



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Laboratory Services and Applied Science Division

11 Technology Drive

North Chelmsford, Massachusetts 01863-2431

Drafted Date: September 10, 2020

Finalized Date: October 5, 2020

Subject: Reconnaissance and Sampling Inspection Report
Clean Water Act
City of Nashua, NH

From: Michelle Coombs, Investigator \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: Solanch Pastrana-Del Valle, Inspector, ECAD-EWC
Elizabeth Kudarauskas, Inspector, ECAD-EWC

I. Permittee Information

- A. Facility Name: City of Nashua, NH
- B. Facility Location: 9 Riverside Street, Nashua, NH 03062
- C. Facility Contact: Lisa Fauteux, Director of Public Works, (603)589-3140,
fauteuxl@nashuanh.gov
- D. NPDES Permit ID: NHR041021 (MS4)

II. Background Information

- A. Date/Start time of recon inspection: August 18, 2020 @ 8:30 AM
- B. Weather conditions: Partly cloudy, ~70°F
- C. Date/Start time of sampling inspection: September 2, 2020 @ 8:30 AM
- D. Weather conditions: Overcast, light rain, ~60°F
- E. USEPA Representatives: Michelle Coombs and Shannon Brunelle (LSASD-FSB)
- F. State/Local Representatives: None
- G. Federally Enforceable Requirements Investigated:
Stormwater discharges and certain non-stormwater discharges from the City of Nashua, NH (the City) Municipal Separate Storm Sewer System (MS4) are authorized by the 2017 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 NHR041021.

H. 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 Inspections

The purpose of the reconnaissance inspection was to locate stormwater outfalls, combined sewer overflows (CSOs) and associated manholes, and/or catch basins which discharge into the Nashua River and Salmon 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 Nashua, NH Municipal MS4 that may adversely impact the water quality in the Nashua River and Salmon Brook. Samples were collected from nine (9) locations in accordance with the FSB Investigations Team Stormwater Program Plan. Sample sites were identified during a reconnaissance inspection conducted on August 18, 2020. None of the samples collected were from CSOs.

V. Permittee Details

The City of Nashua, NH occupies approximately 31.9 square miles in Hillsborough County, NH, approximately 35 miles south of Concord, NH. The City shares borders with the municipalities of Amherst, NH, Merrimack, NH, and Litchfield, NH to the north, Hudson, NH to the east, Tyngsboro, MA and Dunstable, MA to the south, and Hollis, NH to the west. According to the 2010 U.S. Census, the population of Nashua was 86,501. The City consists primarily of household residences with some downtown mixed use, as well as industrial areas. There are nine (9) combined sewer outfalls permitted to discharge into the receiving waters of the Merrimack and Nashua Rivers, in accordance with NPDES Permit No. NH0100170. For the scope of this inspection, Salmon Brook and Nashua River are listed as MS4 receiving waters in the City's Notice of Intent (NOI) for coverage under the permit.

VI. 8/18/2020 Reconnaissance Inspection Summary

On Tuesday, August 18, 2020, Inspector Coombs conducted a reconnaissance inspection of the City of Nashua, NH MS4. She was not accompanied by any city or state representatives. The inspection was unannounced.

The inspection started at approximately 8:30 AM. At the time of the inspection, the weather was partly cloudy and approximately 70°F. According to Weather Underground for the Boire Field Station (airport code: KASH), the last amount of recorded precipitation prior to the inspection was 0.21 inches on August 5, 2020.

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

VII. 9/2/2020 Sampling Inspection Summary

On Wednesday September 2, 2020, EPA employees Michelle Coombs and Shannon Brunelle (as a trainee) (“the EPA Inspection Team”) conducted a compliance sampling inspection of the MS4 within the City of Nashua, NH at the locations described in Section VIII. They were not accompanied by any city or state representatives. The inspection was unannounced.

The inspection started on Lund Street at Salmon Brook at approximately 08:30 AM. At the time of the inspection, the weather was overcast and lightly raining and approximately 60°F. According to Weather Underground for the Boire Field Station (airport code: KASH), the last amount of precipitation recorded prior to the inspection was 0.28 inches on August 18, 2020.

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 and recorded. Samples were collected from each outfall and delivered to and analyzed for E. coli and Enterococcus and Pharmaceutical and Personal Care Products (PPCPs) at the EPA New England Regional Laboratory (NERL) in North Chelmsford, MA. Table 1 below summarizes the sampling and analytical data.

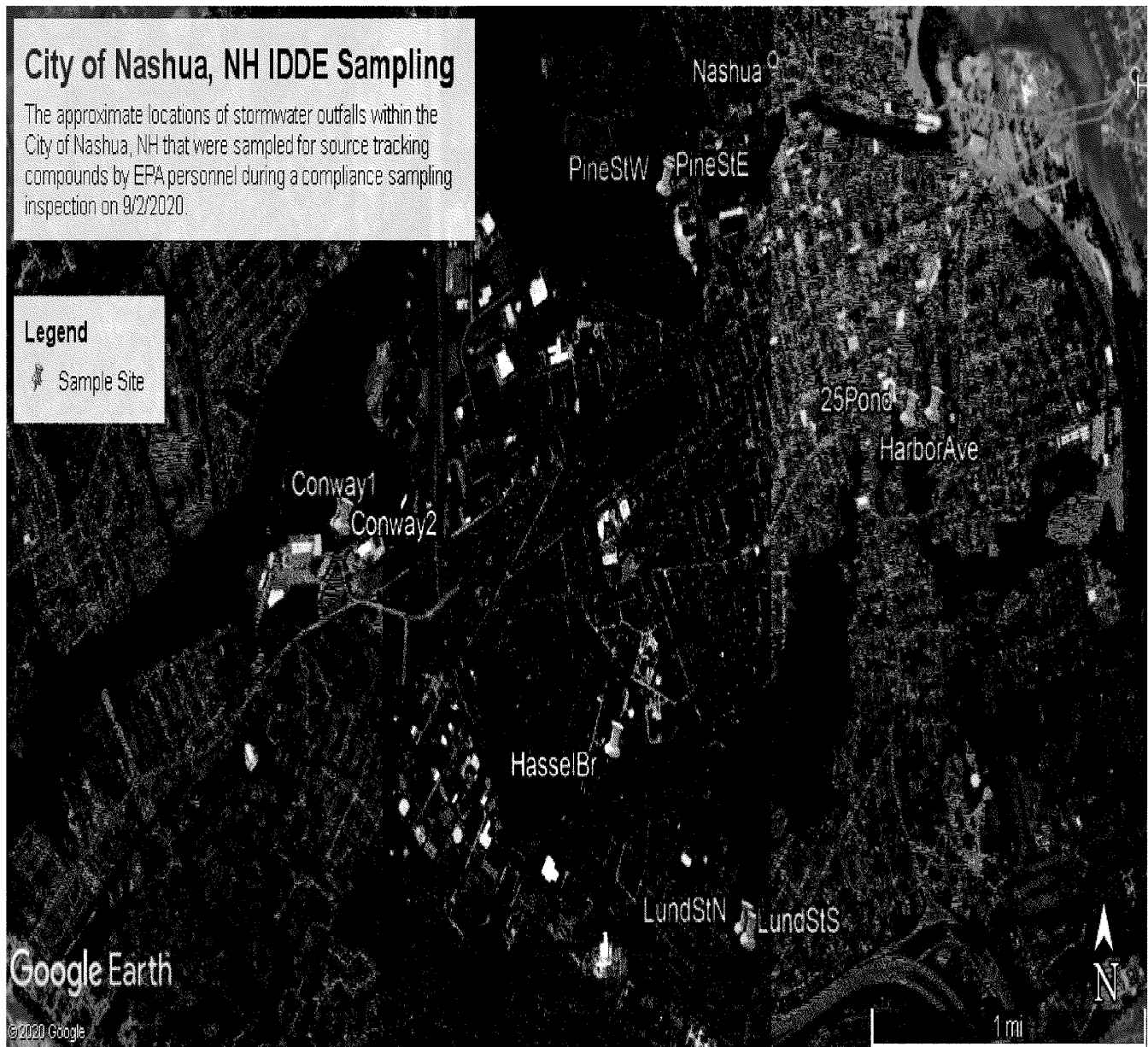
VIII. Description of 9/2/2020 Sampling Locations

Photographs depicting each sample location are included in Appendix A of this report, unless otherwise noted.

- **LundStS**: Elliptical concrete outfall approximately 48 inches across, with a circular pipe approximately 12 inches in diameter. Flow was approximately 5 gallons per minute (gpm). No odor was detected. White suds were visible in the pool downstream of the pipe. A dead mouse was observed in the pipe.
- **LundStN**: Circular outfall approximately 12 inches in diameter, located under the Lund Street bridge, on the east side of Salmon Brook. Flow was approximately 10-15 gpm. No odor was detected.
- **HassellBr**: A circular concrete outfall approximately 36 inches in diameter. Flow was approximately 20-25 gpm. No odor was detected. Long, green, algae growth was observed in the water line in the pipe. Some orange sediment along the east side of the bank was observed.

- **PineStW**: A circular concrete outfall approximately 36 inches in diameter. Flow was approximately 20 gpm. No odor was detected. Some brown suds were observed in the pool. Orange sediment was observed in the pipe and pool downstream.
- **PineStE**: A circular concrete outfall approximately 24 inches in diameter and located about 50 feet east of “PineStW”. Flow was approximately 3-5 gpm. No odor was detected. Some green algae visible in pipe. Some suds were observed in pool under rip rap. High flow could be heard upstream.
- **25Pond**: A black, circular, PVC pipe approximately 12 inches in diameter. Flow was approximately 10 gpm. No odor was detected. The pool was a slightly milky color. Some green algae growth was observed in the pipe. Some trash was observed downstream.
- **HarborAve**: A circular concrete outfall approximately 60 inches in diameter. Flow was approximately 5 gpm. Some suds were observed in pool downstream. Lots of trash was observed downstream. No odor was detected.
- **Conway2**: A circular concrete pipe approximately 12 inches in diameter. Flow was approximately 2-3 gpm. Green algae growth was observed in the pipe, and orange discoloration was observed on the rocks downstream. No photograph was captured at this location.
- **Conway1**: Elliptical concrete outfall approximately 36 inches across, with the circular pipe about 24 inches in diameter. Flow was approximately 1 gpm. A musty odor was detected. Dark gray scum was observed in the water line in the pipe. Significant orange sediment was observed on rocks in pool.

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 9/2/2020 Sampling and Analytical Data

Location	Site ID	LundStS	LundStN	HasselBr	PineStW	PineStE	25Pond	HarborAve	Conway2	DUP-01	Conway1
	Sample Date	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020	9/2/2020
	Sample Time	8:40	8:50	9:46	10:38	10:53	11:57	12:30	13:20	13:20	13:30
Coordinates (decimal degrees) ¹	North	42.735071	42.735409	42.741180	42.760083	42.760240	42.752140	42.752315	42.748555	42.748555	42.748612
	West	-71.470639	-71.471044	-71.480397	-71.476365	-71.476144	-71.458215	-71.456391	-71.500426	-71.500426	-71.500739
YSI Meter	Salinity, ppt	0.0	0.1	0.2	0.2	0.1	0.1	0.0	0.1	N/A	0.1
	Temperature, °C	19.1	18.7	18.7	20.4	18.9	21.3	20.0	20.2	N/A	19.2
	Conductivity, µS/cm	93.5	340	336.8	489	163	102.8	96.0	158.9	N/A	163.4
Field Test Kits (mg/L)	Ammonia	0.5	0.5	0.25	0.25	0.25	0.25	0.0	0.0	N/A	0.25
	Total Chlorine	0.02	0.02	0.03	0.04	0.08	0.19	0.21	0.07	N/A	0.04
	Surfactants		0.75			0.50				N/A	0.25
Bacteria (MPN/100mL)	E. coli	6,932	293	>9,678	109	1,302	944	1,164	6,932	N/A	6,212
	Enterococcus		399							N/A	
Pharmaceuticals and Personal Care Products (ng/L)	Cotinine	290	39	130		190	540	290	130	120	8.8
	Acetaminophen	200	14	290	41	290	750	190	230	220	4.5
	Paraxanthine	130	29	120	35	77	490	160	59	56	8.1
	Atenolol	96	ND	190	ND	100	510	98	110	110	ND
	Caffeine	3,800	150	2,900	300	2,500			1,800	1,700	65
	Metoprolol	85	ND	160	ND	89	500	83	82	87	ND
	Diphenhydramine	ND	0.54	ND	ND	ND	ND	ND	ND	ND	ND
	Carbamazepine	17	ND	32	2.3	18	94	20	17	18	ND

Abbreviations and Notes:

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

N/A: Not Analyzed

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 Level (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 for 9/2/2020 Sampling Inspection

X. Attachments

Attachment A: Laboratory Report for Pharmaceuticals and Personal Care Products (Source Tracking) Analysis

Attachment B: Laboratory Report for E. coli Analysis

Attachment C: Laboratory Report for Enterococcus Analysis

Appendix A

Photograph Log



LundStS: Outfall flowing south into Salmon Brook. Note suds in pool in the lower left of photo. Location of dead mouse is indicated by a red circle.



LundStN: Outfall flowing east into Salmon Brook from the northwest side of Lund Street. Flow direction of Salmon Brook is indicated by the red arrow.



HasselBr: Outfall flowing south into Hassells Brook from under the street. Note the orange sediment on the bank in the lower right of the photo.



PineStW: Outfall flowing north into the Nashua River. Note the orange sediment in the pipe (red arrow) and the brown suds in the pool (yellow arrow).



PineStE: Outfall flowing north into the Nashua River. Note the green algae growth in pipe.



25Pond: Outfall flowing southwest into Salmon Brook. Note the green algae growth in the pipe.



HarborAve: Outfall flowing west into Salmon Brook. Note the trash downstream of the outfall.



Conway1: Outfall flowing north into Mill Pond. Note the gray scum in pipe.



Conway1(2): A second photograph of the Conway1 outfall, looking downstream into pool (outfall immediately out of frame in the lower right of photo). Note the significant orange staining of the rocks and sediment. Flow direction into Mill Pond is indicated by a red arrow.

Attachment A
Laboratory Report for
Source Tracking Analysis

Author: Laboratory Services Branch
Pages: 17

Laboratory Report

September 23, 2020

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 20090005
Project: MS4 Nashua, NH
Analysis: HPLC/MS/MS Source Tracking Analysis
EPA Chemist: Peter Philbrook

Date Samples Received by the Laboratory: 09/02/2020

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,

20090005\$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.

20090005\$STA

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	LundStS	Lab Sample ID:	AB87712
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/14/2020	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	10
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	290	10	4.0	
103-90-2	Acetaminophen	200	10	20	
611-59-6	Paraxanthine	130	10	20	
29122-68-7	Atenolol	96	10	20	
58-08-2	Caffeine	3800	10	40	
56392-17-7	Metoprolol	85	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	17	10	4.0	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	103	59 - 137
Diphenhydramine-D3	77	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	LundStN	Lab Sample ID:	AB87713
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	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	39	1	0.40	
103-90-2	Acetaminophen	14	1	2.0	J
611-59-6	Paraxanthine	29	1	2.0	J
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	150	1	4.0	
56392-17-7	Metoprolol	ND	1	2.0	
58-73-1	Diphenhydramine	0.54	1	0.40	
298-46-4	Carbamazepine	ND	1	0.40	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	103	59 - 137
Diphenhydramine-D3	94	19 - 135

Comments: J = Estimated value - The internal standard recovery for acetaminophen was below QC criteria at 42% recovery. 50%-150% is the acceptable range. Both acetaminophen and paraxanthine values are estimated as they both use acetaminophen as the IS. Low internal standard recovery is due to matrix effects.

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	HasselBr	Lab Sample ID:	AB87714
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	10
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	130	10	4.0	
103-90-2	Acetaminophen	290	10	20	
611-59-6	Paraxanthine	120	10	20	
29122-68-7	Atenolol	190	10	20	
58-08-2	Caffeine	2900	10	40	
56392-17-7	Metoprolol	160	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	32	10	4.0	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	128	59 - 137
Diphenhydramine-D3	88	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	PineStW	Lab Sample ID:	AB87715
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	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	59	1	0.40	
103-90-2	Acetaminophen	41	1	2.0	
611-59-6	Paraxanthine	35	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	300	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	133	59 - 137
Diphenhydramine-D3	87	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	PineStE	Lab Sample ID:	AB87716
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	10
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	190	10	4.0	
103-90-2	Acetaminophen	290	10	20	
611-59-6	Paraxanthine	77	10	20	
29122-68-7	Atenolol	100	10	20	
58-08-2	Caffeine	2500	10	40	
56392-17-7	Metoprolol	89	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	18	10	4.0	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	117	59 - 137
Diphenhydramine-D3	82	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	25 Pond	Lab Sample ID:	AB87717
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	50
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	540	50	20	
103-90-2	Acetaminophen	750	50	100	
611-59-6	Paraxanthine	490	50	100	
29122-68-7	Atenolol	510	50	100	
58-08-2	Caffeine	25000	50	200	
56392-17-7	Metoprolol	500	50	100	
58-73-1	Diphenhydramine	ND	50	20	
298-46-4	Carbamazepine	94	50	20	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	99	59 - 137
Diphenhydramine-D3	84	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: Harbor Ave
Date of Collection: 9/02/2020
Date of Preparation: 9/03/2020
Date of Analysis: 9/10/2020
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB87718
Matrix: Stormwater
Amount Prepared: 500 mL
Percent Solids: N/A
Extract Dilution: 10
pH: N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	290	10	4.0	
103-90-2	Acetaminophen	190	10	20	
611-59-6	Paraxanthine	160	10	20	
29122-68-7	Atenolol	98	10	20	
58-08-2	Caffeine	4900	10	40	
56392-17-7	Metoprolol	83	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	20	10	4.0	

Surrogate Compounds

Recoveries (%)

QC Ranges

Phentermine-D5

142

59 - 137

Diphenhydramine-D3

88

19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID: Conway 2
Date of Collection: 9/02/2020
Date of Preparation: 9/03/2020
Date of Analysis: 9/10/2020
Dry Weight Prepared: N/A
Wet Weight Prepared: N/A

Lab Sample ID: AB87719
Matrix: Stormwater
Amount Prepared: 500 mL
Percent Solids: N/A
Extract Dilution: 10
pH: N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	130	10	4.0	
103-90-2	Acetaminophen	230	10	20	
611-59-6	Paraxanthine	59	10	20	
29122-68-7	Atenolol	110	10	20	
58-08-2	Caffeine	1800	10	40	
56392-17-7	Metoprolol	82	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	17	10	4.0	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	139	59 - 137
Diphenhydramine-D3	93	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	DUP-1	Lab Sample ID:	AB87720
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	10
Wet Weight Prepared:	N/A	pH:	N/A

CAS Number	Compound	Concentration ng/L	Dilution	RL ng/L	Qualifier
486-56-6	Cotinine	120	10	4.0	
103-90-2	Acetaminophen	220	10	20	
611-59-6	Paraxanthine	56	10	20	
29122-68-7	Atenolol	110	10	20	
58-08-2	Caffeine	1700	10	40	
56392-17-7	Metoprolol	87	10	20	
58-73-1	Diphenhydramine	ND	10	4.0	
298-46-4	Carbamazepine	18	10	4.0	

Surrogate Compounds	Recoveries (%)	QC Ranges
Phentermine-D5	117	59 - 137
Diphenhydramine-D3	80	19 - 135

Comments:

MS4 Nashua, NH

HPLC/MS/MS Source Tracking Analysis

Client Sample ID:	Conway 1	Lab Sample ID:	AB87721
Date of Collection:	9/02/2020	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	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	8.8	1	0.40	
103-90-2	Acetaminophen	4.5	1	2.0	
611-59-6	Paraxanthine	8.1	1	2.0	
29122-68-7	Atenolol	ND	1	2.0	
58-08-2	Caffeine	65	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	128	59 - 137
Diphenhydramine-D3	93	19 - 135

Comments:

MS4 Nashua, NH

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Stormwater
Date of Preparation:	9/03/2020	Amount Prepared:	500 mL
Date of Analysis:	9/10/2020	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

66

59 - 137

Diphenhydramine-D3

44

19 - 135

Comments:

MS4 Nashua, NH

MATRIX SPIKE (MS) RECOVERY

Sample ID: AB87713

PARAMETER	SPIKE ADDED ng/L	SAMPLE CONCENTRATION ng/L	MS CONCENTRATION ng/L	MS % REC	QC LIMITS (% REC)
Acetaminophen	120	14.0	101	73	61 - 100
Atenolol	120	ND	159	132	59 - 122
Caffeine	240	150	298	62	54 - 128
Carbamazepine	24.0	ND	17.3	72	61 - 120
Cotinine	24.0	39.0	52.4	56	48 - 124
Diphenhydramine	24.0	0.54	13.8	55	30 - 130
Metoprolol	120	ND	99.7	83	59 - 128
Paraxanthine	120	29.0	195	138	42 - 125

MS4 Nashua, NH

Laboratory Duplicate Results

Sample ID: AB87721

PARAMETER	SAMPLE RESULT ng/L	SAMPLE DUPLICATE RESULT ng/L	PRECISION RPD %	QC LIMITS
Acetaminophen	4.5	4.25	5.7	50
Atenolol	ND	ND	NC	50
Caffeine	65.0	62.1	4.6	50
Carbamazepine	ND	ND	NC	50
Cotinine	8.8	8.57	2.7	50
Diphenhydramine	ND	ND	NC	50
Metoprolol	ND	ND	NC	50
Paraxanthine	8.1	7.20	12	50

MS4 Nashua, NH

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ng/L	LFB RESULT ng/L	LFB RECOVERY %	QC LIMITS %
Acetaminophen	120	87.6	73	53 - 105
Atenolol	120	82.6	69	62 - 117
Caffeine	240	187	78	50 - 127
Carbamazepine	24	19.5	81	28 - 126
Cotinine	24	14.4	60	52 - 134
Diphenhydramine	24	13.0	54	30 - 130
Metoprolol	120	100	83	33 - 139
Paraxanthine	120	71.3	59	61 - 113

Comments:

Samples in Batch: AB87712, AB87713, AB87714, AB87715, AB87716, AB87717, AB87718, AB87719, AB87720, AB87721



REGION 1

Page 17 of 17

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS		REMARKS													
SAMPLERS: (Signature)																			
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION														
20090005	Nashua, NH MS4- Nashua, NH																		
SAMPLERS: (Signature)																			
Michael Combs																			
9/2	0840		X		LundStS	1	X												
9/2	0850		X		LundStN	1	X												
9/2	0946		X		HasselBr	1	X												
9/2	1038		X		PineStW	1	X												
9/2	1053		X		PineStE	1	X												
9/2	1157		X		25Pond	1	X												
9/2	1230		X		HarborAve	1	X												
9/2	1320		X		Conway2	1	X												
9/2	1320		X		DUP-1	1	X												
9/2	1330		X		Conway1	1	X												
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)									
Michael Combs		9/2/2020 14:50																	
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											
		9/2/2020 14:50		ESAT		9/2/2020 14:50		20090005 \$STA											

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

40C

1- 20727

ED_019088A_00004625-00035

Attachment B
Laboratory Report for
E. coli Analysis

Author: 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

September 25, 2020

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 20090006
Project: MS4 Nashua, NH
Analysis: E. Coli Defined Substrate
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/02/2020

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA LSASD 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

20090006ECMM

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

20090006ECMM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 - NEW ENGLAND
LABORATORY SERVICES BRANCH
MS4 Nashua, NH

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
LundStS	AB87722	09/02/20	8:40 am	09/02/20	3:50 pm	E. Coli Defined Substrate	6932	4	
LundStN	AB87723	09/02/20	8:50 am	09/02/20	3:50 pm	E. Coli Defined Substrate	293	4	
HasselBr	AB87724	09/02/20	9:46 am	09/02/20	3:50 pm	E. Coli Defined Substrate	>9678	4	
PineStW	AB87725	09/02/20	10:38 am	09/02/20	3:50 pm	E. Coli Defined Substrate	109	4	
PineStE	AB87726	09/02/20	10:53 am	09/02/20	3:50 pm	E. Coli Defined Substrate	1302	4	
25 Pond	AB87727	09/02/20	11:57 am	09/02/20	3:50 pm	E. Coli Defined Substrate	944	4	
Harbor Ave	AB87728	09/02/20	12:30 pm	09/02/20	3:50 pm	E. Coli Defined Substrate	1164	4	
Conway 2	AB87729	09/02/20	1:20 pm	09/02/20	3:50 pm	E. Coli Defined Substrate	6932	4	
Conway 1	AB87730	09/02/20	1:30 pm	09/02/20	3:50 pm	E. Coli Defined Substrate	6212	4	

Number of Samples: 9

REGION 1

CHAIN OF CUSTODY RECORD

[illegible]

Attachment C
Laboratory Report for
Enterococcus Analysis

Author: 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

September 25, 2020

Michelle Coombs - LFSB
US EPA New England R1

Project Number: 20090006
Project: MS4 Nashua, NH
Analysis: Enterococcus in Water
Analyst: Jack Paar

Date Samples Received by the Laboratory: 09/02/2020

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA LSASD 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

20090006ENTERO

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

20090006ENTERO

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

Matrix: Stormwater

Sample Number	Lab ID	Date of Collection		Date of Analysis		Compound	Concentration MPN/100mL	RL MPN/100mL	Qualifier
LundStS	AB87722	09/02/20	8:40 am	09/02/20	3:50 pm	Enterococcus in Water	24196	10	
LundStN	AB87723	09/02/20	8:50 am	09/02/20	3:50 pm	Enterococcus in Water	399	10	
HasselBr	AB87724	09/02/20	9:46 am	09/02/20	3:50 pm	Enterococcus in Water	17329	10	
PineStW	AB87725	09/02/20	10:38 am	09/02/20	3:50 pm	Enterococcus in Water	1670	10	
PineStE	AB87726	09/02/20	10:53 am	09/02/20	3:50 pm	Enterococcus in Water	2143	10	
25 Pond	AB87727	09/02/20	11:57 am	09/02/20	3:50 pm	Enterococcus in Water	2723	10	
Harbor Ave	AB87728	09/02/20	12:30 pm	09/02/20	3:50 pm	Enterococcus in Water	7701	10	
Conway 2	AB87729	09/02/20	1:20 pm	09/02/20	3:50 pm	Enterococcus in Water	7270	10	
Conway 1	AB87730	09/02/20	1:30 pm	09/02/20	3:50 pm	Enterococcus in Water	5475	10	

Number of Samples: 9



REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS		REMARKS						
20090006		Nashua, NH MSH - Nashua, NH										
SAMPLERS (Signature) Michelle Coombs												
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
1	9/2	0840	X		Lund St S	1	X	X				
2	9/2	0850	X		Lund St N	1	X	X				
3	9/2	0946	X		Hassel Br	1	X	X				
4	9/2	1038	X		Pine St W	1	X	X				
5	9/2	1053	X		Pine St E	1	X	X				
6	9/2	1157	X		25 Pond	1	X	X				
7	9/2	1230	X		Harbor Ave	1	X	X				
8	9/2	1320	X		Conway 2	1	X	X				
9	9/2	1330	X		Conway 1	1	X	X				
Relinquished by: (Signature) M. Coombs		Date / Time 9/2/2020 14:33		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (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 9/7/2020 14:33		Remarks lims only no sample trans.				

1- 20726

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