STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
CADILLAC DISTRICT OFFICE

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

March 2, 2017

Ms. JoLisa McDay, Water Plant Supervisor
City of Flint Water Treatment Plant
4500 North Dort Highway
Flint, Michigan 48505

Dear Ms. McDay:

SUBJECT: Revised Total Coliform Rule Monitoring Plan

The Final Revised Total Coliform Monitoring Plan (Plan), dated February 1, 2016, prepared and submitted to this office by the City of Flint's (City's) consultant, Confluence Engineering Group, LLC, has been reviewed. The Plan is approved for immediate implementation and satisfies the requirements of the Revised Total Coliform Rule and R 325.10704c of the administrative rules for the Michigan Safe Drinking Water Act. Following the Plan will allow the City to exceed the minimum of 100 total coliform samples required each month to meet its state and federal regulations.

The Plan, as submitted, identifies 20 total coliform monitoring locations. It is recommended that the City continues to work with its consultant to locate 5 additional total coliform monitoring locations, bringing the total number to 25 locations. During the next several months, Department of Environmental Quality staff will contact you to confirm the City's progress in finding the additional sampling locations.

If there are any comments or questions, please contact me.

Sincerely,

Jon W. Bloemker, Ph.D., P.E.,
Engineering Unit Supervisor
Drinking Water and Municipal Assistance
989-460-7254

cc: Ms. Melinda Friedman, Confluence Engineering Group, LLC
Ms. Heather Shoven, US Environmental Protection Agency, Region 5
cc/email: Ms. Rebecca Slabaugh, Arcadis
Mr. Christopher Hill, Arcadis
Mr. Bryce Feighner, DEQ
Mr. George Krisztian, DEQ
Mr. Robert London, DEQ
Mr. Brian Thurston, DEQ

City of Flint
Final RTCR Coliform Monitoring Plan

February 1, 2016

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A. Introduction and Objectives

This Coliform Monitoring Plan (Plan) has been developed for the City of Flint (City) to meet requirements of the Revised Total Coliform Rule (RTCR) and R 325.10704c of Michigan's rules for public water supplies.

Drinking water systems conduct total coliform monitoring with the objective of evaluating microbial water quality to ensure water provided to consumers is free of disease-causing organisms. While drinking water systems can't evaluate the microbial quality of all water in all locations of their distribution system in a cost-effective manner, a coliform monitoring program allows systems to evaluate water quality in many locations throughout their system on a monthly basis.

This Plan has been developed to meet the following objectives:

- Update the City's coliform monitoring plan to comply with recent requirements of the RTCR.
- Ensure representative routine coliform sampling in the City's system by expanding the number of routine samples collected.
- Provide Standard Operating Procedures (SOPs) for coliform sampling and regulatory reporting.
- Provide emergency response and public notification procedures in the event of a total coliform or *E. coli* positive sample.
- Provide information for the completion of Level 1 and Level 2 system assessments
- Enhance water quality surveillance.

B. Coliform Monitoring Requirements

The following sub-sections outline coliform monitoring requirements which apply to the City.

According to the 2015 American Community Survey (ACS-2015), the City serves a population estimated to be 98,310. SDWIS records have recently been updated to reflect this population. According to requirements in R 325.10704g, the City is required to collect at least 100 coliform samples throughout their distribution system each month. Samples are analyzed by the City's certified laboratory. The City may, with DEQ approval, decrease sample collection to 90 samples per month if the population drops below 96,000. The City will be required to increase sample collection to 120 per month if the population served by the City increases to more than 130,000.

Coliform samples are analyzed for the presence or absence of total coliform. A satisfactory test indicates no coliform are present. An unsatisfactory test is positive for the presence of coliform bacteria. Further testing is conducted on unsatisfactory samples to determine if *E. coli* is present.

Repeat samples are required if the routine sample is unsatisfactory. Three repeat samples are required

at the following locations:

- The same tap as the original unsatisfactory Routine sample.
- An active service within five active connections upstream from where the original unsatisfactory sample was taken*.
- An active service within five active connections downstream from where the original unsatisfactory sample was taken*.

*If sample sites are not available within five connections up or downstream of the routine sample location, alternative sites may be selected that represent the up or downstream water quality.

C. System Information

Flint purchases treated surface water (finished water) from the Great Lakes Water Authority to serve a population of approximately 98,310 (per 2015 census). Finished water enters the system at the water treatment plant and is continuously monitored for free chlorine residual. Chlorine, caustic soda (as needed), and orthophosphate are supplemented at this location (CSII). The water is then distributed to the City's system via one transmission line. The City has four reservoirs for a total of 54 MG of storage capacity. The City is comprised of a single pressure zone, although there is a small pumped pressure district in the southwest region of the City. The water treatment plant and storage reservoirs (sample sites 5 and 11) are shown on the attached map. Approximately 90% of the City's distribution system is comprised of unlined cast iron pipe.

Table 1. System Information

Water System Name:	City of Flint
Address:	4500 North Dort Highway Flint, MI 48505
County:	Genesee
WSSN:	2310
Population Served:	98,310 (2015 census)

D. Key Contacts

As of December 2016, the following are the key contacts from the City, MDEQ, County, and local news media for RTCR monitoring and emergency response activities.

Table 2. Key Contact Information

Name	Title	E-mail	Phone number(s)
City of Flint – Water System			
JoLisa McDay	Water Plant Supervisor	jmcday@cityofflint.com	(810) 787-6537
Vacant	Water Plant Ops. Supervisor		(810) 787-6537
William Bradley	Lab Supervisor	wbradley@cityofflint.com	(810) 787-6537
Michigan DEQ			
Bob London (primary contact for RTCR)	Corrosion Control Specialist	londonr@michigan.gov	(989) 450-7834
Jon Bloemker	KWA Team Leader	bloemkerj@michigan.gov	(989) 460-7254
Brian Thurston	Distribution Specialist	thurstonb@michigan.gov	(231) 590-3430
Pollution Emergency Alerting System			1-800-292-4706
City of Flint			
Dr. Karen Weaver	Mayor	kweaver@cityofflint.com	(810) 766-7346
Sylvester Jones	City Administrator	sjones@cityofflint.com	(810) 237-2057
Kristin Moore	Public Relations Director	kmoore@cityofflint.com	(810) 875-2576
Dr. Pamela Pugh	Chief Public Health Advisor	ppugh@cityofflint.com	(810) 237-2041
Genesee County Health Department			
Jim Henry	Environmental Health Director	jhenry@gchd.us	(810) 257-3612 (517) 404-8401 (cell)
Mark Valacak	Health Officer	mvalacak@gchd.us	(810) 257-3588
Public Notification - Media			
mlive – Flint Journal		flnews@mlive.com	(810) 766-6100
Channel 25 - WEYI			(810) 687-9612

E. Sample Locations and Schedule

Under this revised plan, a total of 30 coliform samples will be collected each week from 20 unique locations.* Previously, the City collected 30 coliform samples each week from 10 unique locations. The RTCR requires systems to identify sample sites that are representative of the system. Features that should be represented through coliform monitoring include pressure zones, unique sources, areas served by reservoirs, and vulnerable conditions such as dead ends, transient usage, high water age, high hazard cross connections, and sensitive populations. While the ten historical coliform sample sites are

geographically spread throughout the system, recent water quality concerns and identification of new areas of low chlorine residual have prompted a re-evaluation of the sample sites under the RTCR. [1]The City's 10 existing TCR sites have been retained, and 10 new sites have been selected to capture a variety of conditions to ensure that microbiological water quality is maintained throughout the system. In addition to coliform, the sites are sampled for chlorine residual. These sites were selected with input from Flint staff, EPA, MDEQ and Arcadis staff after consideration for site accessibility, upstream/downstream access, and safety.

The sample sites are presented geographically on the attached RTCR Sample Site Map. Also shown are five additional surveillance monitoring sites for which chlorine residual will be monitored on a weekly basis for informational purposes. Thus, when sites are accessible, a total 35 chlorine measurements will be taken from 25 unique locations each week. Table 3 lists the City's existing and new routine coliform sampling locations, chlorine residual surveillance monitoring locations, sampling schedule, and repeat sample site locations (for coliform sites only). Sampling will occur on the days indicated in the third column when possible and adjustments will be made on an as-needed basis for holidays and irregular months.

Table 3. Monthly Total Coliform Monitoring Locations

Dist. Site #	Routine Site Address	Sampled on Which Days	Historical Sampling Site	Planned Upstream Site Address[1]	Planned Downstream Site Address[1]
1	2501 Flushing Rd University Market	M F	TCR[3]	2702 Flushing	1117 N. Chevrolet Ave
2	3 1621 Saginaw Street Ten Fu Chinese Gourmet	M F	New	1638 Saginaw St	1709 Saginaw St
3	3609 Beecher Palace Liquor Store	M F	EPA Chlorine Monitoring[4]	3617 Beecher Rd	3505 Beecher Rd
4	3521 Corunna Rite-Aid	M F	Quarterly (DBP)[5]; former Taco Bell site upstream[3,]	3606 Corunna	3409 Corunna
5	1100 Cedar Cedar St Reservoir	M Th(e/o)[2]	TCR[3]	702 12th St	1035 Ann Arbor
6	611 W. Court Street, Ste. 200 Dean T. Yeotis Law Offices	M Th(e/o)[2]	New	620 W. Court	521 W. Court
7	1159 Foss Ave. Foss Avenue Church	Tu Th(e/o)[2]	EPA Chlorine Monitoring[4]	1185 Foss Ave	1164 E. Holbrook Ave.
8	6204 N. Saginaw St	Tu	TCR[3]	6101 N. Saginaw St	6509 N. Saginaw St

[1]*Instances, including but not limited to holidays, declining participation, and site closings, may reduce the number of weekly samples collected.

	North Flint Automotive	Th(e/o)[2]			
9	5018 Clio Rd Rite-Aid	Tu Th(e/o)[2]	TCR[3]	5005 Cloverlawn Rd	4825 Clio Rd
10	4090 Clio Road Auto Zone	Tu Th(e/o)[2]	New	4117 Clio Rd	4006 Clio Rd
11	1416 Dupont St West Side Reservoir	Tu Th(e/o)[2]	TCR[3]	1360 Dupont St	1430 Dupont St
12	2503 Garland Street Hoffman's Deco Deli & Café	Tu Th(e/o)[2]	New	605 Garland	401 Garland
13	3538 Richfield Rd Grandma Recipes	W F (e/o)[2]	Quarterly (DBP)[5]	3246 Richfield Rd	3702 Richfield Rd
14	3802 Davison Rd Admiral	W F (e/o)[2]	Former Arby's TCR site downstream[3]	3718 Davison Rd	3835 Davison Rd
15	2132 Davison Road Luigi's Restaurant	W F (e/o)[2]	New	2320 Davison Rd	2100 Davison Rd
16	2838 E. Court St Rite-Aid	W F (e/o)[2]	TCR[3]	905 S. Dort Hwy	2845 E. Court St
17	3302 S. Dort Hwy Liquor Palace	W F (e/o)[2]	TCR[3]	3124 S. Dort Hwy	3316 S. Dort Hwy
18	3717 Fenton Rd Rite-Aid	W F (e/o)[2]	Quarterly (DBP)[5]	3708 Fenton Rd	3621 Fenton Rd
19	3216 MLK Blvd Salem Housing	Th F(e/o)[2]	TCR[3]	3110 MLK Ave	3317 MLK Ave
20	1525 MLK Fire House #3	Th F (e/o)[2]	EPA Chlorine Monitoring[4]	1402 MLK	1602 Oren Ave
21	510 Leta Avenue Don's Market CHLORINE ONLY	M	New	Not applicable	Not applicable
22	1002 W. Home Ave Hasselbring senior center CHLORINE ONLY	Tu	EPA Chlorine Monitoring[4]	Not applicable	Not applicable
23	4612 Western Rd Sam's Rollingwood Market CHLORINE ONLY	W	EPA Chlorine Monitoring[4]	Not applicable	Not applicable
24	3109 Kleinpell St Genesee Community Health CHLORINE ONLY	Th	EPA Chlorine Monitoring[4]	Not applicable	Not applicable
25	3402 Western Rd Fire House #5 CHLORINE ONLY	F	EPA Chlorine Monitoring[4]	Not applicable	Not applicable

[1]When a routine sample is positive for total coliform or *E.coli*, collect samples from repeat sites in the distribution system. Supplies that purchase their source water must notify their supplier of water within 24 hours of a positive routine sample result. Surface water supplies are not required to sample their source water.

[2]Samples will be collected on an every-other week basis.
[3]Sample site was previously used for the Total Coliform Rule monitoring plan.
[4]Sample site was previously used during EPA chlorine monitoring.
[5]Sample site is currently used for quarterly expanded water quality parameter (EWQP) and disinfection byproduct monitoring (DBP).

Repeat Sample Sites

Most of the repeat sample sites shown in Table 3 are within five active connections up/downstream of the routine sample site. The City will attempt to use the repeat sample locations shown in Table 3 for repeat coliform sample collection; however, because they are not routine sample locations, there are times when they may be unavailable. In that case, the City will use an alternate site that is representative of the water quality for the routine sample site. If an alternative site is needed, the City will send a written justification to DEQ for use of the alternative site.

F. Sampling and Reporting SOP

Monthly Monitoring

1. Collect samples at regular time intervals throughout the month.
2. Failure to collect all required routine samples in a monitoring period is a violation. Another total coliform monitoring violation in the following 12 months will result in a fine. Notify the DEQ if monitoring was not performed as required.

Sample Instructions

Sample Containers – Sample containers used for microbiological examination are collected in plastic or glass bottles that have been cleansed, carefully rinsed, and sterilized. For drinking water samples containing chlorine, the sample bottles should contain a dechlorinating agent. The dechlorinating is added prior to sterilization.

Sample Collection Procedure – **Overview:** When collecting a sample leave ample air space in the bottle to allow for mixing before examination. When using Idexx 120mL sample bottles, fill bottle to 100mL line. Flush and disinfect sample port and use aseptic techniques to avoid sample contamination. The sample should be representative of the water being tested. If the sample is taken from a distribution system tap, select a tap that is water from a service pipe directly connected with the water main.

Detailed Instructions:

1) Remove any tap attachments such as aerators or filters.
2) If tap cleanliness is questionable, apply disinfectant (100 mg/L solution of sodium hypochlorite or alcohol wipes) to sample tap before flushing service line.
3) Open tap fully and let water run until the water is cold, to permit turnover of the water in the service line and premise plumbing prior to the sample point.

4) When sampling from a mixing faucet, run hot water for 2 to 3 minutes, then cold water until cold.
5) Flush the tap until you measure a temperature change, then record the chlorine residual level. Measure and record the chlorine residual at the same time and place as every routine and repeat sample collected.
6) Reduce water flow to permit filling of sample bottle without splashing, and to prevent over filling.
7) Remove cap from bottle and hold cap with the inner surface facing downward. Do not set cap down. Dust-like particles in the bottle are a preservative; do not empty out or rinse out this preservative.
8) Fill the bottle to 100 mL line. Avoid contact with sample tap or other surfaces. Do not overfill or underfill.
9) Recap the sample bottle before turning off the water.
10) Complete the laboratory chain of custody form and attach it to the sample bottle.

Procedure When Sample Result Is POSITIVE

1) If a distribution system sample result is positive for total coliform bacteria or *E.coli*, then collect repeat samples **within 24 hours** of learning of the positive result from all of the following sites:
    a. The site of the positive sample result; and
    b. An upstream site within five service connections of the original positive site; and
    c. A downstream site within five service connections of the original positive site; and

Note: If approved by the DEQ, when an upstream repeat site is temporarily not available, sample the closest available location to the repeat site that is also upstream of the routine site and similarly for the downstream side.

2) Notify the DEQ District Office **within 24 hours** to learn what further action is required when greater than 5.0 percent are positive. Follow up action includes a formalized assessment of the water supply.
3) Notify the DEQ District Office **by the end of the day** if any sample result is positive for *E.coli*.
4) For an *E. coli* MCL Violation, public notification is required within 24 hours. Due to the public health risk, a boil-water advisory will typically be issued in response to an *E. coli* MCL violation. An *E. coli* MCL violation will trigger a Level 2 Assessment, which is to be completed by DEQ.

City of Flint *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call Lab Supervisor and MDEQ by end of the day that the City is notified of positive sample.
2. Contact GLWA
   - Review source water data
   - Identify operational changes
3. Contact Genesee County Public Health
4. Collect repeat samples outlined in section E or alternate locations that are expected to represent pathways of contamination into the distribution system.
   - Collect investigative samples as needed.
5. Inspection of potential pathways and correct as needed:
   - Review SCADA records for pressure irregularities.
   - Reservoir inspection for potential pathways; screens, hatches, locks, etc.
   - Interview staff for operational changes, water main breaks, pressure outages, etc.
   - Review cross connection program and status.
   - Review construction activities.

   See Appendix A for MDEQ Level 1 and 2 Assessment Forms
6. Implement health advisory as directed by MDEQ if deemed necessary.
7. Review repeat sample results.
   - Any repeat samples unsatisfactory: Issue health advisory. Work with MDEQ to Conduct Level 2 Assessment
   - Establish criteria for lifting health advisory.

G. Coliform Violations

Under the RTCR, the non-acute MCL violation (when greater than 5% of monthly samples are positive for total coliform) has been removed. Instead, a Level 1 Assessment must be performed. An MCL violation is issued when the *E. coli* MCL is not met. In this case a Level 2 Assessment must be performed. Information on Assessments is provided below.

E. coli MCL Violations

An *E. coli* MCL violation occurs if a routine sample and at least one related repeat sample both have coliform bacteria present and one of the samples is positive for the presence of *E. coli*. If this occurs, contamination is confirmed in the water supply.

If an *E. coli* MCL violation occurs, follow the steps outlined in Section F.

Other Types of Violations

Other types of violations related to RTCR compliance include treatment technique violations, monitoring violations, and reporting violations:

- **Treatment Technique (TT) violations** result from failure to perform appropriate assessments or correction actions. TT violations require Tier 2 public notification (public notice as soon as practicable, but not later than 30 days following the violation).
- **Monitoring violations** result from a failure to collect any coliform sample (routine or repeat) or a failure to analyze an unsatisfactory total coliform positive sample for *E. coli* bacteria. Tier 3 public notification is required for monitoring violations. For this type of notification, the City must communicate the violation to customers within 12 months of the violation, which could be included in the Consumer Confidence Report (if it is issued within 12 months).
- **Reporting violations** result from failure to submit a monitoring report or completed assessment form in a timely manner or failure to notify MDEQ following an *E. coli* positive sample in a timely manner. Reporting violations require Tier 3 public notification.

H. Assessments

A key component of the RTCR is to require a system assessment when triggered by results from coliform monitoring. The two types of assessments are described below.

Level 1 Assessment

A Level 1 Assessment is triggered when more than 5% of monthly samples are TC+ or when the system fails to collect any required repeat samples following a TC+. The assessment is an evaluation intended to identify possible presence of sanitary defects, defects in DS coliform monitoring practices, and (when possible) the likely reason that the supply triggered the assessment. The Level 1 Assessment is conducted by the system's owner and/or operator. Information gathered in the assessment is described on the *MDEQ Level 1 Assessment Form for Community Water Supplies* (included in Appendix A) and submitted to MDEQ for review within 30 days of learning that the assessment was triggered. The form must identify any sanitary defects found during the investigation and provide a list of corrective actions that were completed during the investigation and/or a proposed time table for completing corrective actions.

Level 2 Assessment

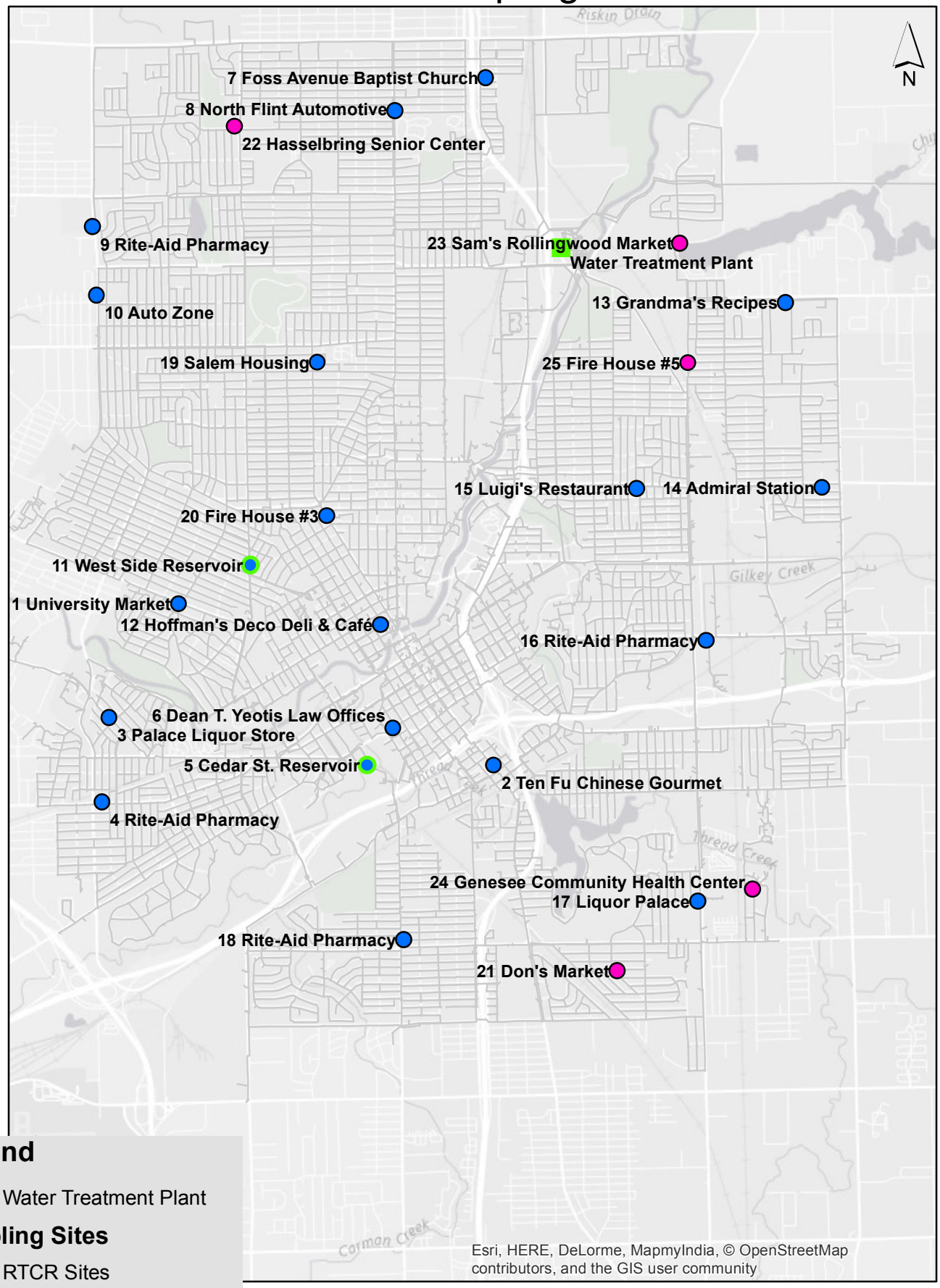
A Level 2 Assessment is triggered by an *E. Coli* MCL violation or when two Level 1 Assessments are triggered within a rolling 12-month period. A Level 2 Assessment is a more detailed evaluation than a Level 1 Assessment and is conducted by the State. MDEQ will send a team of staff members to Flint to complete the assessment. The team will conduct the assessment as soon as practicable and generally within one week of being notified of the violation.

Table 4 provides a basic comparison of Level 1 and Level 2 Assessments.

Table 4. Comparison of Level 1 and Level 2 Assessment Requirements

	Level 1 Assessment	Level 2 Assessment
Trigger for assessment	● TC+ in >5% of monthly samples, or ● Failure to collect any repeat samples following TC+ sample	● *E. Coli* MCL violation, or ● Two Level 1 Assessments required within 12-month period
Party responsible for completing assessment	Supply owner or operator	MDEQ
Assessment Deadline	● City to initiate assessment as soon as practicable after learning of trigger ● Submit assessment form to DEQ **within 30 days** of learning that a trigger was exceeded	● MDEQ to initiate assessment as soon as practicable after learning of trigger ● Correct sanitary defects as soon as practicable or on State-approved timeline identified in form
Assessment Form	Level 1 assessment form for community water supplies (Appendix A)	Level 2 assessment form for community water supplies (Appendix A)
Minimum assessment elements	● Review and identification of atypical events that could have affected or impaired distributed water quality ● Changes in DS O&M that could affect DS water quality (inc. storage) ● Source and treatment considerations affecting DS water quality ● Review of water quality data ● Inadequacies in sample sites, sampling protocols, and sample processing ● Form describing sanitary defects detected, corrective actions completed, and a proposed timetable for each corrective action not already completed	

City of Flint
RTCR Sampling Sites



Legend

- Water Treatment Plant

Sampling Sites

- RTCR Sites
- Reservoir and RTCR Sites
- Chlorine Only Sites

0 0.4 0.8 1.6 2.4 3.2 Miles

Appendix A - Level 1 and 2 Assessment Forms

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

LEVEL 1 ASSESSMENT FORM FOR COMMUNITY WATER SUPPLIES

Issued under authority of the Safe Drinking Water Act, 1976 PA 399, as amended, MCL 325.1001 et seq., and its Administrative Rules (Act 399).

This form must be completed and submitted to the appropriate DEQ District Office as soon as possible, but no later than 30 days after the supply triggered the assessment. It should be completed by the Operator In Charge, Water Supply Owner, or a knowledgeable representative of the water system.

1. General Information

CWS Name:	WSSN:
Assessor Name:	Assessor Title:
Phone Number:	E-mail:
Trigger Event: Greater Than 5% Total Coliform Positives ☐ ***or*** Failure to Collect All Repeat Samples ☐	
Date Assessment Triggered:	Date Assessment Completed:

2. Bacteriological Sample Summary (Include all results associated with monitoring period, add additional pages if necessary)

Date & Time	Location	Purpose (Routine, Repeat, Triggered, Construction, Repair)	Result (ND, TC+, EC+, invalid, interference)	Collected By	Laboratory

3. Assessment Questions: Answer each question in Subsections A - G either Yes, No or Not Applicable (NA). Review and evaluate each question for potential causes of contamination. If the answer to any of these questions is unknown, leave blank and indicate on a separate sheet what actions will be taken to determine the necessary information.

A. Sample Site Selection and Sample Collection	**Answer**		
	Yes	**No**	**NA**
Were the samples collected in accordance with the Sample Site Plan?	☐	☐	☐
Was the location and condition of the sample tap sanitary?	☐	☐	☐
Were proper sample collection procedures followed?	☐	☐	☐
Were the samples submitted to the lab in a timely & acceptable manner?	☐	☐	☐

B. Source – Wells (if wells are not used check here ☐ and go to subsection C)	**Answer**		
	Yes	**No**	**NA**
Do the wells have a proper well cap, sanitary seal and vent screens?	☐	☐	☐
Have the wells/pumps undergone any recent repairs or maintenance activities?	☐	☐	☐
Is the exposed portion of the casing (including electrical conduit) in good condition?	☐	☐	☐
Is the area near the well cap/casing free of insects, bugs, brush and vegetation?	☐	☐	☐
Is there standing water or other unsanitary conditions near the wells?	☐	☐	☐
Any signs of vandalism to wells or forced entry into well houses?	☐	☐	☐

C. Source – Surface Water (if surface water is not used check here ☐ and go to subsection D)	Answer		
	Yes	No	NA
Are there any new potential contamination sources, or visible signs of unsanitary conditions near the raw water intake?	☐	☐	☐
Any signs of vandalism or unauthorized access to source facilities?	☐	☐	☐
Was there any heavy precipitation, rapid snowmelt or flooding recently?	☐	☐	☐
Any unusual changes to quality of the raw water like a spike in turbidity, sudden change in pH or very high heterotrophic plate counts?	☐	☐	☐

D. Treatment (if no treatment check here ☐ and go to subsection E)	Answer		
	Yes	No	NA
Have there been additions or modifications to any treatment process?	☐	☐	☐
Have there been interruptions in any treatment process?	☐	☐	☐
Any signs of vandalism or unauthorized access to treatment equipment or facilities?	☐	☐	☐
Are there any issues with operation or maintenance of treatment equipment, units or processes?	☐	☐	☐
Is there any water quality data that indicates treatment is ineffective?	☐	☐	☐

E. Storage (if no water storage tank check here ☐ and go to subsection F)	Answer		
	Yes	No	NA
Are there any holes, leaks or other structural problems?	☐	☐	☐
Are access hatches and manhole openings tightly covered and secured?	☐	☐	☐
Are all vents and overflow pipes screened?	☐	☐	☐
For hydropneumatic tanks, is the tank waterlogged?	☐	☐	☐
Any signs of vandalism or unauthorized access to storage facilities?	☐	☐	☐
Have the tank(s) been recently drained, cleaned or inspected?	☐	☐	☐

F. Distribution System	Answer		
	Yes	No	NA
Have there been any low pressure events (≤ 20 psi)?	☐	☐	☐
Have there been any water main breaks, repairs, or new main installations?	☐	☐	☐
Have there been any recent fires or hydrant flushing?	☐	☐	☐
Have there been any booster pump issues, repairs or new installations?	☐	☐	☐
Is the supply actively performing cross connection control inspections, including frequent testing of all testable backflow preventers?	☐	☐	☐
Have there been other construction activities like hydrant or valve replacement that could have introduced contamination into the system?	☐	☐	☐
If samples were collected from inside a building, has there been any recent plumbing work performed within the building?	☐	☐	☐

G. Operation and Maintenance (O & M)	Answer		
	Yes	No	NA
Any changes in procedures or staff effecting O & M activities?	☐	☐	☐
Any water quality data collected from the treated water tap or distribution system show results are indicative of an issue?	☐	☐	☐
Any complaints from customers related to water quality or low pressure?	☐	☐	☐
Any other issues or items that may have caused bacteriological contamination?	☐	☐	☐

4. Issue Description: For any answer in Part 2, Subsections A - G that are in a shaded box, use this space to describe the event and provide additional information on potential causes of contamination identified during the assessment. Include corresponding dates with your findings. Attach additional page(s) if needed. Include date(s) of low pressure events, water main breaks, maintenance activities, etc. with your findings.

5. Corrective Actions Taken or to be Taken for any Issues Identified in Part 3: Use this space to describe corrective actions already taken and date(s) completed; or a proposed timetable for corrective actions not yet completed. Attach additional page(s) if needed.

6. Certification: I hereby certify that the information contained herein is true, accurate and complete to the best of my knowledge and information.	
Assessor's Name (printed):	
Assessor's Signature:	**Date:**

DEQ USE ONLY: This section is to be completed by DEQ.	
Reviewer Name:	**Date Reviewed:**
Date Received:	**Within 30 days of trigger: Yes ☐ No ☐**
Assessment Complete: Yes ☐ No ☐	**Likely Reason for Positive Samples Identified: Yes ☐ No ☐**
Corrective Actions Completed: Yes ☐ No ☐ NA ☐	**Proposed Schedule Acceptable: Yes ☐ No ☐ NA ☐**
Assessment Level Reset Yes ☐ No ☐	
Comments:	

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

LEVEL 2 ASSESSMENT FORM FOR COMMUNITY WATER SUPPLIES

Issued under authority of the Safe Drinking Water Act, 1976 PA 399, as amended, MCL 325.1001 et seq., and its Administrative Rules (Act 399).

This form must be completed as soon as possible, but no later than 30 days after the supply triggered the assessment. It must be completed by DEQ - Office of Drinking Water & Municipal Assistance staff.

1. General Information	
CWS Name:	WSSN:
DEQ Staff Completing Assessment:	
Name & Title of Person Representing the CWS During Assessment:	
Level 2 Trigger: *E. coli* MCL ☐ ***or*** 2nd Level 1 Assessment in 12 months ☐	
Date Assessment Triggered:	Date Assessment Completed:

2. Bacteriological Sample Summary (Include all results associated with monitoring period, add additional pages if necessary)

Date & Time	Location	Purpose (Routine, Repeat, Triggered, Construction, Repair)	Result (ND, TC+, EC+, invalid, interference)	Collected By	Laboratory

3. Assessment Questions: Answer each question in Subsections A - H either Yes, No or Not Applicable (NA). Review and evaluate each question for potential causes of contamination. If the answer to any of these questions is unknown, leave blank and indicate on a separate sheet what actions will be taken to determine the necessary information, including any supplemental information that needs to be provided by the water supply.

A. Sample Site Selection and Sample Collection	**Answer**		
	Yes	**No**	**NA**
Were the samples collected in accordance with the Sample Site Plan?	☐	☐	☐
For positive samples, were the taps used in appropriate condition for collection?	☐	☐	☐
For positive samples, were the taps used on a regular basis?	☐	☐	☐
Did someone other than a regular sample collector collect the samples?	☐	☐	☐
Were proper sample collection procedures followed? (tap flushed, aerator removed, cap properly handled, clean and sealed sample bottles used, bottles not rinsed, etc.)	☐	☐	☐
Were the samples kept cool and delivered to the lab within 30 hours of collection?	☐	☐	☐
Have there been any recent plumbing changes or construction at the site?	☐	☐	☐
Any identified cross connections near the sample tap or premise plumbing?	☐	☐	☐
Is there any Point of Entry (POE) treatment units after the service line connection or in the premise?	☐	☐	☐
Is there any Point of Use (POU) treatment units at the sample tap(s) location?	☐	☐	☐

B. Source – Wells (if wells are not used check here ☐ and go to subsection C)	**Answer**		
	Yes	**No**	**NA**
Do the wells have approved and secured well caps or sanitary seals?	☐	☐	☐
Are the well caps or sanitary seals vented and screened?	☐	☐	☐
Is the top of the well head at least 12-inches above grade?	☐	☐	☐

B. Source – Wells (if wells are not used check here ☐ and go to subsection C)	Answer		
Is the electrical conduit damaged or not sealed to the well cap?	☐	☐	☐
Is the ground graded to prevent water flow towards the wells?	☐	☐	☐
Is there standing water or other unsanitary conditions near the wells?	☐	☐	☐
Have any wells/pumps undergone any recent repairs or maintenance activities?	☐	☐	☐
Do the wells have adequate isolation distances from sources of contamination?	☐	☐	☐
Does the raw water quality data indicate changes to the source water quality?	☐	☐	☐
Has the pumping capacity of the well(s) changed recently?	☐	☐	☐
Have there been any sewer or chemicals spills, or other disturbances near the wells?	☐	☐	☐
Have any backup or emergency wells been placed into service?	☐	☐	☐

C. Source – Surface Water (if surface water is not used check here ☐ and go to subsection D)	Answer		
	Yes	No	NA
Is the intake screened and in good condition?	☐	☐	☐
Any signs of vandalism or unauthorized access to source facilities?	☐	☐	☐
Does the raw water quality data indicate changes to the source water?	☐	☐	☐
Are there any obvious sources of contamination in the source?	☐	☐	☐
Have there been any sewer or chemicals spills, or other disturbances in the area of the source?	☐	☐	☐
Any signs of Algal blooms?	☐	☐	☐
Was there any heavy precipitation, rapid snowmelt or flooding recently?	☐	☐	☐
Any signs of drought or low water levels in the source?	☐	☐	☐
Has source water turnover occurred?	☐	☐	☐

D. Well House or other Low or High Service Pump House (if there are no well/pump houses, check here ☐ and go to subsection E)	Answer		
	Yes	No	NA
Are there unsanitary conditions?	☐	☐	☐
Any openings where animals may enter?	☐	☐	☐
Are there signs of animal activity?	☐	☐	☐
Are air/vacuum relief valves properly screened and air gapped?	☐	☐	☐
Are any vents/reliefs associated with control valves air gapped and not subject to flooding?	☐	☐	☐
Any cross-connections (piping in drains, chemical feed, irrigation, fire suppression)?	☐	☐	☐
Is the pump-to-waste piping capped and air gapped?	☐	☐	☐
Is the well/pump house subject to flooding?	☐	☐	☐
Is the well/pump house used for any other purposes such as storage or maintenance activities?	☐	☐	☐
Is there evidence of unauthorized entry?	☐	☐	☐

E. Treatment (if no treatment check here ☐ and go to subsection F)	Answer		
	Yes	No	NA
Have there been additions or modifications to any treatment process?	☐	☐	☐
Have there been interruptions in any chemical feed, treatment unit or process?	☐	☐	☐
Have there been any recent maintenance or repair of treatment equipment?	☐	☐	☐
Are all treatment devices and processes operational and properly maintained?	☐	☐	☐
Any signs of vandalism or unauthorized access to treatment equipment or facilities?	☐	☐	☐
Are there any signs that the chemicals being fed have been contaminated (discoloration, unusual odors, suspended particles, etc.)?	☐	☐	☐
If chlorine is used, was there a detectable residual at the sample sites where the positive samples occurred?	☐	☐	☐
If chlorine is used, is a residual currently being detected at the plant tap and within the distribution system?	☐	☐	☐
Were there any instances where C*T was not properly maintained?	☐	☐	☐
Does water quality data indicate inadequate or inappropriate treatment of water?	☐	☐	☐

E. Treatment (if no treatment check here ☐ and go to subsection F)	Answer		
	Yes	No	NA
If sand/gravel or other mixed media filtration is used, are the media depths near the original design depths and are the underdrains in good condition?	☐	☐	☐
Did the plant flow exceed the state rated treatment capacity?	☐	☐	☐
For surface water plants, did a review of the turbidity data reveal any anomalies?	☐	☐	☐
For membrane plants, is daily integrity testing being performed every 24 hours of operation and do the results indicate that the membranes are in good condition?	☐	☐	☐

F. Storage (if no water storage tank check here ☐ and go to subsection G)	Answer		
	Yes	No	NA
Are there any holes, leaks, cracks or other structural problems that could be a source of contamination?	☐	☐	☐
Are access hatches and manhole openings tightly covered, and secured?	☐	☐	☐
Do the access hatches/openings have a tightly fitted, rim overlapped cover and non-deteriorated gasket?	☐	☐	☐
Are all vents and overflow pipes properly screened?	☐	☐	☐
Are the vents turned downward with an adequate air gap at the termination point?	☐	☐	☐
Do the overflow pipes have at least a 12-inch air gap at the outlet?	☐	☐	☐
Do overflow pipes and downspouts drain water away from the structure?	☐	☐	☐
For hydropneumatic storage, is the tank maintaining adequate minimum pressure?	☐	☐	☐
For hydropneumatic storage, is the tank waterlogged?	☐	☐	☐
Are the storage facilities secured to prevent unauthorized access?	☐	☐	☐
Any signs of vandalism or unauthorized access visible?	☐	☐	☐
Is there evidence of bird activity on the storage tank roof (nests, droppings, feathers, etc.)?	☐	☐	☐
Is any portion of the storage facilities buried or installed below grade?	☐	☐	☐
Has there been any tank maintenance or recent work?	☐	☐	☐
Any recent inspections indicating sanitary deficiencies or recommended repairs?	☐	☐	☐
If the tank has been inspected or removed from service recently, was it properly disinfected and sampled?	☐	☐	☐
If chlorine is used, is there a detectable residual in or leaving the tank(s)?	☐	☐	☐

G. Distribution System	Answer		
	Yes	No	NA
Is there any evidence the system experienced low (< 20 psi) or negative pressure?	☐	☐	☐
Have there been any water main breaks, repairs, or new main installations?	☐	☐	☐
Have there been any firefighting, system flushing or other high demand events recently?	☐	☐	☐
Have there been any distribution system booster pump issues, repairs or new installations?	☐	☐	☐
Have there been other construction activities like hydrant or valve replacement that could have introduced contamination into the system?	☐	☐	☐
Are there hydrants or blow-offs with unplugged weep/drain holes located in areas of high water table or poorly draining soils?	☐	☐	☐
Are there any dead-ends that are not flushed on a regular basis?	☐	☐	☐
Are there any air relief valves located in vaults where the vent terminates below grade or are not properly air gapped above grade?	☐	☐	☐
Is the supply actively performing cross connection control inspections, including regular testing of all testable backflow preventers including those at residential accounts?	☐	☐	☐
Is there any evidence of intentional contamination in the distribution system?	☐	☐	☐
Are there any control or altitude valves subject to flooding?	☐	☐	☐

H. Operation and Maintenance (O & M)	Answer		
	Yes	No	NA
Any changes in procedures or staff effecting O & M activities?	☐	☐	☐
Is maintenance of all facilities and equipment being performed per appropriate schedule?	☐	☐	☐
Any recent interruptions to electrical power?	☐	☐	☐
Have there been any automation/control system interruptions recently?	☐	☐	☐

H. Operation and Maintenance (O & M)	Answer		
	Yes	No	NA
Any complaints from customers related to water quality or low pressure?	☐	☐	☐
Have there been any illnesses reported or suspected of being waterborne?	☐	☐	☐
Any other issues that could have contributed to bacteriological contamination?	☐	☐	☐

4. Issue Description: For any answer in Part 3 that is in a shaded box, use this space to describe the event and provide additional information on potential causes of contamination identified during the assessment. Include corresponding dates with your findings. Attach additional pages if needed. Include dates of sample collection, water main breaks, maintenance activities, etc. with your findings.

5. Corrective Actions Taken or to be Taken for any Issues Identified in Part 3: Use this space to describe corrective actions already taken and date completed; and/or a proposed timetable for corrective actions not yet completed. Attach additional pages if needed.

6. Certification: I hereby certify that the information contained herein is true, accurate and complete to the best of my knowledge and information. Must be DEQ - ODWMA staff.

Assessor's Name (printed):	
Assessor's Signature:	**Date:**

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7. DEQ District Supervisor Review: This section is to be completed by DEQ District Supervisor.

Supervisors Name:	**Date Reviewed:**
Date Received:	**Within 30 days of trigger:** Yes ☐ No ☐
Assessment Complete: Yes ☐ No ☐	**Likely Reason for Positive Samples Identified:** Yes ☐ No ☐
Corrective Actions Completed: Yes ☐ No ☐ NA ☐	**Proposed Schedule Acceptable:** Yes ☐ No ☐ NA ☐
Assessment Level Reset: Yes ☐ No ☐	
Comments:	