

The Revised Total Coliform Rule (RTCR) (15A NCAC 18C .1539) requires that systems develop a written Sample Siting Plan that identifies sampling sites and a sample collection schedule. These Plans are subject to State review and revision and must be available by no later than **March 31, 2016**. A copy of the Plan must be kept on site and be obtainable for review by the Public Water Supply Section's Regional Office staff during system inspections. If your system already has a Sample Siting Plan, it should be reviewed to ensure all requirements are met before the deadline.

The Plan must be detailed enough for the State reviewer to verify that the routine total coliform sampling sites are representative of water quality throughout the distribution system. The Plan must include information on routine and repeat sample locations and any sampling points necessary to meet the requirements of triggered source water monitoring under the Ground Water Rule (GWR). Note that for ground water systems serving 1,000 or fewer people and using a single well, use of a dual-purpose sample (repeat RTCR sample/triggered GWR source water sample) is approved by the State; thus, the source location can be used for compliance with both the RTCR and the GWR.

Sampling sites should be selected carefully to represent the varying conditions that occur within the distribution system. It is important to identify and include areas that may adversely affect the microbiological quality of the water such as low pressure zones, areas of low velocity, and dead-end lines.

An example Sample Siting Plan template is available on our website.

Factors to consider when preparing a Sample Siting Plan include:

- Location and type of water sources, treatment facilities, storage tanks, booster pump stations, blowoffs/flushing points, hydrants and critical valves;
- Distribution system's configuration and location of mains, branch lines, service connections, loops, dead-end pipes, sites of deteriorating water lines, and interconnections with purchase water systems;
- Cross-connection hazards and shared connections;
- Pressure zones and areas of low water pressure;
- Areas of low-velocity water movement;
- Varying population densities;
- Water age; and
- Avoiding undesirable conditions such as swivel type faucets, leaky faucets, faucets near or below ground, faucets with threads on the inside of their spouts, and faucets with aerators.

A properly completed Sample Siting Plan includes the following:

1. System information -

- System name;
- County;
- Seven-digit Water System Number;
- System type;
- Total number of service connections;
- Population count;
- Minimum number of required routine samples (based on population – see Tables below);
- List of routine sample location codes with corresponding addresses or site description;
- List of repeat fixed sample location codes with addresses or site descriptions for each routine sample location OR provide the standard operating procedure (SOP) that will be used for the selection of repeat locations on a situational basis;
- Frequency of required routine monitoring (e.g. 10 samples/month);
- Sample collection schedule (e.g. 5 samples during week 2, and 5 samples during week 3 of each month);
- Monthly rotation cycles (e.g. Sample locations 1-10 will be sampled during the 1st month of each quarter, locations 11-20 will be sampled during 2nd month of each quarter, and locations 21-30 will be sampled during the 3rd month of each quarter);
- Treatment plant description and type of disinfectant used;
- Date plan was prepared (and revision date, if applicable); and
- Name, phone number and email address of the person who prepared or revised the plan.

2. Distribution system map – It is highly recommended that a distribution system map displaying the following information be included in your Sample Siting Plan:

- Layout of distribution system’s piping;
- All water sources and entry points into the distribution system;
- Treatment facilities, including booster stations;
- Storage tanks and reservoirs;
- Hydrant locations;
- Dead-end mains and known trouble areas;
- Locations of the routine coliform bacteriological sampling sites;
- Maximum Residence Time (MRT) sites** and other areas with high water age (** MUST denote locations for measuring residual disinfectant concentrations as required under 15A NCAC 18C .1302).

Number of Sites and Sample Location Code Requirements:

- A minimum of five sites must be identified for small systems required to collect one routine sample per monitoring period.
- Larger systems that collect two or more samples per month must identify at least two to three times the number of sampling sites as required according to the system’s population. Use the entire sampling location pool to establish monthly rotation cycles. (See Tables below for required number of routine samples based on population.)
- For systems with less than five (5) service connections, all service connections must be identified as a sample site.
- A location code must be developed for each sampling location. The codes for routine samples must be three characters using letters, numbers or a combination of both (for example: ABC, 002, or 1B3). Note: If there is a need for repeat sampling, the upstream and downstream sample location codes may have to be uniquely created at the time of collection if no routine sampling sites are located within 5 service connections upstream and downstream of the original positive. For example, a repeat sample collected upstream of the routine positive sample collected at location 002 might be coded as “002U”. Likewise, the downstream sample would be “002D”.
- Address information or a site description must be provided for each location code.

Community Water Systems:

Table 1 - Routine Total Coliform Monitoring Frequency for Community Water Systems			
Population Served	Minimum Number of Samples per Month	Population Served	Minimum Number of Samples per Month
25 to 1,000	1	59,001 to 70,000	70
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,001 to 450,000	180
6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to 780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,001 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480

Non-Community Water Systems:

Table 2 - Routine Total Coliform Monitoring Frequency for Non-Community Water Systems	
Population Served	Minimum Number of Samples/Frequency
Ground Water Systems	
1,000 or fewer people	1 sample / quarter [see §141.854(b)]
More than 1,000 people	same as community system based on population / month (see Table 1)
Surface Water and GWUDI (Subpart H) Systems	
1,000 or fewer people	1 sample / month [see §141.856(b)]
More than 1,000 people	same as community system based on population / month (see Table 1)

Seasonal Water Systems:

A seasonal system is a non-community water system that is not operated as a public water system on a year-round basis and starts up and shuts down at the beginning and end of each operating season. Seasonal systems must demonstrate completion of a State-approved start-up procedure prior to serving water to the public. North Carolina's Start-up Checklist procedures must be completed annually, prior to the system serving water to the public. Upon completion of the start-up procedures, submit the Checklist and Certification to the Public Water Supply Section to receive compliance credit.

Table 3 - Routine Total Coliform Monitoring Frequency for Seasonal Water Systems	
Population Served	Minimum Number of Samples/Frequency
All Public Water Systems that were activated on or after April 1, 2016	
1,000 or fewer people	1 sample / month (while in operation)
More than 1,000 people	same as community system based on population / month (while in operation) (see Table 1)
All Public Water Systems that were activated prior to April 1, 2016	Existing schedule as of March 31, 2016 (while in operation) unless triggered to increased monitoring on or after April 1, 2016, or unless otherwise directed by the State.

Important Notes on Routine Monitoring: [Section .1539, §141.853(a)]

- Routine samples should be collected at representative sites throughout the distribution system. Each routine sample should be collected from a different sampling site.
- Systems must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.
- Monitoring may take place at customers' premises, at dedicated sampling stations, or at other approved compliance sampling locations. Avoid sample taps with obvious unsanitary conditions. Make sure the tap is properly disinfected and flushed before collecting a sample.
- Systems are encouraged not to wait until the last week of the compliance period to collect samples to avoid potential problems with timely collection and reporting of results to the State.

Important Notes on Repeat Monitoring: [Section .1539, §141.853, §141.858 and §141.859]

- If any routine sample is total coliform-positive, a **set** of three (3) repeat samples must be collected for each positive routine sample within **24 hours** of being notified of the positive result [§141.858(a)(1)].
- A **set** of repeat samples must have at least the following [§141.853(a)(5)]: one sample collected from the same sampling tap where the original total coliform-positive sample was taken (Repeat-Original Tap), one sample collected within five (5) service connections upstream (Repeat-Upstream), and one sample collected within five (5) service connections downstream (Repeat-Downstream) of the original total coliform-positive sample location, unless the following conditions are met:
 - The State allows an alternative sampling location in lieu of one repeat upstream or downstream location. A system may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites on a situational basis [§141.853(a)(5)(i)]; or
 - For ground water systems with a single well and serving 1,000 or fewer people, when the system is required to also conduct triggered source water monitoring under the GWR [Section .2202, §141.402(a)], the State approves, in writing, a dual-purpose sample location that satisfies the requirements for the RTCR required repeat upstream sample and the GWR triggered source water sample [§141.853(a)(5)(ii)].
- The system must continue to collect additional sets of repeat samples from the same locations until either total coliforms are not detected in one complete set of repeat samples or the system determines that a coliform treatment technique trigger specified in §141.859(a) has been exceeded as a result of the total coliform-positive repeat samples and notifies the State [§141.858(a)(3)].

Important Note on Additional Routine Monitoring: [Section .1539, §141.854(j)]

- Beginning April 1, 2016, systems collecting samples on a quarterly or annual frequency must collect at least three (3) routine samples the month following a total coliform-positive routine sample.

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