



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

Drafted Date: May 26, 2021

Finalized Date: July 1, 2021

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

From: Michelle Coombs, Inspector \MRC\
Field Services Branch (FSB)
Laboratory Services and Applied Science Division (LSASD)

Reviewed By: Jerome Keefe, Investigations Team Leader, LSASD-FSB \JCK\
Jerome Keefe, Investigations Team Leader, LSASD-FSB

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

CC: Elizabeth Kudarauskas, Water Technical Lead, ECAD-EWC
Todd Borci, Inspector, ECAD-EWC

I. Facility Information

- A. *Facility Name:* City of Methuen, MA
- B. *Facility Location:* 41 Pleasant St, Searles Bldg. Room 206, Methuen, MA 01844
- C. *Facility Contact:* Stephen Gagnon, Engineering Dept. Administrator,
SJGagnon@ci.methuen.ma.us, (978)983-8550
- D. *NPDES Permit ID:* MA041210 (MS4)

II. Background Information

- A. *Date/Start time of recon inspection:* 05/24/2021, 08:30 AM
- B. *Weather conditions:* ~65°F, partly cloudy
- C. *USEPA Representatives:* Michelle Coombs and Shannon Brunelle (as a trainee)
- D. *State/Local Representatives:* None
- E. *Date/Start time of sampling inspection:* 05/25/2021, 08:15 AM
- F. *Weather conditions:* ~ 60°F, partly cloudy
- G. *USEPA Representatives:* Michelle Coombs and Shannon Brunelle (as a trainee)
- H. *State/Local Representatives:* None
- I. *Federally Enforceable Requirements Investigated:*
Stormwater discharges and certain non-stormwater discharges from the City of Methuen, MA (the City's) Municipal Separate Storm Sewer (MS4) are authorized by the National Pollutant Discharge Elimination System (NPDES) General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (hereinafter, the Permit), issued by the Environmental Protection Agency (EPA)

Region 1. The City obtained coverage under the Permit with NPDES Permit ID MA041210.

J. 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 Merrimack River, Spickett River, Searles Pond, and Bare Meadow Brook, 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 City of Methuen, MA Municipal Separate Storm Sewer System that may adversely impact the water quality in the Merrimack River, Spickett River, Searles Pond, and Bare Meadow Brook. Samples were collected from twelve (12) locations in accordance with the FSB Investigations Team Stormwater Program Plan. Sample sites were identified during a reconnaissance inspection conducted on May 24, 2021.

V. Permittee Details

The City of Methuen, MA occupies approximately 23 square miles in Essex County, MA, approximately 30 miles northwest of Boston, MA. The City shares borders with the municipalities of Haverhill to the northeast, North Andover to the east, Lawrence and Andover to the south, Dracut (Middlesex County) to the west, Pelham, New Hampshire (Hillsborough County) to the northwest, and Salem, New Hampshire (Rockingham County) to the north. According to the 2010 U.S. Census, the regulated population of Methuen was 47,252. There are five (5) CSOs permitted to discharge into the receiving waters of the Merrimack River and the Spickett River (NPDES Permit No. MA0100447). The Merrimack River, Spickett River, and Bare Meadow Brook are listed as MS4 receiving waters in the Methuen Notice of Intent (NOI) for coverage under the permit.

VI. 05/24/2021 Reconnaissance Inspection Summary

On Monday, May 24, 2021, EPA employees Michelle Coombs and Shannon Brunelle ("the EPA Inspection Team") conducted an unannounced reconnaissance inspection of the City of Methuen, MA MS4. They were not accompanied by any city or state representatives. The inspection

started at Bare Meadow Brook at approximately 08:30 AM. At the start time of the inspection, the weather was approximately 65°F and partly cloudy.

According to Weather Underground for the Lawrence Municipal Airport (KMANORTH328), the last precipitation event prior to the inspection occurred on May 10, 2021, with 0.34 inches recorded. No precipitation was recorded within the 72 hours before the inspection.

None of the locations visited during the recon inspection were field screened with the test kits or the YSI water quality meter. Locations visited were noted for appearance, presence of flow, and access requirements.

VII. 05/25/2021 Sampling Inspection Summary

On May 25, 2021, the EPA Inspection Team conducted an unannounced compliance sampling inspection of the City of Methuen MS4 at the locations described in Section VIII. They were not accompanied by any city or state representatives. The inspection started at Bare Meadow Brook at approximately 08:15 AM. At the start time of the inspection, the weather was approximately 60°F and partly cloudy.

According to Weather Underground for the Lawrence Municipal Airport (KMANORTH328), the last precipitation event prior to the inspection occurred on May 10, 2021, with 0.34 inches recorded. No precipitation was recorded within the 72 hours before the inspection. According to the National Weather Service, in the month (to date) of May, 0.35 inches of rain was observed, which is approximately 13% normal of the 30-year normal value of 2.67 inches. According to the US Drought Monitor, as of May 25, 2021, Essex County is experiencing no 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 were also taken using a YSI meter for specific conductivity, salinity, and temperature. All field data was recording on field data sheets. Samples were delivered to and analyzed for E. coli and Enterococcus and 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

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

- **Renfrew**: A single outfall approximately 16 inches in diameter located on the northwest side of the Renfrew St bridge at Bare Meadow Brook. Discharge flow was approximately 5 gallons per minute (gpm) into Bare Meadow Brook. Suds in the pool were observed below the pipe. Sample was collected from the outfall pipe. A strong flowing discharge that appeared to be coming from a highly pressurized source was observed at this location. The observed discharge was flowing straight down from the top of the street culvert into the brook. A photograph was taken and is included in the report (labelled as “Renfrew2”). A sample could not be collected because it was not accessible.

- **459MerrSt:** A single reinforced concrete outfall approximately 24 inches in diameter located at 459 Merrimack Street. Discharge flow was approximately 20 gpm into the Merrimack River. Some suds were observed downstream of the pipe. Sample was collected from the outfall pipe.
- **Walton:** A single reinforced concrete outfall approximately 24 inches in diameter located at the end of Walton Avenue. Discharge flow was approximately less than 5 gpm into a small wetland area flowing to the Merrimack River. Sample was collected from the outfall pipe.
- **PleasVal:** A single concrete outfall approximately 24 inches in diameter located on the southeast corner of Chippy Lane and Pleasant Valley Street. Discharge flow was approximately 12-15 gpm into Bare Meadow Brook. A slightly musty odor was detected, and green/brown algae growth was observed in the pipe. Sample was collected from the outfall pipe.
- **Outfall1A:** A pair of reinforced concrete outfalls approximately 36 inches in diameter located at the Prides Crossing Complex on Riverview Blvd. Discharge flow was approximately 5 gpm into the Merrimack River. Brown algae growth was observed in the pipe and on the downstream rocks, the sample appeared slightly cloudy, and suds were observed downstream. Sample was collected from the south outfall pipe (looking upstream)
- **Outfall1B:** A pair of reinforced concrete outfalls approximately 36 inches in diameter located at the Prides Crossing Complex on Riverview Blvd. Discharge flow was approximately 5 gpm into the Merrimack River. Brown algae growth was observed in the pipe and on the downstream rocks, the sample appeared slightly cloudy, and suds were observed downstream. Sample was collected from the north outfall pipe (looking upstream)
- **Perkins:** A single concrete outfall approximately 24 inches in diameter located at the end of Perkins Street. Discharge flow was approximately less than 5 gpm into a small stream flowing to the Merrimack River. Suds at the mouth of the outfall and green algae growth were observed in the pipe. Sample was collected from the outfall pipe.
- **76Swan:** An in-stream sample collected from an unnamed stream from Searles Pond located near the CVS parking lot at the corner of Jackson Street and Swan St. Trash and green algae growth was observed floating on the stream surface and a musty odor was detected. Sample was collected from the stream prior to the reinforced concrete inflow pipe that flows under the parking lot. The outfall adjacent to this inflow point was dry and not flowing.
- **EastSt:** A single concrete outfall approximately 12 inches in diameter located in the Jehovah's Witness Kingdom Hall parking lot on the south side of the property. Discharge flow was approximately less than 5 gpm into the unnamed stream from Searles Pond (stream sampled at the 76Swan location). A slightly musty odor was detected, and brown/green algae growth was observed in the pipe. Sample was collected approximately 6 inches inside the pipe due to the receiving water slightly backfilling into the pipe.
- **Horne:** A single PVC outfall approximately 18 inches in diameter located on Horne St on the northwest side of the street, slightly north of the intersection with Huse Road. Discharge flow was approximately 5 gpm into the Spickett River. Some suds were observed in the pool and orange staining was observed on the rocks and sediment and

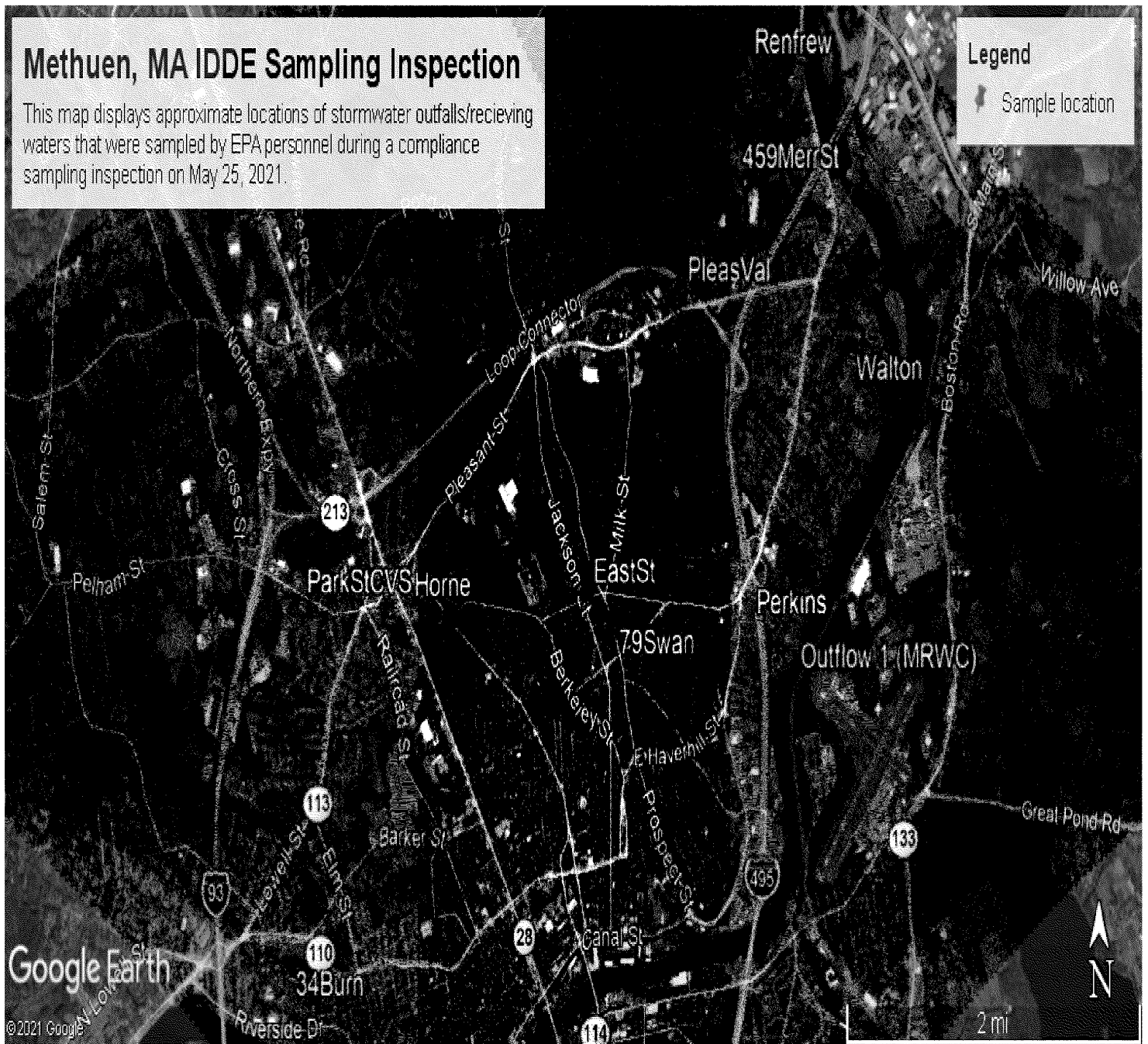
in the pipe. An oily, fragmented sheen was observed on the stream surface. Sample was collected from the outfall pipe.

- **ParkStCVS:** A single reinforced concrete outfall approximately 36 inches in diameter with a duckbill installed, located at the southeast corner of the CVS parking lot on Park Street. Discharge flow was approximately 10 gpm into the Spickett River. An oily, fragmented sheen was observed on the stream surface as well as orange sediment at the opening of the duckbill. Algae growth was also observed on the rocks. Sample was collected from the duckbill. A second outfall with a duckbill is located adjacent to this sample location; however it was not flowing at the time of the inspection. The duckbill was cracked and exposing the inside of the pipe.
- **34Burn:** A single reinforced concrete outfall approximately 12 inches in diameter located on the southeast side of the parking lot at 34 Burnham Road. Discharge flow was approximately less than 5 gpm into an unknown stream flowing to the Merrimack River. Long brown algae growth was observed inside the pipe and the pipe was almost completely submerged by water. Sample was collected at the outfall pipe.

Outfalls listed in this section were observed to be flowing but were not sampled during the inspection due to time constraints.

- **ECapitol:** A single steel outfall approximately 24 inches in diameter located at the intersection of East Capitol Street and Marc Avenue. Discharge flow was approximately 5 gpm into a wetland area that flows into the Spickett River. Outfall was completely submerged by water. No sample was collected at this location.
- **BrookSt:** A single outfall (size and construction could not be determined due to visual obstruction) located at the corner of Brook Street and Queen Avenue. Discharge flow was approximately less than 1 gpm into an unnamed stream flowing from Searles Pond. Brown algae growth and a slightly musty odor was observed at this location. Trash, including multiple car batteries, was observed at this location. No sample was collected at this location.
- **French:** A single reinforced concrete outfall approximately 18 inches in diameter located at the eastern corner of the parking lot behind the church on All Saints Lane. Discharge flow was a trickle into the Spickett River. No sample was collected at this location.

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	Renfrew	459MerrSt	Walton	PleasVal	Outfall1A	Outfall1B
	Sample Date	05/25/2021	05/25/2021	05/25/2021	05/25/2021	05/25/2021	05/25/2021
	Sample Time	08:25	08:52	09:15	09:40	10:12	10:15
Coordinates ¹ (decimal degrees)	North	42.756615	42.750860	42.737998	42.743969	42.722651	42.722651
	West	-71.133133	-71.125383	-71.126391	-71.149160	-71.134020	-71.134020
YSI Meter	Salinity, ppt.	0.5	0.2	0.1	0.5	1.0	1.0
	Temperature, °C	14.9	17.1	15.1	14.0	12.0	12.6
	Conductivity, µS/cm	1011	462.1	304.7	1090	2011	2031
Field Test Kits (mg/L)	Ammonia	0.0	0.0	0.0	0.25	0.0	NA
	Total Chlorine	0.0	0.76	0.05	0.04	0.10	NA
	Surfactants	0.5	0.25	0.25	0.5	0.5	NA
Bacteria (MPN/100mL)	E. coli	ND	ND	12	6	353	218
	Enterococcus	8	ND	4			616
PPCPs (ng/L)	Cotinine	0.57	2.1	1.6	7.3	1.2	1.1
	Acetaminophen	ND	ND	ND	4.7	ND	ND
	Paraxanthine	ND	ND	ND	ND	ND	ND
	Atenolol	ND	ND	ND	ND	ND	ND
	Caffeine	ND	8.3	ND	21	6.2	6.3
	Metoprolol	ND	ND	ND	ND	ND	ND
	Diphenhydramine	ND	ND	ND	ND	ND	ND
	Carbamazepine	1.3	0.43	ND	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 ≥ 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.

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

Location	Site ID	Perkins	76Swan	EastSt	Horne	DUP01	ParkStCVS	34Burn
	Sample Date	05/25/2021	05/25/2021	05/25/2021	05/25/2021	05/25/2021	05/25/2021	05/25/2021
	Sample Time	10:45	11:14	11:35	12:03	12:03	12:29	12:55
Coordinates ¹ (decimal degrees)	North	42.723838	42.723491	42.725738	42.723636	42.723636	42.725100	42.701016
	West	-71.139989	-71.158446	-71.161914	-71.180656	-71.180656	-71.183230	-71.201799
YSI Meter	Salinity, ppt.	1.2	0.7	0.7	0.1	N/A	1.0	0.4
	Temperature, °C	15.2	17.2	17.9	15.4	N/A	14.6	16.5
	Conductivity, µS/cm	2373	1404	1447	282.3	N/A	2010	764.0
Field Test Kits (mg/L)	Ammonia	0.25	0.0	0.0	0.0	N/A	0.25	0.25
	Total Chlorine	0.06	0.08	0.06	0.0	N/A	0.03	0.19
	Surfactants	0.5	0.5	0.5	0.25	N/A	0.5	0.25
Bacteria (MPN/100mL)	E. coli	16	1,302	281	ND	N/A	ND	ND
	Enterococcus	120			ND	N/A	4	ND
PPCPs (ng/L)	Cotinine	0.81	4.6	2.8	0.96	1.0	2.5	2.4
	Acetaminophen	ND	ND	ND	ND	ND	ND	ND
	Paraxanthine	ND	3.3	2.9	ND	ND	2.3	3.0
	Atenolol	ND	ND	ND	ND	ND	ND	ND
	Caffeine	ND	12	9.6	ND	ND	22	9.6
	Metoprolol	ND	ND	ND	ND	ND	ND	ND
	Diphenhydramine	ND	ND	ND	ND	ND	ND	ND
	Carbamazepine	ND	0.42	ND	ND	ND	2.3	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

Entero: Red ≥ 1,000 col/100ml, Orange ≥ 350 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

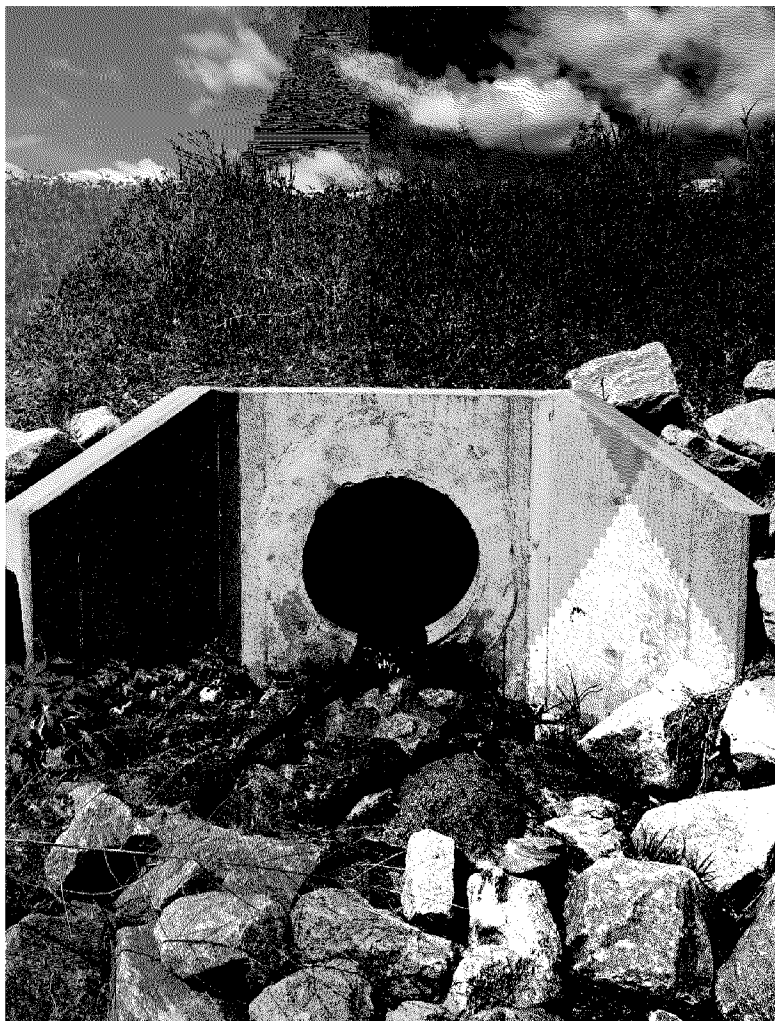
Appendix A **Photograph Log**



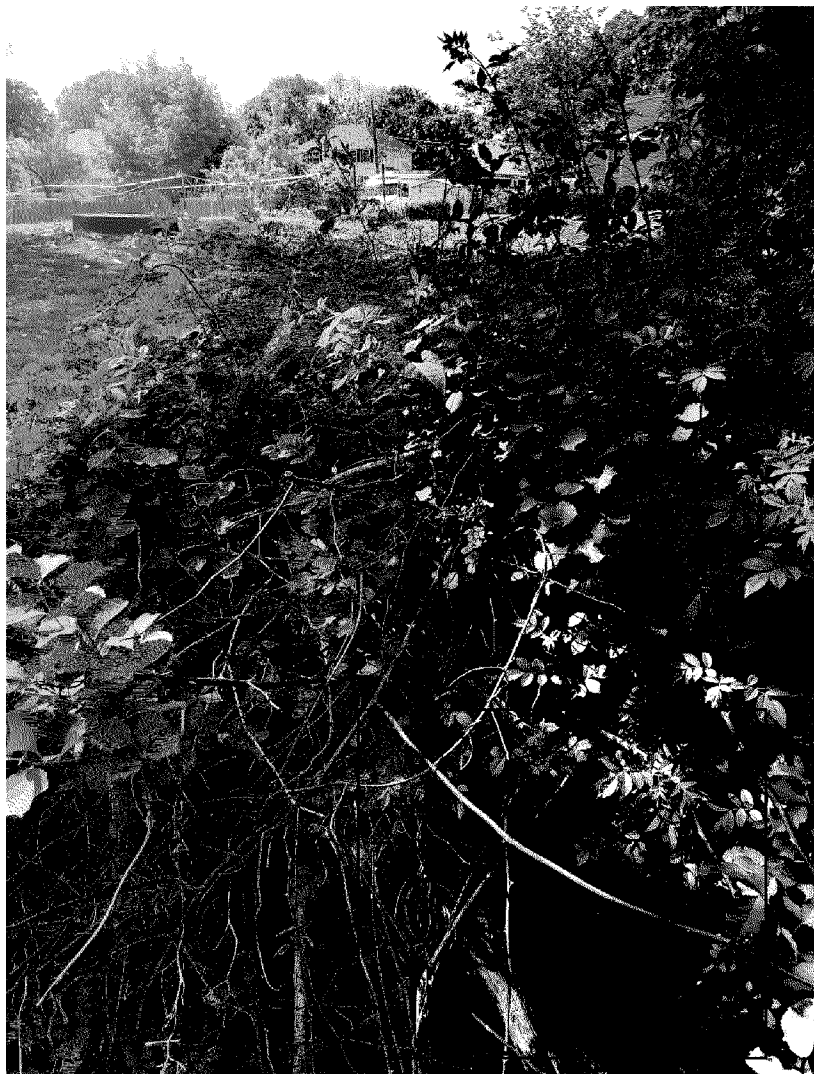
Renfrew (photo taken 5/24 at 08:48 AM): Outfall located on the northeast side of the Renfrew Street bridge over Bare Meadow Brook. Sample point is indicated by a red arrow.



Renfrew2 (photo taken 5/24 at 08:48 AM): Downstream view of unidentified discharge spraying into Bare Meadow Brook from the top of the culvert, indicated by a red circle.



459MerrSt (photo taken 5/24 at 10:32 AM): Outfall located near 459 Merrimack Street flowing into the Merrimack River. Sample point is indicated by a red arrow.



Walton (photo taken 5/24 at 10:18 AM): Outfall located at the intersection of Walton Ave and Riley Ave (indicated by a red box), with an access manhole in the background.



Walton (photo taken 5/24 at 10:18 AM): Close-up view of the outfall where the sample was collected. Sample point is indicated by a red arrow.



PleasVal (photo taken 5/24 at 09:03 AM): Outfall located on the northeast corner of Chipppy Lane and Pleasant Valley St. flowing into Bare Meadow Brook. Sample point is indicated by a red arrow.



Outfall 1A & 1B (from left to right) (photo taken 5/25 at 10:09 AM): Pair of outfalls located within the Pride's Crossing complex flowing into the Merrimack River. Sample points are indicated by red arrows.



Perkins (photo taken 5/24 at 10:01 AM): Outfall located at the end of Perkins Street flowing into an adjacent wetland to the Merrimack River. Sample point is indicated by a red arrow.



76Swan (photo taken 5/24 at 11:21 AM): Gated outfall located on the north side of the CVS parking lot at 76 Swan Street (dry at time of inspection). In-stream sample of the stream coming from Searles Pond collected just before the opening of the culvert pipe that flows under the parking lot. Sample point is indicated by a red arrow.



76Swan (photo taken 5/24 at 11:21 AM): View of gated culvert opening where the stream coming from Searles Pond begins to flow underneath the parking lot. Sample point is indicated by a red arrow.



EastST (photo taken 5/24 at 10:51 AM): Outfall located at the southern end of the Kingdom of Jehovah's Witnesses parking lot, flowing into the stream coming from Searles Pond. Sample point is indicated by a red arrow.



Horne (photo taken 5/24 at 12:27 PM): Outfall located at the northwest corner of Horne Street, just north of the intersection with Huse Road, flowing into the Spickett River. Note the orange staining of the pipe and sediment. Sample point is indicated by a red arrow.



ParkStCVS (photo taken 5/24 at 12:58 PM): Outfall with duckbill located on the southeast corner of the CVS parking lot on Park Street, flowing into the Spickett River. Sample point is indicated by a red arrow.



34Burn (photo taken 5/24 at 13:58 PM): Outfall located near the southeast corner of the driveway leading toward Riverside Drive. Note that the outfall is almost completely submerged. Sample was collected at the mouth of the outfall and is indicated by a red arrow.



ECapitol (photo taken 5/24 at 14:45 PM): Outfall located at the corner of East Capitol Street and Marc Ave, adjacent to 47 East Capitol Street. The outfall is completely submerged. No sample was collected at this location.



BrookSt (photo taken 5/24 at 11:09 AM): Outfall located at the corner of Brook Street and Queen Avenue flowing into an unnamed stream flowing from Searles Pond. No sample was collected at this location. Outfall is located under the bank on the right side of the photograph (indicated by a red arrow). Discharge flow is visible and is indicated by a blue bracket.



French (photo taken 5/24 at 12:05 PM): Outfall located at the eastern corner of the parking lot behind the church on All Saints Lane. Flow was a trickle into the Spickett River. No sample was collected at this location.

Attachment A
Laboratory Report for
Source Tracking Analysis

Author: LSASD Laboratory Services Branch
Pages: 20

Laboratory Report

June 08, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21050030
Project: MS4 Methuen, MA
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 05/25/2021

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_STA..

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,

21050030\$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.

21050030\$STA

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Renfrew	Lab Sample ID:	AB91884
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	0.57	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	1.3	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	58	59 - 137
Diphenhydramine-D3	45	19 - 135

Comments: Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: 459MerrSt
Date of Collection: 5/25/2021
Date of Preparation: 5/26/2021
Date of Analysis: 6/01/2021
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB91885
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	2.1	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	8.3	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	0.43	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	67	59 - 137
Diphenhydramine-D3	75	19 - 135

Comments:

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Walton	Lab Sample ID:	AB91886
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	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	89	59 - 137
Diphenhydramine-D3	92	19 - 135

Comments:

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	PleasVal	Lab Sample ID:	AB91887
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	7.3	1	0.40	
103-90-2	Acetaminophen	4.7	1	2.0	
611-59-6	Paraxanthine	ND	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	21	1	4.0	J
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	J

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	27	59 - 137
Diphenhydramine-D3	77	19 - 135

Comments: J = The internal standard recovery for caffeine was 43% and carbamazepine was 31% where 50%-150% are the QC limits. All other IS recoveries were within limits - matrix suppression is indicated.

Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Outfall 1A	Lab Sample ID:	AB91888
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	1.2	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	6.2	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	J

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	61	59 - 137
Diphenhydramine-D3	57	19 - 135

Comments: J = The internal standard recovery for carbamazepine was 33%, where 50%-150% are the expected QC limits. All other IS recoveries were within limits - matrix suppression is indicated.

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Outfall 1B	Lab Sample ID:	AB91889
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	1.1	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	6.3	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	J

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	53	59 - 137
Diphenhydramine-D3	52	19 - 135

Comments: J = The internal standard recovery for carbamazepine was 33%, where 50%-150% are the expected QC limits. All other IS recoveries were within limits - matrix suppression is indicated.

Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Perkins	Lab Sample ID:	AB91890
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	0.81	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	56	59 - 137
Diphenhydramine-D3	60	19 - 135

Comments: Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	76Swan	Lab Sample ID:	AB91891
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	4.6	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	3.3	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	12	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	J

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	16	59 - 137
Diphenhydramine-D3	73	19 - 135

Comments: J = The internal standard recovery for carbamazepine was 33%, where 50%-150% are the expected QC limits. All other IS recoveries were within limits - matrix suppression is indicated.

Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	EastSt	Lab Sample ID:	AB91892
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	2.8	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	2.9	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	9.6	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	J

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	19	59 - 137
Diphenhydramine-D3	68	19 - 135

Comments: J = The internal standard recovery for carbamazepine was 33%, where 50%-150% are the expected QC limits. All other IS recoveries were within limits - matrix suppression is indicated.

Recovery of the surrogate Phentermine was below QC limits

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Horne	Lab Sample ID:	AB91893
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	0.96	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

67

59 - 137

Diphenhydramine-D3

65

19 - 135

Comments:

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	DUP01	Lab Sample ID:	AB91894
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	1.0	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	78	59 - 137
Diphenhydramine-D3	72	19 - 135

Comments:

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: ParkStCVS
Date of Collection: 5/25/2021
Date of Preparation: 5/26/2021
Date of Analysis: 6/01/2021
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB91895
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	2.5	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	2.3	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	22	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	ND	1	0.40	
298-46-4	Carbamazepine	2.3	1	0.40	

Surrogate Compounds

Recoveries (%)

QC Ranges

Phentermine-D5

74

59 - 137

Diphenhydramine-D3

73

19 - 135

Comments:

MS4 Methuen, MA

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	34Burn	Lab Sample ID:	AB91896
Date of Collection:	5/25/2021	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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	2.4	1	0.40	
103-90-2	Acetaminophen	ND	1	2.0	
611-59-6	Paraxanthine	3.0	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	9.6	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	59 - 137
Diphenhydramine-D3	82	19 - 135

Comments:

MS4 Methuen, MA

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Stormwater
Date of Preparation:	5/26/2021	Amount Prepared:	500 mL
Date of Analysis:	6/01/2021	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

70

59 - 137

Diphenhydramine-D3

74

19 - 135

Comments:

MS4 Methuen, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB91890

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	ND	91.5	76	61 - 100
Atenolol	120	ND	130	108	59 - 122
Caffeine	240	ND	177	74	54 - 128
Carbamazepine	24.0	ND	20.3	85	61 - 120
Cotinine	24.0	0.81	21.6	87	48 - 124
Diphenhydramine	24.0	ND	16.4	68	30 - 130
Metoprolol	120	ND	140	117	59 - 128
Paraxanthine	120	ND	108	90	42 - 125

MS4 Methuen, MA

Laboratory Duplicate Results

Sample ID: AB91887

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	4.7	4.57	2.8	50
Atenolol	ND	ND	NC	50
Caffeine	21.0	19.7	6.4	50
Carbamazepine	ND	ND	NC	50
Cotinine	7.3	7.70	5.3	50
Diphenhydramine	ND	ND	NC	50
Metoprolol	ND	ND	NC	50
Paraxanthine	ND	ND	NC	50

MS4 Methuen, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	89.0	74	53 - 105
Atenolol	120	86.7	72	62 - 117
Caffeine	240	147	61	50 - 127
Carbamazepine	24	20.7	86	28 - 126
Cotinine	24	21.4	89	52 - 134
Diphenhydramine	24	13.0	54	30 - 130
Metoprolol	120	91.1	76	33 - 139
Paraxanthine	120	120	100	61 - 113

Comments:

Samples in Batch: AB91884, AB91885, AB91886, AB91887, AB91888, AB91889, AB91890, AB91891, AB91892, AB91893, AB91894, AB91895, AB91896



ENVIRONMENTAL PROTECTION AGENCY

REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	NO. OF CONTAINERS	REMARKS								
201050030	Methuen MS4 - Methuen, MA										
SAMPLERS: (Signature) <i>Paula L. Lombardi</i>											
Page 2											
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION						
	5/25	0825	X		Renfrew	1	X				
	5/25	0852	X		459MerSt	1	✓				Ammonium Acetate preservative
	5/25	0915	X		Walton	1	✓				
	5/25	0940	X		Pleasant	1	✓				
	5/25	1012	X		Outfall 1A	1	✓				Ammonium Acetate preserv.
	5/25	1015	X		Outfall 1B	1	✓				Ammonium Acetate preserv.
	5/25	1045	X		Perkins	1	✓				
	5/25	1114	X		76Swan	1	✓				
	5/25	1135	X		East St	1	✓				
	5/25	1203	X		Horne	1	✓				
	5/25	1203	X		DUPA1	1	✓				
	5/25	1229	X		Park St CVS	1	✓				
	5/25	1255	X		34Burn	1	✓				Ammonium Acetate preservative
Relinquished by: (Signature) <i>Paula L. Lombardi</i> Date / Time 5/25/21 1420 Received by: (Signature) _____											
Relinquished by: (Signature) _____ Date / Time _____ Received by: (Signature) _____											
Relinquished by: (Signature) _____ Date / Time _____ Received for Laboratory by: (Signature) <i>Paula L. Lombardi</i> Date / Time 5-25-21 14:20 Remarks _____											

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

300

1-18491

Attachment B
Laboratory Report for
E. coli Analysis

Author: LSASD Laboratory Services Branch
Pages: 4



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

Microbiology Laboratory Report

June 18, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21050032
Project: MS4 Methuen, MA
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 05/25/2021

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 OEME 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

21050032ECMM

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

21050032ECMM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
MS4 Methuen, 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
Renfrew	AB91898	05/25/21	8:25 am	05/25/21	2:25 pm	E. Coli Defined Substrate	ND	4	
459MerrSt	AB91899	05/25/21	8:52 am	05/25/21	2:25 pm	E. Coli Defined Substrate	ND	4	
Walton	AB91900	05/25/21	9:15 am	05/25/21	2:25 pm	E. Coli Defined Substrate	12	4	
PleaVal	AB91901	05/25/21	9:40 am	05/25/21	2:25 pm	E. Coli Defined Substrate	16	4	
OutFall1A	AB91902	05/25/21	10:12 am	05/25/21	2:25 pm	E. Coli Defined Substrate	353	4	
OutFall1B	AB91903	05/25/21	10:15 am	05/25/21	2:25 pm	E. Coli Defined Substrate	218	4	
Perkins	AB91904	05/25/21	10:45 am	05/25/21	2:25 pm	E. Coli Defined Substrate	16	4	
76Swan	AB91905	05/25/21	11:14 am	05/25/21	2:25 pm	E. Coli Defined Substrate	1302	4	
EastSt	AB91906	05/25/21	11:35 am	05/25/21	2:25 pm	E. Coli Defined Substrate	281	4	
Horne	AB91907	05/25/21	12:03 pm	05/25/21	2:25 pm	E. Coli Defined Substrate	ND	4	
ParkStCVS	AB91908	05/25/21	12:29 pm	05/25/21	2:25 pm	E. Coli Defined Substrate	ND	4	
34Burn	AB91909	05/25/21	12:55 pm	05/25/21	2:25 pm	E. Coli Defined Substrate	ND	4	

Number of Samples: 12



REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS		REMARKS										
SAMPLERS: (Signature)																
STA. NO.	DATE	TIME	COMP.													GRAB
1	5/25	0825	X		BenFrew	1	✓	✓								Salinity: 0.5 ppt
2		0852			459 Merr St		✓	✓								0.2
3		0915			Walton		✓	✓								0.1
4		0940			PleasVal		✓	✓								0.5
5		1012			OutFall 1A		✓	✓								1.0
6		1015			OutFall 1B		✓	✓								1.0
7		1045			Perkins		✓	✓								1.2
8		1114			76 Swan		✓	✓								0.7
9		1135			East St		✓	✓								0.7
10		1203			Horne		✓	✓								0.1
11		1229			Park St CVS		✓	✓								1.0
12	↓	1255			34 Burn	↓	✓	✓								0.4
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)						
[Signature]		5/25/21 1415		[Signature]												
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)						
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks								
[Signature]				[Signature]		5/25/21 1415		ICE < 7°C was using no sample transfer								

1- 18490

Attachment C
Laboratory Report for
Enterococcus Analysis

Author: LSASD Laboratory Services Branch
Pages: 4



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

Microbiology Laboratory Report

June 18, 2021

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 21050032
Project: MS4 Methuen, MA
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 05/25/2021

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 OEME 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

21050032ENTERO

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

21050032ENTERO

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

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection		Date of Analysis		Compound	Concentration MPN/100mL	RL MPN/100mL	Qualifier
Renfrew	AB91898	05/25/21	8:25 am	05/25/21	2:25 pm	Enterococcus in Water	8	4	
459MerrSt	AB91899	05/25/21	8:52 am	05/25/21	2:25 pm	Enterococcus in Water	ND	4	
Walton	AB91900	05/25/21	9:15 am	05/25/21	2:25 pm	Enterococcus in Water	4	4	
PleaVal	AB91901	05/25/21	9:40 am	05/25/21	2:25 pm	Enterococcus in Water	2747	4	
OutFall1A	AB91902	05/25/21	10:12 am	05/25/21	2:25 pm	Enterococcus in Water	1642	4	
OutFall1B	AB91903	05/25/21	10:15 am	05/25/21	2:25 pm	Enterococcus in Water	616	4	
Perkins	AB91904	05/25/21	10:45 am	05/25/21	2:25 pm	Enterococcus in Water	120	4	
76Swan	AB91905	05/25/21	11:14 am	05/25/21	2:25 pm	Enterococcus in Water	2452	4	
EastSt	AB91906	05/25/21	11:35 am	05/25/21	2:25 pm	Enterococcus in Water	1089	4	
Horne	AB91907	05/25/21	12:03 pm	05/25/21	2:25 pm	Enterococcus in Water	ND	4	
ParkStCVS	AB91908	05/25/21	12:29 pm	05/25/21	2:25 pm	Enterococcus in Water	4	4	
34Burn	AB91909	05/25/21	12:55 pm	05/25/21	2:25 pm	Enterococcus in Water	ND	4	

Number of Samples: 12



REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS		REMARKS										
SAMPLERS: (Signature)																
STA. NO.	DATE	TIME	COMP.													GRAB
1	5/25	0825	X		BenFrew	1	✓	✓								Salinity: 0.5 ppt
2		0852			459 Merr St		✓	✓								0.2
3		0915			Walton		✓	✓								0.1
4		0940			PleasVal		✓	✓								0.5
5		1012			OutFall 1A		✓	✓								1.0
6		1015			OutFall 1B		✓	✓								1.0
7		1045			Perkins		✓	✓								1.2
8		1114			76 Swan		✓	✓								0.7
9		1135			East St		✓	✓								0.7
10		1203			Horne		✓	✓								0.1
11		1229			Park St CVS		✓	✓								1.0
12	↓	1255			34 Burn	↓	✓	✓								0.4
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)						
[Signature]		5/25/21 1415		[Signature]												
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)						
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks								
[Signature]				[Signature]		5/25/21 1415		ICE < 7°C was using no sample transfer								

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