	Program URL	Program Contact	PWS Specific Courses and Topics Offered
TRWA	Conferences	www.trwa.org/?page=182	512-472-8591	TRWA provides conferences throughout the year, topics include: <ul style="list-style-type: none"> • Distribution Water Quality • Innovative Approaches to Water Resource Challenges in Texas
TRWA	Classroom Training	www.trwa.org/events/event_list.asp	512-472-8591	<ul style="list-style-type: none"> • Basic Water Work Operations • Chlorinator Maintenance • Groundwater and Surface Water Production • Equipment Maintenance • Water Distribution • Water Utility Calculations
TRWA	Online Training	www.trwa.org/?page=59	512-472-8591	<ul style="list-style-type: none"> • Basic Water Works Operations • Water Utility Safety • Chlorinator Systems and Chemical Handling • Pump and Motor Maintenance
TRWA	Public Funds Information Act Training	trwa.site-ym.com/events/EventDetails.aspx?id=850371&group=	512-472-8591	<ul style="list-style-type: none"> • 6-hour initial course • 4-hour renewal course
TRWA	Water University Utility Management Certification	trwa.site-ym.com/?page=61	512-472-8591	Webpage contains information about the Utility Management Certification program and includes: <ul style="list-style-type: none"> • Online application • Study Guide • Utility Management Certification Exam
Texas Water Infrastructure Coordination Committee (TWICC)	Online Resource	www.twicc.org/	www.twicc.org/contact/index.asp	TWICC holds periodic workshops to provide information on funding for water and wastewater systems along with other subjects.

Helpful Contacts

PWS Resources – TCEQ

Table 2 provides a comprehensive list of contact information for the TCEQ programs that may be helpful for PWS planning and management.

Table 2. Contact Information for TCEQ Resources

TCEQ Program	What We Offer	Phone (e-mail)	Webpage(s)
Clean Rivers Program webpage	Information about the partnership between TCEQ and regional water authorities to coordinate and conduct water quality monitoring, assessment, and stakeholder participation to improve the quality of surface water within each river basin in Texas.	(crp@tceq.texas.gov)	www.tceq.texas.gov/waterquality/clean-rivers
Financial, Managerial, and Technical Assistance Program	Through a contract with skilled professionals, TCEQ offers free financial, managerial, and technical assistance to help public water and wastewater systems comply with regulations.	512-239-4691 (FMT@tceq.texas.gov)	www.tceq.texas.gov/drinkingwater/fmt
Groundwater Conservation Districts webpage	Local units of government that develop and implement plans for the effective management of groundwater.	512-936-0817	www.tceq.texas.gov/groundwater/districts.html
Small Business and Local Government Assistance (SBLGA)	The SBLGA provides confidential technical assistance without the threat of enforcement.	800-447-2827	<ul style="list-style-type: none"> • TexasEnviroHelp.org • www.tceq.texas.gov/goto/help4pws
Operating a Public Water System webpage	Information and links to PWS resources.	N/A	www.tceq.texas.gov/drinkingwater/operating-public-water-system
Office of Water (OOW)	Oversees the design and operational requirements of all public water and wastewater systems.	512-239-4691	www.tceq.texas.gov/goto/water_main

TCEQ Program	What We Offer	Phone (e-mail)	Webpage(s)
OOW Water Availability Division – Water Availability Section	Obtain copies of DCP handbooks for different types of water systems.	512-239-4691 (WRAP@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights
OOW Water Availability Division – Water Rights Permitting Team	If you want to get additional surface water, you will need to fill submit a water right application.	512-239-4691	www.tceq.texas.gov/permitting/water_rights
OOW Water Supply Division – Drinking Water Standards Section	Webpage Finding Information about Water Wells in Texas	512-239-4691	www.tceq.texas.gov/drinkingwater/SWAP/wells.html
OOW Water Supply Division – Drought Team	If you are experiencing water outages or having issues due to drought, rules require that you report when you have less than a 180-day supply of water.	512-239-4691	N/A
OOW Water Supply Division – Plan Review Team	To find out more about becoming an approved water hauler.	512-239-4691	N/A
OOW Water Supply Division – Technical Review and Oversight Team	If drought has reduced the water supply to critical levels, the TCEQ may grant an alternative dead-end main flushing routine on a case-by-case basis.	512-239-4691	N/A
Watermaster Section – Watermaster Program	Ensures compliance with water rights by monitoring stream flows, reservoir levels, and water use. Watermasters also coordinate diversions and regulate reservoirs as needed to prevent the wasting of water or its being used in quantities beyond a user's right.	512-239-4691 (watermaster@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights/wmaster

TCEQ Program	What We Offer	Phone (e-mail)	Webpage(s)
Watermaster Program Brazos Watermaster	Administers water rights in the Brazos River Basin below and including Possum Kingdom Lake.	254-761-3006 (brazoswm@tceq.texas.gov) Or contact Brazos Watermaster Molly Mohler directly: 254-761-3027 (molly.mohler@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights/wmaster/brazos-river-watermaster
Watermaster Program Concho Watermaster	Administers water rights in the Concho River segment of the Colorado River Basin.	866-314-4894 (conchowm@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights/wmaster/crw/conchoriver.html
Watermaster Program Rio Grande Watermaster	Administers water rights in the Rio Grande River Basin above Lake Amistad (the Upper Rio Grande).	956-430-6046 800-609-1219 (watermaster@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights/wmaster/rgwr/riogrande.html/#jurisdiction
Watermaster Program South Texas Watermaster	Administers water rights in the Guadalupe, Lavaca, Lavaca-Guadalupe Coastal, Nueces, Nueces-Rio Grande Coastal, San Antonio, and San Antonio-Nueces Coastal river basins.	800-733-2733 (watermaster@tceq.texas.gov)	www.tceq.texas.gov/permitting/water_rights/wmaster/stwr/southtexas.html

PWS Resources – Other Agencies, Trade Associations, and Nonprofits

Contact information for other agencies, trade associations, and nonprofit organizations that may be helpful for PWS planning and management are listed in Table 3.

Table 3. Contact Information for Other Agencies, Trade Associations, and Nonprofit Organizations

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
Association of State Drinking Water Administrators (ASDWA)	Professional association	ASDWA is a national voice for state drinking water programs.	703-812-9505	www.asdwa.org
Association of Water Board Directors —Texas	Professional association	An advocacy group for water utility districts and an industry expert, providing leadership, education, and resources.	281-350-7090	awbd-tx.org
American Water Works Association (AWWA)	Nonprofit organization	AWWA is a scientific and educational association dedicated to managing and treating water. Provides resources, training, and support.	800-926-7337 (service@awwa.org)	www.awwa.org
Communities Unlimited - RCAP	Nonprofit organization	Provides technical assistance, training, and financial assistance for small towns and rural communities (with populations less than 10,000).	903-261-9161 or 512-284-3000	www.communitiesU.org
Independent Water and Sewer Companies of Texas (IWSCOT)	Nonprofit organization	IWSCOT is an association of privately owned water and sewer utilities serving more than 100,000 consumers statewide that provides education resources and presentations.	512-346-4011 (IWSCOT@austin.twcbc.com)	iwscot.org

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
Public Utility Commission of Texas (PUC)	Water Utilities Division	Offers free one-on-one assistance to help conduct rate studies, rate setting, accounting, and budgeting. Professional contractors provide an existing, or proposed, water, or sewer utility with support and guidance tailored to utility's specific needs.	512-936-7405 (water@puc.texas.gov)	www.puc.texas.gov/industry/water/utilities/fmt.aspx
Texas Department of Agriculture	The Water Source	Provides online water and drought resources. Oversees state and federal loans and grants for qualifying utilities.	512-463-7476	texasagriculture.gov/home/productionagriculture/thewatersource.aspx
Texas Engineering Extension Service (TEEX)	Water and Wastewater Programs	TEEX provides training and support for water utilities management.	800-723-3811	teex.org/Pages/Program.aspx?catID=16
Texas Alliance of Groundwater Districts	Professional association	Provides educational and technical assistance to member districts and the public.	512-596-3101	www.texasgroundwater.org
Texas AWWA (TAWWA)	Nonprofit Organization	TAWWA unites water professionals in Texas to protect public health and water resources by advancing technology, education, science, and management.	512-238-9292 (help@tawwa.org)	www.tawwa.org
Texas Department of Public Safety	State agency	Guidance Document titled Drought Assistance Directory for Public Officials and Drinking Water Utilities.	N/A	www.dps.texas.gov/dem/CouncilsCommittees/droughtCouncil/droughtAssistDir.pdf
Texas Groundwater Protection Committee (TGPC)	Association of state agencies and groundwater districts.	TGPC bridges the gap between state groundwater programs, improves coordination between member agencies, and works to protect groundwater. Identifies areas where new or existing groundwater programs could be enhanced, and improves coordination among agencies involved in groundwater activities.	512-239-4691	www.tgpc.state.tx.us
Texas Public Works Association	Trade association	A nonprofit association that promotes professional excellence and public works awareness through education, advocacy and the exchange of knowledge	214-444-9596 (TPWA@outlook.com)	www.tpwa.org

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
Texas River Authority	Angelina-Neches River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	936-632-7795	www.anra.org
Texas River Authority	Bandera County River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	830- 796-7260	www.bcragd.org
Texas River Authority	Brazos River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	254-761-3100 or 888-922-6272	www.brazos.org
Texas River Authority	Guadalupe-Blanco River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	830-379-5822	www.gbra.org
Texas River Authority	Lavaca-Navidad River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	361-782-5229	www.lnra.org
Texas River Authority	Lower Colorado River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	512-473-3200 or 800-776-5272	www.lcra.org
Texas River Authority	Lower Neches Valley Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	409-892-4011	www.lnva.dst.tx.us
Texas River Authority	Nueces River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	830-278-6810	www.nueces-ra.org
Texas River Authority	Red River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	940-723-2236	www.rra.texas.gov
Texas River Authority	Sabine River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	409-746-2192	www.sra.dst.tx.us
Texas River Authority	San Antonio River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	210-227-1373 or 866-345-7272	www.sara-tx.org

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
Texas River Authority	San Jacinto River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	936-588-3111	www.sjra.net
Texas River Authority	Trinity River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	817-467-4343 or 877-872-4343	www.trinityra.org
Texas River Authority	Upper Colorado River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	325-655-0565	www.ucratx.org
Texas River Authority	Upper Guadalupe River Authority	Agency established by the state legislature, given authority to develop and manage the waters of the state.	830-896-5445	www.ugra.org
Texas Rural Water Association (TRWA)	Trade association	TRWA provides resources and training to serve, represent, and support member water and wastewater utilities.	512-472-8591	www.trwa.org
Texas Water Conservation Association	Trade association	An association of water professionals and organizations that serves as a leader and advocate for water users.	512-472-7216	www.twca.org
Texas Water Development Board (TWDB)	State agency	Provides leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water. Collects and shares water-related data. Assists with regional planning and preparing the state water plan for the development of the state's water resources. Administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects.	512-463-7847	www.twdb.texas.gov
TWDB	Financial Assistance Programs	Offers a variety of cost-effective loan and grant programs that provide for the planning, acquisition design and construction of water related infrastructure and other water quality improvements.	512-463-0991 (Financial_Assistance@twdb.texas.gov)	www.twdb.texas.gov/financial/index.asp
TWDB	Groundwater Resources Division	Collect, interpret, and provide accurate, objective information on the groundwater resources of Texas. Monitor groundwater levels and groundwater quality in 9 major and 21 minor aquifers,	512-936-0871 (david.thorkildsen@twdb.texas.gov)	www.twdb.texas.gov/groundwater/index.asp

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
TWDB	Leak Detection	TWDB has leak detection equipment that utilities in Texas may borrow for free. This program will aid the utility in reducing water loss by locating leaks within the distribution system and verifying flow rates from production meters.	Use the loan forms on the leak detection webpage to request equipment.	www.twdb.texas.gov/leak-detection.asp
TWDB	Publications	TWDB publications that may be helpful to PWS planning and operation include reports, user manuals, and loan and grant program information sheets.	Call 512-463-8337 to order hard copies of TWDB publications.	www.twdb.texas.gov/publications
TWDB	Surface Water Division	Provides scientific and engineering expertise associated with data collection, analysis and modeling of surface waters in Texas to ensure the continued availability of water supplies and the maintenance of the ecological health and productivity of Texas rivers, streams, reservoirs, bays and estuaries.	512-463-7847	www.twdb.texas.gov/surfacewater/index.asp
TWDB	Water Resources Planning	Collects and compiles planning data; Administers regional and state water planning processes. Maintains the Regional Water Planning Database. Coordinates the inter-agency financial assistance loan review process. Conducts socio-demographic data analyses. Manages the Water Use Survey program.	<ul style="list-style-type: none"> • Central Office: 512-463-6277 • Team 1, Regions A, O, E, F: 512-463-6021 • Team 2, Regions G, B: 512-475-1128 • Team 3, Regions C, D: 512-475-4816 • Team 4, Regions H, I: 512-463-0250 	www.twdb.texas.gov/waterplanning
TWDB	Water Loss Audit	TWDB resource to provide water-loss audit assistance.	N/A	www.twdb.texas.gov/conservation/municipal/waterloss/index.asp

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
TWDB	Water Resources Planning	Collects, analyzes, and disseminates water-related data; and, by provides other services necessary to aid in planning and managing the state's water resources.	N/A	www.twdb.texas.gov/waterplanning
TWDB	Water Use, Projections & Planning	Collects, reports, and projects water use.	512-936-0829 (kevin.kluge@twdb.texas.gov)	N/A
Texas Water Infrastructure Coordination Committee (TWICC)	Trade association	TWICC is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas.	See Contact Information webpage at <www.twicc.org/contact/index.asp>	www.twicc.org
Texas Water Quality Association	Trade association	Represents household, commercial, and industrial water quality improvement industry in Texas.	361-573-6707	twqa.org
Texas Water Utilities Association	Trade association	Provided training programs, technical publications, and mutual problem-solving opportunities to water utilities.	888-367-8982	www.twua.org
United States Department of the Interior	Reclamation, Great Plains, Current Reservoir Data	Posts data for four minor Texas reservoirs.	N/A	www.usbr.gov/gp-bin/arcweb_sanford.pl
United States Environmental Protection Agency.	Federal agency	Guidance document titled, Strategies for Saving Energy at Public Water Systems.	N/A	www.epa.gov/documents/epa816f13004.pdf
United States Geological Survey	Water Data	Surface water level and streamflow data.	N/A	<ul style="list-style-type: none"> waterdata.usgs.gov/tx/nwis/current?type=lake waterdata.usgs.gov/tx/nwis/current/?type=flow

Agency or Organization	Program or Organization Type	What They Offer	Phone (e-mail)	Webpage(s)
United States Geological Survey	Texas Water Science Center	Provides real-time stream stage and stream flow, water quality, and groundwater levels for more than 650 sites in Texas, including continuously monitored site.	512-927-3500	tx.usgs.gov
Water Environment Association of Texas	Trade association	Nonprofit that provides technical and educational resources.	512-693-0060 (julie@weat.org)	www.weat.org
Water Environment Federation (WEF)	Nonprofit Organization	WEF provides technical education and training for thousands of water quality professionals.	1-800-666-0206	www.wef.org

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.