



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division

11 Technology Drive

North Chelmsford, Massachusetts 01863-2431

Drafted Date: 5/25/2022

Finalized Date: 7/7/2022

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

From: Shannon 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, Inspector, ECAD-EWC

I. Facility Information

- A. Facility Name: City of Lawrence, MA*
- B. Facility Location: 200 Common St, Lawrence, MA 01841*
- C. Facility Contact: Brian Pena, Water & Sewer Commissioner
bpena@cityoflawrence.com (978) 620-3110*
- D. NPDES Permit ID: MAR041201 (MS4)*

II. Background Information

- A. Date/Start time of sampling inspection: 05/24/22 09:00 AM*
- B. Weather conditions: 65°F, sunny*
- C. USEPA Representatives: Michelle Coombs, Shannon Brunelle*
- D. State/Local Representatives: N/A*
- E. Federally Enforceable Requirements Investigated:*
Stormwater discharges and certain non-stormwater discharges from the City of Lawrence, MA (the City'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 City obtained coverage under the Permit with NPDES Permit ID MAR04120.
- 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 compliance sampling inspection was to identify potential illicit connections or illegal discharges within the Lawrence, MA MS4 that may adversely impact the water quality in the Merrimack River, Spicket River and Shawsheen River. Samples were collected from 6 locations in accordance with the FSB Investigations Team Stormwater Program Plan.

V. Permittee Details

The City of Lawrence occupies approximately 7.4 square miles in Essex County, Massachusetts, approximately 30 miles from, north of Boston, MA. The City shares borders with the municipalities of Methuen to the north and northwest, North Andover to the east, and Andover to the south and southwest. According to the 2020 U.S. Census, the population of Lawrence was 89,143. The Merrimack River, Spicket River and Shawsheen River are listed as MS4 receiving waters in the city Notice of Intent (NOI) for coverage under the permit.

VI. 05/24/22 Sampling Inspection Summary

On May 24, 2022, EPA employees Michelle Coombs and Shannon Brunelle ("the EPA Inspection Team") conducted an unannounced compliance sampling inspection of the Lawrence, MA MS4 at the locations described in Section VII. They were not accompanied by any city or state representatives. The inspection started at northeastern side of the parking lot located at 1 Essex St at approximately 09:00 AM. At the time of the inspection, the weather was sunny and approximately 65 °F.

According to National Weather Service for the Lawrence Municipal Airport (KLWM), the last precipitation event prior to the inspection occurred on 05/22/22, with 0.22 inches recorded. There was 0.22 inches precipitation recorded within the 72 hours before the inspection. According to the National Weather Service, in the month of May, the City observed 1.85 inches of rain, which is approximately 54% of the 30-year normal value of 3.39 inches. According to the US Drought Monitor, as of 5/25/22, Essex County is experiencing abnormally dry drought conditions.

The sampling locations described in Section VII 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 and PPCPs at the EPA New England Regional Laboratory (NERL) in North Chelmsford, MA. Table 1 below summarizes the sampling and analytical data.

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

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

- **Market01**: a single, plastic, circular outfall, approximately 36 inches in diameter, located near the eastern side of the parking lot at 1 Essex Dr. Discharge flow was approximately 5-7 gallons per minute (gpm) into Shawsheen River. Sample was collected at the mouth of the outfall. Dark green/brown algae growth was observed on rocks and a brown film was observed on the pipe. Trash was observed downstream of the outfall. A sewage odor was observed upstream of the outfall. The upstream infrastructure, a manhole and a secondary unseen source, was observed to be leaking onto the ground. Sample preserved with ammonium acetate due to the presence of elevated levels of total chlorine.
- **Law02**: a single concrete, circular outfall, approximately 48 inches in diameter, located at the north-west corner of sports field behind 165 Crawford St. Discharge flow was approximately 8-10 gallons per minute (gpm) into Shawsheen River. Sample was collected at the mouth of the elliptical structure surrounding the outfall. A musty odor was detected. Brown algae growth was observed inside outfall. Trash and rags were caught on the grate at the mouth of the outfall.
- **SPI07**: a single, concrete, rectangular culvert, approximately 6ft by 4ft in size, located near the southeastern side of the parking lot adjacent to 14 Vine St. Discharge flow was approximately 10 gallons per minute (gpm) into Spicket River. Sample was collected approximately 10 feet downstream of culvert opening. Trash was observed downstream. Some suds and brown algae growth were observed inside culvert. Dup01 collected with sample.
- **MM01**: a single, concrete, circular outfall, approximately 26 inches in diameter, located at southern western corner of the bridge located in the parking lot of 550 Broadway St. Discharge flow was approximately 8-10 gallons per minute (gpm) into Spicket River. Sample was collected at the mouth of the outfall using sampling pole. Suds and trash observed downstream of outfall. Orange staining observed on pipe.
- **Law05A**: a single, concrete, circular outfall, approximately 30 inches in diameter, located at 1 Eaton Street, near the north-eastern side of the parking lot adjacent to the Merrimack River. The outfall was 7/8 submerged into the Merrimack River. Sample was collected at the mouth of the outfall. A sheen was observed on the surface of the water inside the outfall.
- **Law05**: a single, circular outfall, approximately 48 inches in diameter, located at the left-hand side of the parking lot entrance to 1 Eaton St. Discharge flow was approximately <1 gallon per minute (gpm) into an unknown tributary adjacent to the Merrimack river. Sample was collected at the mouth of the outfall. A milky color and consistency was observed in pool downstream

Outfalls not sampled:

- **Law07**: Outfall inaccessible therefore no sample collected during sampling event.

Map of Sample Locations

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

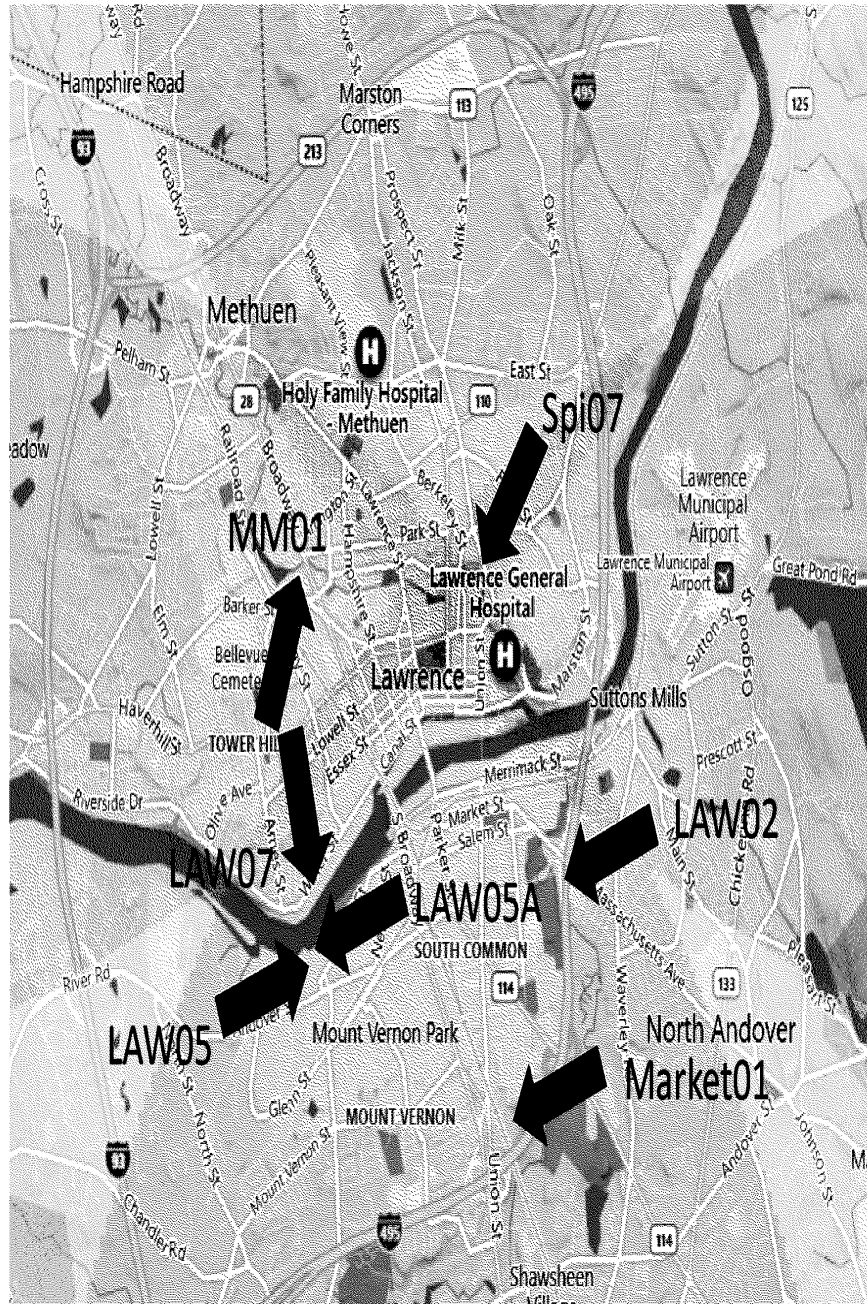


Table 1: Summary of Sampling and Analytical Data

Location	Site ID	Market01	Law02	SPI07	Dup01
	Sample Date	05/24/22	05/24/22	05/24/22	05/24/22
	Sample Time	09:05	09:35	10:52	10:52
Coordinates ¹ (decimal degrees)	North	42.682495	42.695437	42.715216	42.715216
	West	-71.148770	-71.146327	-71.154100	-71.154100
YSI Meter	Salinity, ppt.	0.7	0.8	0.7	N/A
	Temperature, °C	13.2	14.3	16.1	N/A
	Conductivity, µS/cm	1390	1583	1373	N/A
Field Test Kits (mg/L)	Ammonia	0.25	0.00	0.25	N/A
	Total Chlorine	0.12	0.00	0.00	N/A
	Surfactants	0.25	0.50	0.50	N/A
Bacteria (MPN/100mL)	E. coli	1642	3683	318	N/A
	Enterococcus	185	987	96	N/A
PPCPs (ng/L)	Cotinine	6.0	1.8	7.5	8.3
	Acetaminophen		29	32	35
	Paraxanthine	100	7.4	3.8	4.1
	Atenolol	8.5	ND	ND	ND
	Caffeine	130	48	32	35
	Metoprolol	6.3	2.5	ND	ND
	Diphenhydramine	1.8	0.56	ND	ND
	Carbamazepine	3.2	16	0.45	0.48

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/Fecal Coliform: Red ≥ 10,000 col/100ml, Orange ≥ 1,260 col/100ml, Yellow ≥ 410 col/100ml, Black < 410 col/100ml

Enterococcus: Red ≥ 1,000 col/100ml, Orange ≥ 350 col/100ml, 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 ≥ 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	MM01	Law05A	Law05
	Sample Date	05/24/22	05/24/22	05/24/22
	Sample Time	11:45	12:40	12:55
Coordinates ¹ (decimal degrees)	North	42.714613	42.692848,	42.692145
	West	-71.178635	-71.175273	-71.175708
YSI Meter	Salinity, ppt.	0.4	N/A	N/A
	Temperature, °C	14.2	N/A	N/A
	Conductivity, µS/cm	875	N/A	N/A
Field Test Kits (mg/L)	Ammonia	0.25	0.25	0.25
	Total Chlorine	0.00	0.00	0.00
	Surfactants	0.25	0.25	0.35
Bacteria (MPN/100mL)	E. coli	ND	16	6932
	Enterococcus	10	ND	135
PPCPs (ng/L)	Cotinine	0.76	1.9	4.6
	Acetaminophen	ND	ND	170
	Paraxanthine	ND	8.0	21
	Atenolol	ND	13	4.2
	Caffeine	ND	23	110
	Metoprolol	ND	11	3.5
	Diphenhydramine	ND	6.5	0.48
	Carbamazepine	0.95	3.7	1.5

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/Fecal Coliform: Red ≥ 10,000 col/100ml, Orange ≥ 1260 col/100ml, Yellow ≥ 410 col/100ml, Black < 410 col/100ml

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

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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.

VIII. Appendix

Appendix A: Photograph Log

IX. 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

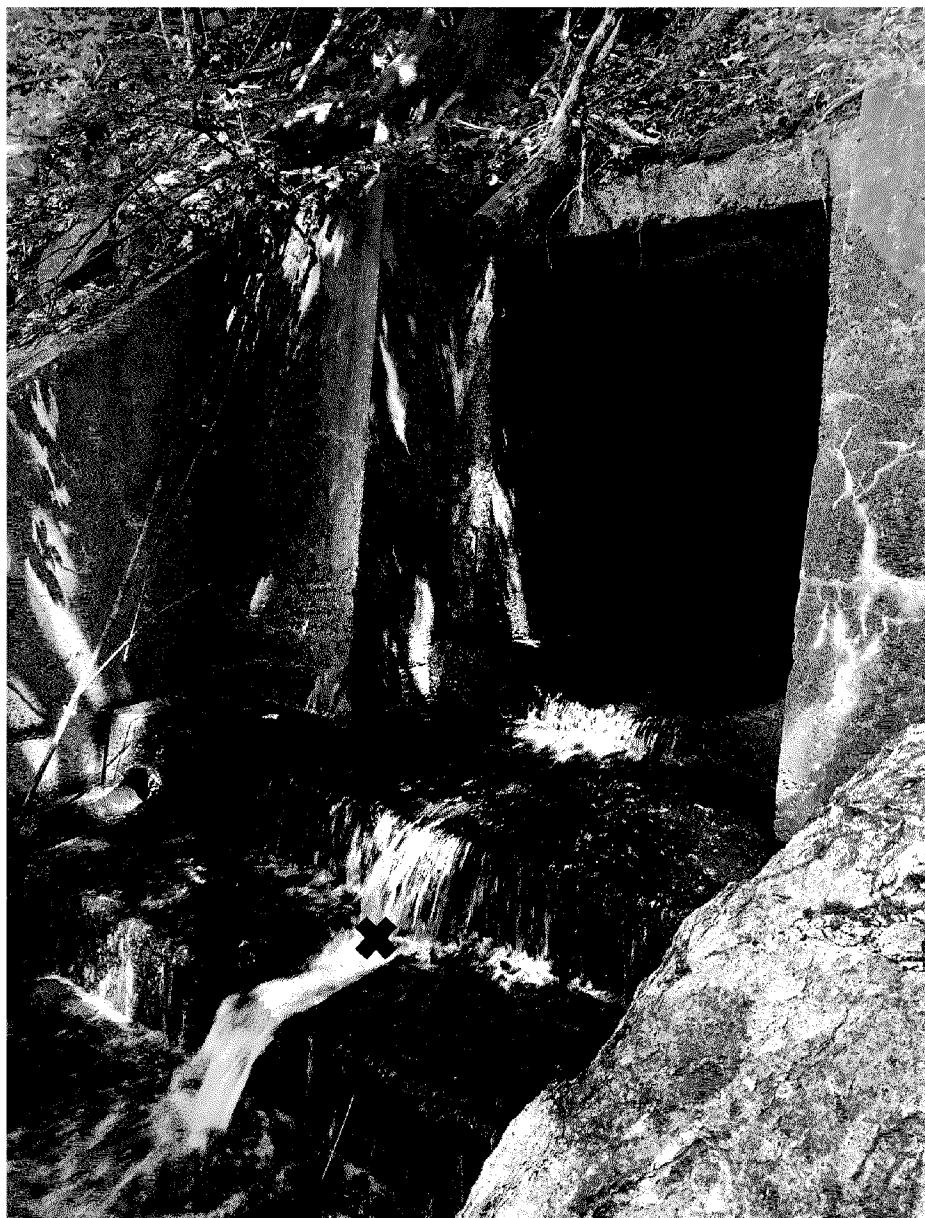
Photograph Log



Market01 (photo taken 05/24/22 at 09:05 AM) Outfall located near the eastern side of the parking lot at 1 Essex Dr into an unnamed stream into the Shawsheen River. Sample point is indicated by a red x.



Law02 (photo taken 05/24/22 at 09:35 AM) located at the north-west corner of sports field behind 165 Crawford St into the Shawsheen River. Sample point is indicated by a red x.



SPI07 (photo taken 05/24/22 at 10:52 AM), located near the southeastern side of the parking lot adjacent to 14 Vine St into the Spicket River. Sample point is indicated by a red x.



MM01 (photo taken 05/24/22 at 11:45 AM) located at southern western corner of the bridge located in the parking lot of 550 Broadway St into the Spicket River. Sample point is indicated by a red x.



Law05A (photo taken 05/24/22 at 12:40 PM) located at 1 Eaton Street, near the north-eastern side of the parking lot adjacent to the Merrimack River into the Merrimack River. Sample point is indicated by a red x.



Law05 (photo taken 05/24/22 at 12:55 PM) located at the left-hand side of the parking lot entrance to 1 Eaton St. into an unknown tributary. Sample point is indicated by a red x.

Attachment A
Laboratory Report for
Source Tracking Analysis

Author: LSASD Laboratory Services Branch
Pages: