



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division

11 Technology Drive

North Chelmsford, Massachusetts 01863-2431

Drafted Date: 9/29/2022

Finalized Date: 11/07/2022

Subject: Reconnaissance and Sampling Inspection Report
Clean Water Act – National Pollutant Discharge Elimination System
Town of Braintree, MA

From: Shannon Shea (Brunelle), Inspector
Laboratory Services and Applied Science Division (LSASD)
Field Services Branch (FSB)

Reviewed

By: Jerome Keefe, Investigations Team Leader, LSASD-FSB

To: Denny Dart, Water Compliance Section Chief,
Enforcement and Compliance Assurance Division (ECAD-EWC)

CC: Todd Borci, U.S EPA, ECAD-EWC

I. Facility Information

- A. Facility Name:* Town of Braintree, MA
- B. Facility Location:* 1 John F Kennedy Memorial Drive, Braintree, MA, 02184
- C. Facility Contact:* James Arsenault - (781) 794-8254 - jarsenault@braintreema.gov
- D. NPDES Permit ID:* MAR041029 (MS4)

II. Background Information

- A. Date/Start time of recon inspection:* 08/23/2022 10:15
- B. Weather conditions:* Overcast, approximately 70 °F
- C. USEPA Representatives:* Michelle Coombs, Shannon Shea (Brunelle)
- D. State/Local Representatives:* None

- A. Date/Start time of sampling inspection:* 09/26/2022 09:15
- B. Weather conditions:* sunny, approximately 70 °F
- C. USEPA Representatives:* Michelle Coombs, Shannon Shea (Brunelle)
- D. State/Local Representatives:* None
- E. Federally Enforceable Requirements Investigated:*

Stormwater discharges and certain non-stormwater discharges from the Braintree, MA Town's Municipal Separate Storm Sewer Systems (MS4) are authorized by the National Pollutant Discharge Elimination System (NPDES) General Permit for the Discharge of Stormwater from Small MS4 (hereinafter, the Permit), issued by the

Environmental Protection Agency (EPA) Region 1. The town obtained coverage under the Permit with NPDES Permit ID MAR041029.

F. Pollutants Sampled: Pharmaceuticals and Personal Care Products (PPCPs), E. coli/Enterococcus, Ammonia (nitrogen), Total Chlorine, and Surfactants

III. Disclaimer:

Unless otherwise noted, this report describes conditions at the facility/property as observed by EPA inspector(s), and/or through records provided to and/or information reported to EPA inspector(s) by facility representatives and as understood by the inspector(s). This report may not capture all operations or activities ongoing at the time of the inspection. This report does not make final determinations on potential areas of concern. Nothing in this report affects EPA's authorities under federal statutes and regulations to pursue further investigation or action.

IV. Type and Purpose of Inspection(s)

The purpose of the reconnaissance inspection was to locate stormwater outfalls, associated manholes, and/or catch basins which discharge into the Monaquot River, Cedar Swamp, and Old Quincy Reservoir while noting appearance, presence of flow, and access requirements for one or more sampling inspections.

The purpose of the compliance sampling inspection was to identify potential illicit connections or illegal discharges within the Braintree, MA MS4 that may adversely impact the water quality in the Monaquot River, Cedar Swamp, and Old Quincy Reservoir. Samples were collected from seven locations in accordance with the FSB Investigations Team Stormwater Program Plan. Sample sites were identified during a reconnaissance inspection conducted on 08/23/2022.

V. Permittee Details

The Town of Braintree, MA occupies approximately 14.56 square miles in Norfolk County, MA, approximately 13 miles south of Boston, MA. The Town shares borders with the municipalities of Quincy to the north, Weymouth and South Weymouth to the east, Holbrook and Randolph to the south, Milton to the west. According to the 2020 U.S. Census, the population of Braintree was 39,143. The Monaquot River, Cedar Swamp, and Old Quincy Reservoir are listed as MS4 receiving waters in the Braintree, MA Notice of Intent (NOI) for coverage under the permit.

VI. 08/23/2022 Reconnaissance Inspection Summary

On 08/23/2022, EPA employees Michelle Coombs and Shannon Shea (Brunelle) ("the EPA Inspection Team") conducted an unannounced reconnaissance inspection of the town of Braintree, MA MS4. They were not accompanied by any town or state representatives. The inspection started at 40 Alida road at approximately 10:20. At the time of the inspection, the weather was overcast and approximately 70 °F. According to the National Weather Service for the Norwood Memorial Airport (KOWD), the last precipitation event prior to the inspection occurred on 08/22/2022, with 0.91, inches recorded. 0.91 inches of precipitation was recorded within the 72 hours before the inspection.

None of the locations visited during this inspection were field screened with the test kits or the YSI quality meter. Locations visited were noted for appearance, presence of flow, and access requirements. Photographs taken during the inspection are listed in Appendix A.

VII. 09/26/2022 Sampling Inspection Summary

On 09/26/2022, EPA employees Michelle Coombs and Shannon Shea (Brunelle) (“the EPA Inspection Team”) conducted an unannounced compliance sampling inspection of the Town of Braintree, MA MS4 at the locations described in Section VIII. They were not accompanied by any town or state representatives. The inspection started near 9 Allen Street at approximately 09:15. At the time of the inspection, the weather was sunny and approximately 70 °F.

According to the National Weather Service for the Norwood Memorial Airport (KOWD), the last precipitation event prior to the inspection occurred on 09/25/2022, with 0.01 inches recorded. There was 0.01 inches precipitation recorded within the 72 hours before the inspection. According to the National Weather Service, in the month (to date) of September, the town observed 4.28 inches of rain, which is approximately 120% of the 30-year normal value of 3.54 inches. According to the US Drought Monitor, as of 09/29/2022, Norfolk County is experiencing severe drought conditions.

The sampling locations described in Section VIII were field screened using test kits for ammonia (nitrogen), surfactants, and total chlorine. In-situ measurements for specific conductivity, salinity, and temperature were also measured using a YSI water quality meter and recorded. Field data were recorded on field data sheets. Samples were delivered to and analyzed for E. coli, Enterococcus, PPCPs at the EPA New England Regional Laboratory (NERL) in North Chelmsford, MA. Table 1 below summarizes the sampling and analytical data.

VIII. Description of Sampling Locations (in order of collection time)

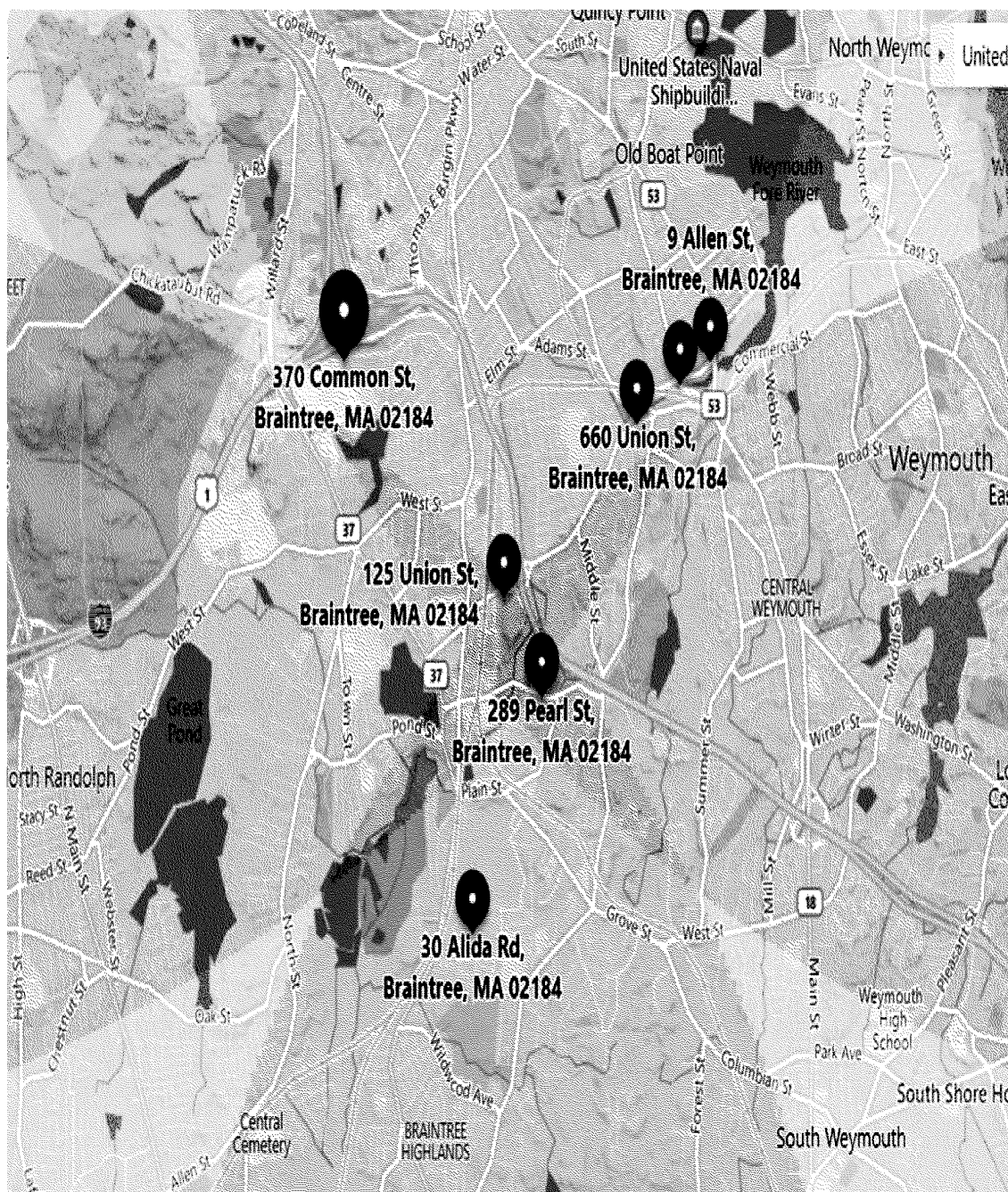
Photographs depicting each sample location are included in Appendix A of this report.

- **MQR-005**: a single, steel, circular outfall, approximately 12 inches in diameter, located at 100 Shaw Street. Discharge flow was approximately 50 gallons per minute (gpm) into the Monaquot River. Sample was collected at the mouth of the outfall. A slightly musty odor was detected at the outfall. The effluent had no observed color, turbidity or floatables. Green algae growth was observed on the rocks below the outfall, on the inside of the pipe and on the outside of the pipe.
- **MQR-012A**: the left (when facing the river at outfalls) of a double, concrete, circular outfall, approximately 36 inches in diameter, located at 660 Union Street. Discharge flow was approximately 30 gallons per minute (gpm) into the Monaquot River. Sample was collected at the mouth of the outfall. Effluent was slightly brown in color. The effluent had no observed odor, turbidity or floatables. A light brown staining was observed inside the pipe and on the rocks surrounding the outfall. Inside of the pipe has visibly cracked joints.
- **MQR-012B**: the right (when facing the river at outfalls) of a double, concrete, circular outfall, approximately 36 inches in diameter, located at 660 Union Street. Discharge flow was approximately 20 gallons per minute (gpm) into the Monaquot River. Sample was collected in between the two outfalls where flow discharges out of cracks in the pipe. The

effluent had no observed odor, color, turbidity or floatables. A pool of effluent and a large sediment build up were observed inside the pipe.

- **CDS-010**: a single, concrete, circular outfall, approximately 36 inches in diameter, located at 40 Alida Road. Discharge flow was approximately less than 1 gallons per minute (gpm) into Cedar Swamp. Sample was collected at the mouth of the outfall. No odor was observed at the outfall. The effluent was slightly brown with a cloudy/milky turbidity. A fragmented sheen was observed on the surface of the pool. An orange staining was observed on the sediment.
- **MQR-081**: a single, concrete, circular outfall, approximately 36 inches in diameter, located at 289 Pearl Street. Discharge flow was approximately less than 1 gallon per minute (gpm) into the Monaquot River. Sample was collected at the mouth of the outfall. A strong petroleum odor was observed at the outfall. A petroleum-like substance was observed on the surface of the pool. The effluent was clear in color and had a cloudy turbidity. Orange-stained sediment and filamentous algae growth was observed downstream of outfall.
- **MQR-075A**: a single, concrete, circular outfall, approximately 48 inches in diameter, located at 125 Union Street. Discharge flow was approximately 5 gallons per minute (gpm) into the Monaquot River. Sample was collected at the mouth of the outfall. A strong petroleum odor was observed when approaching outfall. A slightly earthy odor was observed inside the pipe. Effluent had no observed color or turbidity. An oil sheen on the surface and orange staining on the sediment were observed downstream. Sediment build up was observed at the mouth of the outfall. Dup-01 was collected with sample.
- **MQR-075**: a single, concrete, circular outfall, approximately 48 inches in diameter, located at 125 Union Street. Discharge flow was approximately 5 gallons per minute (gpm) into the Monaquot River. Sample was collected at the mouth of the outfall. An extremely strong petroleum odor was observed inside pipe. The effluent was slightly brown in color and was slightly turbid. An oil sheen was observed downstream and inside pipe. Orange staining on the sediment downstream was observed. Audible flow upstream inside pipe was observed, not visual without light source within pipe.

Map of Sample Locations



Note: the locations on the map were estimated using Google Earth and are used for display purposes only.

Table 1: Summary of Sampling and Analytical Data

Location	Site ID	MQR-005	MQR-012A	MQR-012B	CDS-010
	Sample Date	09/26/22	09/26/22	09/26/22	09/26/22
	Sample Time	09:25	09:57	10:03	10:50
Coordinates ¹ (decimal degrees)	North	42.222326	42.219860	42.219860	42.187993
	West	-70.973868	-70.981559	-70.981559	-71.003488
YSI Meter	Salinity, ppt.	0.3	0.2	0.2	0.3
	Temperature, °C	20.5	18.8	18.8	18.6
	Conductivity, µS/cm	626	429.5	431.2	527
Field Test Kits (mg/L)	Ammonia	0.50	0.0	0.0	0.25
	Total Chlorine	0.10	0.0	0.0	0.07
	Surfactants	0.25	0.25	0.25	0.50
Bacteria (MPN/100mL)	E. coli	>9678	643	568	43
	Enterococcus		218	410	ND
PPCPs (ng/L)	Cotinine		12	13	3.9
	Acetaminophen	510	ND	ND	3.6
	Paraxanthine		4.8	4.8	3.7
	Atenolol	5.1	ND	ND	ND
	Caffeine		69	72	23
	Metoprolol	18	ND	ND	ND
	Diphenhydramine	2.4	ND	ND	ND
	Carbamazepine	3.5	ND	ND	ND

Abbreviations and Notes:

1. The coordinates listed in Table 1 were derived from the map created in Google Earth, therefore the coordinates are estimates of the actual locations.

N/A: Not Analyzed

ND: Not Detected above Reporting Limit

E. Coli: Red ≥ 10,000 col/100ml, Orange ≥ 1,260 col/100ml, Yellow ≥ 410 col/100ml, Black < 410 col/100ml

Enter: Red ≥ 1,000 col/100ml, Orange ≥ 350 Yellow ≥ 130 col/100ml, Black < 130 col/100ml

NH₃: Red ≥ 6 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L

Cl₂: Red ≥ 1.0 mg/L, Orange ≥ 0.3 mg/L, Yellow ≥ 0.02 mg/L, Black < 0.02 mg/L

Surfactants: Red ≥ 1.0 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L (may give false positive at salinity greater than 1 ppt)

PPCPs: Dark Pink ≥ 10x the RL; Pink ≥ 10x the RL; Light Pink ≥ 3x the RL; No Pink < 3x the RL*

*See Reporting Limit (RL) values for each compound in attached Laboratory Report for Source Tracking

EPA notes while there are currently no numerical standards to compare pharmaceutical results against, it is EPA's experience that acetaminophen is the single best bacterial source tracking compound of those listed above, and any detection of this compound may indicate a source of sanitary sewage. With respect to all of the above compounds, when a sanitary sewage source is present, depending on the type of source, distance from the sample location, and the strength of the source, concentrations of these compounds may range from the low ng/l range up to thousands of ng/L.

Table 1: Summary of Sampling and Analytical Data, cont.

Location	Site ID	MQR-081	MQR-075A	Dup-01	MQR-075
	Sample Date	09/26/22	09/26/22	09/26/22	09/26/22
	Sample Time	11:25	12:00	12:00	12:12
Coordinates ¹ (decimal degrees)	North	42.202743	42.209528	42.209528	42.209521
	West	-70.993151	-70.998077	-70.998077	-70.998113
YSI Meter	Salinity, ppt.	0.3	0.6	N/A	0.8
	Temperature, °C	19.6	18.8	N/A	18.8
	Conductivity, µS/cm	686	1286	N/A	1623
Field Test Kits (mg/L)	Ammonia	0.25	0.25	N/A	0.25
	Total Chlorine	0.07	0.0	N/A	0.08
	Surfactants	0.75	0.75	N/A	0.25
Bacteria (MPN/100mL)	E. coli	70	944	N/A	1462
	Enterococcus	75	315	N/A	307
PPCPs (ng/L)	Cotinine	4.4	6.4	5.9	1.6
	Acetaminophen	2.2	7.0	6.1	ND
	Paraxanthine	3.4	5.2	4.7	ND
	Atenolol	ND	ND	ND	ND
	Caffeine	180	71	72	24
	Metoprolol	ND	ND	ND	ND
	Diphenhydramine	ND	ND	ND	ND
	Carbamazepine	ND	0.42	ND	ND

Abbreviations and Notes:

1. The coordinates listed in Table 1 were derived from the map created in Google Earth, therefore the coordinates are estimates of the actual locations.

N/A: Not Analyzed

ND: Not Detected above Reporting Limit

E. Coli: Red ≥ 10,000 col/100ml, Orange ≥ 1260 col/100ml, Yellow ≥ 235 col/100ml, Black < 235 col/100ml

Enterococcus: Red ≥ 1,000 col/100ml, Orange ≥ 350 col/100ml, Yellow ≥ 61 col/100ml, Black < 61 col/100ml

NH₃: Red ≥ 6 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L

Cl₂: Red ≥ 1.0 mg/L, Orange ≥ 0.3 mg/L, Yellow ≥ 0.02 mg/L, Black < 0.02 mg/L

Surfactants: Red ≥ 1.0 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L (may give false positive at salinity greater than 1 ppt)

PPCPs: Dark Pink ≥ 100x the RL; Pink ≥ 10x the RL; Light Pink ≥ 3x the RL; No Pink < 3x the RL

*See Reporting Limit (RL) values for each compound in attached Laboratory Report for Source Tracking

EPA notes while there are currently no numerical standards to compare pharmaceutical results against, it is EPA's experience that acetaminophen is the single best bacterial source tracking compound of those listed above, and any detection of this compound may indicate a source of sanitary sewage. With respect to all of the above compounds, when a sanitary sewage source is present, depending on the type of source, distance from the sample location, and the strength of the source, concentrations of these compounds may range from the low ng/l range up to thousands of ng/L.

IX. Appendix

Appendix A: Photograph Log

X. Attachments

Attachment A: Laboratory Report for PPCPs (Source Tracking) Analysis

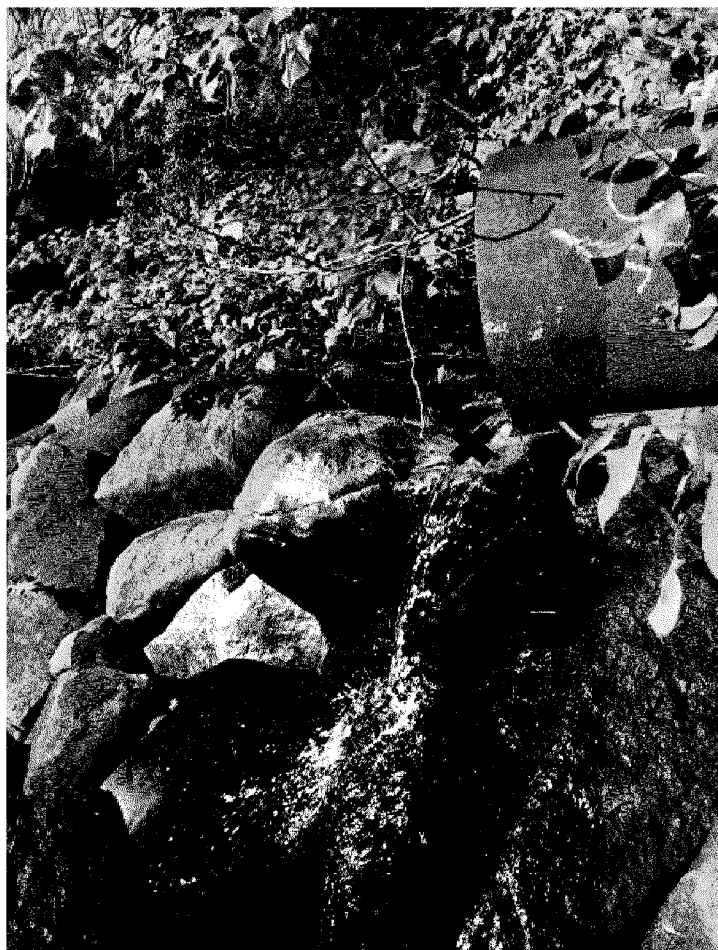
Attachment B: Laboratory Report for E. coli Analysis

Attachment C: Laboratory Report for Enterococcus Analysis

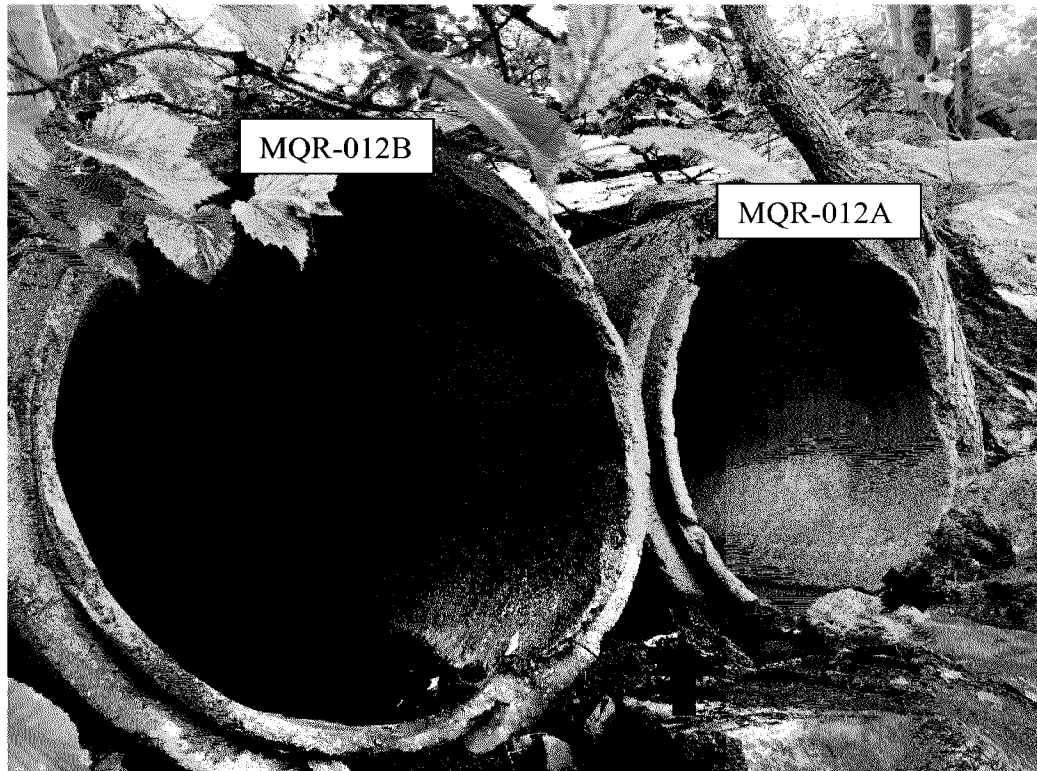
End of Report

Appendix A

Photograph Log



MQR-005 (photo taken 09/26/22 at 09:25 AM) Outfall located near 100 Shaw Street flowing into the Monatiquot River. Sample point is indicated by a red x.



MQR-012A & MQR-012B (photo taken 09/26/22 at 09:57 AM) Outfall located near 660 Union Street flowing into the Monatiquot River. Sample point MQR-012A is indicated by a red x. Sample point MRQ-012B is indicated by a red arrow.



CDS-010 (photo taken 09/26/22 at 10:50 AM) Outfall located near 40 Alida Road flowing into Cedar Swamp. Sample point is indicated by a red x. The blue arrow indicates direction of flow.



MQR-081 (photo taken 09/26/22 at 11:25 AM) Outfall located near 289 Pearl Street flowing into the Monaquot River. Sample point is indicated by a red x. The blue arrow indicates direction of flow.



MQR-075A (photo taken 09/26/22 at 10:50 AM) Outfall located near 125 Union Street flowing into the Monatiquot River. Sample point is indicated by a red x. The blue arrow indicates direction of flow.



MQR-075 (photo taken 09/26/22 at 10:50 AM) Outfall located near 125 Union Street flowing into the Monatiquot River. Sample point is indicated by a red x. The blue arrow indicates direction of flow.

Attachment A
Laboratory Report for
Source Tracking Analysis

Author: LSASD Laboratory Services Branch (LSB)
Pages: 16

Laboratory Report

October 19, 2022

Michelle Coombs - LFSB
Shannon Brunelle - LFSB
US EPA New England R1

Project Number: 22090042
Project: MS4 Braintree, MA
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 09/26/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, LSBSOP-LCMS_STA3.

The SOP is based on an EPA Regional Analytical Method developed at the EPA New England Laboratory.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

22090042\$STA

Qualifiers:

RL = Reporting limit

ND = Not Detected above Reporting limit

NA = Not Applicable due to high sample dilutions or sample interferences

NC = Not calculated since analyte concentration is ND.

J = Estimated value

J1 = Estimated value due to MS recovery outside acceptance criteria

J2 = Estimated value due to LFB result outside acceptance criteria

J3 = Estimated value due to RPD result outside acceptance criteria

J4 = Estimated value due to LCS result outside acceptance criteria

E = Estimated value exceeds the calibration range

L = Estimated value is below the calibration range

B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.

R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.

C = The identification has been confirmed by GC/MS.

A = Suspected Aldol condensation product.

N = Tentatively identified compound.

22090042\$STA

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MQR-005	Lab Sample ID:	AC02046
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	40	1	0.40	
103-90-2	Acetaminophen	510	5	10	
611-59-6	Paraxanthine	200	1	2.0	
29122-68-7	Atenolol	5.1	1	2.0	
58-08-2	Caffeine	420	1	4.0	
56392-17-7	Metoprolol	18	1	2.0	
58-73-1	Diphenhydramine	2.4	1	0.40	
298-46-4	Carbamazepine	3.5	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	74	37 - 113
Diphenhydramine-D3	62	8 - 114

Comments: Sample extract was diluted 5X and re-run on 17OCT2022 to bring acetaminophen into the calibration range

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MQR-012A	Lab Sample ID:	AC02047
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	12	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	4.8	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	69	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	79	37 - 113
Diphenhydramine-D3	63	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: MQR-012B
Date of Collection: 9/26/2022
Date of Preparation: 9/27/2022
Date of Analysis: 10/12/2022
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AC02048
Matrix: Stormwater
Amount Prepared: 500 mL
Percent Solids: N/A
Extract Dilution: 1
pH: N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	13	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	4.8	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	72	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	91	37 - 113
Diphenhydramine-D3	66	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	CDS-010	Lab Sample ID:	AC02049
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	3.9	1	0.40	
103-90-2	Acetaminophen	3.6	1	2.0	
611-59-6	Paraxanthine	3.7	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	23	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	77	37 - 113
Diphenhydramine-D3	56	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MQR-081	Lab Sample ID:	AC02050
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	4.4	1	0.40	
103-90-2	Acetaminophen	2.2	1	2.0	
611-59-6	Paraxanthine	3.4	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	180	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	74	37 - 113
Diphenhydramine-D3	40	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: MQR-075A
Date of Collection: 9/26/2022
Date of Preparation: 9/27/2022
Date of Analysis: 10/12/2022
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AC02051
Matrix: Stormwater
Amount Prepared: 500 mL
Percent Solids: N/A
Extract Dilution: 1
pH: N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	6.4	1	0.40	
103-90-2	Acetaminophen	7.0	1	2.0	
611-59-6	Paraxanthine	5.2	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	71	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.42	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	75	37 - 113
Diphenhydramine-D3	58	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	DUP-01	Lab Sample ID:	AC02052
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	5.9	1	0.40	
103-90-2	Acetaminophen	6.1	1	2.0	
611-59-6	Paraxanthine	4.7	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	72	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.44	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	74	37 - 113
Diphenhydramine-D3	55	8 - 114

Comments:

MS4 Braintree, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	MQR-075	Lab Sample ID:	AC02053
Date of Collection:	9/26/2022	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	1.6	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	ND	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	24	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	67	37 - 113
Diphenhydramine-D3	53	8 - 114

Comments:

MS4 Braintree, MA

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Stormwater
Date of Preparation:	9/27/2022	Amount Prepared:	500 mL
Date of Analysis:	10/12/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	ND	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	ND	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	ND	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	73	37 - 113
Diphenhydramine-D3	85	8 - 114

Comments:

MS4 Braintree, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AC02048

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	ND	87.7	73	55 - 99
Atenolol	120	ND	99.6	83	24 - 160
Caffeine	240	72.0	284	88	34 - 131
Carbamazepine	24.0	ND	19.8	83	61 - 107
Cotinine	24.0	13.0	33.5	87	48 - 112
Diphenhydramine	24.0	ND	11.8	63	17 - 112
Metoprolol	120	ND	75.3	81	31 - 137
Paraxanthine	120	4.8	110	95	41 - 132

MS4 Braintree, MA

Laboratory Duplicate Results

Sample ID: AC02052

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	6.1	5.95	3.1	50
Atenolol	ND	ND	NC	50
Caffeine	72.0	66.0	9.0	50
Carbamazepine	0.44124	ND	20	50
Cotinine	5.9	5.75	3.2	50
Diphenhydramine	ND	ND	NC	50
Metoprolol	ND	ND	NC	50
Paraxanthine	4.7	4.16	2.8	50

MS4 Braintree, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	90.1	75	45 - 106
Atenolol	120	104	87	33 - 129
Caffeine	240	163	68	41 - 120
Carbamazepine	24	20.1	84	63 - 108
Cotinine	24	16.8	70	55 - 106
Diphenhydramine	24	16.2	76	15 - 113
Metoprolol	120	91.6	87	41 - 122
Paraxanthine	120	89.9	88	52 - 115

Comments:

Samples in Batch: AC02046, AC02047, AC02048, AC02049, AC02050, AC02051, AC02052, AC02053

CHAIN OF CUSTODY RECORD

[illegible]

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

ESB FORM-CHAINCUSTODY1

Revisión 1
05/16/2022

Attachment B
Laboratory Report for
E. coli Analysis

Author: LSASD-LSB
Pages: 4



United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Microbiology Laboratory Report

October 24, 2022

Michelle Coombs - LFSB
Shannon Brunelle - LFSB
US EPA New England R1

Project Number: 22090043
Project: MS4 Braintree, MA
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/26/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, TC/ECColilert4.

Sample preparation and analysis was done following the EPA Region I method: Total Coliform/E. coli by Defined Substrate.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England LSASD Biology QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8604.

Sincerely,

Jack A. Paar, III
Biology Laboratory Manager

22090043ECMM

Water Microbiology Laboratory
Data Qualifier Codes

J = Estimate
H = Exceeds holding time
I = Exceeds incubation time
At = Atypical overgrowth
S = Lost sample
V = Insufficient sample volume
TNTC = Too numerous to count
MB = Media blank
+++ = Positive control
--- = Negative control
SP = Spiked Sample
L = Estimated, result below reporting limit (RL)
ND = Not Detected, result less than RL
D = Lab Duplicate
P = Plate counts outside preferred range
FDUP = Field Duplicate collect time not specified on Chain of Custody. Field duplicate
LIMS default time = 12:00AM

22090043ECMM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
MS4 Braintree, MA
E. Coli Defined Substrate

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection	Date of Analysis	Compound	Concentration MPN/100 mL	RL MPN/100 mL	Qualifier
MQR-005	AC02054	09/26/22 9:25 am	09/26/22 2:15 pm	E. Coli Defined Substrate	>9678	4	
MQR-012A	AC02055	09/26/22 9:57 am	09/26/22 2:15 pm	E. Coli Defined Substrate	643	4	
MQR-012B	AC02056	09/26/22 10:03 am	09/26/22 2:15 pm	E. Coli Defined Substrate	568	4	
CDS-010	AC02057	09/26/22 10:50 am	09/26/22 2:15 pm	E. Coli Defined Substrate	43	4	
MQR-081	AC02058	09/26/22 11:25 am	09/26/22 2:15 pm	E. Coli Defined Substrate	70	4	
MQR-075A	AC02059	09/26/22 12:00 pm	09/26/22 2:15 pm	E. Coli Defined Substrate	944	4	
MQR-075	AC02060	09/26/22 12:12 pm	09/26/22 2:15 pm	E. Coli Defined Substrate	1462	4	

Number of Samples: 7

Attachment C
Laboratory Report for
Enterococcus Analysis

Author: LSASD-LSB
Pages: 4



United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Microbiology Laboratory Report

October 24, 2022

Michelle Coombs - LFSB
Shannon Brunelle - LFSB
US EPA New England R1

Project Number: 22090043
Project: MS4 Braintree, MA
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/26/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, ECA Enterolert3.

Sample preparation and analysis was done following the EPA Region I method: Enterococcus by Defined Substrate

Data were reviewed in accordance with the internal verification procedures described in the EPA New England LSASD Biology QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8604.

Sincerely,

Jack A. Paar, III
Biology Laboratory Manager

22090043ENTERO

Water Microbiology Laboratory
Data Qualifier Codes

J = Estimate
H = Exceeds holding time
I = Exceeds incubation time
At = Atypical overgrowth
S = Lost sample
V = Insufficient sample volume
TNTC = Too numerous to count
MB = Media blank
+++ = Positive control
--- = Negative control
SP = Spiked Sample
L = Estimated, result below reporting limit (RL)
ND = Not Detected, result less than RL
D = Lab Duplicate
P = Plate counts outside preferred range
FDUP = Field Duplicate collect time not specified on Chain of Custody. Field duplicate
LIMS default time = 12:00AM

22090043ENTERO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
MS4 Braintree, MA
Enterococcus in Water

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection	Date of Analysis	Compound	Concentration MPN/100mL	RL MPN/100mL	Qualifier
MQR-005	AC02054	09/26/22 9:25 am	09/26/22 2:15 pm	Enterococcus in Water	4884	10	
MQR-012A	AC02055	09/26/22 9:57 am	09/26/22 2:15 pm	Enterococcus in Water	218	10	
MQR-012B	AC02056	09/26/22 10:03 am	09/26/22 2:15 pm	Enterococcus in Water	410	10	
CDS-010	AC02057	09/26/22 10:50 am	09/26/22 2:15 pm	Enterococcus in Water	ND	10	
MQR-081	AC02058	09/26/22 11:25 am	09/26/22 2:15 pm	Enterococcus in Water	75	10	
MQR-075A	AC02059	09/26/22 12:00 pm	09/26/22 2:15 pm	Enterococcus in Water	315	10	
MQR-075	AC02060	09/26/22 12:12 pm	09/26/22 2:15 pm	Enterococcus in Water	307	10	

Number of Samples: 7

CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipment. Copy to Coordinator Field Files.

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Revision 1
05/16/2022