United States
Environmental Protection
Agency

Revised Total Coliform Rule (RTCR) Sample Siting Plan with Template Manual

Public Water Systems serving 1,000 or fewer persons,
Direct Implementation Program and Tribal Water Systems

Office of Water (4606M)
EPA 815-B-18-005
September 2018

Introduction

What is the Purpose of this Document?

The purpose of this document is to provide instructions to develop a sample siting plan that meets the requirements of the Revised Total Coliform Rule (RTCR) [40 CFR Part 141 Subpart Y]. It includes protocols and an electronic fillable sample siting plan template to assist small public water systems (PWSs) serving 1,000 or fewer persons.

Who is the Intended User of this Document?

This document and the attached template were designed for use by PWSs including those within the U.S. EPA Direct Implementation and Tribal programs with:

- surface water or ground water as their source that serve 1,000 or fewer people;
- a requirement to collect one (1) routine total coliform (TC) sample monthly;
    - Note: If more or less sampling is required (e.g., one sample per quarter), the template can easily be modified.
- known inventories (e.g., treatment facility, pumps, type and location of storage tank); and
- available distribution maps.

Note: Throughout this document, the term "primacy agency" is used to refer to all governing bodies with enforcement responsibility for public water systems including: states, U.S. territories, Indian tribes and U.S. EPA.

What is a Sample Siting Plan?

A written sample siting plan specifies the routine sampling schedule and the locations (i.e., routine and repeat) in the distribution system where TC samples are collected. The locations selected must be representative of the finished water supplied to consumers. The purpose of sampling is to identify any coliform contamination so it can be dealt with quickly. Sample siting plans are subject to primacy agency review and revision.

A sample siting plan must include the:

- PWS's sample sites (i.e., the location) where routine and repeat samples are collected: if approved by the primacy agency, also include sample sites for dual purpose samples that are used to meet the requirements for the RTCR repeat sampling and the Ground Water Rule (GWR) triggered source water monitoring.
- PWS's schedule for collecting the routine samples: For example, "[PWS_ID] will collect one routine TC sample every first Tuesday of the calendar month."

The sample siting plan is a living document and should be updated to reflect changes to the PWS such as: major changes in population; new or additional water sources; infrastructure changes, such as a change in the distribution system (i.e., extended/ abandoned lines or pressure zones); or changes in disinfection or other treatment.

Why Does a Public Water System Need to Develop a Sample Siting Plan?

To maintain compliance with the requirements of the RTCR [40 CFR 141.853], all PWSs must develop a sample siting plan. The original sample siting plan should be kept on-site for use by personnel who collect the samples and made available at the primacy agency's request.

Developing a Sample Siting Plan

Selecting Sample Locations

Contaminants like coliform bacteria may not be uniformly distributed. It is critical that the location(s) selected provide samples that are most representative of the water served to customers in the PWS's entire distribution system. It is especially important to identify and include in the sample siting plan those features of the system that may affect the microbiological quality of the water. ***PWSs should consider varying sample site locations throughout the year to better characterize water quality throughout the distribution system***.

When selecting sample locations, PWSs should consider:

- sites that best represent water served to customers throughout the distribution system;
- proximity to main transmission lines, pressure zones and storage tanks;
- locations of dead-end pipes, loops and other areas of the piping system's configuration;
- pressure zones that are upstream and downstream of all storage tanks;
- cross-connection hazards;
- seasonal customers or locations with inconsistent water use;
- areas of the distribution system delivering water from different sources;
- areas of the distribution system with longer retention times; and
- areas of the distribution system with low water pressure and slow water movement.

Generally, sample locations should be:

- at a mid-distribution system point;
- not on the transmission lines (e.g., the distribution system's largest pipes);
- directly after the storage tanks, specifically for tanks with direct or flow through design (e.g., separate pipe for inlet and outlet); and
- multipurpose sample locations.
    - If consistent with each rule, sample locations can be used for compliance with multiple drinking water regulations. For example, compliance monitoring for Total Trihalomethane and Haloacetic Acid under the Disinfectants and Disinfection Byproduct Rules.

Collecting More Samples Than the Minimum Requirements

Most small PWSs serving 1,000 or fewer persons are required to take only one (1) *compliance* sample per month. A system may collect more *compliance* samples than required. This is particularly beneficial to investigate and uncover potential problems in the distribution system. If a PWS wishes to take more *compliance* samples than required, those samples must be included in the sample siting plan. Once included in the sample siting plan, the extra *compliance* samples must be used to calculate if coliform treatment technique triggers have been exceeded. Here are some considerations for when a small PWS may wish to take more than the minimum required *compliance* samples:

- More than one well or storage tank to capture potential impacts on water quality;
- More than one pressure zone with separate sources in each pressure zone;
- Isolated sub-populations in separate pressure zones associated with large storage tanks;
- Long distance (more than 2 miles) between connections within the distribution system, or other situations leading to stagnant water. This is especially important in areas with small populations or large pipe diameters.

For more guidance, refer to the figures below in *Examples for Choosing Routine Sample Locations in a Distribution System*.

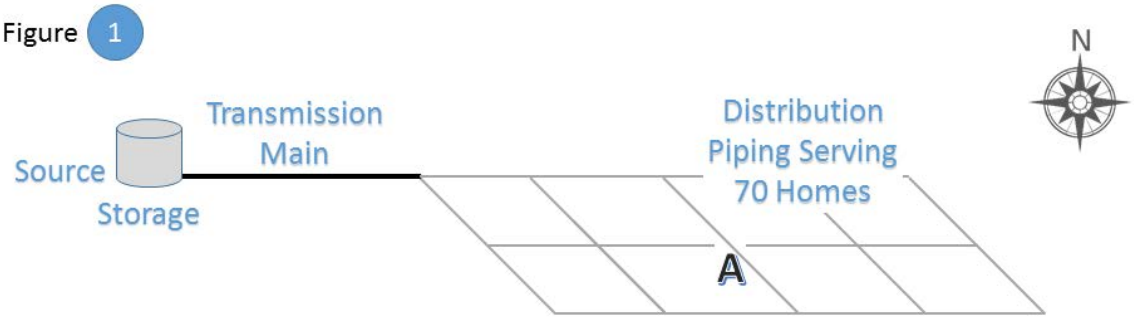
Selecting Sampling Taps

Faucets and specially installed sampling taps are the two most common types of sampling sites. If faucets are to be used, each faucet should be examined carefully to ensure its suitability. Some examples of potentially unsuitable faucets are:

- Swivel-type faucets because they are difficult to disinfect;
- Faucets with a single valve for hot and cold water;
- Faucets or taps with leaky packing material around the stem;
- Faucets that supply areas, such as janitorial or commercial sinks, where bacterial contamination is likely;
- Faucets or taps close to or below ground level;
- Faucets that point upward;
- Faucets that have threads on the inside of their spouts because they are difficult to disinfect;
- Outdoor faucets; and
- Faucets with aerators because they may harbor bacteria. (If such faucets are used, it is recommended that the aerator should be removed before a sample is collected and disinfected before replacing it.)

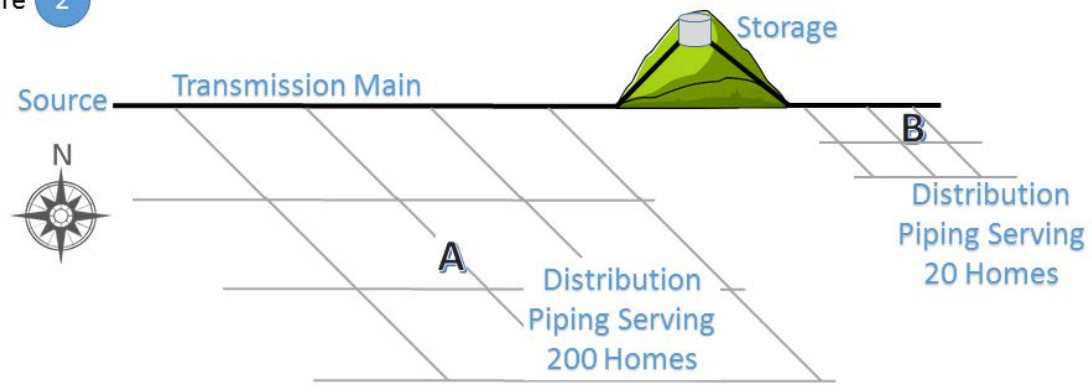
Examples for Choosing Routine Sample Locations in a Distribution System

Figure 1



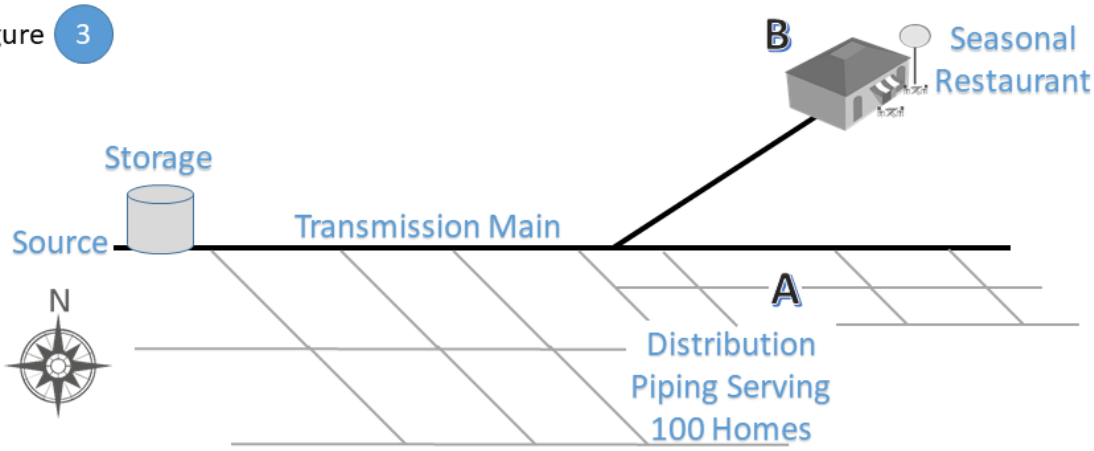
Looped Distribution System. In Figure 1, the system type is a surface water community water system (CWSs) that collects one sample per month. All customers are in a fully looped distribution system. In a system like this where all the water served to customers is in the distribution system east of the storage tank, at a minimum the site should be in the middle of the distribution system, and not on the large transmission line leading from the storage tank. Other considerations may include identifying multiple locations and alternate sample collection sites to address periods of highest demand or highest vulnerability due to population or seasonal changes.

Figure 2



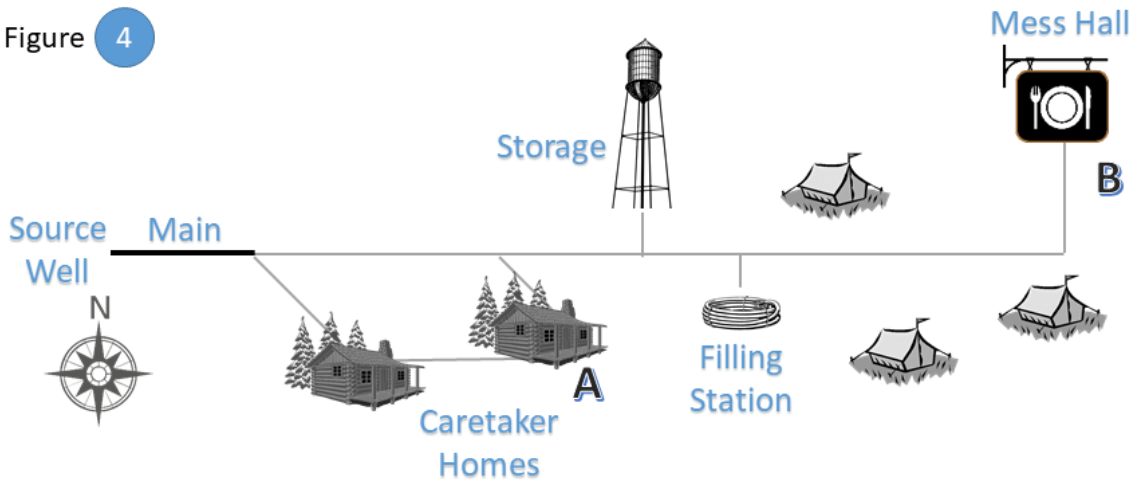
Rotate Sample Sites. In Figure 2, the system type is surface water CWS that collects one sample per month. Most customers are located west of the storage tank. Therefore, taking a sample at Site A, which is in the middle of the distribution system on the side of the storage tank with the 200 homes, is more representative of the water served to most of the customers. However, the water on the east side of the storage tank where Site B is located is representative of the water quality after the storage tank. In this configuration, Site A is more representative of the water that most people receive while Site B is more likely representative of water from the storage tank but serving fewer (but a significant number of) people. It is appropriate to alternate the system's monthly sample location between Sites A and B in order to fully represent and understand the water quality of the entire distribution system.

Figure 3



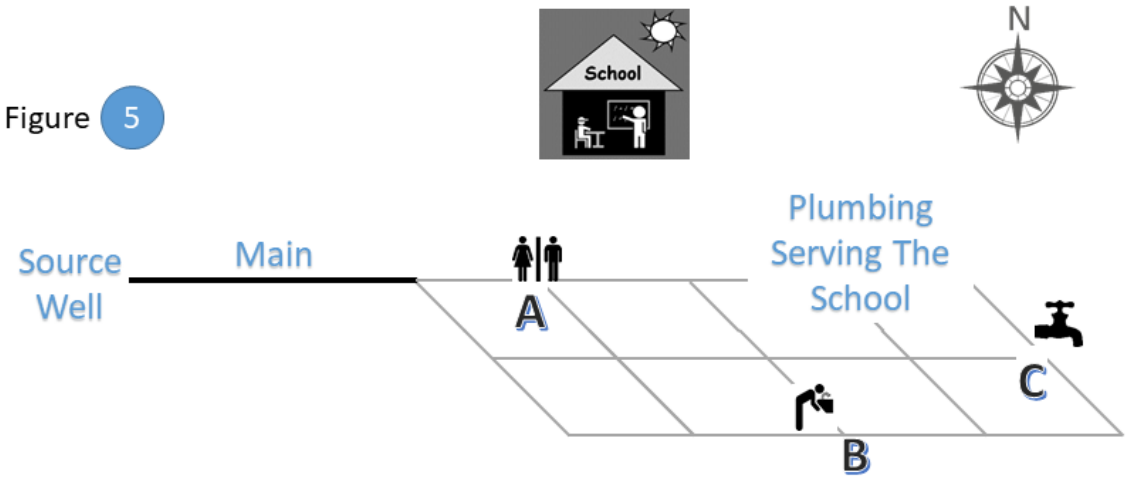
Re-Evaluate Sites. In Figure 3, the system type is a surface water CWSs that collects one sample per month. Most customers are located south of the transmission line. Currently the system samples at Site A, which is in the middle of the distribution system in a densely populated area of 100 homes and representative of the water served to the most people. However, a new seasonal restaurant was recently built north of the transmission line. In this case the system should re-evaluate their sample sites. In a system like this, Site A is more representative of the water served to the majority of people, while Site B is representative of water served to fewer (but a significant number of) people. It is appropriate to alternate the system's monthly sample location between Sites A and B in order to fully represent the seasonal variations in the water system.

Figure 4



Two pressure zones, one operated seasonally. In Figure 4, the system is a ground water transient non-community water system (TNCWSs) with two pressure zones. One zone operates year-round and provides water to the three full-time caretakers. The second zone (after the storage tank) serves the camp sites and is operated seasonally. The state requires the system to monitor year-round and the system has qualified for reduced monitoring, therefore they collect one sample per quarter. When the camp sites are closed the system collects their sample at the caretaker homes (Site A). Prior to opening the camp sites, the system follows the start-up procedures required by the state and moves their sample site to the Mess Hall (Site B). It is appropriate to alternate the system's sample location between Sites A and B in order to fully represent the seasonal variations in the water system.

Figure 5



School Distribution System. In Figure 5, the system type is a ground water non-transient non-community water system (NTNCWSs) that collects one sample per month. The school provides water from a single ground water source to 250 students, faculty and staff for nine months each year. The school is NTNCWS because it treats and supplies drinking water to more than 25 people for more than six months each year. The school distributes water to Site A (restrooms), Site B (water fountain) and Site C (kitchen sink). In a system like this, Site B is more representative of the water that is served to most people, but water from Site C is also representative of water served to a significant number of people. It is appropriate to alternate the system's monthly sample location between Sites B and C to fully represent and understand the water quality of the entire distribution system. Note: The water fountain (Site B) is considered an appropriate sampling location because it serves water to the most people in the school, and therefore provides the quality of the water served at that site. This could lead to better maintenance practices of the water fountain if the decision is made that the coliform positive result(s) is likely caused by a site specific problem.

TEMPLATE: Sample Siting Plan for Coliform Monitoring under the Revised Total Coliform Rule (RTCR)

Instructions:

This sample siting plan template is designed for use by PWSs using ground water, surface water or ground water under the direct influence of surface water (GWUDI) that serve 1,000 or fewer persons and are required to take one (1) routine sample per month as required by the RTCR. Use the format on the following pages to enter the routine and repeat sample locations for each month.

Note: The template can be modified by adding or removing rows for PWSs required to take more than one sample per month. It can also be used for PWSs required to take routine samples on a quarterly or annual schedule by changing the word "Monthly" to "Quarterly" in the [Monthly Routine Sample Sites] box. Attach additional pages as needed.

Things to consider in selecting routine sample locations:

- Are the routine sample locations representative of the entire distribution system?
- Can you take proper repeat samples at each site based on your current choices of routine sampling sites? If not, then routine sites will need to be re-evaluated and selected appropriately.
    - ***Reminder:*** Within 24 hours of being notified of the TC+ result, three (3) repeat samples must be collected, one (1) at a site available within five (5) taps upstream of the original routine sample site, one (1) at a site available within five (5) taps downstream of the original routine sample site and (1) one at the original routine sample site.
    - If your system does not have access to five taps upstream and five taps downstream of the TC+ site, you should consider the following: Submit to your primacy agency for approval, alternative monitoring locations for repeat samples that better characterize possible contamination routes into the distribution system other than the five upstream and downstream locations. ***If the PWS wishes to include alternative monitoring locations in a sample siting plan, it must submit the plan to the primacy agency before using the alternative locations.*** For more details, contact the primacy agency.

Include a map of the distribution system:

- Add a map(s) of the distribution system showing locations of the sample sites as identified in the RTCR sample siting plan. This should include sites for routine and repeat TC monitoring in the distribution system and source water sites if necessary under the GWR.
- Clearly indicate the multiple sources (e.g., wells) and distribution zones, pressure zones, interconnections, and storage tanks.
- If you do not have a map of the distribution system, create one by using an on-line mapping tool.

Where to submit:

Submit all information and questions with a copy of your RTCR sample siting plan, and any updates for review to: Enter Primacy Agency Contact Info.

Sample Siting Plan for the Revised Total Coliform Rule (RTCR)

[40 CFR 141.851-141.861] - or enter other primacy agency regulation reference

Date: _____ **PWSID #:** _____

System Name: _____

Authorized Person/Operator's Name: _____ **Phone:** _____

Submitter's Name: _____ **Phone:** _____

Submitter's Title/Position: _____

Primacy Agency Reviewer/Contact (to be filled by agency): _____

Sample Results Reporting deadlines:

Within the first 10 days following the end of the required monitoring period, sample results of all required compliance monitoring must be submitted to the primacy agency. *E. coli*-positive routine samples or *E. coli* maximum contaminant level (MCL) violations must be reported by the end of the day when the system is notified of these results unless the system learns of the result or violation after the primacy agency is closed and the primacy agency does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the primacy agency before the end of the next business day [40 CFR 141.861(a)(1)].

Process for Re-Evaluating Sample Points:

At least once per year, the PWS should review the sample siting plan to be sure that changes in population, new water sources, changes in the distribution system or changes in treatment are represented accurately. ***Any sample siting plan changes should be sent to the primacy agency's office for review.***

Disinfectant Used in the Distribution System and Ground Water Rule (GWR) Requirements:

Does the PWS disinfect? Yes ☐ No ☐

If yes, what type of treatment is used?

- ☐ Chlorine (residual must be measured as free chlorine)
- ☐ Chloramines (residual must be measured as total chlorine)
- ☐ Other type of disinfectant:

Does the PWS provide 4-log treatment? Yes ☐ No ☐

Does the PWS conduct compliance monitoring under the GWR? Yes ☐ No ☐

Does the PWS have a GWR representative triggered source water monitoring plan? Yes ☐ No ☐

Does the PWS have any sample locations approved for dual purpose sampling? Yes ☐ No ☐

List sample locations approved for dual purpose sampling here: _____

How many wells do you use to serve your customers? _____

Sample Siting Plan – Coliform testing required under the Revised Total Coliform Rule (RTCR)

	Monthly Routine Sample Sites (Place an X in boxes below):													Repeat Sample Sites (range or specific address)		Assigned # for Associated Source(s)		Routine Sample Point Description (hose bib, sink faucet, etc.)
	Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
1														Down		routine	repeat	
														Up			repeat	
2														Down		routine	repeat	
														Up			repeat	
3														Down		routine	repeat	
														Up			repeat	
4														Down		routine	repeat	
														Up			repeat	
5														Down		routine	repeat	
														Up			repeat	
6														Down		routine	repeat	
														Up			repeat	

List Source Name(s):	Assigned # for Source:

Bacteria Sampling Laboratory Information:

Laboratory Name: _____

Address: _____

City: _____

Zip Code: _____

Phone Number: _____

Contact Person: _____

Complying with the Revised Total Coliform Rule (RTCR)
Public Water Systems (PWSs) on Ground Water, Surface Water or Ground Water Under the Direct Influence of Surface Water and Serve 1,000 or Fewer Persons

Routine Monitoring Actions

Collect one (1) routine sample per month or calendar quarter, as directed by the primacy agency. If PWS is on less than monthly routine sampling, it is required to take additional routine samples the month following a TC+.

Repeat Sample Actions

Within 24 hours (unless an extension is granted by the primacy agency) of notification of a total coliform-positive (TC+) sample result, a PWSs must collect three (3) repeat samples (a set):

- Collect 3 repeat samples for each TC+ routine sample, even if a level 1 or level 2 Assessment is triggered. Collect 3 repeat samples when one or more repeat sample in the set is TC+.
- Continue collecting a set of 3 repeat samples until, either TC is not detected in one complete set or the system triggers a Level 1 or Level 2 Assessment.

PWSs must collect at least 3 repeat samples at the locations described in their sample siting plan that include:

- One (1) at the same sample tap where the original TC+ sample occurred;
- One (1) at a tap within five (5) service connections upstream of the original TC+ site; and
- One (1) at a tap within five (5) service connections downstream of the original TC+ site.

The primacy agency may allow alternative monitoring locations for repeat samples that better characterize possible contamination routes into the distribution system other than the five upstream and downstream locations. ***If the PWS wishes to include alternative monitoring locations in a sample siting plan, it must submit the plan to the primacy agency before using the alternative locations.*** For more details, contact the primacy agency**.**

Note: *PWSs should send the samples to the lab immediately, the lab must begin analyzing the drinking water sample no later than the 30th hour from the collection time.*

Ground Water Rule (GWR) Actions

If "triggered source water monitoring" from the GWR applies to your water system, when you have a TC+ under the RTCR, you must:

- Collect 1 sample from each well in use at the time the routine TC+ was collected.
- Analyze the sample for EC, if dual purpose* samples are approved by your primacy agency. If dual purpose samples are not approved, analyze the sample for a fecal indicator.
    * Applies to PWS using one well. Take one of the three repeat samples from the same monitoring location as the GWR. This "dual purpose" sample would meet both the RTCR and GWR requirements. Label the sample bottle and chain-of-custody form appropriately.

For more GWR details go to: https://www.epa.gov/dwreginfo/ground-water-rule-compliance-help-water-system-ownersand-operators.

Disinfectants and Disinfection Byproduct Rule Actions

A PWS that uses chlorine or chloramine in the treatment process or that does not add chlorine or chloramine but delivers water that has been treated with chlorine or chloramine must follow the requirements of CFR 141.132:

- The residual disinfectant must be measured at the same time and the same location as each TC sample collection; and
- These measurements must be conducted by a party approved by the primacy agency.

Selecting a Laboratory

- PWSs must use a state- or U.S. EPA-certified laboratory for all drinking water samples to be considered valid (40 CFR 141.852). Contact the primacy agency for a list of certified laboratories.

For more RTCR help, go to: https://www.epa.gov/dwreginfo/total-coliform-rule-compliance-help-public-water-systems**.**